POLITICS OF IRAN-PAKISTAN-INDIA PIPELINE PROJECT

Thesis Submitted to Jawaharlal Nehru University

for the award of the Degree of

DOCTOR OF PHILOSOPHY

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2017

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DECLARATION

This is to certify that the thesis entitled **Politics of Iran-Pakistan-India Pipeline Project** submitted by me in partial fulfilment of the requirements for the award of the degree of **DOCTOR OF PHILOSOPHY** is my own work and has not been previously submitted for the award of any other degree of this or any other university.

Vandana K

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CERTIFICATE

We recommend that this dissertation be placed before the examiners for evaluation.

Professor A.K. Mohapatra
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Acknowledgement

I wish to express my deepest gratitude to my supervisor, Professor P.R. Kumaraswamy for his constant support, guidance and encouragement despite my several shortcomings. During thesis period, I got all supports from him whatever I needed in my writing. His constructive critiques and illuminating suggestions have greatly contributed to enrich my study.

I am grateful to all my teachers who constantly helped me to widen my views on the research topic.

I am thankful to the staff of JNU Central Library, IDSA and CWAS for helping me in finishing my research work.

I would like to thank my son who sacrificed his crucial time throughout my thesis work which he wanted to spend with me, for my husband for his motivation and countless hours to read and critique my research work. I would also like to thank my parents who have eased the way of my thesis work by their blessings and moral supports and continuous encouragement. I would like to thank to my mother and father-in-laws for their blessings and brother and brother-in-laws as well as sister and sister-in-laws for their moral and academic supports.

I am also thankful to CWAS family especially Bhist ji, Raj Kumar ji and my dear friend Ayem Pongen. Last but not least, I would also like to thank to my all friends for their sincere support and encouragement in my most needed time which helped me to successfully complete this work.

VANDANA KUMARI

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List of Abbreviations

API	American Petroleum Institute
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APM	Administrative Price Mechanism
BCM	Billion Cubic Metres
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BP	British Petroleum
BTC	Baku-Tbilisi-Ceyhan
CAGR	Compound Annual Growth Rate
CIS	Commonwealth of Independent States
CISADA	Comprehensive Iran Sanctions, Accountability, and Divestment Act
CPEC	China-Pakistan Economic Corridor
ECT	Energy Charter Treaty
EIA	Energy Information Administration
EOR	Enhanced Oil Recovery
EU	European Union
FDI	Foreign Direct Investment
GAIL	Gas Authority India Limited
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IEEPA	International Emergency Economic Powers Act

ILSA	Iran and Libya Sanctions Act, 1996
IOCL	Indian Oil Corporation Limited
IOI	Iran-Oman-India
IPC	Iran Petroleum Contract
IPI	Iran-Pakistan-India Pipeline
IRGC	Iranian Revolutionary Guard Corps
ISA	Iran Sanction Act
JWG	Joint Working Group
MBI	Myanmar-Bangladesh-India
MEA	Ministry of External Affairs (India)
MMBTU	Million British Thermal Unit
MMSCMD	Million Standard Cubic Metres per Day
MNCs	Multinational Oil Companies
MP&NG	Ministry of Petroleum and Natural Gas
MTPA	Million Tonnes per Annum
NDAA	National Defence Authorization Act
NELP	New Exploration Licensing policy
NIGEC	National Iranian Gas Export Company
NIOC	National Iranian Oil Company
NOCs	National Oil Companies
OAPE	Organisation of Arab Petroleum Exporting Countries
OPEC	Organisation of Petroleum Exporting Countries
OVL	ONGC Videsh Limited

RIL	Reliance Industries Limited
SJWG	Special Joint Working Group
TAPI	Turkmenistan-Afghanistan-Pakistan-India
TCF	Trillion Cubic Feet
US	United States of America
WTO	World Trade Organisation

Contents

Chapter-1

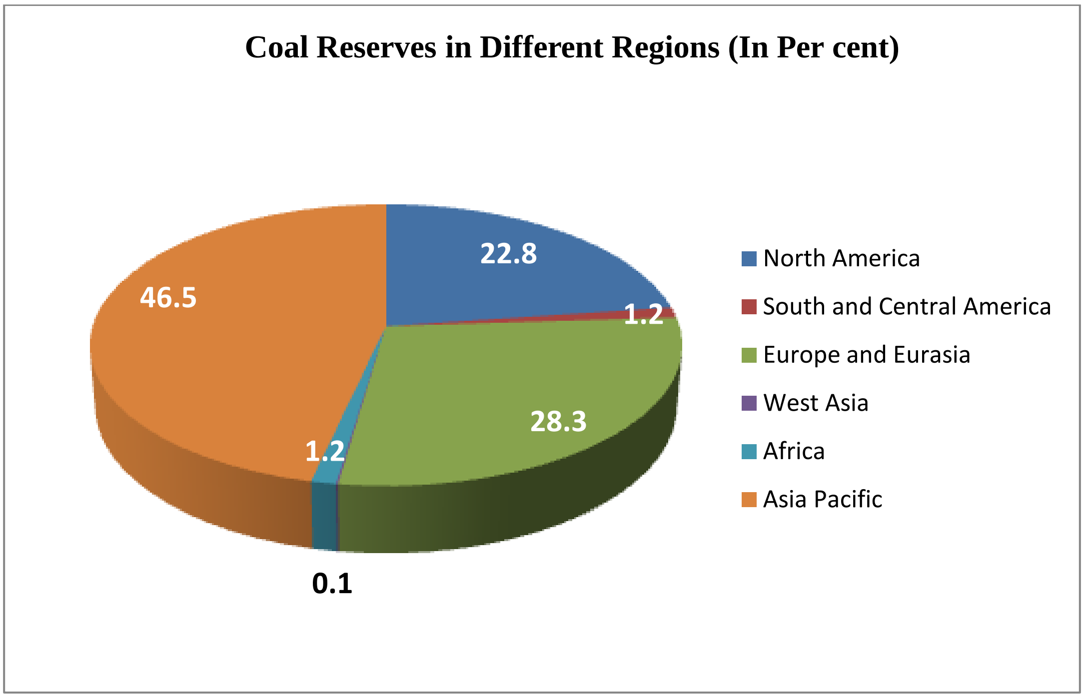
Introduction

Energy has been an integral part of human development and economic progress. Each and every country aspires to become technologically advanced and wants to have sufficient amount of energy for its sustainable development. Energy has also been fundamental needs of human being since its existence. In terms of primary energy resource, oil, natural gas, coal, nuclear energy, hydro-electricity and renewable energy like solar, wind etc. are used in meeting global energy demands which had the share of 33.28 per cent, 24.13 per cent, 28.11 per cent, 4.46 per cent, 6.86 per cent and 3.16 per cent respectively in 2016 [British Petroleum (BP), 2017].

In ancient times, human beings were mostly dependent on bio-fuels like wood, dung and charcoal for heating and cooking. In the mid 18th century the choice shifted from bio-fuel to fossil fuel (non-renewable in nature) especially in the form of kerosene for lightening. This was cheaper than other available bio-fuels like whale oil which had been in use for lightening. However, the industrialisation of European countries particularly Britain during 18th and 19th centuries changed the energy matrix. The coal, another kind of fossil fuel, emerged as a key element for industrialisation process. As a result, the economic value of coal increased. However, the region particularly Britain, had large reserves of coal (Fernihough and Rourke, 2014) hence was not compelled to look to other regions for coal supply. Consequently, security of coal supply was not an issue for the industrialising countries.

Geographically, the coal reserves has been more diversified compared to other fossil fuels, namely oil and natural gas, and are found in almost all regions of the world. The **Graph-1.1** displays the reserves of coal in different regions.

Graph-1.1



Source- (BP, 2017)

The largest coal reserves are located in the Asia Pacific region. According to the latest data, this region had 46.5 percent of coal reserves in 2016 and is followed by Europe and Eurasia, North America, Africa, South and Central America and West Asia with 28.3 per cent, 22.8 per cent, 1.2 per cent, 1.2 per cent and 0.1 per cent respectively (BP, 2017). The data shows that the coal reserves are mostly in those parts of the world economy (Europe and Eurasia, the US and Asia Pacific) where its demands are more. Hence, the security of coal supply did not attract much attention as oil did after 1973 when energy security became a global agenda.

The genesis of the energy security can be traced to 1915. The concept of 'energy security', a substitute slogan for 'energy independence' which was coined by President Richard Nixon of the United States in 1974, originates from Winston Churchill's comment in 1915 when he said, "Safety and Certainty in oil lie in variety and variety alone". The statement was based on the facts when British took the decision in 1912 to fuel its naval fleet with oil from the West Asian region. The shift of fuel from coal which came from Welsh to oil from West Asia increased the British dependence on others. However, 'Energy Security' got global attention only in 1973 after the oil crisis which resulted due to the Arab-Israel war.

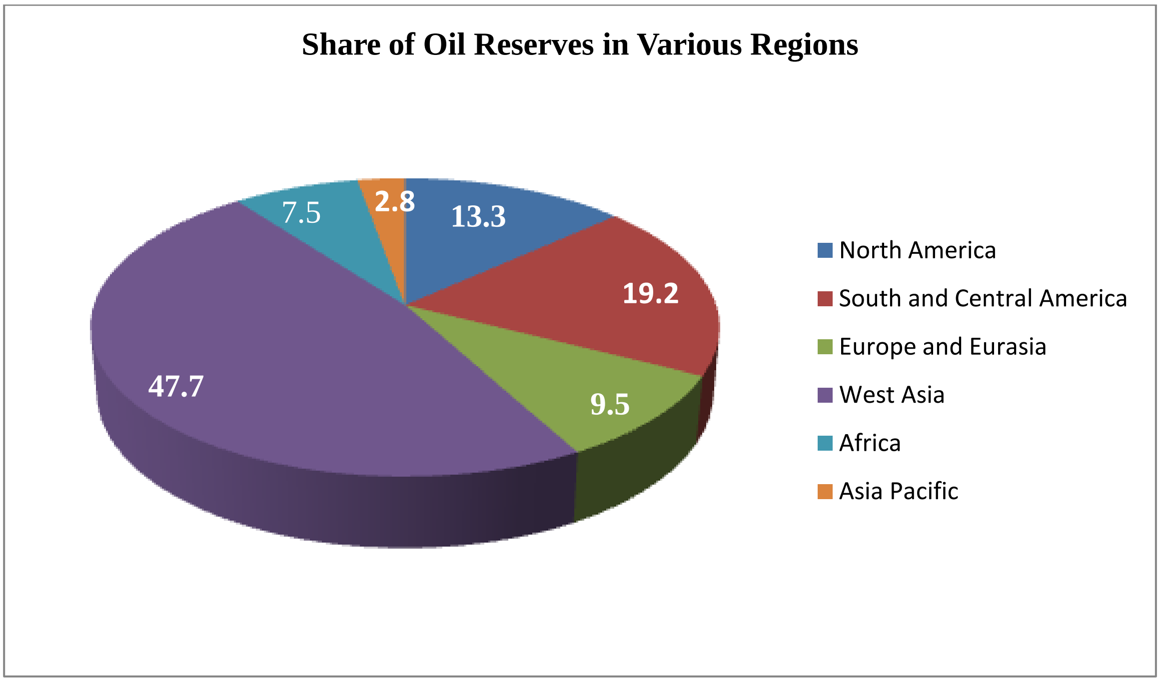
During the Arab-Israel war in October 1973, the United States (US) and other Western countries supported Israel. Nonetheless, these countries were highly dependent on the West Asian oil, particularly on the Arab countries. As a retaliation to their supports to Israel, the Organisation of Arab Petroleum Exporting Countries (OAPEC) embargoed oil supplies to these Western countries. This disrupted not only their oil supplies but also increased the global oil prices and exposed the oil supply vulnerabilities of these countries. The oil price increased from US$3.05 per barrel in 1973 to US$10.73 per barrel in 1974 (Organisation of Petroleum Exporting Countries (OPEC), 2008). Simultaneously, these periods also experienced the nationalisation of oil and gas assets in many host countries or their increasing say over it, such as Saudi Arabia, Venezuela etc.

Earlier, the oil Industry had been mostly under the control of multinational oil companies (MNCs) who had been managing and operating oil industry in an integrated framework and "the price of crude oil was determined in an oligopolistic market arrangement, under which a 'posted price' was established, with royalties and taxes paid to host governments on the basis of this price" (Okogu, 2003).

Amid the enhancing influence of the state in oil industry and its use as a means for political and strategic gains by oil exporting countries further deepened the concern of this issue. As a result, it has become an important agenda for most of the countries of the world since 1973. In 'Energy Security', 'energy' refers to 'fuel and other sources of power used for operating machinery, etc.' while 'security' indicates 'measures taken to guarantee the safety of a thing of value, etc'. In this sense, energy security is the certainty in the supply of sources of power.

For long, it was the oil which remained the focus of energy security. While the demand for oil is universal, all countries are not endowed with oil resources. The West Asia has the largest oil reserves. The region contained 58.9 per cent in 1995, 55.0 per cent in 2005 and 47.7 per cent in 2016 of oil reserves (BP, 1996; BP, 2006; BP, 2017). The other regions do have the reserves but they lag behind the West Asian region by a great margin; in 2016, North America, South and Central America, Europe and Eurasia, Africa and Asia Pacific had 13.3 per cent, 19.2 per cent, 9.5 per cent, 7.5 per cent and 2.8 per cent respectively of the total oil reserves. The **Graph-1.2** illustrates the status of the various regions in respect of oil reserves.

Graph-1.2



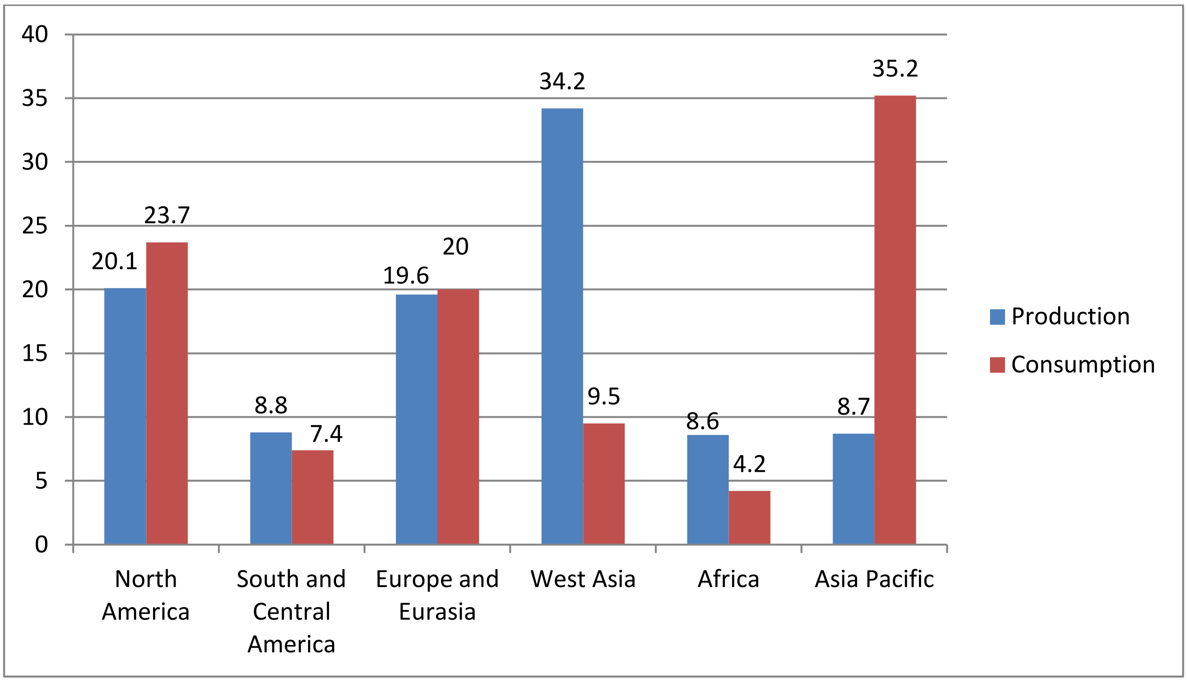
Sources-(BP, 2017)

There has also been asymmetric relationship between production and consumption of oil which is apparent from the **Graph 1.3.**

For long, it was oil which was the focus of energy security debates and gradually began to include natural gas which is increasingly traded internationally and is a key to power generation. The growing concern over global warming encouraged many countries to go for environment friendly energy resources and the natural gas is considered as a cleanest fossil fuel resource. The West Asia region also continued to have the largest reserves of the natural gas. In 1995, it had 37.78 per cent of global gas reserves while in 2005 and in 2016, it was 46.15 per cent and 42.5 per cent respectively. The other regions such as North America, South and Central America, Europe and Eurasia, Africa and Asia Pacific have 6.0 per cent, 4.1 per cent, 30.4 per cent, 7.6 per cent and 9.4 per cent respectively of the global natural gas reserves in 2016 (BP, 2016). The **Graph-1.4** shows the share of various regions in terms of gas reserves.

Graph-1.3

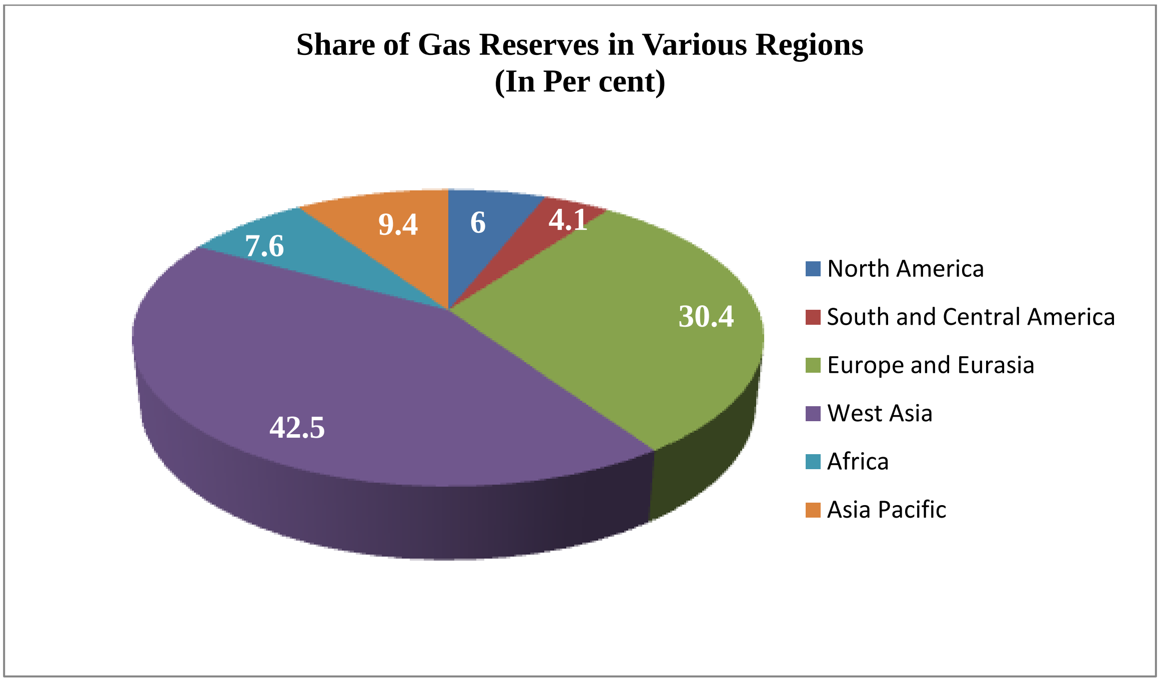
Share of Oil Production and Consumption by Region in 2016



Sources-(BP, 2017)

Graph-1.3 shows that Asia Pacific region was largely dependent on other regions for its oil supply while West Asia has the surplus production.

Graph-1.4

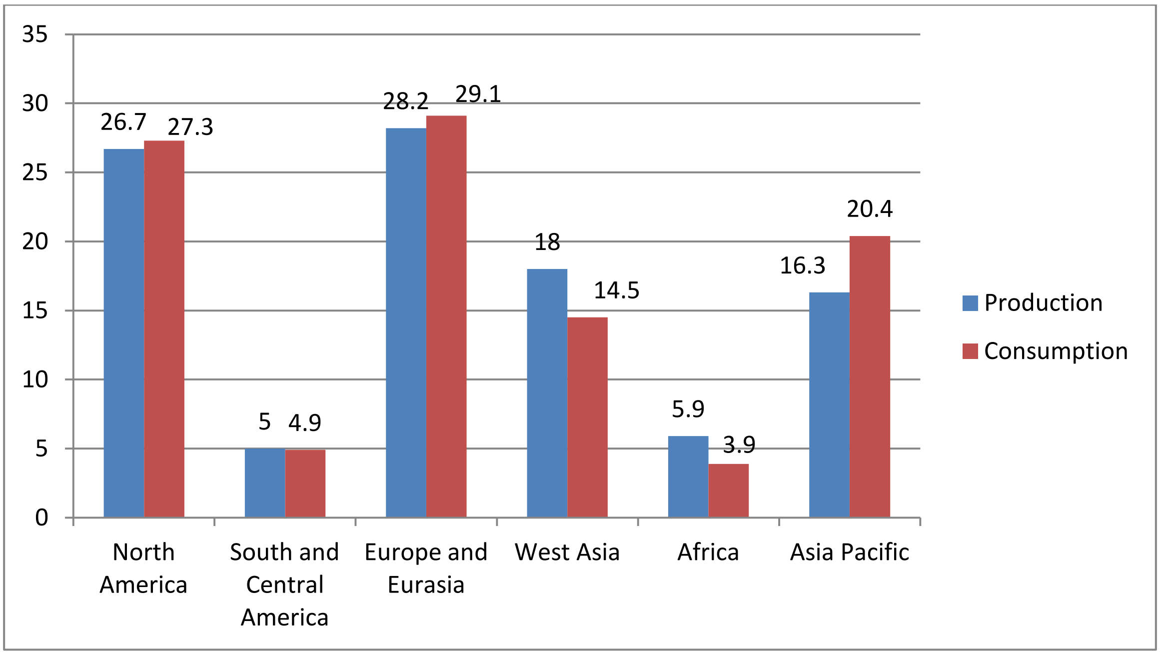


Sources-(BP, 2017)

In the 20th and 21st centuries, the oil and natural gas became the primary requirement for the economic development and their demand is universal. Moreover, the larger demand is coming particularly from the haves-not. This is also evident from the regional natural gas production and consumption shown in **Graph-1.5**

Graph-1.5

Share of Natural Gas Production and Consumption by Region (in Per cent)



Sources-(BP, 2017)

In 2016, the natural gas production by West Asia was 637.8 billion cubic metres (bcm) while consumption was 512.3 bcm or an export capacity of approximately 125.5 bcm of natural gas. On the other side, the rising demands of this fuel in Asia Pacific led to demand-supply gap. The region produced 579.9 bcm of natural gas while the demands were 722.5 bcm in the same year or the region lacked almost 142.6 bcm of its total demands (BP, 2017). The demand-supply asymmetry in oil and natural gas has intensified the apprehension of energy security.

For the energy importing countries, the issue of energy security becomes more important because of the positive linkages between economic growth and energy consumption while the major oil and gas suppliers are in unstable regions in the West Asia and Africa. The geopolitical uncertainty aggravates the fears of a possible supply disruption and volatility in oil prices. The limited investment in the upstream sector of oil and gas resources due to slow market reforms adversely affects the prospective oil and gas production. Apart from above all, there are few or no viable energy alternatives to oil and gas as well as of the West Asian region, as the major supplier of these two energy resources (Madan, 2006).

To address the concern of security of energy supplies, many countries and institutions have defined the concept of ‘energy security’. International Energy Agency (IEA) has given a broader definition from the perspective of energy importers which was established in 1974 by energy importing countries mainly the members of Organisation for Economic Co-operation and Development (OECD). Established as an international energy forum in the wake of 1973-74 oil crisis, it aims to help its members respond to major oil supply disruptions. According to the Agency, energy security is as “the uninterrupted availability of energy sources at an affordable price” (International Energy Agency, 2015). By analysing the long-term and short-term energy security, it observed:

> Long-term energy security mainly deals with timely investments to supply energy in line with economic developments and sustainable environmental needs. Short-term energy security focuses on the ability of the energy system to react promptly to sudden changes within the supply-demand balance. Lack of energy security is thus linked to the negative economic and social impacts of either physical unavailability of energy, or prices that are not competitive or are overly volatile” (International Energy Agency, 2015).

Nevertheless, with the passage of time, concerns over energy security have not been confined to the energy importers only but the energy-endowed countries are also exposed to the energy vulnerabilities as an exporter and energy security concern became one of the significant agenda for them.

In the changing global energy scenario, the oil producers outside the OPEC have also started to influence the energy market dominated by the OPEC since 1973 the oil crisis. In 1979, out of 1,664.98 million tonnes per year of crude oil exports, OPEC exported 1,318.57 million tonnes per year or almost a share of 79.2 per cent (OPEC, 1999). The technological development in the exploration, extraction and production of oil led the emergence of many oil producers and exporters which enhanced the competition between oil exporters for their market share. It is evident as OPEC exported 25,013.9 million tonnes out of world’s 44,175.0 million tonnes in 2016, but its share decreased to 56.6 per cent (OPEC, 2017a). Therefore, "any disruption that threatens the stability of energy demand, production and prices as well as the conservation of energy resources is a challenge to the economic security" of the energy-endowed exporting countries (Arcas and Gosh, 2014: p-115). The issue becomes more important for the energy exporter as the major share of their gross domestic product (GDP) is constituted by the earnings from the oil exports. **Table-1.1** illustrates the contribution of oil revenue in the GDP of OPEC's major oil exporting countries.

Table-1.1

Share of Petroleum Exports in GDP

(In Per cent)

Year	Iran	Iraq	Kuwait	Nigeria	Saudi Arabia
2001	15.76	67.99	22.97	26.19	17.04
2010	17.23	38.89	49.70	29.11	48.10
2012	17.27	43.15	62.35	20.72	45.85
2013	12.10	38.08	61.74	17.58	43.11
2014	12.61	36.89	57.97	14.69	37.62
2015	6.94	27.43	42.47	8.66	23.46
2016	10.03	26.31	37.50	6.94	21.00

Sources- (OPEC, 2008; OPEC, 2012; OPEC, 2017)

Table-1.1 shows that the oil earnings had major contribution in the GDP of Iran, Iraq, Kuwait, Nigeria and Saudi Arabia. Additionally, most of the oil exporting countries build their budget plan based on oil revenue. To achieve this revenue, each country considers a break even oil price according to their budget plan and it differs from country to country. For example, it is at US$135 for Iran, for Russia, at US$100 and Saudi Arabia at US$95 (Soloman, 2014). In case, producers attempt to make up in volume by increasing its exports what they have lost in prices, it could be rational for one but disastrous collectively (Kemp, 2015) as the increase output would lead to further decline in oil price. Thus, for oil producing countries, "energy security involves a delicate balance between 'security of supply' and 'security of demand'" (El-Badri, 2011: p-14) as the balance helps to maintain market share and competitive oil price to continue its production.

Hence, the perception of energy security is based on various factors including energy endowment, geographic location, economic conditions, facility for energy transportation etc. and so the critical elements and factors of energy security vary in different countries at different times. As a result, there is no consensus on the definition of energy security between energy consumer and producer rather it differs from country to country and region to region (Arcas and Gosh, 2014). The European Union, highly dependent on overseas oil and gas supply, defined energy security which “ranges from narrow issues of physical supply disruption to broader ones involving the economic, environmental, and political consequences of changes to energy markets” (Dreyer and Stang, 2013: p-1).

The US has been the largest oil consuming country of the world. According to a report by the Congress, “energy security is the ability of US households and business to accommodate disruptions of supply in energy markets” (Congress of the United States, 2012: p-1). The definition mainly focuses on the control in the sudden high price rise due to supply disruption as occurred in 1973 oil crisis and the households and businesses would be in the position to absorb the limited additional costs that arise in case of supply disruptions. At times, it was defined in other ways by some policy makers, such, “energy security is having the flexibility to choose not to import oil from countries associated with terrorism or from countries that might seek to use their exports of oil to influence international affairs” (Congress of the United States, 2012: p-1).

The United Kingdom House of Common’s Energy and Climate Change Committee defined the energy security as “a secure energy system is one that is able to meet the needs of people and organisations for energy services such as heating, lighting, powering appliances and transportation, in a reliable and affordable way both now and in the future” (Mueller, 2014: p-4).

India which is highly dependent on overseas supply of gas and oil has also defined the word ‘energy security’. According to Planning Commission, an institution under the Government of India, “energy security is defined in terms of reasonable assurance of access to energy and relevant technologies at all times with an ability to cope with sudden shocks. Energy security does not mean complete energy independence, it only means an ability to meet reasonable requirements with reasonable assurance of stable supply or an ability to pay for import needs" (Planning Commission, 2014a). Indian President Abdul Kalam in his 59th Independence Day speech in 2005 had said,

> Energy Security, which means ensuring that our country can supply lifeline energy to all its citizens, at affordable costs at all times, is thus a very important and significant need and is an essential step forward. But it must be considered as a transition strategy, to enable us to achieve our real goal that is- Energy Independence or an economy which will function well with total freedom from oil, gas or coal imports.

Putting energy as India's first and highest priority, he had called for determination to achieve this within the next 25 years, that is, by the year 2030 (Kachhal, 2016).

Although, there is no agreed definition of energy security, the common factors which emerged are the price volatility and the insecurity of demand and supply. Due to the absence of any alternatives to address these issues during the supply disruption, the oil and gas importers have no option but to bear the huge financial burden. In the course of time, oil producers and consumers developed a mechanism to cushion their economy from the supply shock and price volatility.

For the oil exporter, it created an oil fund collected from the oil earnings which helps to "adjust government spending and cushion the domestic economy from the sharp and unpredictable variations in oil prices and revenues" (Fasano, 2000: p-3). Many countries whose economy is significantly dependent on oil revenue have these fund such as Norway's State Petroleum Fund, State of Alaska's Constitutional Oil Budget Fund and Permanent Fund, Kuwait's General Reserve Fund and Reserve Fund for Future Generations, Oman's State General Reserve Fund and Contingency Fund, and Iran's Oil Stabilisation fund etc.

For oil importers, it emphasised on the building of strategic petroleum reserves to mitigate the impact of oil supply disruption. The US, China, Japan, South Korea, Spain and India, among others, have strategic petroleum reserves.

However, there is a need for "a balance between supply and demand as well as a fair, stable price that is acceptable to both consumers and producers. It all underlines the fact that security of supply and security of demand cannot be decoupled" (Badri, 2008). Consequently, there is a need for cooperation and coordination between energy producers and consumers to stabilise the global energy market and for the consolidation of their energy relationships. Oil producers and exporters are encouraged to invest in downstream sector of its importers and the latter are encouraged to invest in the upstream sector of its energy exporters (Jaffe and Medlock III, 2004). For the co-ordination among stakeholders in energy market, the dialogue between OPEC and non-OPEC (*Sputnik International*, 2017) as well as energy consumers and producers is being promoted (Skinner, 2005).

However, the importance of midstream sector in energy security cannot be ignored which facilitates for carrying oil and gas from its exporter to importer countries. In short, "midstream is the connector for upstream and downstream sectors" (Miers, 2015: p- 3) which includes the "gathering, processing/blending, transportation and storage of oil, natural gas and related products" (EIG partners, 2017).

This research focuses on gas pipeline. Pipelines are considered as a choice of transporting system for the natural gas for both consumers and producers. Two factors have largely contributed towards their preference. Firstly, it is a cheaper means of transport among others. Secondly, it ensures certainty to producers for the gas market and consumers for its gas supplies during the contracting period hence it serves their energy security.

The feasibility of the pipeline system depends on the nature of the distance and motivational level of the producer and consumer. In case of cross-border pipeline project, the pipeline passes through two or more countries. Being transnational in nature, these pipelines are not only used for the transport of hydrocarbon energy, but these are also employed by the involved stakeholders to fulfil their political, economic and other interests. Consequently, the pipelines, particularly cross-border pipelines, influence the world politics and vice versa.

The study examines the situation of energy security in India and the contribution of Iran towards it. Further, it has analysed the political problems and technological challenges which have prevented the Iran-Pakistan-India (IPI) pipeline to come into existence.

Review of Literature

The review of literature of the research topic has been divided into three themes, namely, India's energy security, Indo-Iranian Engagement and the IPI Pipeline project and its challenges.

India's Energy Security

Many literatures delineate and illustrate the fast Indian economic growth rate since 1991 which has increased its energy needs drastically (Ahluwalia, 2002). According to Girijesh Pant, in the formative phase of the energy policy, Indian concerns were confined to domestic production of oil and gas which could not cope up with the rising demand for energy (Pant, 2008). This resulted in increasing dependence on imports of energy which has made energy security an important component of India's external engagement. Keeping this in view, a full-fledged energy security division was established in the Ministry of External Affairs, Government of India (MEA) in 2009 (MEA, 2012b).

In August 2006, Planning Commission of India brought out a draft report on *Integrated Energy Policy* where it has defined energy security in a comprehensive way. According to it, energy security is "reasonable assurance of access to energy and relevant technologies at all times with an ability to cope with sudden shocks. It also accepts that energy security does not mean complete energy independence, it only means an ability to meet reasonable requirements with reasonable assurance of stable supply or an ability to pay for import needs" (Planning Commission, 2014a).According to Girijesh Pant one of the key words of the definition was 'the insulation from shock and disruption' which becomes a challenge when the shock and disruption are emanating from the domain where India has very little or no influence (Pant, 2008).

According to Planning Commission, the non-commercial sources of energy still constitute about one-fourth of the total energy supplies, but the share has been going down due to increasing substitution with commercial sources of energy. The commercial energy component has been growing up from 25.48 per cent in 1953-54 to 75.5 per cent in 2011-12 (Planning Commission, 2014a; Pant, 2008).

Most literatures show that coal has been India's prime fuel since independence and is mainly used for power generation [Ministry of Petroleum and Natural Gas (MP&NG), 2006c]. However, globally, coal use has declined as power companies are increasingly switching to natural gas to fuel their electricity plants due to low prices, forecasts of vast supplies and cleaner in nature compared to coal (Smith, 2010). India, the third largest coal producer, also continues to experience regulatory, land acquisition, technical, and distribution challenges that limit production growth and create bottlenecks such as inefficient transportation of coal to key demand centres [Energy Information Administration (EIA), 2014b]. Therefore, even though India has significant coal reserves, a policy to continue heavy investments in coal-based technologies may not enhance its energy security (Pandey, 2006).

India is the fourth largest energy consumer and is likely to become the third largest by 2030 (Energy Statistics, 2013). David Scott articulates that in Indian energy basket, oil and natural gas has the dominant say after coal where oil and natural gas contributes 33 per cent and 9 per cent respectively. Renewable energy resources have very small contribution in it. The *Hydrocarbon Vision 2025* released in 2000 indicated that by 2025 natural gas would have 20 per cent share in India's energy mix. This shows that there is going to be a tremendous growth in gas consumption in India in the years to come (Scott, 2011).

India has very limited oil and natural gas reserves which are estimated to be 800million tonnes and 1.4 tcm respectively, with the share of 0.3 per cent and 0.7 per cent in terms of global reserves respectively at the end of 2013 (BP, 2014). The growth rate of Indian primary commercial energy demand is around 6.8 per cent, while the domestic production is growing only at the rate of 2.6 per cent, creating a big gap in demand and supply (Planning Commission, 2006). The Planning Commission says that India imports 36 per cent of its energy demand. If the government and industry do not change their policy and improve technology of production and consumption, India would have to import 84.4 per cent of its energy demand in 2047 (Planning Commission, 2013; Kumaraswamy, 2013).

Natural gas has experienced the fastest growth rate in India's primary energy demands which is about 4.8 per cent annually and is forecast to rise to 1.6 trillion cubic feet (tcf) per year (Sahu, 2008; Pant, 2008). According to EIA, the natural gas consumption has grown at an annual rate of 8 per cent from 2000 to 2012, although supply disruptions starting in 2011 resulted in declining consumption (EIA, 2013). With low reserve of natural gas in India, the production of gas was 33.7 bcm in 2013 and the reserve-to-production ratio indicates that its life is expected to be 41.5 years compared to the world average of 55.1 years (BP, 2014). It is projected that the demand-supply gap of natural gas would increase from 141.5 million standard cubic metres per day (mmscmd) in 2012-13 to 515.9 mmscmd in 2029-30 (Petroleum and Natural Gas Regulatory Board (PNGRB), 2013). Due to limited demands, India was self-sufficient in natural gas until 2004 when it began to import LNG from Qatar (EIA, 2014b).

Indo-Iranian Relations

Iran stands out prominently as the largest and most populous Islamic nation with large reserves of oil and natural gas in West Asia (Maleki, 2007). The geostrategic importance of Iran in the Gulf is vital for India as it connects the Gulf to the Arabian Sea through its narrow Strait of Hormuz (Narvenkar, 2011). Indian officials often mention that Iran is a part of India's "proximate neighbourhood" which shared a common 947-kilometre long border until 1947 and had strong cultural and commercial interactions (Rao, 2010). The Persian language (Farsi) remained the court language of India throughout the Mughal period (Yazdani, 2007). Their cultural relationship continues to be strong even after India's independence in 1947. A cultural agreement has been signed with Iran in 1956 and a library of 4,000 books opened in Teheran (MEA, 1956).

The Iranian Embassy opened a cultural centre in Delhi in 1959 (MEA, 1960) and Iran has cultural centres in New Delhi and Mumbai (MEA, 2012). On 3 May 2013, External Affairs Minister of India, Salman Khurshid inaugurated the India Cultural Centre in Tehran (MEA, 2013). India over the years has emerged as one of the favourite tourist destinations for Iranian tourists and every year around 40,000 Iranians visit India for various purposes (MEA, 2012).

Nevertheless, India had no relations on the diplomatic level with Persia (former name of Iran) before the advent of the Mughal rule in India. According to Riazul Islam, the success of Safavids of Persia synchronised with that of the Great Mughals of India and they had close relations (Islam, 1970). Centuries of shared cultural and civilisational affinities, which is normally invoked in the official meetings, did not prove to be of much help in building mutual trust and establishing durable political and strategic relationship (Alam, 2011).

In 1947, the independence of India also resulted in the creation of the Muslim-majority Pakistan, which became Iran's eastern neighbour. Pakistan's assertion of its Islamic credentials, its contentious bilateral relationship with India, and its pro-Western orientation laid the foundations for the development of friendly ties between Pakistan and Iran which was backed by the US. Iran's ties with Pakistan through its alliances with the Western bloc led by the US complicated its relations with India (Yazdani, 2007). Besides the spread of Cold War politics, wars between India and Pakistan prevented closer relations between Iran and India, with the former taking the side of Pakistan (Ahmadi, 2011).

In addition, India's friendly ties with the Egyptian President Gamal Abdul Nasser, a leader of Arab nationalism, further strained the Indo–Iranian relations. However, in geo-political terms, Iran has remained a priority state for India since independence and India signed a treaty of friendship with Iran on 15 March 1950 (Yazdani, 2007, MEA, 1950). The Shah first visited India in March 1956 and Prime Minister Nehru visited Iran in September 1959. During the 1962 Sino-Indian conflict, Iran supported India (Yazdani, 2007). The Iranian Revolution of 1979 that overthrew the pro-Western Shah's regime and established political system based on Islamic principles. In the area of foreign policy, it called for rejection of external supremacy, preservation of the policy of non-alignment, consolidation of relations with the states searching for peace and preservation of solidarity with the Islamic world (Pattnaik, 2011).

Since the visit of Prime Minister Narasimha Rao in 1994, high level exchanges resumed and in January 2003, President Mohammad Khatami was the Chief Guest at the Republic Day celebrations (MEA, 2012). In *New Delhi Declaration2003*, issued during Khatami's visit, both Iran and India referred to each other as "strategic partners" (Maleki, 2013). Enayatollah Yazdani opined that from being a distant neighbour during the cold war India transformed to a potential regional ally in the post-Soviet period (Yazdani, 2007).

According to Anwar Alam, a simultaneous 'convergence and drift' approach characterises their relationship in recent times. According to him, stability of Afghanistan, terrorism, idea of a gas pipeline, energy security and security of sea routes, diversification of commercial activities from oil based trade to non-oil areas, the strategic importance of construction of Chabahar and Bandar Abbas ports and sharing of multi-polar world order are issues in which both countries can work together. However, according to Alam, they differ widely on the role of US in West

Asia, Central Asia and Afghanistan, Pakistan's role in Afghanistan and its linkages with terrorism, the nuclear issue and viability of IPI gas pipeline (Alam, 2011).

For India, defence cooperation with Iran would have strategic implications. Afghanistan is critical to India's security and Iran can provide a major stabilising influence there. Iran also wants Indian assistance to upgrade Russian-supplied military hardware. In 2001 and 2006 both conducted joint naval exercises. The timing of second naval exercise in March 2006 overlapped with President George W. Bush's visit to India and signalled that the US would not dictate India's foreign policy (Chansoria, 2011). However, despite these initiatives, strategic and defence cooperation between the two countries is relatively low primarily due to India's turn to the West (Maleki, 2013). In terms of nuclear issue, India voted in favour of the implementation of the non-proliferation safeguards agreement in International Atomic Energy Agency(IAEA) against Iranian wishes (Behuria, 2011; Dutta, 2005). However, India continues to maintain an autonomous position and its vote on the Iranian nuclear issue can better be explained in terms of its national interests (Mahapatra, 2011).

However, in a globalising world where there are immense opportunities for Indian business and investment and the scope for technical and economic cooperation with Iran is self-evident (Rao, 2010). Under the Indo-Iranian Treaty of Commerce and Navigation, the Iranian government has granted the "most- favoured nation treatment" to the Indian exports since 1958 (MEA, 1959). India and Iran hold regular bilateral talks on economic and trade issues at the India-Iran Joint Commission Meeting (JCW) which first met in June 1969 in Teheran (MEA, 1970). Indian vision of Afghanistan as a hub for economic activity, trade and transit linking South and Central Asia is shared by the Iranian side (Rao, 2010).

Even if the trust gap is widening between the two countries after India's vote against Iran in IAEA, the talks between India and Iran are going on over projects like the IPI gas pipeline, LNG project, development of the Farsi oil and gas blocks, South Pars gas field, Chabahar container terminal project and Chabahar-Faraj-Bam railway project etc (Behuria, 2011). The Indo-Iranian economic and commercial links have generally been dominated by purchase of oil by India resulting in overall trade balance in favour of Iran (MEA, 2013). However, in recent years, the setting up of free trade zones in Iran and with the India-Iran-CIS trade corridor taking shape rapidly, the climate for investing in Iran has become very conducive. In November 2003, Iran has invited

Indian Mining Machinery Manufacturers to set up joint ventures and India is working on a preferential trade agreement with Teheran which is to take the shape of a free trade agreement (Khan, 2011).

The Indo-Iranian trade in 2011-12 was US$15.94 billion in which Indian exports to Iran was US$2.40 billion and imports from Iran was US$ 10.93 billion, mainly crude oil (MEA, 2013). There is potential for the development in the non-energy bilateral economic ties. The US sanctions and compulsion to pay in rupees to Iran for its oil import had given additional impetus for the exploration of such trade relations. This could be used by Iran to increase its import from India (Madan, 2014; Rao 2010).

The sanctions of US and the European Union (EU) considerably impede India's import of energy resources from Iran. The ban on insurance for the Iranian tankers and Iran to approach to international financial institution for the financial transactions became a big hurdle for energy trade between the two countries (Pant, 2013). In the wake of the nuclear deal concluded in 2015 both countries are working towards managing their energy and economic cooperation under the shadow of the US and EU sanctions. Until then India did not halt its oil import from Iran but reduced its intake. Using the rupee payment arrangement it was trying to expand trade in other commodities like tea, pharmaceuticals, automobile, electronics, spare parts and agricultural products (Roy, 2013).

Iran-Pakistan-India Pipeline Project and its Challenges

In increasingly global and transparent markets, the energy trade especially, oil and natural gas trade has been shaped more by transport costs than political relationships (Manning, 2000; Wesley, 2006). David Scott says that geo-economic considerations are an explicit element of India's concerns in its extended neighbourhood concept (Scott, 2009). According to *Delhi Declaration 2003*, both India and Iran recognised that they are natural partners as Iran has abundant energy resources and India is large market for energy (MEA, 2003). Sustained and enhanced energy cooperation is seen as an essential requisite for supporting the continued robust economic growth of the Asian region and in this context, the idea of importing natural gas through pipelines has been gaining shape for quite some time (OPEC bulletin, 2013; Singh 2008).

Many scholars recognised that Iran has large reserves of gas (Dadwal, 2011; Khan, 2011). The proven natural gas reserves are estimated to be 36.6 tcm, representing 18 per cent of the world's natural gas reserves in 2012 (BP, 2013a). However, due to the prolonged US sanctions upon Iran's energy sector, much of its gas remains unexploited, hence holds huge potential for future production and export (Dadwal, 2011; EIA, 2014a). According to Iran and Libya Sanctions Act (ILSA) of 1996, foreign companies that make an investment of more than US$20 million in one year in Iran's energy sector would face US sanctions (CRS Report for Congress, 2014). This and subsequent US sanctions have limited the modernisation and technological development of Iran's oil, gas and petrochemical sectors (Amuzegar, 1997). Thus, Iran's gross natural gas production remains low which was 160.5 bcm in 2012 with a reserve-to-production ratio of 234.8 years. In 2012, Iran exported only 4.4 bcm of natural gas but was willing to increase its export (BP, 2013a).

For India it is ideal that gas be supplied through pipelines from neighbouring countries, not least because the price of LNG is firmly linked to crude prices, which has been volatile and have distinctly moved to a more expensive bracket. Moreover, once constructed, pipelines offer security of supply because piped gas, unlike LNG tankers, cannot be diverted by noncompliant producer states to other markets (Mahalingam, 2007). Yet, there is strain between India's ideal energy security calculations and its actual external engagement for energy security and this is evident in the Indo-Iranian energy relations. India is unable to seek energy security through Iranian energy sources despite its being an ideal source of its energy security and its desire to engage itself with it (Kumaraswamy, 2013).

The IPI gas pipeline would bring Iran as a producer and India as a consumer of gas together (Asghar and Nazuk, 2007). Some dubbed IPI as a peace pipeline (Cohen and et al., 2008; Haq, 2010) and some call it win-win project for Iran, Pakistan and India (Ahmad, 2008; Agrawal, 2009). The idea of a gas pipeline from the Gulf region to the Indian subcontinent was presented originally in 1989. They planned a daily supply of 100 million cubic metre (mcm) to the Indian subcontinent; of which 10 mcm would be used in Iran, 20 mcm in Pakistan and 70 mcm in India (Ghorban, 2006). There are many literatures which deal with the possible route for the transport of gas from Iran to India and beyond. According to Narsi Ghorban, it could be onshore and offshore gas pipelines involving Iran, Pakistan and India. There are three possible routes for IPI pipeline: one, overland, from Iranian gas fields terminal at Assaluyeh to the Pakistani border and then on to India; two, offshore route hugging Pakistani coast along

Baluchistan; and three, deep sea route under Pakistan's exclusive economic zone (Dietl, 2011). Some literature discussed that China could be part of it. However, it did not deal with the political and strategic interests of China associated with IPI pipeline (Kemenade, 2009).

If the IPI pipeline is overland and passes through Pakistan, it would be 2775 kilometre long and would transport gas energy from the Assaluyeh energy field in Southern Iran. It would cover a stretch of over 1,100 kilometres of Iranian territory, then would cross through Pakistan's Baluchistan and Sind provinces before linking up with Rajasthan and Gujarat in Western India (Kemenade, 2009). Its diameter would be of 56 inch (Dietl, 2008).

In spite of these studies and assessments, the pipeline has not been a reality (Ghorban 2006). The IPI pipeline is bogged down in traditional regional rivalries especially between India and Pakistan. For India, security of pipeline is a major concern (Sanati, 2013). Nansi Ghorban emphasises that if private sector was given the chance, it would do a better job, although it too would face problems. According to him, the politicisation of IPI pipeline was the cause for its delay (Ghorban, 2006). Some literature discussed that IPI pipeline has been overshadowed by the US-Iran relations (Singh, 2008) which was marked with unprecedented animosity and hostility after 1979 Iranian revolution and subsequent events including hostage crisis (Kumar, 2011).

In 2009, India withdrew from the project citing pricing and security concerns soon after signing a civilian nuclear cooperation agreement with the US in 2008 (Haq, 2010). Factionalism in Iran remained one of the responsible factors for gas price rise from time to time (Jalilvand, 2013). Ashok K. Behuria pointed out that the IPI Pipeline has been a victim of deteriorating relations with Iran on the one hand and adverse relations with Pakistan on the other (Behuria 2011). Chintamani Mahapatra observed that because of the US factor, Iran's nuclear policy and difficulties of laying the pipeline through Pakistan, the IPI pipeline did not move smoothly (Mahapatra, 2011).

According to Shebonti Ray Dadwal, due to the Indo-US civil nuclear deal India came under the US pressure in the IAEA and this resulted in the suspension of IPI pipeline. She highlights that India also cited security concerns as well as differences with Islamabad over transit and transport fees as the reasons (Dadwal, 2011b). Nevertheless, Iran has already laid its part of pipeline which runs up to its border with

Pakistan. For Pakistan, financial problem is the hurdle for the start of its construction (Haider, 2014). At the same time, due to instability in Iraq, India is willing to strengthen its energy ties with Iran along with Russia and Commonwealth of Independent States (CIS) countries and has given indication of the revival of IPI pipeline (*The Economic Times*, 2014).

The conceptualisation of IPI pipeline is not new; however there is very little research on the subject. Previous studies on IPI Pipeline seldom cover exclusively on it, especially in the context of India's relations with Iran and energy security concerns. Some literature do discuss about the US sanctions and its impact on IPI pipeline but only in general terms which needs to be studied in detail. The IPI pipeline would have great impact on Asian region. However, there is no in-depth analysis on regional politics over IPI pipeline. The domestic politics of Iran, Pakistan and India over energy is also responsible for delay of IPI pipeline. This needs in-depth study. Besides the political factor, the IPI project faced a number of technical and strategic problems which are also responsible for the delay of it but did not receive adequate treatment. The proposed study tries to fill these existing gaps in the study of IPI Pipeline project.

Definition, Rationale and Scope of the Study

Energy is essential for the economy of country and this makes energy security an important national agenda of a country. However, energy security has several definitions which depend upon one's perceptions. The study has analysed these definition with a special focus on India's perception towards its energy security.

Iran has large reserves of crude oil and natural gas and has been playing an important role in the global energy market. India, on the other side, with its fast growing economy, has become a big energy consumer. In addition to that the growing global concern of climate change has also influenced India to look for cleaner sources of energy. Natural gas is more environment friendly compared to other fossil fuels. However, the domestic production of natural gas is not able to meet its growing demand. India's natural gas consumption was increasing at the rate of 5 per cent during first half of the 2010s. It is expected that it would have the average annual growth rate of 2.0 per cent from 2010 to 2040 due to supply constraints. Although India imports majority of gas from Qatar in the form of LNG, it is technically more complex and comparatively more expensive than pipeline.

To maintain its economic growth, India needs to diversify its gas supplies. The pipeline is seen as the best way to transport natural gas from gas fields to gas consuming markets. In this view, the IPI pipeline project is the best way to transport Iranian gas to Indian market via Pakistan. The study has looked at the rationales of the IPI pipeline project. In spite of being a win-win project for all involved countries, the pipeline could not materialise since its conceptualisation in 1989. Since Iran is under the US sanctions regime, the study has analysed its impact on IPI Pipeline. The proponent of the pipeline project failed to recognise the complexities and potential pitfalls. The study has examined the strategic and technical reasons behind the delay of this project and the issues such as price dispute, security concerns pertaining to the IPI pipeline which were not given adequate attention.

The present study seeks to analyse the IPI project within the context of two axes, namely Indo-Iranian relations and India's growing need for energy imports. The politics of pipeline has been analysed at three different levels that is global, regional (Asia) and domestic (Iran, Pakistan and India). The technical and strategic issues have covered gas price and its indexes, security, delivery point of gas, finance and technological issues.

To know the trend of the data for more than five years of any issue, compound annual growth rate (CAGR) has been used. As per the need of study, year 1947, 1973 and 1991 has been adopted for the reference for India which had an impact on its energy trade and policies. In 1947, India got independence and the year has been used as a base period for the analyses of subsequent development in the energy sector. In 1973, India was affected from the oil crisis due to the increase in global oil price. In 1991, Indian economy was liberalised. For Iran, the years 1973, 1979, 1996 and 2010 affected Iran's energy sector to large extent. The oil crisis of 1973 increased Iran's oil revenue tremendously and so its share in its GDP. The share of oil rents in Iran's GDP increased from 0.304 per cent in 1973 to 30.666 per cent in 1974. This was maintained until the Islamic Revolution of 1979. In 1996, the US sanction started targeting Iranian energy sector where foreign investors were barred from investing beyond a certain amount. In 2010, EU joined the US and implemented sanctions which deeply affected Iran's economy besides its energy sector.

However, there are also some limitations in collecting the data. There is no specified data on India-Iran hydrocarbon trade provided by Indian government up to 2005-06, hence the study is unable to analyse the hydrocarbon trade between the two based on data prior the period of 2005-06. Additionally most of the Iranian government sources on the subject are in Persian language. Due to the lack of knowledge of the language, these sources could not be utilised for the study.

Research Questions

1. To what extent is Iran important in India's energy security calculations?

2. How does the IPI pipeline serve the interests of Iran, Pakistan and India?

3. How has the domestic politics of these three countries impinge upon the IPI pipeline?

4. What were the impacts of the regional politics upon the IPI pipeline?

5. How did US sanctions affect the IPI pipeline?

6. What are the technical and strategic problems facing IPI pipeline project?

Hypotheses

1. The US Sanctions are the principal reason behind delay of IPI pipeline project.
2. Domestic political difficulties in Iran, Pakistan and India have complicated the IPI pipeline and delayed its fruitation.

Research Methods

The study is based on an analytical approach. To substantiate the study, data of primary energy sources particularly oil and gas from the different sources have been applied. For the study, both primary and secondary sources have been utilised. For primary sources, political speeches, interviews (print and electronic media), reports by various international and national agencies have been used, such as *International Energy Outlook* by EIA, *World Energy Outlook* by IEA, *Annual Statistical Bulletin* by OPEC, World *Investment Report* by U.N., *Regional Economic Outlook: Middle East and Central Asia* by IMF, India's *Foreign Relations Documents by Government of India*, *Annual Reports* of Ministry of Petroleum and Natural Gas (Government of India), *Annual Reports* of Ministry of Finance (Government Of India), *Energy Statistics* by Ministry of Statistics and Programme Implementation (Government of India), *Annual Statistical Bulletin* by Nigerian National Petroleum Corporation (Government of Nigeria), Information by Press Information Bureau, *Commercial*

Relations and Trade Agreements by Department of Commerce, *Annual Reports* by MEA etc. The secondary sources comprised of B.P. Statistical Review of World Energy by British Petroleum, books, articles and other scholarly materials.

Chapterisation

The Second Chapter on *India's Energy Security* deals with India's domestic oil and gas scenario under the time frame of 1947-55, 1956-73, 1974-90, and 1991-2015. Further, it brings out the country's vulnerability in terms of dependence on other countries for its oil and gas requirements. The last section of the Chapter discusses about India's energy policy for the security of energy supply.

The Third Chapter on *Iran's Role in India's Energy Needs* starts with the backdrop of India-Iran relations in general. It enlightens with the Iran's position and potential in oil and natural gas sectors globally. Later, it discusses India's dependence on Iran for its oil needs and the possibility of further energy cooperation.

The Fourth Chapter on *Domestic and Regional Politics* deals with the progress of IPI pipeline since 1989. It also analyses its organisational structure and technological details. This discusses the political and economic interests of Iran, Pakistan and India in this pipeline. The chapter focuses on political and economic bargaining among the parties concerned over IPI pipeline and discuss politics of Saudi Arabia and Qatar vis-à-vis IPI. It also highlights the Russia's interest over the project.

The Fifth Chapter on *US Sanctions on Iran* deals with the background of prolonged tension between the US and Iran leading up to host of energy related sanctions. It discusses US sanctions on Iran since 1979 and how Iran responded to these sanctions to sustain its economy. Further, this chapter examines how these US and US-supported international sanctions directly or indirectly affect the IPI pipeline.

The Sixth Chapter on *Commercial, Technical and Strategic Challenges* begins with the characteristics of natural gas which makes its transport costly and complex. Later, it discusses various issues involved in IPI pipeline in detail like gas price, transit fee, security, finance. This also looks at the available options for India to meet its gas demands in case of delay of IPI Pipeline project and Iran-Oman-India (IOI) gas pipeline, Myanmar-Bangladesh-India (MBI) gas pipeline and Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline has been discussed. It also looks up

India’s adaption for LNG trade. The last Chapter summarises the findings of the study and tests the hypotheses.

Chapter-2

India's Energy Security

This Chapter starts with *Overview of India's primary energy scenario* which discusses the different components of its primary energy sources like coal, nuclear energy, renewable energy etc. The next part *India's crude oil and petroleum products scenario* provides the detail picture of India's oil industry, emphasising on the consumption, production, imports and exports of oil and petroleum products under four distinct time period namely, 1947 to 1955, 1956 to 1973, 1974 to 1990 and 1991 to 2015. The next segment on *Natural gas scenario* presents a detailed account of natural gas market. As an importer, India's existing infrastructure for LNG has been discussed and the section analyses India's policy towards oil and gas equities and how it emerged as an opportunity for the ONGC Videsh Limited (OVL) and other national oil companies (NOCs) for overseas engagements under sub-section *Oil and gas equities*. The last section '*Oil and natural gas sources in West Asia'* deals with the potentials of the region and why it became an attractive for the oil and gas importers.

"Energy has always been a crucial factor for the economic development of a human society", hence energy security emerged as an important issue for nearly a century (Labandeira and Manzano, 2012). There are two factors which are responsible for the increase in demand of energy; one is rising economy of the concerned countries and the other is the growing population, tending towards consumerism or both (Tverberg, 2012). Studies pertaining to energy consumption and economic development reveal a strong and positive relationship between commercial energy consumption and economic development. It is difficult to separate economic growth and rising energy consumption. This strong positive relationship between these two variables indicates that more economic growth needs more of commercial energy (Dhungel, 2008).

For India, both the growing population and economy are responsible for the growth of energy demand. India is home to 17.5 per cent of the global population, the second largest in the world after China. According to the 2011 Census, India's total population has increased from 1028.7 million to 1210.6 million in 2001-2011 or an increase of 181 million people during the decade or an increase of 17.7 per cent (Chandramouli, 2013).

With reference to economic growth, India is among the fastest growing economies of Asian region. According to the World Bank, the average gross domestic product (GDP) growth rate of India during 2001-2015 was 7.19 per cent, just behind China whose GDP growth rate was 9.66 per cent during the same period. Moreover, in 2015, India surpassed China in terms of GDP growth rate with 7.93 per cent against 6.91 per cent in China (World Bank, 2016). Simultaneously, India's per capita of GDP increased from US$83.795 in 1961 to US$309.32 in 1991 and US$1,593.25 in 2015 (World Bank, 2016).

A study done by Shonali Pachauri indicated that as "income and expenditure levels rise, households tend to use more commercial fuels and electricity" (Pachauri, 2007). As a result, India's growing population and economy along with rising per capita income led to increase its primary commercial energy consumption whose compound annual growth rate (CAGR) was at 5.02 per cent during 1991 to 2015 while the production was limited to 3.24 per cent[1] for these period [British Petroleum(BP), 2002; BP, 2016]. Consequently, India has been an energy deficient country. The issue of energy security became important when the share of non-commercial energy resources like dung, woods etc. kept declining in meeting its energy needs as they contributed almost 75 per cent of its total energy needs in 1953-54 but reduced to 25 per cent in 2011-12 (Pant, 2008).

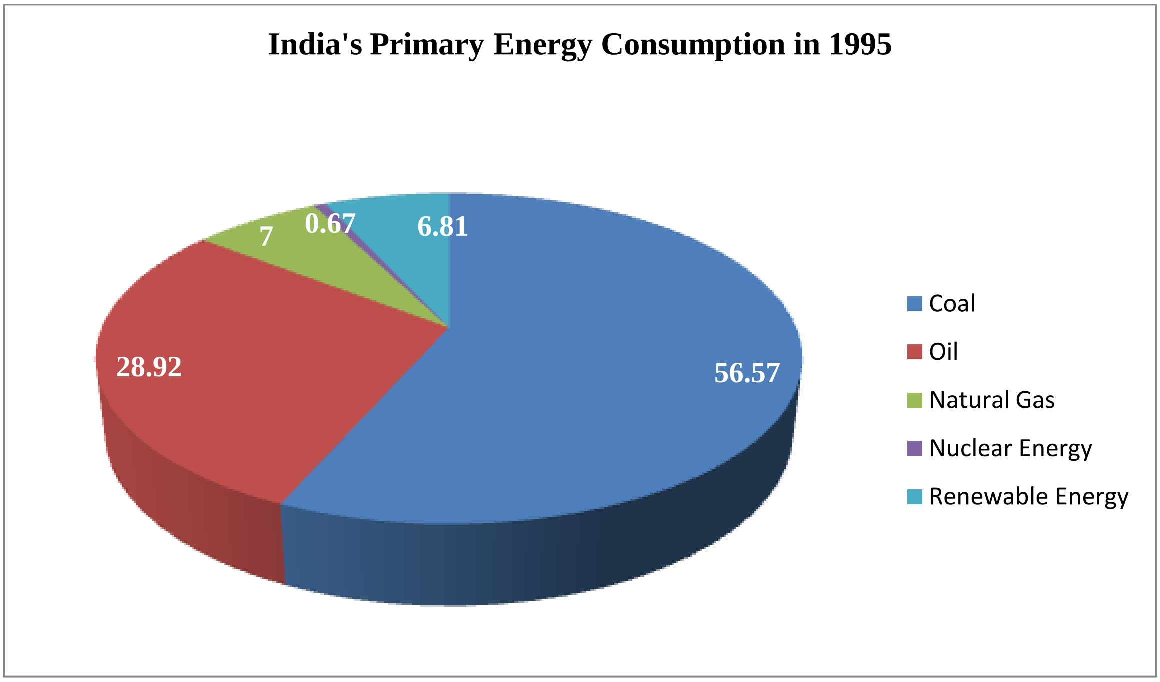
With comparatively low energy production than consumption, India was unable to meet its demands through domestically produced primary energy sources especially oil and natural gas and was forced to import. Amid dependence on others for meeting its energy demands, the energy security concern became prominent for the Indian government (India Energy Portal, n.d.). In the energy security risk scores and rankings for 25 large energy consuming countries, India stood at sixteenth in 1980 and scaled up to nineteenth rank with the risk scores of 1,186 in 2014. Norway secured first rank with the risk score of 733 in 2014 and was considered as the most energy secured country (United States Chamber of Commerce, 2016). This shows that India became more insecure in terms of energy supply in given time period.

[1] The production of primary sources included only oil, natural gas, coal and bio-fuel.

Overview of India's primary energy scenario:

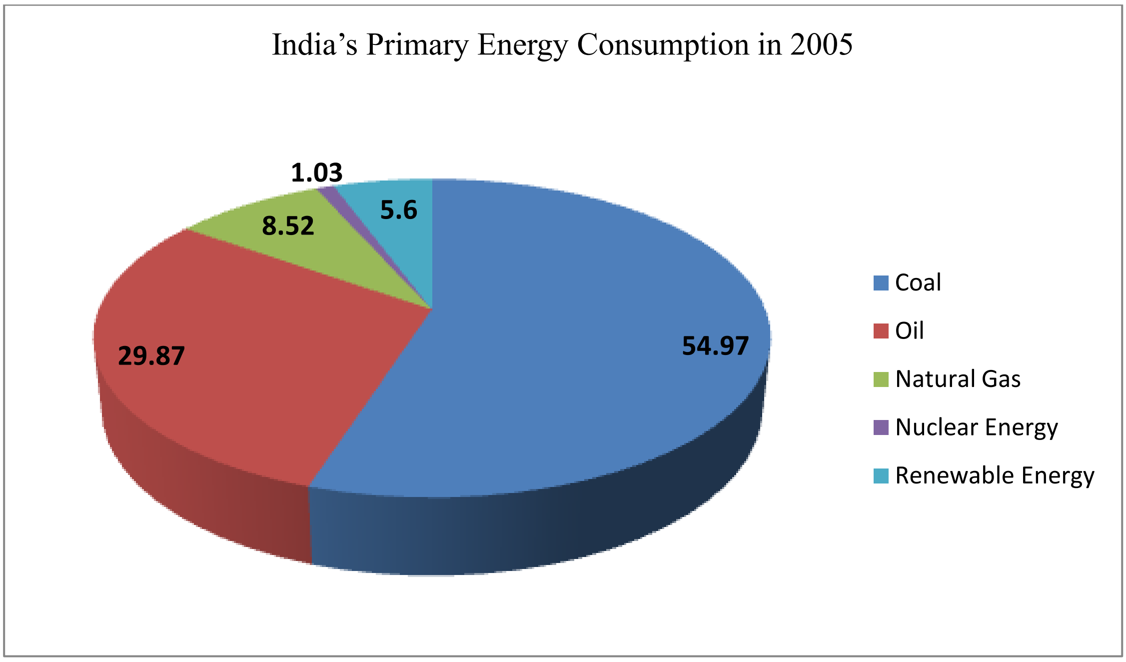
Coal has been the major source of energy in India among hydrocarbon resources. It had a large reserve of coal with 306.60 billion tonnes of proven reserves as on 1 April 2015 of which "prime coking coal was 5.313 billion tonnes, medium and semi coking coal were 29.09 billion tonnes, non-coking coal was 270.70 billion tonnes and Tertiary coal (high sulphur) was 1.49 billion tonnes (Mahanadi Coal Fields Limited, n.d.). In terms of share in global coal reserves, it was almost 6.8 per cent in 2015 (BP, 2016). **Graph-2.1, 2.2 and 2.3** shows the importance of coal in India's energy needs which met the largest share in its total primary energy consumption in 1995, 2005 and 2015 having the share of 56.57, 54.97 and 58.12 per cent respectively. It also depicts share of other primary resources in India's total primary energy consumptions for these periods.

<u>Graph-2.1</u>



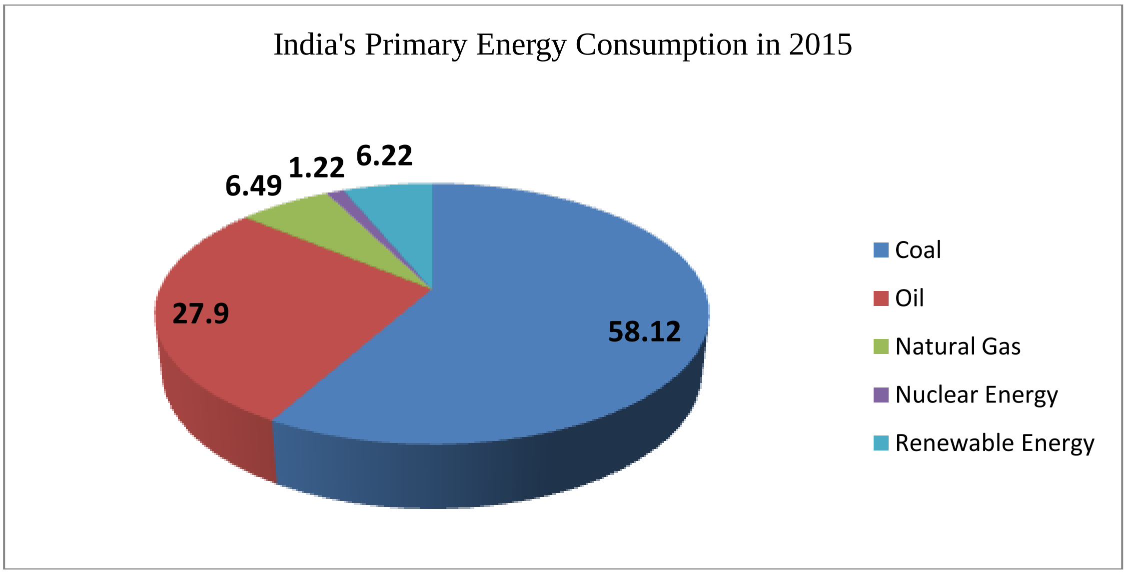
Sources- (BP, 2004)

Graph 2.2



Sources- (BP, 2006)

Graph-2.3



Sources- (BP, 2016)

Although India has large reserve of coal, it imports to meet its consumption needs. For example, it imported 217.78 million tonnes, of which coking coal was 43.72 million tonnes and non-coking coal was 174.07 million tonnes, in 2014-15 (Ministry of Coal, 2017). Being low in quality and delay in land acquisition and lengthy approval process for environmental and other legal issues to mine coal, make the Indian coal sector unattractive to foreign investments. Hence, it could not produce sufficient coal to meet demands. This is apparent in 2014-15, the latest available data when it produced 609.18 million tonnes of coal and the consumption was 822.14 million tonnes (coking coal was 55.74 million tonnes and non-coking coal was 766.40 million tonnes) (Ministry of Coal, 2017). Having the limited reserves of coking coal, (Mondal, 2016) India increased its imports to meet the significant proportion of the demands, as the steel industry is getting revived (Dash, 2016) in which coal is one of the important raw material.

Most of the coal reserves in India come under the category of bitumen to sub-bitumen, a non-coking coal which contains 34.69 per cent of fixed carbon with 5.98 per cent moisture along with 20.70 per cent of volatile matters such as methane, hydrocarbons, hydrogen and carbon monoxide and incombustible gases like carbon dioxide and nitrogen (Researchgate, n.d.). Accordingly considering the presence of such a large quantity of such impurities and its capacity to yield energy per kilogram, it is categorised as medium-to-low in quality. Anthracite, one of the coking coals considered as a high quality coal, contains 80 to 95 per cent of fixed carbon and less than 1 per cent each of sulphur and nitrogen. Moisture content generally ranges from 5 to 15 per cent as impurities. The possibility of ash presence in this type of coal is in between 10 to 20 per cent. It has also the highest calorific value among all types of coal (Sunshine, n.d.) and in opposite, lignite has the lowest calorific value.

As most of the Indian coal is sub-bituminous, it emits hazardous matters such as sulphur oxides, particulate matter, nitrogen oxides, mercury etc along with high ash after combustion (Sunshine, 2017). Ash is an impurity that reduces burning capacity of coal. The Indian coal contains 38.63 per cent of ash (Researchgate, n.d.) and this reduces its caloric value compared to Anthracite and hence has less monetary value. The high ash content in sub-bituminous coal has also a hazardous effect on environment due to the presence of higher alkaline substance than other coal ash like Anthracite and Bituminous (Sunshine, 2017).

The world is under the threat of global warming and it has emerged as an important global issue. According to *Statistics Portal 2015*, India ranks third in CO2 emissions worldwide and in 2014 had 5.7 per cent share in it (*The Statistics Portal*, 2015), a major contributor to global warming. The Kyoto protocol was the first comprehensive step adopted in 1997 to address this issue based on United Nations Framework Convention on Climate Change which was adopted in New York on 9 May 1992. However, it entered into force on 16 February 2005 (United Nations Framework Convention on Climate Change, 2014). The key features of the Protocol are

> … it has mandatory targets on greenhouse gas emissions for the world's leading economies which have accepted it. These targets range from -8 per cent to +10 per cent of the countries individual 1990 emissions levels with a view to reducing their overall emissions of such gases by at least 5 per cent below existing 1990 levels in the commitment period 2008 to 2012 (United Nations Framework Convention on Climate Change, 2014).

Under the protocol, European Union (EU), United States (US) (later withdrew its support for the Protocol), Canada, Japan came into the category which had to cut their carbon emissions. India did not come under this category and was not bound to cut its greenhouse emissions under Kyoto Protocol (Sethi, 2014). Nevertheless, India promised to reduce greenhouse gas "emission intensity of its GDP by 33 to 35 per cent by 2030 from 2005 level" (Sinha, 2015b). Therefore, India has to increase the share of energy resources which are more environments friendly.

Although, the renewable energy is considered a clean and environmental friendly energy source, it has very less contribution in India's total energy consumption and was at 6.81 per cent, 5.6 per cent and 6.22 per cent in 1995, 2005 and 2015 respectively. The renewable sources of energy include wind, solar power, hydro-power, geo-thermal etc., but these are not very attractive due to the electrical power generation costs per unit, low capacity to utilise the existing infrastructure and problem in continuity of energy production. The electrical power generation cost by wind is 40 to 100 per cent more and by solar, three to four times higher than by coal and gas (Smith, n. d.). The utilisation of existing structure for wind and solar energy is also very low which is 17-38 per cent for onshore wind, 40-45 per cent for offshore wind and 9-24 per cent for solar power while for coal and gas, it is almost 85 per cent. Additionally, there is interruption in electricity generation by the use of renewable sources of energy as it depends on the weather. In case of wind, it needs acceptable range of speed that is between 16 to 35.4 kilometres per hour (Woofenden, 2011) while the solar power cannot be generated in night or in cloudy day (Smith, n.d.).Hence it cannot become the reliable source of energy and not going to be a substitution for three hydrocarbon energy resources (coal, oil and natural gas) anytime soon.

The other source of energy is nuclear which had a very low share in India’s total primary energy consumption with 0.67 per cent, 1.03 per cent and 1.22 per cent in 1995, 2005 and 2015 respectively (**Graphs-2.1, 2.2 and 2.3**). Amid the paucity of funds, long gestation period of nuclear plant [seven to eight years (Sinha, 2015a)], lack of nuclear technologies, insufficient uranium reserves to feed the plant (Bhoje and Govindarajan, n.d.), India could not increase the nuclear energy production significantly. More importantly, the safety issues like radiation effects, radioactive waste management, decommissioning and accident risks lead to apprehension over nuclear energy plants in some section of the society (Department of Atomic Energy, 2015).

The other important sources of energy are oil and natural gas which met 35.92 per cent, 38.39 per cent and 34.39 per cent in 1995, 2005 and 2015 respectively of India’s total commercial energy needs as shown in **Graph-2.1**, 2.2 and 2.3. As the study focuses more on these resources, it is relevant to discuss it in detail in the context of India. In the changing political economy of the world, India’s dependence on imports to meet its oil and natural gas requirements varied from time to time and so is the level of its vulnerabilities.

India’s Crude Oil and Petroleum Products Scenario:

India’s first commercial crude oil discovery was in 1889 at Digboi, Assam and systematic drilling began in 1891(Edugreen, n.d.). To look after the oil business in and around this area, Assam Oil Company was formed by Assam Railways and Trading Company Limited registered at London in 1899 which established country’s first refinery with the capacity of 0.50 million tonnes per annum at Digboi in 1901 (Directorate General of Hydrocarbons, 2017; Indian Oil, n.d.). The crude oil production was 0.75 tonnes per day (757.08 litres per day) during 1890s. However, it is important to note that the larger share of its petroleum products needs were imported and its marketing and pricing was determined by multinational companies like Burmah and Shell, Caltex etc.

At the time of independence in 1947, the India’s oil and petroleum products industry were undeveloped. Thereafter, it went through different stages of development due to the changing domestic and global events. Based on these changes, India's oil and petroleum products scenario has been studied under the four distinct time period these are 1947-1955, 1956-1973, 1974-1990 and 1991-2015 based on the development of this industry.

Initial Phase, 1947-1955

In 1947, India was mainly dependent on the non-commercial energy resources such as fire wood, animal dung, agricultural wastes etc. to fulfil its energy needs which contributed over 67 per cent of its total energy supply (Dayal, n.d.). Rest was supported by commercial energy resources. Indian petroleum industry was mostly controlled by multinational companies (MNCs) (Narayan, n.d.) such as United Kingdom (UK)-based Burmah and Shell and US-based Standard and Vacuum (also Known as Esso) and Caltex. In the British India, the energy sector particularly oil sector remained one of the most neglected area in terms of industrial development. In 1947, the crude oil production was 0.25 million tonnes per annum and with the single refinery in Digboi with a total refining capacity of 0.3 million tonnes per annum. Thus, out of its 3 million tonnes of petroleum products consumed in 1948-49 (Narayan, n.d.), approximately 90 per cent was met through imports (Dayal, n.d.). The import was mostly from the Abadan refinery in Iran, which was owned by Anglo-Iranian Oil Company where the British government held 51 per cent share. The investment in Iran was Britain's largest single overseas investment, valued at US$448 million in 1946 which also became the source of major earning for Britain, calculated at more than US$400 million per year (Hopkins, 2017).

The availability of cheap oil source from the Gulf countries on one side and unwillingness to share the technological know-how of refinery industry with India and train its population encouraged the multinational oil companies(MNCs) to continue importing of petroleum products for India's need rather than establishing refinery industry there (Competition Commission of India, 2009). They feared that the establishment of refineries in India could encourage and facilitate the emergence of their competitor in the country in reference to the oil products. Moreover, these companies were selling the imported petroleum products with high margin of profits, as they had the distribution and marketing rights (Competition Commission of India, 2009). As a result, the MNCs opted to continue imports of petroleum products from the Abadan refinery and were not willing to build refineries in India.

On the other side, Indian government was also not taking initiative to build refineries as it was not in the position to compete with these established multinational companies to supply crude oil and products to its population. This shows that its energy supply mechanism was systematised according to the needs of colonial regime. Hence, India was highly dependent on other countries particularly on Iran for its petroleum products which was the choice of policy of the MNCs. Thus, it increased the vulnerability of the country in terms of petroleum products supply particularly in the case of instability in Iran. Nevertheless it continued to remain a source of financial gains to these MNCs even after 1947.

With the formation independent India, it was considered that oil had significant role in the economic development of the country and Prime Minister Jawaharlal Nehru kept this sector a priority for policies and infrastructural development. The government came up with the first Industrial Policy Resolution 1948 to determine the role of state and private parties in various industries which could give momentum to industrial development. This emphasised the need to keep oil industry under state ownership and control and stipulated that "all new units should be government-owned (Indian Oil Corporation, 2017).

In the meanwhile, Iran's Prime Minister Mossadegh carried out the nationalisation process of oil companies in 1951. He did this over the issue of sharing the ownership of British-owned Anglo-Iranian Oil Company (AIOC). This was also a set back to the multinational companies which were responsible for the supply of oil products to India as they also lost control over their refineries in Abadan. The new political development in Iran adversely affected India's petroleum products supply. As a result, Burmah and Shell, Standard and Vacuum as well as Caltex independently agreed to build refineries in India (Bamberg, 2000).

Nevertheless, the MNCs found themselves in increasing conflict with the Indian government over the Nahorkatiya oil field in Assam which was discovered in 1953. As the government wanted to increase its hold in oil sector, it refused Burmah's demand for refining or marketing of this oil source and asked for joint ownership in crude oil production (Indian Oil Corporation, n.d.). In response, Burmah temporarily suspended all exploration activities in India and eventually the MNCs agreed to build refineries. Standard and Vacuum set up a refinery in 1954 with a capacity of 1.25 million tons per annum (mtpa) (Hindustan Petroleum Corporation Limited, 2015) and Burmah and

Shell in 1955 with a capacity of 2.2 mtpa (Press Information Bureau, 2015) both in Bombay (Now Mumbai). Further, to develop oil and natural gas resources, a state unit ‘Oil and Natural Gas Directorate’ was set up towards the end of 1955, as a subordinate office under the then Ministry of Natural Resources and Scientific Research. This was mainly constituted with geo-scientists (Directorate General of Hydrocarbons, 2017) that meant its functions were limited to the exploration and development of oil and gas resources.

Thus, during 1947 to 1955, India was extremely dependent on the overseas supply of petroleum products rather than crude oil, as it did not have refinery except Digboi oil and was vulnerable to supply shocks. Moreover, the transport of petroleum products was more complex and costly than of crude oil as many refined products are more volatile and flammable than crude oil (Wilson, 2013). Hence, India was losing the major part of its foreign currency in importing these products. It is important to note that the dependence on overseas supply was the deliberate policy of the MNCs in which they were making big profit by applying their marketing and distribution rights (Competition Commission of India, 2009).

Second phase, 1956-1973

In 1956, the parliament adopted the Industrial Policy Resolution 1956 amid the acceptance of the “socialist pattern of society as the objective of social and economic policy” (Press Information Bureau, 1956:1) which aimed to prepare the strategy for industrial development of different sectors. This implied that the state was to play a key role in it. As oil had a strategic importance, it was included in core sector along with other industries like arms and ammunition and allied items of defence equipments, atomic energy, iron and steel, coal and lignite etc. For the core sector or Schedule A, the state was exclusively responsible for future development and all new units in these industries were to be set up only by the state. However, it did not preclude the expansion of the existing privately owned units, or the possibility of the state securing the co-operation of private enterprise in the establishment of new units when the national interests required (Press Information Bureau, 1956: 1).

To act efficiently for the development of oil and natural gas, the government took several initiatives. It raised the status of the Oil and Natural Gas Directorate, to a commission in 1956 with enhanced powers, although it continued to be under the government. In 1959, the unit got the statutory status whose main functions were “to plan, promote, organise and implement programmes for development of petroleum resources and the production and sale of petroleum and petroleum products produced by it" (Oil and Natural Gas Corporation Limited, 2017). Within a year, it successfully discovered oil in Cambay Basin and later, in Ankleshwar Field in Gujarat in 1960, Kalol in 1961, Lakwa in 1964, Geleki in 1968 (Directorate General of Hydrocarbons, 2017).

In the refinery sector, Indian Refineries Ltd., a wholly-owned public sector company was established in 1958 under the chairmanship of Feroze Gandhi which set up three refineries namely, at Guwahati (Assam in 1962), Barauni (Bihar in 1964) and Koyali (Gujarat in 1965) for processing of crude oil discovered in Assam and Gujarat (Directorate General of Hydrocarbons, 2017). In 1957, Caltex also built a refinery with a capacity of 0.65 mtpa in Visakhapatnam (Hindustan Petroleum Corporation Limited, 2015). On 30 June 1959, Indian Oil Company Ltd. was established with S. Nijalingappa as the first chairman (Indian Oil Corporation Limited, n.d.) for marketing petroleum products which was merged with Indian Refineries Ltd. in 1964 and became Indian Oil Corporation Ltd.

Later, a refinery was set up at Cochin as a joint venture with Phillips Petroleum Corporation, an American company in 1966 based on imported crude with a capacity of 6,250 tonnes per day (50,000 barrels per day) (Bharat Petroleum, 2016). In 1969, a refinery was set up at Chennai named 'Madras Refinery Corporation Limited' with equity participation from American and Iranian companies. With the building of new refineries under the government companies, the state became successful to enhance its say in oil industry. **Table-2.1** Shows the market share of the government and private oil companies.

Table-2.1

Market Share of Private and Government Oil Companies (Percentages)

Year	Indian Oil Corporation	Burmah-Shell, Esso and Caltex	Others
1960	0.2	92.5	7.3
1965	21.0	73.4	5.6
1968	42.5	53.8	3.7
1970	50.9	44.8	3.7
1972	57.3	37.9	4.8

Sources- (Chaudhury, 1977: 440)

As indicated in **Table-2.1**, the share of government companies in terms of refinery capacity in Indian oil market increased from 0.2 per cent in 1960 to 57.3 per cent in 1972. Simultaneously, its crude oil production increased from 0.25 million tonnes per year in 1948-49 to 7.32 million tonnes per year in 1972-73. Though, India became successful to increase its crude oil production, but it was still highly dependent on crude oil imports even in 1973 when oil consuming countries experienced the first major oil crisis in history. Its imports of crude oil were 12.08 million tonnes in 1972-73 or almost 62.27 per cent of its total consumption (Ministry of Statistics and Programme Implementation, 2006). The rising refinery capacity partly encouraged the crude oil imports.

Meanwhile, the oil crisis of 1973 adversely affected India's foreign exchange reserves. During September 1973 to November 1973 Arab members of Organisation of Petroleum Exporting Countries (OPEC) such as Saudi Arabia, Kuwait, Libya, Iraq, UAE, Algeria and Qatar cut their crude oil production from 2.71 million tonnes per day (19.874 million barrels per day) to 2.09 million tonnes per day (15.333 million barrels per day). However, rest of the members of OPEC namely Iran, Venezuela, Nigeria and Indonesia increased their production from 1.74 million tonnes per day (12.773 million barrel per day) to 1.78 million tonnes per day (13.114 million barrel per day). Nevertheless, OPEC's total crude oil production dropped from 4.45 million tonnes per day (32.647 million barrels per day) to 3.88 million tonnes per day (28.447 million barrels per day) (Alhajji, 2005).

When the crisis began, India, like many other developing countries, had hoped that its impact would only be limited to the countries which were directly supporting to the Israel in the October War of 1973 (Dadwal, n.d.). Further, it also anticipated that it would be given favourable treatment in terms of low oil price since it was having friendly relationship with the Arab states. Nonetheless, Arab and other members of OPEC expressed their inability to adopt a dual pricing system of a lower oil price for friendly countries than others (Dadwal, n.d.). As a result, the oil crisis of 1973 raised the oil price from US$3.05 per barrel in 1973 to US$10.73 per barrel in 1974 (OPEC, 2008) which put pressure on the Indian exchequer.

Thus, India’s oil industry during 1956 to 1973 was in a transitional phase where the government continued increasing its hold over oil market with the establishment of several new refineries. However, it could not maintain its oil production in pace with the demand and had to increase its import of crude oil which was not the case during the period of 1947 and 1955 when it was importing petroleum products.

Third Phase 1974-1990

The steep rise in crude oil price during 1973-74 had an adverse impact on India financially and increased cost of imported crude oil led to the increased outflow of foreign currency. In 1972-73, India's crude oil and petroleum products import bill was around US$267 million (Rs.203 crores) which raised to US$1404 million (Rs.1,157 crores) due to the oil crisis (Ahluwalia, 1986). This was around 30 per cent of its potential export earnings (Ahluwalia, 1986). After the oil crisis, 1974 witnessed several new energy related developments in India. The policy makers started to emphasise on the increase of coal consumption (Prasad, 1986) which enhanced from 78.18 million tonnes in 1972-73 to 85.58 million tonnes in 1974-75 (Ministry of Statistics and Programme Implementation, 2006).

Further, ONGC continued taking efforts in the exploration and development of oil and gas fields and the discovery of oil in the Arabian Sea adjacent to Mumbai in 1965 raised the spectrum of prospective oil productions fields. Later, the successful drilling of oil well in the high seas of Bombay (Now Mumbai) on 19 February 1974 was one of the most important developments in the oil sector (Singh and et al., 2004). The drilling confirmed the huge reserves of crude oil whose production was economically viable. The commercial production from this field could only be started from 1976 and it was responsible for the swift growth of India’s total crude oil production during

1970s and 1980s. **Table 2.2** depicts that India's domestic crude oil production that increased around 21 per cent during 1976-77 to 1977-78.

Table-2.2

India's Crude Oil Scenario from 1973 to 1990
(million tonnes)

Year	Demand*	Production	import	Per cent of import of demand**	Per cent of oil in total "primary energy"[2] consumption***
1973-74	21.044	7.189	13.855	66	N.A.
1974-75	21.700	7.684	14.016	65	N.A.
1975-76	22.072	8.448	13.624	62	N.A.
1976-77	22.946	8.898	14.048	61	N.A.
1977-78	25.270	10.763	14.507	57	N.A.
1978-79	26.290	11.633	14.657	56	N.A.
1979-80	27.887	11.766	16.121	58	N.A.
1980-81	26.755	10.507	16.248	61	N.A.
1981-82	30.654	16.194	14.460	47	N.A.
1982-83	33.460	21.063	12.397	37	N.A.
1983-84	36.465	26.020	10.445	29	N.A.
1984-85	36.154	28.990	7.164	20	N.A.
1985-86	44.784	30.168	14.616	33	N.A.
1986-87	45.956	30.480	15.476	34	N.A.
1987-88	48.091	30.357	17.734	37	N.A.
1988-89	49.855	32.040	17.815	36	N.A.
1989-90	53.577	34.087	19.490	36	N.A.

[2] "Primary energy should be used to designate those sources that only involve extraction or capture, with or without separation from contiguous material, cleaning or grading, before the energy embodied in that source can be converted into heat or mechanical work"(Overgaard, 2008).

1990-91	53.720	33.021	20.699	38	28.62 in 1991

Sources-(Ministry of Statistics and Programme Implementation, 2006; BP, 2002)

Simultaneously, the consumption of oil was also increasing. However, the increasing domestic oil production helped to reduce the pressure on import of oil until 1989-90 and the share of oil imports in its total demands declined from 66 per cent in 1973-74 to 38 per cent in 1990-91.

Besides emphasising on the increase of domestic oil production, Indian government also started to take over upstream and downstream industries of foreign oil companies operating in the country. Though, India had already created some oil companies in late 1950s such Indian Oil company, ONGC etc. the nationalisation of existing foreign companies could start only from 1974. The oil crisis of 1973 and nationalisation drive of MNCs by Russia, Mexico and Iran etc. prompted the Indian government to nationalise MNCs. Oil has a strategic importance and ensures national independence (Mackey and Callus, 2012. After its use in 1973 as a strategic weapon India did not want to let indigenous oil to be remained in foreign hands. There was also the precedent of nationalisation of oil companies by Russia in 1918, Mexico in 1938, Iran in 1951 etc. and these nationalised companies did a great job in increasing domestic oil production and distribution (Mackey and Callus, 2012). Moreover, the petroleum has been considered as “the property of the people” (Rouzaut and Favennec, 2011: 29) which imply that national people should have access to oil products at as low a price as possible (Rouzaut and Favennec, 2011).

India’s existing MNCs were working for their private gains and the interest of their parent counties while Indians were unable to realise its benefits. To increase its hold over energy sector and share its benefit with its population, Indian government nationalised the three foreign oil companies between 1974 and 1976; these were Esso, Burmah and Shell and Caltex, all wholly owned subsidiaries of large MNCs, commonly known as the Oil Majors (Chaudhury, 1977).

To strengthen energy security and broaden the range of energy resources, India started to focus on the development of non-conventional energy sources including nuclear energy. The Pokharan-I the first nuclear test on 18 May 1974 was officially considered peaceful with a code name ‘Smiling Buddha’. It was engaged in developing its own nuclear programme since 1944 with the foundation of Tata

Institute of Fundamental Research by Homi J. Bhabha, well before its independence, especially for energy, medicines etc. However, it could not be developed as a source of energy until the 1970s. The nuclear energy was yet to be developed as a reliable source of energy and it has been facing many challenges due to its dual use (Mian, and Glaser, 2006). It can be understood why nuclear energy had only 1.22 per cent share in India's total energy needs even in 2015 (Graphs**2.3)**.

Simultaneously, India kept establishing refineries. In 1975, a refinery was set up in the public sector at Haldia, West Bengal by Indian Oil Company. In 1979, the commissioning of refinery at Bongaigaon was the "first experiment in having an integrated petroleum refinery-cum-petrochemicals unit" (Narayan, 2000). In Mathura, a refinery was built in 1982 with a capacity of 6.0 mtpa to meet the demands of petroleum products in north western part of the country (Indian Oil, n.d.). The national oil companies (NOCs) were concurrently working on the expansions of the coastal refineries at Mumbai, Cochin, Chennai and Visakhapatnam during 1977 and 1987. "The notable features of the capacity additions during these periods had been the extensive utilisation of the process design capabilities of Engineers India Ltd., a public sector undertaking of the Government of India and installation of secondary processing facilities to increase the production of much required kerosene, diesels and LPG" (Narayan, 2000). As a result, its refining capacity enhanced from 18.459 million tonnes in 1970-71 to 51-52 million tonnes in 1990-91. **Table-2.3** provides India's status in petroleum products from 1973-74 to 1990-1991.

Table-2.3

India's Petroleum Products Scenario from 1973-74 to 1990-91

Year	Demand (million tonnes)	Production (million tonnes)	Net Imports (million tonnes)	Per cent of imports of demand	India's refining capacity (million tonnes)
1973-74	23.57	19.49	3.38	14.34	N.A
1974-75	23.30	19.61	2.47	10.60	N.A
1975-76	23.67	20.83	2.05	8.95	N.A
1976-77	25.40	21.43	2.55	10.03	N.A

1977-78	26.99	23.21	2.83	10.48	N.A
1978-79	29.71	24.19	3.83	12.89	N.A
1979-80	31.32	25.79	4.63	14.78	N.A
1980-81	32.26	24.12	7.25	23.10	N.A
1981-82	34.10	28.18	4.82	14.13	N.A
1982-83	36.39	31.07	4.23	11.62	N.A
1983-84	37.77	32.92	2.85	7.54	N.A
1984-85	40.82	33.23	5.15	12.61	N.A
1985-86	43.36	39.88	1.90	4.54	N.A
1986-87	46.27	42.76	0.55	1.18	N.A
1987-88	48.93	44.72	0.73	1.49	N.A
1988-89	52.88	45.69	4.20	7.94	N.A
1989-90	56.77	48.69	3.97	6.99	N.A
1990-91	57.74	48.56	6.01	11.01	51-52

Sources- (Ministry of Statistics and Programme Implementation, Several Years); (Singh, 1995)

With the boosting of refining capacity, India's production of petroleum products increased from 19.49 million tonnes in 1973-74 to 48.56 million tonnes in 1990-91 (See **Table-2.3)**. However, it could not cope-up with its rising demands which increased from 23.57 million tonnes in 1973-74 to 57.74 million tonnes in 1990-91. Consequently, the imports rose from 3.38 million tonnes in 1973-74 to 6.01 million tonnes in 1990-91, but in terms of share of imports in total demands of petroleum products got reduce from 14.34 per cent in 1973-74 to 11.01 per cent in 1990-91 (See **Table-2.3**). Thus, the oil industry came under the dominance and control of the public sector companies which became successful to make the country self reliant in terms of petroleum products to a great extent.

As the nationalisation of oil companies by respective host countries became a global phenomenon, the globalisation and liberalisation of world economy became a new reality during the 1980s and 1990s (Crafts, 2004). The disintegration of Union of Soviet Socialist Republics in 1991 gave the impetus to this process (Stivachtis, 2015).

India was not an exception. The internal economic crisis and the pressure from World Bank and other developed countries compelled India to liberalise its economy (Gosal, 2013). Consequently, the economic reforms were introduced in 1991.

Reform Phase, 1991-2015

With the introduction of economic reforms in July 1991, the economic liberalisation started and the reforms "were based on the assumption that market forces could guide the economy in a more effective manner than government control" (Madhotra, 2010:7). To make economy flexible and export oriented, the reforms focussed on rapid industrial development and an increase in the role of private sector (Madhotra, 2010). After the liberalisation and increased participation of private sector, the economic growth rate enhanced. According to a report by the World Bank, the average GDP growth rate was 5.68 per cent during 1980 and 1990 which raised to 6.31 per cent during 1991 and 2015 (World Bank, 2016). As there has been a causal links between economic growth and increase in energy consumption and it was apparent in India also [Energy Information Administration (EIA), 2013]. **Table-2.4** shows how the rise in India's GDP per capita led to the increase in energy use per capita.

Table-2.4

India's GDP per Capita and Energy Use per Capita

Year	GDP per capita (US$)	Energy use (kg of oil equivalent per capita)
1991	309.33	358.48
1992	323.52	364.22
1993	307.41	365.67
1994	353.29	372.41
1995	381.53	386.31
1996	408.24	390.65
1997	424.09	398.61
1998	421.82	400.71
1999	451.09	416.20

2000	452.41	418.51
2001	460.83	417.22
2002	480.62	422.48
2003	557.90	425.50
2004	640.60	440.95
2005	729.00	451.06
2006	816.73	467.50
2007	1,018.13	486.55
2008	991.52	503.07
2009	1,090.36	546.22
2010	1,345.72	563.16
2011	1,461.37	579.31
2012	1,446.77	600.19
2013	1,451.53	606.43
2014	1,569.94	636.72
2015	1,593.26	N.A.

Sources- (World Bank, 2016)

Table-2.4 shows that GDP per capita increased from US$309.33 in 1991 to US$1,569.94 in 2014 at the CAGR of 12.3 per cent. Simultaneously, the energy use per capita also enhanced from 358.48 kg of oil equivalent per capita in 1991 to 636.72 kg of oil equivalent per capita in 2014 with the CAGR of 4.19 per cent. As the rate of energy consumption per capita has been lower compared to GDP per capita during this period, there is a scope for escalation in energy consumption particularly commercial energy. Crude oil contributed significantly in meeting India’s total primary energy demands and in 2016, it contributed almost 29.38 per cent. **Table-2.5** provides the detail account for India’s crude oil scenario from 1991.

Table-2.5

India's Crude Oil Scenario since 1991

(million tonnes)

Year	Demand*	Production	Import	Per cent of import of demand**	Share of oil in total "primary energy" consumption***
1991-92	54.340	30.346	23.994	44	28.63 in 1992
1992-93	56.197	26.950	29.247	52	28.14 in 1993
1993-94	57.848	27.026	30.822	53	28.53 in 1994
1994-95	59.588	32.239	27.349	46	28.92 in 1995
1995-96	62.509	35.167	27.342	44	29.87 in 1996
1996-97	66.806	32.900	33.906	51	30.28 in 1997
1997-98	68.351	33.858	34.493	50	31.25 in 1998
1998-99	72.530	32.722	39.808	55	32.99 in 1999
1999-00	89.754	31.949	57.805	64	33.11 in 2000
2000-01	106.523	32.426	74.097	70	33.00 in 2001
2001-02	110.738	32.032	78.706	71	32.86 in 2002
2002-03	115.033	33.044	81.989	71	32.48 in 2003
2003-04	123.807	33.373	90.434	73	31.62 in 2004
2004-05	129.842	33.981	95.861	74	29.78 in 2005
2005-06	130.111	32.190	99.409	76	28.42 in 2006
2006-07	146.553	33.988	111.502	76	32.85 in 2007
2007-08	156.103	34.118	121.672	78	32.39 in 2008
2008-09	160.774	33.508	132.775	83	31.51 in 2009
2009-10	192.768	33.690	159.259	83	30.47 in 2010
2010-11	196.989	37.684	163.595	83	30.37 in 2011
2011-12	204.121	38.090	171.729	84	30.25 in 2012

2012-13	219.212	37.862	184.795	84	29.42 in 2013
2013-14	222.497	37.788	189.238	85	28.33 in 2014
2014-15	223.240	37.460	189.430	85	27.90 in 2015
2015-16	232.860	36.940	202.850	87	29.38 in 2016

Sources- (Ministry of Statistics and Programme Implementation, 2006; MP&NG, 2015; Ministry of Statistics and Programme Implementation, 2014; BP, Several Years).

Note-*Refinery Crude Throughput is taken as demand of crude Oil in India.
** This also includes the re-export of oil in the form of petroleum products.
*** Column is in calendar year.

Due to the high economic growth, India's crude oil demand increased from 54.340 million tonnes in 1991-92 to 232.860 million tonnes in 2015-16 with the CAGR of 5.99 per cent during these periods. In terms of oil production, it was significantly low compared to its consumption which was 30.346 million tonnes in 1991-92 and which increased to only 36.940 million tonnes in 2015-16 at the CAGR of 0.79 per cent during the same period.

To increase the oil production, the government opened the upstream sectors for private participations and New Exploration Licensing policy (NELP) was introduced in 1999 which provides a level playing field to private companies on par with Indian NOCs for the allotment of license for the oil exploration and production (Ministry of Oil and Natural Gas, 2017). It increased the role of private participation in upstream sector as well as the pace of oil exploration. Hence, during 2016-17 ONGC and OIL produced almost 61.5 per cent and 9 per cent respectively of indigenous crude oil while the share of private or joint venture companies in oil production was 29.5 per cent [Ministry of Petroleum and Natural Gas, 2017]. **Table-2.6** gives the detail of development in the oil and gas related activities under NELP regime.

Table-2.6

Development under NELP Regime

NELP Rounds	Blocks awarded under production sharing regime	Investment under NELP (US$ million)
NELP-One	24	12542.81
NELP-Two	23	942.67
NELP-Three	23	5196.63
NELP-Four	20	2100.18
NELP-Five	20	1005.80
NELP-Six	52	2573.25
NELP-Seven	41	815.19
NELP-Eight	32	439.14
NELP-Nine	19	119.31
Total	254	25734.98

Sources-(MP&NG, 2017)

Note- The total investment was taken as on 1 April 2016.

Table-2.6 illustrates that NELP-One was the most successful bidding vis-à-vis investments in oil and gas exploration when it was US$12.54 billion, thereafter it has been declining trend in general which also became an obstacle for further increasing oil production.

Thus, it is apparent that domestic oil production has not been sufficient to meet rising oil demands and there has been a big gap between its production and consumption. The other main reason in low oil production has been the aging oil fields like Mumbai High field and onshore Gujarat and Assam-Arakan Basins etc. (EIA, 2016); political issues like bandhs and blockade from time to time due to various reasons; and geological issues like water and sand ingress problems in oil wells etc. which occurred in Assam-Arakan Basins in 2013 (MP&NG, 2013). The sluggishness in oil production left no option for India but to look for oil producing countries to meet the growing oil demand.

As a result, its dependence on the overseas oil supply had risen extensively from 23.994 million tonnes in 1991-92 to 202.850 million tonnes in 2015-16 or almost rise of 846 per cent. In terms of share of imports in meeting India’s total crude oil demands, it increased from 44 per cent in 1991-92 to almost 87 per cent in 2015-16, highly vulnerable condition from the energy security perspective. For crude oil imports, India has been largely dependent on the West Asian region and in 2012-13, the region supplied almost 62.44 per cent of the country’s total oil import while in 2013-14 and 2014-15, it was 61 per cent and 58 per cent respectively (PTI, 2016f). For the energy security purpose, Indian government kept emphasising on the diversification of its energy sources which is considered an important part of energy security, as forecasted by Winston Churchill in 1915.

This was more important when developing countries like India did not have an active strategic oil reserve to support oil consumer country during a supply shock. Having its importance during supply shocks, India has planned for setting up strategic crude oil reserves of 5.33 million tonnes at three locations in Vishakhapatnam (1.33 million tonnes), Mangalore (1.50 million tonnes) and Padur (2.5 million tonnes) with the capacity to supply approximately 10.5 days of crude oil requirement according to its consumption during 2016-17. The government has plans to raise it to 63 days (MP&NG, 2017).

Although West Asia has been largest oil supplier to India it has also been a region of turmoil for various reasons and this may interrupt the energy supply at any time. For example the Iranian Revolution in 1979, Iran-Iraq war during 1980-88 and decision by OPEC to cut oil output in 1979 (Homavandi, 2012) increased oil price from US$12.70 per barrel in 1978 to US$32.51 per barrel in 1981 (OPEC, 2008) saw volatility. As a result, India’s capital outflow increased from US$2050.51 million (Rs.1686.9 crores) in 1978-79 to US$6237.29 million (Rs.5263.5 crores) in 1980-81 (Singh, 1986).Therefore, the diversification of energy supply is one of the strategies to attain the security of energy supply. That is why India is looking for other regions to provide its energy needs and India’s reliance on West Asian region has reduced from 68 per cent in 2001-02 (Verma, 2012) to 61 per cent in 2013-14 and 58 per cent in 2014-15 (PTI, 2016). In 2013-14 it bought 115.86 million tonnes of oil from this region out of

189.24 million tonnes while in fiscal year 2014-15, imports from the region were 109.88 million tonnes out of its total imports of 189.44 million tonnes (PTI, 2016f). During 2013-14, Latin America was the second biggest oil contributor with 31.73 million tonnes of oil or almost 17 per cent of India's total import while African region followed it with 30.39 million tonnes of oil supply (PTI, 2014).

The diversification of oil supplies may also help India to do away with the Asian premium which is the extra cost charged by the Gulf oil producers from the Asian oil importing countries such as India, Japan and others for decades (Demongeot, 2009). Due to few alternatives to Gulf crude and little bargaining power, these Asian countries paid up to US$6 more for the same quality of oil from the Gulf region than the US or European refiners ET Bureau, 2015). In gist, Asia's oil supplies from the Gulf nations attract a premium from US$2 to US$3 per barrel and are in-built in the cost of crude (Airy, 2014).

As India's oil supplier, Saudi Arabia has been the largest one during 2000s, as shown in **Table-2.7**. To study and analyse India's crude oil supplier as country-wise, **Table2.7** gives details of its five largest crude oil provider as well as their share in India's total oil imports in percentage. The data has been taken from 2001-02 to 2015-16 as its prior data is not available.

Table-2.7

India's Top Five Crude Oil Suppliers and its Share in its Total Crude Oil Supply (per cent)

Year	First	Second	Third	Fourth	Fifth	from others
2001-02	Saudi Arabia (16.95)	Kuwait (15.18)	Nigeria (14.86)	Iran (10.75)	UAE (9.67)	32.59
2002-03	Saudi Arabia (22.95)	Nigeria (14.26)	Kuwait (11.23)	UAE (10.98)	Iran (9.04)	31.54
2003-04	Saudi Arabia (26.06)	Nigeria (12.25)	Kuwait (12.03)	Iran (9.55)	UAE (9.33)	30.78

2004-05	Saudi Arabia (24.98)	Nigeria (15.74)	Kuwait (11.84)	Iran (10.02)	Iraq (8.67)	28.75
2005-06	Saudi Arabia (25.45)	Nigeria (13.62)	Iran (11.47)	Iraq (11.27)	Kuwait (10.57)	27.62
2006-07	Saudi Arabia (22.10)	Iran (13.17)	Iraq (12.05)	Nigeria (11.70)	Kuwait (10.22)	30.76
2007-08	Saudi Arabia (22.19)	Iran (16.00)	Iraq (11.73)	UAE (8.94)	Kuwait (8.45)	32.69
2008-09	Saudi Arabia (19.54)	Iran (16.42)	Kuwait (11.10)	Iraq (10.84)	UAE (10.42)	31.68
2009-10	Saudi Arabia (14.89)	Iran (14.37)	Kuwait (9.51)	Iraq (9.03)	Nigeria (8.47)	43.73
2010-11	Saudi Arabia (17.17)	Nigeria (10.61)	Iran (10.50)	Iraq (9.64)	Kuwait (9.39)	42.69
2011-12	Saudi Arabia (19.23)	Iraq (14.34)	Kuwait (10.82)	Nigeria (9.33)	Iran (9.03)	36.99
2012-13	Saudi Arabia (18.84)	Iraq (13.06)	Venezuela (11.17)	Kuwait (10.1)	UAE (8.4)	38.43
2013-14	Saudi Arabia (20.78)	Iraq (12.99)	Venezuela (11.26)	Kuwait (10.6)	Nigeria (8.39)	35.98
2014-15	Saudi Arabia	Iraq	Venezuela	Kuwait	Nigeria	37.22

	(18.35)	(12.78)	(12.1)	(10.01)	(9.54)	
2015-16	Saudi Arabia (19.6)	Iraq (17.66)	Nigeria (11.37)	Venezuela (11.15)	UAE (7.32)	32.9

Sources-[Verma, Nidhi2012; Department of Commerce, India (Several Years)]

Table-2.7 shows that the Saudi contribution was more than one-fourth in India's total oil imports in 2003-04. Nevertheless, India has been making efforts to lessen its dependence not only on Saudi Arabia but also on the West Asian region.

Although, India's reliance on overseas oil supply has increased to meet its rising oil demands, it became more affluent in producing petroleum products. With the increasing production of petroleum products, it emerged as an important player in the global energy market. The definition of energy security by Planning Commission which incorporates "energy security does not mean complete energy independence" can be perceived on India's emphasis for increasing exports of petroleum products to other countries. **Table 2.8** gives data regarding the petroleum products of India from 1991.

Table-2.8

India's Petroleum Products Scenario since 1991

(Million Tonnes)

Year	Demand	Production	Net Imports	Share of imports in total demands (per cent)	India's refining capacity (calendar year)
1991-92	59.60	48.34	6.50	10.90	N.A
1992-93	61.65	50.35	7.56	12.26	N.A
1993-94	63.64	51.08	8.04	12.63	N.A
1994-95	70.65	52.92	10.69	15.13	N.A
1995-96	78.07	55.08	16.90	23.47	N.A
1996-97	82.65	59.00	17.10	20.68	N.A.

1997-98	87.80	61.30	20.58	23.43	62 (1998)
1998-99	94.26	64.54	23.05	24.45	70 (1999)
1999-00	102.63	79.41	15.86	15.45	112 (2000)
2000-01	106.97	95.61	0.90	0.93	115 (2001)
2001-02	107.70	100.00	-3.05	-2.83	115 (2002)
2002-03	111.77	104.14	-3.06	-2.73	117 (2003)
2003-04	115.99	113.46	-6.61	-5.69	127 (2004)
2004-05	120.17	118.57	-9.38	-7.80	127 (2005)
2005-06	122.35	119.75	-10.02	-9.13	132 (2006)
2006-07	131.67	135.26	-15.96	-13.37	149 (2007)
2007-08	140.70	144.93	-18.32	-14.46	149 (2008)
2008-09	145.31	150.52	-20.38	-15.66	176 (2009)
2009-10	149.80	179.77	-36.31	-25.31	185 (2010)
2010-11	156.91	190.32	-42.26	-28.53	194 (2011)
2011-12	165.43	203.20	-44.99	-27.19	215 (2012)
2012-13	175.40	217.74	-47.63	-27.15	215 (2013)
2013-14	176.06	220.76	-51.15	-29.05	215 (2014)
2014-15	165.52	221.13	-42.63	-25.75	230 (2015)
2015-16	184.67	231.92	-31.08	-16.8	230 (2016)

Sources- (Ministry of Statistics and Programme Implementation, 2006; Ministry of Statistics and Programme Implementation, 2013; Ministry of Statistics and Programme Implementation, 2015; MP&NG, 2017).

The emphasis on development of refining capacity was also seen from the 1990s. In 1993, a small refinery of 0.5 mtpa at Narimanam (Nagapatinnnam) was built in Tamil Nadu to process the crude oil from adjoining fields like Narimanam and PY-3 oil fields (Kumar, 2012). In 1996, a 3 mtpa refinery was built at Mangalore in a joint venture between HPCL and Indian Rayon. In 1998, a refinery in Panipat Haryana was set up. In 1999, the first privately owned refinery since 1957 was established with a capacity of 25 million tonnes per year by Reliance Industry Limited in Jamnagar, Gujarat. Later, during 2000-2016, seven refineries were built out of which three refineries are in public sectors namely, Numaligarh in Assam (2000), Tatipaka in Andhra Pradesh (2001) and Paradip in Odisha (2016); two refineries in private sectors namely, Vadinar in Gujarat (2006), SEZ, Jamnagar (2008); and two refineries were joint ventures namely, Bina in Madhya Pradesh (2011) and Bathinda in Punjab (2012) (See **Table-3.8**). During 1991 and 2016, the companies were also involved in the expansion of capacity of the existing refineries. With 23 refineries, India had the refining capacity of 230.066 mtpa in 2016-17 (MP&NG, 2017).

India has not been highly dependent on imports for its petroleum products needs as crude oil. Due to the well developed refinery industry, the production of refined oil increased from 48.34 million tonnes in 1991-92 to 231.92 million tonnes in 2015-16 with the CAGR of 6.47 per cent while the demands had risen from 59.60 million tonnes to 184.67 million tonnes with the CAGR of 4.63 per cent for the same period (See **Table-2.8**). This shows that the growth rate of refined oil production was more than consumption which made India a net exporter from 2001-02 with 3.05 million tonnes. Due to the increasingly growing its export, it became the source of earnings for the country. **Table-2.9** gives the data of India's exports and imports of petroleum products.

Table-2.9

India's Imports and Exports of Petroleum Products

(Million US$)

Year	Imports	Exports	Net Exports
1998-99	2,895	86	-2,809
1999-00	3,264	161	-3,103
2000-01	2,642	1,676	-966
2001-02	1,511	1,731	220
2002-03	1,822	2,251	429
2003-04	2,114	3,661	1,547
2004-05	3,278	6,660	3,382
2005-06	6,302	11,233	4,931

2006-07	9,068	17,907	8,839
2007-08	15,126	27,556	12,430
2008-09	13,557	27,282	13,725
2009-10	7,089	30,663	23,574
2010-11	12,067	43,340	31,273
2011-12	14,189	59,319	45,130
2012-13	12,591	58,848	46,257
2013-14	12,466	60,664	48,198
2014-15	12,138	47,277	35,139
2015-16	9,952	27,059	17,107

Sources-(Petroleum Planning and Analysis Cell, 2017)

In 2015-16, it imported 29.456 million tonnes of refined products worth US$ 9,952 million and exported 60.539 million tonnes globally worth US$27,059 million, hence its net exports was 31.08 million tonnes with the earning of US$17,107 million (MP&NG, 2017). As a result, India ranked fifth as its exporter in the world after the US, Russia, Netherlands and Singapore and second in Asia in 2016 with US$27 billion of exports (Workman, 2017). In terms of imports of petroleum products, fuel oil (petrol), light diesel oil etc are purchased by India from UAE, Singapore and China (PTI, 2017) while it exported diesel and fuel oil but in different quality, naphtha etc. was exported to Pakistan, Australia, Vietnam, Africa etc (Abdi, 2017).

Thus, India's crude oil imports increased significantly during 1991-2015 as the domestic oil production was not able to cope up with the rising demands. In terms of petroleum products, India's enhancing refinery capacity led it to increase the production of these products and the country became its major exporter globally. It is apparent that imported crude oil has not only been for the consumption domestically but the value addition in it in the form of different products, it has also become the major source of earnings for the country. Moreover, it is important to note that Indian government has been encouraging private participation in the oil industry through NELP.

India's Natural Gas Scenario:

Natural gas is another important source of energy on which India heavily relies to meet its future energy demands. According to *BP Statistical Review of World Energy 2017,* India had 1.2 trillion cubic metres of gas reserves in 2016 or almost 0.7 per cent of global natural gas reserves. The reserve upon production ratio of gas in India was 44.4 years which denoted that Indian gas reserves could last for 44 years with the existing quantity of gas production per year.**Table-2.10** presents India's natural gas scenario since 1973.

Table-2.10

India's Natural Gas scenario

(Billion Cubic Metres)

Year	Consumption	Gross Production	Net Production	Per cent of use of gross production	Import *	Per cent of import of consumption	Share of gas in total energy consumption*
1973-74	0.76	1.71	0.76	44.48	N.A.	N.A.	N.A.
1974-75	0.95	2.04	0.95	46.59	N.A.	N.A.	N.A.
1975-76	1.13	2.37	1.12	47.55	N.A.	N.A.	N.A.
1976-77	1.38	2.43	1.38	56.87	N.A.	N.A.	N.A.
1977-78	1.46	2.84	1.46	51.56	N.A.	N.A.	N.A.
1978-79	1.71	2.81	1.71	60.84	N.A.	N.A.	N.A.
1979-80	1.68	2.77	1.68	60.75	N.A.	N.A.	N.A.
1980-81	1.52	2.36	1.52	64.54	N.A.	N.A.	N.A.
1981-82	2.22	3.85	2.22	57.69	N.A.	N.A.	N.A.
1982-83	2.96	4.94	2.96	59.90	N.A.	N.A.	N.A.

1983-84	3.40	5.96	3.40	57.05	N.A.	N.A.	N.A.
1984-85	4.14	7.24	4.14	57.18	N.A.	N.A.	N.A.
1985-86	4.95	8.13	4.95	60.85	N.A.	N.A.	N.A.
1986-87	7.08	9.85	7.06	71.80	N.A.	N.A.	N.A.
1987-88	7.97	11.47	7.97	69.48	N.A.	N.A.	N.A.
1988-89	9.25	13.22	9.25	69.98	N.A.	N.A.	N.A.
1989-90	11.17	16.99	11.17	65.76	N.A.	N.A.	N.A.
1990-91	12.77	18.00	12.77	70.93	N.A.	N.A.	6.17 in 2001
1991-92	14.44	18.65	14.44	77.45	N.A.	N.A.	6.59 in 1992
1992-93	16.12	18.06	16.12	89.23	N.A.	N.A.	6.59 in 1993
1993-94	16.34	18.34	16.34	89.11	N.A.	N.A.	6.64 in 1994
1994-95	17.34	19.47	17.34	89.05	N.A.	N.A.	7.01 in 1995
1995-96	18.09	22.64	20.93	79.90	N.A.	N.A.	6.81 in 1996
1996-97	18.63	23.26	21.32	80.11	N.A.	N.A.	7.24 in 1997
1997-98	21.51	26.40	24.55	81.48	N.A.	N.A.	7.5 in 1998
1998-99	22.49	27.43	25.71	81.99	N.A.	N.A.	7.66 in 1999
1999-00	26.89	28.45	26.89	94.51	N.A.	N.A.	7.55 in 2000
2000-01	27.86	29.48	27.86	94.51	N.A.	N.A.	7.55 in 2001
2001-02	28.04	29.71	28.04	94.35	N.A.	N.A.	7.64 in 2002
2002-03	29.96	31.39	29.96	95.46	N.A.	N.A.	8.29 in 2003
2003-04	30.91	31.96	30.91	96.69	N.A.	N.A.	8.31 in 2004
2004-05	30.78	31.76	30.78	96.88	3.378	11	8.75 in 2005
2005-06	31.03	32.20	31.33	97.29	6.84	22	8.58 in 2006
2006-07	31.37	31.75	26.42	82.38	9.20	29	8.63 in 2007
2007-08	30.58	32.42	26.98	83.22	11.24	37	8.37 in 2008
2008-09	32.99	32.85	27.07	82.40	10.89	33	9.72 in 2009
2009-10	46.51	47.50	40.86	86.11	12.36	27	11.05 in 2010

2010-11	51.43	52.22	46.04	88.16	13.42	26	10.65 in 2011
2011-12	60.68	47.56	41.17	86.56	17. 86	29	9.27 in 2012
2012-13	53.91	40.68	34.35	84.43	17.75	33	7.77 in 2013
2013-14	48.99	35.41	29.05	82.03	17.61	36	7.14 in 2014
2014-15	47.75	33.66	26.91	79.94	19.16	40	6.49 in 2015
2015-16	48.83	32.25	25.46	78.94	22.54	46	6.23 in 2016

Sources-(MP&NG, 2014; MP&NG, 2015; Ministry of Statistics and Programme Implementation, 2006; BP, Several Years).

*This column follows the calendar year.

Note- The net gas production is derived after deducting re-injected and flared gas from gross gas production. There are lack data for re-injection of gas from 1995-96 to 2005-06.

Table-2.10 shows that India's consumption of natural gas continued to increase from 1973-74 when was 0.76 billion cubic metres (bcm) in 1973-74 and to 60.68 bcm in 2011-12 but later it started declining and came down to 48.83 bcm in 2015-16. However, its CAGR was at 10.41 per cent during 1973-74 and 2015-16. The natural gas as an energy source became further important as issues pertaining to environmental pollution got the global attention. It is often considered as the cleanest fossil fuel.[3] It produces about 29 per cent and 44 per cent less carbon dioxide, a major contributor in global warming, in per joule of energy production compared to oil and coal respectively (Nat gas, 2013b).

Amid the need to develop gas related infrastructure in India, the government established Gas Authority of India Limited (GAIL) in 1984 to deal in transportation, processing and marketing of natural gas and natural gas liquids. The construction of a 1,700 km-long Hazira-Bijapur-Jagdishpur gas from Hazira in Gujarat to Jagdispur in Uttar Pradesh, passing through Rajasthan and Madhya Pradesh (Narayan, 2000) facilitated the use of natural gas domestically. In Asia, India was the third largest gas consumer with 50.1 bcm in 2016 after China and Japan whose gas consumption were 210.3 bcm and 111.2 bcm respectively (BP, 2017). Demands for natural gas come

[3] With only one carbon and four hydrogen atoms per molecule, Natural gas has the lowest carbon to hydrogen ratio, hence it burns completely, making the cleanest of fossil fuels (International Business Publication, 2015).

from energy and non-energy sectors and **Table-2.11** shows the trends of natural gas consumption in India.

Table-2.11

India's Natural Gas Consumption by Energy and Non-energy Purposes

Year	Gas consumption by energy purposes (bcm)	Gas consumption by non-energy purposes (bcm)	India's total gas consumption (bcm)	Share of energy purposes in gas consumption (per cent)	Share of non-energy purposes in gas consumption (per cent)
2011-12	43.04	18.53	61.57	69.90	30.10
2012-13	35.07	19.63	54.70	64.11	35.89
2013-14	29.89	19.81	49.71	60.13	39.87
2014-15	28.12	19.52	47.64	59.02	40.98
2015-16	27.07	21.47	48.55	55.76	44.24

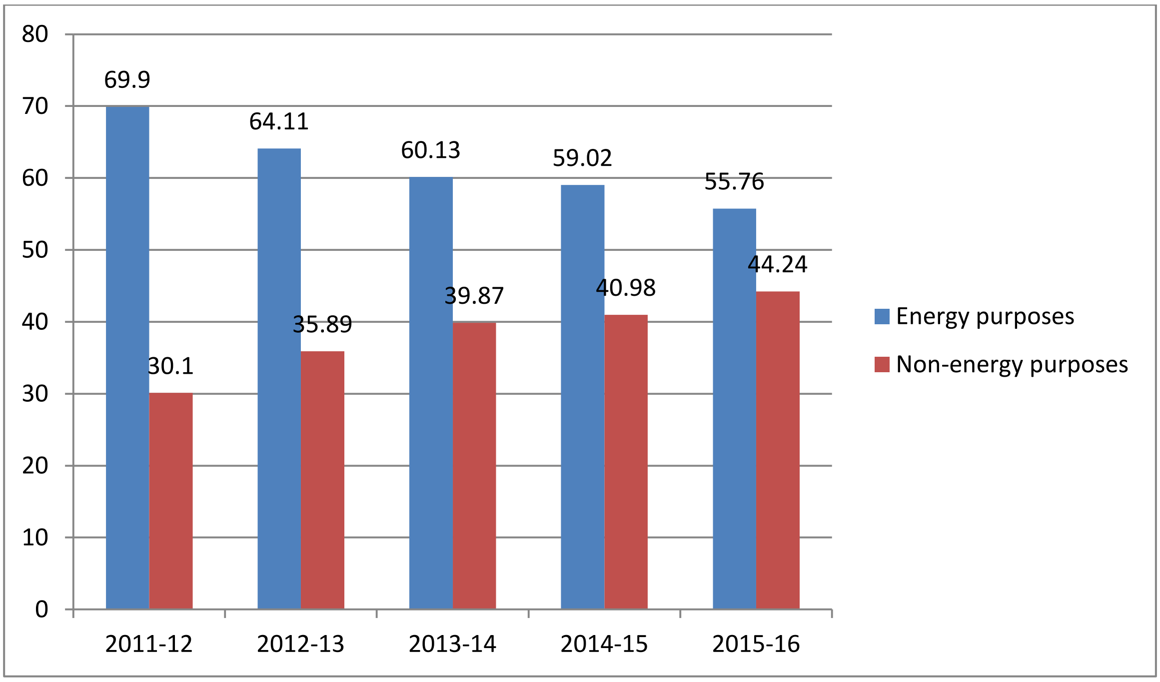
Sources- (Indiaenergy, n.d.)

Table-2.11 shows that major gas demands in India was for energy purposes like power, industrial, manufacture, road transport, city gas distribution, tea plantation, internal consumption for pipeline system, refinery and miscellaneous with average share of 61.78 per cent during 2011-12 and 2015-16. However, its share decreased from 69.90 per cent 2011-12 to 55.76 per cent in 2015-16.

For the non-energy purposes, the majority of gas demands came from fertilizer industry accounting for more than 75 per cent of non-energy purposes which also included petrochemical, sponge iron, liquefied petroleum gas shrinkage etc. **Graph 2.4** shows the comparison between energy and non-energy gas demands.

Graph-2.4

Comparison between India's Gas use in Energy and Non-energy Purposes



Sources-(Indiaenergy, n.d.)

Moreover, the share of natural gas in India's total primary energy consumption kept increasing until 2010. It was 6.17 per cent in 2001 and increased to 11.05 per cent in 2010 Later, it started to decline and in 2016, it came down to 6.23 per cent (BP, 2017) . However, natural gas has been occupying an important place among energy sources.

It is important to note that India had larger gross natural gas production during 1970s and 1980s compared to its consumption but it could not be converted into net gas production. The key reason was the unavailability of appropriate technology to catch the flared gas that had been venting out as a waste product during coal and oil mining. The development of technologies in the exploration of hydrocarbon resources helped to increase the gross and net natural gas production (Admin, 2015). As a result, in 1973-74, the share of non-utilised part of gross natural gas production in the form of re-injected and flared natural gas which was more than 50 per cent and came down to less than 3 per cent in 2005-06 and resulted in the increase of net natural gas production. Further, the increase in gas utilisation for the re-injection in the oil field reduced the extraction of net gas production from the gross gas production (Ministry of Statistics and Programme Implementation, 2017).

For enhancing gas production, government emphasised on the participation of private companies in exploration, development and production of gas and it came up with the NELP and Coal Bed Methane Policy in 1997-1999. “These policies provide a level playing field to the private investors by giving the same fiscal and contract terms as applicable to the Indian national oil companies (NOCs) for the offered exploration acreage” (MP&NG, 2017: page-24). By this policy, the government made private participants also responsible for India’s energy security. Under NELP (1to 9), 254 blocks were awarded out of which 114 were in on-land, 58 in offshore shallow water and 81 in deep water areas. As a result, the NOCs shared 78 per cent of gas production while private and joint venture companies could contribute 22 per cent (MP&NG, 2017).

Further, it is worth discussing about India’s natural gas production on the basis of basins and areas as this classification is helpful in better understanding the reasons behind the variations in their natural gas production since 2011. There are seven basins and areas which produce natural gas and are commercially viable. The other basins have also known reserves of natural gas but commercially not viable. **Table-2.12** reveals the areas and basins which produce natural gas in India.

Table-2.12

Natural Gas Production in India (2013-14)

Basins	**Production from known reserves (bcm)**
Rajasthan	0.98
Assam-Arakan and Assam Shelf	3.73
Cambay	1.77
Cauvery	1.30
Coal-Bed	0.17
Krishna-Godavari	6.83
Mumbai	20.63
Grand Total	**35.41**

Sources- (MP&NG, 2014).

Table-2.12 shows that it was Mumbai (especially from offshore) which had the highest share in natural gas production in 2013-14. The other significant share came from Krishna-Godavari Basin which is located on the east coast. It's on-land and offshore parts cover 15,000 square km and 25,000 square km up to 1000 metres isobath respectively and contain large reserves of oil and natural gas (Directorate General of Hydrocarbons, 2017). Out of 39 awarded blocks/fields in KG Basin, only 10 were operational by March 2017. The Lok Sabha was informed on 20 March 2017 that Cairn Energy Ltd. from Ravva field, RIL from D1, D3 and MA fields in KG-DWN-98/3 (KG-D6) block, Gujarat State Petroleum Corporation and ONGC from KG-OSN-2001/3 Block were involved in oil and gas production from the Krishna-Godavari Basin (Pradhan, 2017).

In this Basin, 7,645 square km deepwater block KG-DWN 98/3 has been the significant amount of gas producer which is also called KG-Dhirubhai-6. Reliance Industries Limited (RIL), a private Indian company with 60 per cent stake in this block and has been operating it with their partners Niko with 10 per cent and BP Plc with 30 per cent since 2000 and for which they got right under NELP-one (Shah, 2016). The discovery of oil and natural gas in KG Dhirubhai-6 block in 2001 by RIL was considered a major finding after the Bombay High by ONGC in 1970s. The gas production from the block (D-26 gas fields) started in September 2008 but the peak production was recorded in March 2010 when D1 and D3 of KG-D-6 produced 22.22 bcm [60 million standard cubic metres per day(mmscmd] (Reliance Industries Limited, 2010). This became the major factor in the rise of India's natural gas production in 2009-10 when it was 47.496 bcm compared to 32.845 bcm in 2008-09 or almost 44.61 per cent higher than previous year (MP&NG, 2014). In 2015-16, the total gas production from KG Basin was 5.24 bcm (5165.22 mmscm) in which KG-DWN-98/3 contributed 3.99 bcm (3939.97 mmscm) (Pradhan, 2017).

After achieving some success in domestic gas production until 2011, India has been experiencing its decrease. Technical and non-technical issues kept affecting the gas production such as bandhs and blockades in Assam over the issue of auction and handing over 12 oil fields of the state to private parties (Kashyap, 2016); insufficient investment in more technically challenging deep-water reserves; a challenging regulatory environment; and unexpected decline in gas reserves (EIA, 2016).

RIL and Government of India, both have their own arguments for the low production from KG Basin. According to the government, the decline in gas production from the KG basin was due to not drilling sufficient numbers of wells. On the other side, RIL claimed that the production declined due to downgrading of reserves and thus sought fresh approval from the government for higher costs and increased price for its produced gas from KG Basin (ET, Bureau, 2016). Hence, the initial development cost of KG D-6 at US$2.4 billion in 2004 was revised in 2006 to US$5.2 billion in the first phase and US$3.3 billion in the second phase (Singh and Jayaswal, 2011).

For the gas price, the RIL continued negotiating hard with the government to increase it by flagging in increase in the cost of gas production. During the early 2000s, the domestic gas price was US$1.79 per million British thermal units (mmBtu) which was increased to US$4.20 per mmBtu in 2007 through the bidding process in the case of KG D-6 gas fields (Jain, 2010).

In October 2014, NDA government approved the new formula of natural gas pricing which was a volume-weighted average price of a set of international price including

Henry Hub of the US, National Balancing Point of the UK, Alberta of Canada and Russian domestic gas price and was to be revised every six months (Sen, 2015). Though, this formula increased domestic gas price from US$4.20 per mmBtu to US$5.61 per mmBtu in November 2014 (PTI, 2015b) it fell down below US$4 per mmBtu in 2016 as the international gas price was low and was not considered as the encouraging gas price for its production from the deep-water discoveries. However, the cost of gas production from these difficult areas ranges between US$6-7 per mmBtu. According to Goldman Sachs, a US-based multinational finance company, India's domestic gas price is lower than US$9 per mmBtu in China, US$10.5 per mmBtu in the Philippines, US$6.5 per mmBtu in Indonesia and US$8 per mmBtu in Thailand and Malaysia. Hence Indian government intends to hike almost 60 per cent in gas price for undeveloped gas discoveries in difficult areas (PTI, 2016b).

Earlier, India was focussing mainly on exploration of conventional form of natural gas that is from independent natural gas field or associated with oil field but the development of new and advanced technology helped to explore non-conventional gas sources such as 'coal bed methane' (CBM)[4] and shale gas. India has started the commercial production of CBM from July 2007 in Raniganj (South) block in West Bengal and is operated by Great Eastern Energy Corporation Limited (MP&NG, 2015).

In terms of shale gas, it refers to natural gas that is trapped within shale formations, a fine-grained sedimentary rock (EIA, n.d.). There are several sedimentary basins in India in which shale gas is presented according to EIA, India has 16.352 tcm (584 tcf) of Shale gas in four basins including Cambay Onland, Damodar, Krishna Godavari Onland and Cauvery Onland. ONGC estimated 5.25 tcm (187.5 tcf) of shale gas in five basins including Cambay Onland, Ganga Valley, Assam and Assam Arakan, Krishna Godavari Onland and Cauvery Onland. Central Mine Planning and Design Institute estimated 1.26 tcm [45 trillion cubic feet (tcf)] of shale gas in six sub-basins including Jharia, Bokaro, North Karanpura, South Karanpura, Raniganj and Sohagpur (MP&NG, 2017). In spite of such a large estimated gas reserves, it could not be produced commercially by December 2016 (MP&NG, 2017).

[4] Coal Bed Methane is natural gas that is trapped in coal seams underground. The seam is drilled to extract the gas (Frack off, 2015).

The above reasons indicate that India is unable to fulfil its rising gas demands through domestic production. To fill the gap between production and consumption, India is left with no option but to import. In the absence of any transnational gas pipeline in India, it started to import LNG from Qatar since 2004 when its Dahej LNG terminal came into operation. India continued developing LNG terminals and infrastructure to increase its capacity to import gas from other parts of the world. **Table 2.13** Gives the details of India's LNG imports.

Table-2.13: India's LNG Imports

Year	India's LNG terminal capacity (mtpa)	India's LNG imports (bcm)	LNG imports from the countries (numbers)
2005	7.5	6.04	3
2006	7.5	7.99	8
2007	7.5	9.98	8
2008	8.6	10.79	11
2009	13.6	12.62	12
2010	13.6	12.15	6
2011	13.6	17.1	12
2012	13.6	20.5	8
2013	21.3	17.8	8
2014	21.3	18.9	11
2015	21.3	21.7	14
2016	26.3	22.5	16

Sources- (BP, Several Years;, Petronet LNG Limited, n.d.; Hazira LNG Private Ltd, n.d.; Pathak, 2012; HT Correspondent, 2013; Modi, 2013; Shyam, 2016;MP&NG, 2017).

Note- In absence of breakwater, available capacity is 1.3 mtpa, nameplate capacity of Dabhol terminal is 5 mtpa.

Table-2.13 shows that India's LNG terminal capacity continued enhancing from 2004 as it developed the LNG infrastructure. In terms of LNG imports, it increased from 2.63 bcm in 2004 to 22.5 bcm in 2016. In the sense of diversification of gas sources, India could diversify its gas sources from one country in 2004 to 16 countries in 2016. In 2016, India imported LNG from the US (0.5 bcm), Brazil (0.1 bcm), Peru (0.1 bcm), Trinidad and Tobago (0.6 bcm), Norway (0.1 bcm), other Europe (0.3 bcm), Oman (0.3 bcm), Qatar (14.0 bcm), United Arab Emirates (0.7 bcm), Algeria (0.1 bcm), Angola (0.4 bcm), Egypt (0.1), Equatorial Guinea (1.4 bcm), Nigeria (2.7 bcm), Australia (1.2 bcm), Malaysia (0.1 bcm) and Qatar, a major supplier of LNG to the world also remained the largest supplier of LNG to India (BP, 2017).

Oil and Gas Equities

The strategies of acquiring oil and gas equities in foreign oil and gas fields are being adopted by India to boost its energy security. MP&NG continued encouraging the oil and gas companies to pursue interests in hydrocarbons resources wherever they were available and acquire equity in oil and gas producing assets, with an overarching objective of enhancing the country's energy security. The potentiality of these equities in supplying oil and gas depends on its specific characteristics have been discussed in Chapter Three.

Indian government created a specific company to promote this goal namely OVL, a wholly owned subsidiary of ONGC. It was named from the erstwhile Hydrocarbons India Private Limited which was incorporated on 5 March 1965. Its primary objective is to look for and acquire oil and natural gas acreages abroad. It was reported that, OVL was present in 17 countries and engaged in 37 projects all over the world. Indian oil companies were present in 25 countries including Iran with investments of nearly US$32.89 billion. From the overseas oil and gas equities, its national oil companies produced approximately 25.18 million tonnes oil equivalent during 2016-17 (MP&NG, 2017) which was 84 per cent more than production in 2011-12 (Abdi, 2017). **Table-2.14** gives the details about the engagement of Indian oil and gas companies in overseas oil and gas equities.

Table-2.14

Participation of Indian Companies in Overseas Oil and Gas Assets

Serial Number	Country	Name of the Project	Participating companies and their share
1.	Vietnam	Block 06.1, Offshore	ONGC Videsh-45 per cent TNK-35 per cent (Operator) Petrovietnam-20 per cent
		Block 128, Offshore	ONGC Videsh-100 per cent
2.	Russia	Sakhalin-1, Offshore	ONGC Videsh-20 per cent Exxon Mobil-30 per cent (Operator) Sodeco-30 per cent SMNG-11.5 per cent
			RN Astra-8.5 per cent
		Imperial Energy, Russia	ONGC Videsh-100 per cent
		Vankorneft	ONGC Videsh-26 per cent
			OIL, IOCL, BPRL-23.9 per cent
		Taas-Yuryakh	OIL, IOCL, BPRL-29.9 per cent
		License 61	OIL-50 per cent
			Petroneft-50 per cent
3.	Sudan	GNPOC, Block 1, 2 and 4, Sudan	ONGC Videsh-25 per cent CNPC-40 per cent
			Petronas-30 per cent
			Sudapet-5 per cent (Jointly Operated)
		Khartoum-Port Sudan Pipeline (741 Km), Sudan	ONGC Videsh-90 per cent (Operator)
			OIL-10 per cent
4.	South Sudan	GPOC, Block 1, 2 and 4, South Sudan	ONGC Videsh-25 per cent CNPC-40 per cent
			Petronas-30 per cent
			Nilepet-5per cent (Jointly Operated)

		SPOC/Block 5A, South Sudan	ONGC Videsh-24.125 per cent Petronas-67.875 per cent Nilepet-8 per cent (Jointly Operated)
5.	Myanmar	Block A-1, Myanmar	ONGC Videsh-17 per cent Daewoo-51 per cent (Operator) KOGAS -8.5 per cent GAIL-8.5 per cent MOGE-15 per cent
		Block A-3, Myanmar	ONGC Videsh-17 per cent Daewoo-51 per cent (Operator) KOGAS-8.5 per cent GAIL-8.5 per cent MOGE-15 per cent
		Shwe Offshore Mid-Stream Project, Myanmar	ONGC Videsh-17 per cent Daewoo-51 per cent (Operator) KOGAS-8.5 per cent GAIL-8.5 per cent MOGE-15 per cent
		Onshore Gas Transportation Pipeline, Myanmar	ONGC Videsh-8.347 per cent CNPC-SEAP-50.9 per cent (Operator) Daewoo-25.041per cent GAIL-4.1735 per cent KOGAS-4.1735 per cent MOGE -7.365 per cent
		Block B-2,	ONGC Videsh-97 per cent (Operator) M and S-3per cent
		Block EP-3, Myanmar	ONGC Videsh-97 per cent (Operator) M and S-3 per cent
		Block: M4, Myanmar	OIL-60 per cent (Op) Oilmax-10 per cent Mercator-25 per cent Oil Star-5 per cent

		Block :YEB, Myanmar	OIL-60 per cent (Op) Oilmax-10 per cent Mercator-25 per cent Oil Star-5 per cent
6.	Mozambique	Rovuma Area-1	ONGC Videsh-16 per cent Anadarko-26.5 per cent (Operator) OIL-4 per cent ENH-15 per cent Mitsui-20 per cent BPRL-10 per cent PTTEP-8.5 per cent
7.	Iraq	Block 8, Iraq	ONGC Videsh-100 per cent
8.	Iran	Farsi Offshore Block, Iran	ONGC Videsh-40 per cent (Operator) IOCL-40 per cent OIL-20 per cent
9.	Libya	Block 43, Libya	ONGC Videsh-100 per cent
		Area 95-96	Sonatrach-50 per cent Indian Oil-25 per cent OIL-25 per cent
10.	Syria	Block 24, Syria	ONGC Videsh-60 per cent IPR International-25 per cent (Operator) Tri Ocean Mediterranean-15 per cent
		Al Furat Petroleum	Himalaya Energy (Syria) B.V.- 33.33 per cent to 37.5

		Co., Syria	per cent Shell-66.67 per cent to 62.5 per cent (Operator –Al Furat Petroleum Company)
11.	Brazil	Block BM-SEAL-4, Brazil	ONGC Videsh-25 per cent Petrobras -75 per cent (Operator)
		BC-10, Brazil, Offshore	ONGC Videsh-27 per cent Shell-50 per cent (Operator) Qatar Petroleum International-23 per cent
		BM-SEAL-11 (3 blocks), Sergipe Basin	Petrobras (Operator)- 60 per cent, IBV-40 per cent
		BM-C-30 (1 block), Campos Basin	Anadarko Petroleum (Operator)-30 per cent, British Petroleum-25 per cent, Maersk-20 per cent, IBV-25 per cent
		BM-POT-16 (2 blocks), Potiguar Basin	Petrobras-30 per cent (Operator), BP-30 per cent, Galp Energia-20 per cent, IBV-20 per cent
12.	Colombia	Mansarovar Energy Colombia Limited (MECL), Colombia	ONGC Videsh-25-50 per cent, Sinopec-25-50 per cent Ecopetrol-50 per cent (Jointly Operated)
		Block RC-8, Colombia	ONGC Videsh-40 per cent (Operator) Ecopetrol-40 per cent Petrobras-20 per cent
		Block RC-9, Colombia	ONGC Videsh-50 per cent Ecopetrol-50 per cent (Operator)

		Block RC-10, Colombia	ONGC Videsh-50 per cent (Operator) Ecopetrol-50 per cent
		Block LLA-69, Colombia	ONGC Videsh-50 per cent SIPC-50 per cent (Jointly Operated)
		Block GUA OFF 2, Colombia	ONGC Videsh-100 per cent
		CPO-5, Colombia	ONGC Videsh-70 per cent (Operator) Petrodorado-30 per cent
		SSJN7, Colombia	ONGC Videsh-50 per cent Pacific Rubieales Energy (PRE)- 50 per cent (Operator)
13.	Venezuela	San Cristobal Project,	ONGC Videsh-40 per cent PDVSA-60 per cent (Jointly Operated)
		Carabobo-1 Project, Venezuela	ONGC Videsh-11 per cent IOCL-3.5 per cent OIL-3.5 per cent Petronas-11 per cent PDVSA-71 per cent (Jointly Operated)
14.	Kazakhstan	Satpayev Project, Kazakhstan	ONGC Videsh-25 per cent KMG-75 per cent (Operator)
15.	Azerbaijan	ACG, Azerbaijan	ONGC Videsh-2.7213 per cent BP-36 per cent (Operator) SOCAR-12 per cent Chevron-11 per cent INPEX-11 per cent Exxon-8 per cent StatOil-8 per cent TPAO-7 per cent

			ITOCHU-4 per cent
		Baku-Tbilisi-Ceyhan (BTC) Pipeline (1760 Km), Azerbaijan	ONGC Videsh-2.36 per cent BP-30.1 per cent (Operator) SOCAR-25 per cent
			StatOil-8.71 per cent
			TPAO-6.53 per cent
			ITOCHU-3.4 per cent
			Chevron-8.9 per cent
			INPEX-2.5 per cent
			ENI-5 per cent
			TOTAL-5 per cent
			Conoco Philips-2.5 per cent
16.	Bangladesh	Block SS4, Bangladesh	ONGC Videsh-45 per cent (Operator),
			OIL-45 per cent
			BAPEX-10 per cent
		Block SS9, Bangladesh	ONGC Videsh-45 per cent (Operator),
			OIL-45 per cent
			BAPEX-10 per cent
17.	New Zealand	Block- 14TAR-R1,	ONGC Videsh-100 per cent
18.	Indonesia	Nunukan Block	BPRL-12.5 per cent
			PT Pertamina Hulu Energy-35 per cent (operator)
			PT Medico-40 per cent Videocon Indonesia-12.5 per cent
19.	Australia	Block EP – 413 (on land)	BPRL- 27.803 per cent
		T/L 1 (Yolla gas field) and T/18P (Trefoil Field)	Prize Petroleum Company Limited (HPCL)-11.25 per cent
20.	East Timor	Block JPDA 06-103	BPRL- 20 per cent
21.	US	Niobrara Shale	Carrizo (Niobrara) LLC-60

		Oil/Condensate JV asset	per cent OIL-20 per cent Indian Oil-10 per cent Haimo Oil and Gas-10 per cent
		Eagle Ford Shale acreage in Texas State	GAIL-20 per cent PI US$246.02 million.
22.	Canada	Pacific Northwest LNG Project	Progress Energy Canada Ltd.-62 per cent Sinopec-15 per cent Indian Oil-10 per cent Japex-10 per cent Petroleum Brunei-3 per cent
23.	Nigeria	OPL- 205 OML – 142	Summit Oil-30 per cent Suntera Nigeria 205 Ltd-70 per cent Suntera- 50 per cent, Indian Oil-25 per cent
24.	Gabon	Shakthi	Old PSC: OIL-45 per cent Indian Oil-45 per cent Marvis Pte Ltd-10 per cent New PSC: OIL-50 per cent Indian Oil-50 per cent
25.	Yemen	82	Medco-45 per cent Kuwait Energy-25 per cent IOCL-15 per cent OIL-15 per cent

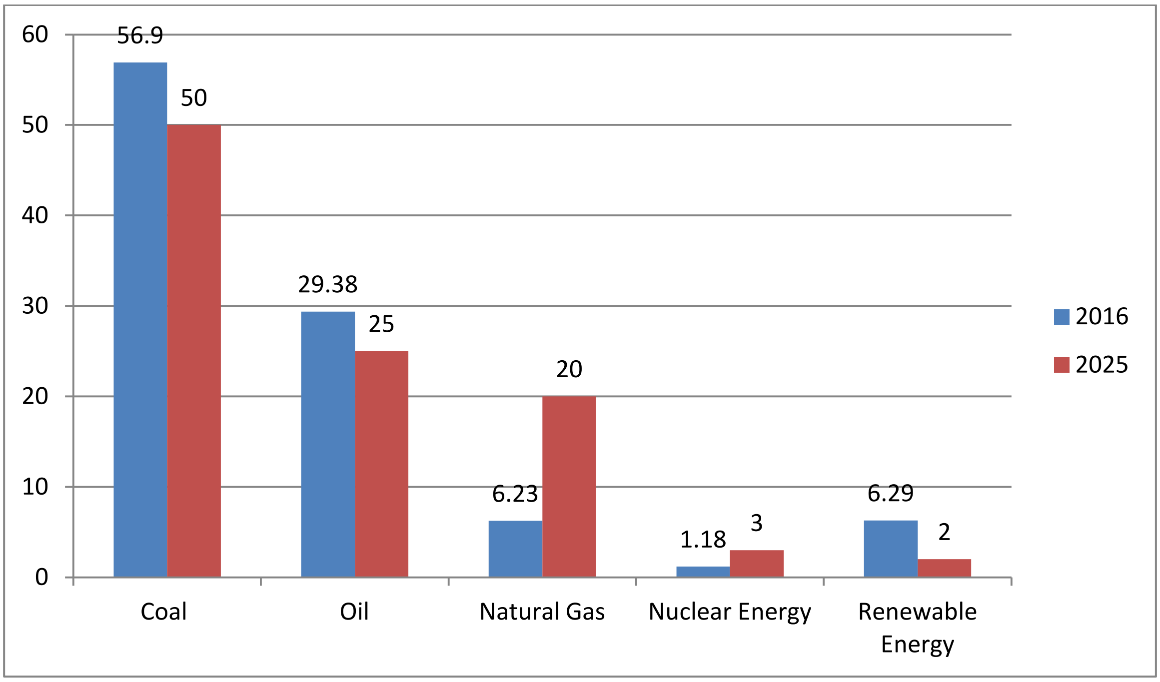
Source: (MP&NG, 2017: 77-81)

Table 2.14 shows that the OVL continued taking efforts to obtain oil and gas assets abroad which were supported by other public sector units. According to the data, their engagement has been comprehensive in nature such as, pipeline project (BTC), stakes in energy companies, share in oil and gas equities etc. It is important to note that in many projects, Indian companies became successful to obtain 100 per cent stake such as, Imperial Energy (Russia), Block-8 (Iraq), Khartoum-Port Sudan Pipeline (Sudan) as well as Farsi Block (Iran) etc. This shows that India perceived foreign oil and gas source as an integral part for ensuring its energy security and these national energy companies acted as an agent and kept engaging themselves abroad strategically for achieving the same.

There is a direct link between GDP and energy consumption and if GDP increases, energy consumption also increases (Campo and Sarmiento, 2013). According to *India Hydrocarbon Vision 2025* oil and gas would continue to play a pre-eminent role as an energy sources which would be 45 per cent in 2025. In 2016, coal, oil, natural gas, renewable energy and nuclear energy had the share of 56.9, 29.38, 6.23, 6.26, and 1.18 per cent respectively in total primary energy supply. However, it was perceived in *Vision* that there would be some changes in the share of these energy sources by 2025 and would be 50, 25, 20, 2 and 3 per cent for coal, oil, gas, renewable and nuclear energy respectively (MP&NG, 2000). The huge increase would be in natural gas which would be 143 bcm by 2025 or almost 285 per cent rise from 50.1 bcm in 2016 (BP, 2017). The increase in the share of gas would be at the expense of oil and coal which are comparatively more polluting energy sources than natural gas. **Graph-2.5** compares the share of fuel in India’s primary energy mix between 2016 and 2025.

Graph-2.5

Projection of India's Primary Energy Demands by Fuels in 2025



Sources- (BP, 2017; Ministry of Petroleum Natural Gas, 2000)

In the above energy scenario where India is highly dependent on others for its energy sources especially for oil and gas, it needs long-term energy policy to sustain its economic growth, one of its key concerns. While it cannot achieve self-sufficiency in terms of oil and gas, it seeks stability in oil and gas supply from other countries. For India, the geographically proximate West Asian region with large reservoir of oil and natural gas appears its natural energy partner.

Oil and Natural Gas Resources in West Asia

The region is known to possess significant amount of global proven oil and gas reserves. Additionally, the low cost oil production from the region enhances its importance in the global energy market. It is evident from one estimate in which Saudi Arabian cost of production could be US$4 to US$6 a barrel, while it costs US$15 for onshore and US$30 for offshore in Nigeria; in Angola it is about US$40 whilst in Kazakhstan US$15 to US$18 (Pant, 2014). For natural gas, its major part in this region is in the form of 'gas caps' associated with oil reserves that can be recovered after the depletion of oilfields and it is also technically difficult to recover. The non-associated natural gas reserves which are easy to recover are mostly found in Qatar, Iraq and Iran. For example, Iraq had 596.12 bcm (21.29 tcf) of non-associated gas reserves out of 3547.6 bcm (126.7 tcf) of total gas reserves (Khatteeb, 2013) while Qatar had 99 per cent non-associated gas reserves out of its total gas reserves in 2013 (John, 2014). In case of Iran, the non-associated gas reserves accounted of 80 per cent of its total gas reserves (Hydrocarbons-technology.com, 2013b).

Due to the large reserves of oil and gas, the region has been the attraction point for many energy importing countries. **Table-2.15** shows the richness of the West Asian region in terms of oil and natural gas reserves.

Table-2.15

Status of West Asian Oil and Gas Reserves vis-à-vis Global Oil and Gas Reserves

Year	Global oil reserves (billion tonnes)	Oil reserves in West Asia (billion tonnes)	Share of West Asia in global oil reserves (per cent)	Share of West Asia in global gas reserves (per cent)
1985	105.08	58.82	55.98	27.79
1986	119.67	73.20	61.16	28.24
1987	124.15	77.28	62.25	29.17
1988	136.18	89.06	65.40	31.29
1989	137.27	90.16	65.67	30.90
1990	136.83	89.96	65.74	30.23
1991	140.86	90.13	63.98	32.54
1992	141.76	90.24	63.65	37.41
1993	139.61	90.03	64.48	31.49
1994	152.49	90.51	59.35	31.88
1995	140.08	90.22	64.41	37.78
1996	143.08	91.68	64.08	33.34

1997	145.85	93.18	63.89	33.81
1998	145.74	93.33	64.04	35.92
1999	148.07	93.54	63.17	36.84
2000	150.70	95.02	63.05	34.96
2001	172.87	95.30	55.12	42.07
2002	180.25	101.11	56.09	40.93
2003	181.97	101.71	55.89	40.80
2004	162.87	100.69	61.82	40.56
2005	163.6	101.2	61.35	40.10
2006	164.5	101.2	61.51	40.48
2007	168.6	102.9	59.87	41.89
2008	170.8	102.0	56.56	40.92
2009	181.7	102	56.13	40.63
2010	188.8	101.8	53.91	40.48
2011	234.3	108.2	48.23	42.81
2012	235.8	109.3	46.35	42.97
2013	238.2	109.4	45.92	42.89
2014	239.8	109.7	45.74	42.78
2015	239.4	108.7	45.40	42.80
2016	240.7	110.1	45.74	42.5

Sources-(BP, Several Years)

Table-2.15 displays that the concentration of oil reserves in the West Asian region was more in 1980s and 1990s compared to 2000s and 2010s. The average share of West Asian oil reserves had been 63.14 per cent of the world during 1985 to 2000.

Due to the large oil discovery in non-West Asian region, its share later decreased to 53.47 per cent during 2001 and 2016. According to a report, the oil discovery in West Asian region was 1.21 billion tonnes (8.87 billion barrel) during 2000 and 2012 while in non-West Asian region, it was 7.75 billion tonnes (56.86 billion barrel) during the same period (Bai and Xu, 2014). For gas reserves, West Asia had less concentration of gas during 1980s and 1990s compared to 2000s and 2010s. The average share of gas reserves in this region was 32.72 per cent while it was 41.60 per cent during 2001-2016. Out of 29.09 tcm (1039.03 tcf) of gas reserves discovery, 5.28 tcm (188.66 tcf) of gas was found in West Asia (Bai and Xu, 2014). Thus the West Asia has large reserves of oil and natural gas to play a key role in global energy markets and continue to remain attractive region for the oil and natural gas importers.

India has also been highly dependent on this region for its oil and gas imports. For several years, India's top five oil energy suppliers including Iran are located in this region (See **Table-2.7**). Iran embraces especial position in the area of energy field because of its geo-strategic location in the Gulf region as well as its richness in oil as well as natural gas resources. Iran holds some of the world's largest deposits of proven reserves of these two energy resources which have been discussed in Chapter Three. Iran held the fourth largest oil reserves with 21.8 billion tonnes or 9.3 per cent of the world oil reserves preceded by Venezuela, Saudi Arabia and Canada having 17.6 per cent, 15.6 per cent and 10.0 per cent respectively. For natural gas, Iran had the largest reserves with 33.5 tcm or 18 per cent of the global known natural gas reserves in 2016 followed by Russia (BP, 2017).

The large oil and gas reserves in Iran show its potentialities as a supplier of these two hydrocarbon energy resources to the global market. For the country like India, the geographical closeness enhances Iran's importance as an energy supplier, as the transportation cost also has impact in determining the final oil and gas prices which has been discussed in detail in Chapter Three. Thus, for growing economy and energy needs, India perceives Iran, a net oil and gas exporter, as a key source of these resources. These complementary interests have led them to strengthen their ties especially in energy sectors beyond their civilizational links such as language, races, etc. which they had been enjoying in the past (Embassy of India, n.d.).

Chapter 3

Iran's Role in India's Energy Needs

Divided into seven sub-sections, Chapter Three begins with *Geo-political map of Iran* which deals with the geographical and political location of the country and how this offers it a regional strategic importance. The next section is *Iran's oil scenario*, followed by *Iran's natural gas scenario*. These two sections discuss Iran's domestic oil and gas situation in terms of production, consumption and exports and its status within the Organisation of Petroleum Exporting Countries (OPEC) and global oil and gas markets. The next focuses on *bilateral trade between Iran and India* which has been dominated by the hydrocarbon trades. Next section on *Iran's role in India's oil supply* points out Iran's contribution in meeting India's oil needs and how was affected by the United States (US) sanctions. In *Iranian gas: India's prospective gas source* the research focuses on the reasons for the absence of gas trade between the two countries. Simultaneously, it depicts the potentiality of their prospective gas trade. The last section *Petroleum products: Mutual Interdependence* points out the emerging importance of equities in energy security concerns. It also discusses how the mutual investments and cooperation between Iran and India in the energy sectors such as, Farsi gas field, Chabahar port etc. became the key means in strengthening their energy relationships.

Geo-political Map of Iran:

Iran with large reserves of oil and natural gas occupies a prominent position in the West Asia. It is at the junction of the Asian continent (Jennings, 2005) which touches the Central Asian region in its northern part, the other large reservoir of hydrocarbon energy. Iran becomes more significant because all the Central Asian countries are landlocked and have access only to Caspian Sea, a largest inland body of water. Iran touches South Asian region in its eastern part which is a large market of hydrocarbon energy. This makes Iran an ideal transit route for the transportation of energy from the Central and Caspian Sea regions to the emerging energy importing countries of Asia.

The strategic location of Iran in the south of Caspian Sea and Gulf of Oman determines its geo-political role in oil and gas energy market worldwide (Maleki, 2007). Iran has large territorial water along the Gulf and Gulf of Oman where its substantial amount of oil and gas reserves are located; its offshore natural gas reserves are more than 60 per cent while offshore oil reserves are 30 per cent (Hydrocarbons-technology.com, 2013a; Hydrocarbons-technology.com, 2013b).

Iran is surrounded by Iraq in its west, Turkey in its north-west, Armenia and Azerbaijan in its north, Turkmenistan in its north-east which connects it with Europe. Besides this, Afghanistan and Pakistan also shares borders with it in its east and south-east part that connects Iran with South Asia. It is noteworthy that Iran and India shared a common 947-km long border until 1947 and continued to have strong cultural and commercial interactions (Rao, 2010).

The geostrategic importance of Iran in the Gulf is vital for India as it connects the Gulf to the Arabian Sea through the narrow Strait of Hormuz as well as it provides India a transit route for the Central Asia. The majority of the global oil trade is seaborne which passes through Strait of Hormuz. According to a report by Energy Information Administration (EIA), the Strait of Hormuz accounted for 30 per cent of the total seaborne oil trade in 2013 (Gamal, 2015). In this context, Iran's offshore oil and gas reserves and the reserves adjacent to these areas makes economic sense as it saves the transportation time and cost for oil trade. Consequently, it makes Iran's oil export cost effective especially in terms of logistical costs and time. Thus, Iran has the potential to play a significant role in the global energy market and has an immense importance for oil and gas importing countries including India.

Iran's Oil Scenario

Iran was the first country in West Asia where commercial crude oil field was discovered in 1908 at Masjid-i-Sulaiman which also became the first oil exporter in 1911 (Smith, 2006). Subsequently many more new oil fields have been discovered in the country in both offshore and onshore areas. According to *BP Statistical Review of World Energy 2016*, Iran possessed around 21.7 billion tonnes or almost 9.04 per cent of the total proved crude oil reserves of the world in 2015 and was the fourth largest reservoir of the world after Venezuela, Saudi Arabia and Canada [British Petroleum(BP), 2016].

The majority of Iran's oil reserves were discovered decades ago. The United Kingdom-based Clyde and Company reported that almost 80 per cent of Iran's reserves were discovered before 1965.According to *Facts Global Energy*, a global energy consultancy firm, Iran's major crude oil reserves, approximately 70 per cent, are located onshore and the remaining 30 per cent on offshore, mostly in the territorial water of the Gulf (EIA, 2015). These are some of the major onshore oil fields like Ahwaz (Asmari Formation), Gachsaran, Marun, Bangestan, Aghajari, Karanj-Parsi, Rag-e-Safid, BibiHakimeh, Darquin, Pazanan etc. Among them, Ahwaz has been the largest field and it produced almost 34.86 million tonnes of oil in 2010. In terms of offshore oil fields, Dorood has been the largest oil producing field which produced 6.47 million tonnes of oil and were followed by Salman, Abuzar, Sirri A and E and Soroush or Nowruz (Worldlistmania, 2011).**Table 3.1** provides the data of crude oil productions of some of the major onshore and offshore oil fields in Iran.

Table 3.1

Major Iranian Oil Fields

Onshore		**Offshore**	
Field's name	Oil production (million tonnes)	Field's name	Oil production (million tonnes)
Ahwaz	34.86	Darood	6.47
Gachsaran	27.88	Salman	6.47
Marun	25.89	Abuzar	6.22
Bangestan	12.20	Sirri A and E	4.73
Aghajari	9.96	Soroush/Nowruz	2.98

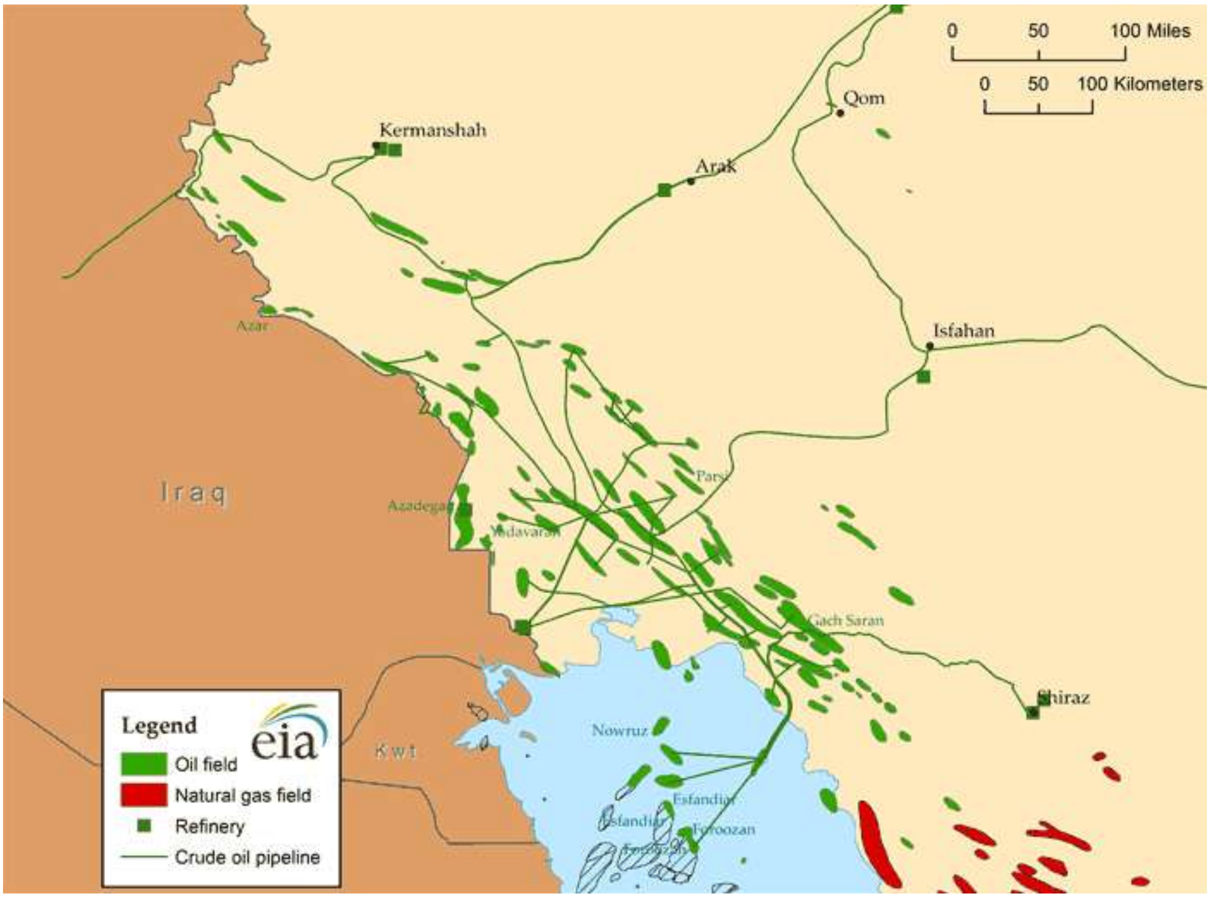
Sources- (Worldlistmania, 2011)

Iran also has proved and probable oil reserves of approximately 68.2 million tonnes largely in offshore area of the Caspian Sea discovered in 2011 (Khatinoglu, 2013). However, it could not start the development of these reserves because the discovered crude oil reserves are in the deep water, at a depth of almost 2.5 km and whose development by existing Iranian technology is a challenging task (*Iran Times*, n.d.). Additionally, the disputes among Azerbaijan, Iran, Kazakhstan, Russia and Turkmenistan over the division of Caspian Sea further added complexities for its developments (Kucera, 2016). Iran also shares a number of onshore and offshore oil and natural gas fields with neighbouring countries, including Iraq, Qatar, Kuwait and

Saudi Arabia (EIA, 2015). Most of Iran’s major oil and gas fields are in its south-western area, chiefly in Khuzestan province. **Map 3.1** shows Iran’s major oil fields.

Map 3.1

Iran’s major oil fields



Sources- (Energy Information Analysis, 2015)

Most of Iran's crude oil is medium in sulphur content and in the 29° to 36° American Petroleum Institute (API)[5] gravity range. Two crude streams, Iran Heavy crude and

[5]“API Gravityis an arbitrary scale expressing the gravity or density of liquid petroleum products. The measuring scale is calibrated in terms of degrees API. The higher the API gravity, the lighter the

Iran Light crude, account for more than 80 per cent of the country's crude oil production capacity (EIA, 2015). Iran Heavy crude contains 1.8 per cent of sulphur and 30° API gravity while Iran Light crude has 1.5 per cent sulphur and 33° API gravity (EIA, 2013).Both crude streams are sourced from onshore fields, many of which are from older fields experiencing natural decline.

According to the *International Energy Agency*, about half of Iran's production is sourced from oil fields that are more than 70 years old, which include the Ahwaz-Asmari, Marun, and Gachsaran fields. The National Iranian Oil Company (NIOC), a state owned oil company has been making efforts by using technologies to improve and maintain the oil production at the aging fields such as the use of Enhanced Oil Recovery techniques which is mainly done by re-injecting associated gas into oil wells to improve oil recovery rates (EIA, 2013).

With such a large oil reserves, Iran remained a major oil producer and exporter of the world. As a founder member of Organisation of Petroleum Exporting Countries (OPEC), the role of Iran has been remarkable in terms of its share in the cartel's total oil production and exports since its establishment in 1960. Formed by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela "around the premise of cooperation with a commitment to safeguard their legitimate national interests and to ensure order and stability in the international oil market" (OPEC, 2017), the OPEC encouraged the member-countries for augmenting their say in the global oil market. With the establishment of national oil companies (NOC), the member-countries became successful in strengthening their stakes in oil production and its management which had been mostly controlled and managed by international oil companies (IOCs) known as Oil Majors until 1973 of oil crisis (OPEC, 2017). These Oil Majors were mainly comprised by Anglo-Persian Oil Company, Gulf Oil, Standard Oil of California, Texaco, Royal Dutch Shell, Standard Oil of New Jersey and Standard Oil Company of New York.

In 1960, Iran shared 12.29 per cent of total crude oil production of OPEC which was 5.08 per cent of the world (OPEC, 2008). In 1970, Iran was the largest crude oil producer of OPEC with 16.35 per cent though its peak production was in 1974 with

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compound. Light crudes generally exceed 38 degrees API and heavy crude are commonly labelled as all crudes with API gravity of 22 degrees or below. Intermediate crudes fall in the range of 22 degrees to 38 degrees API gravity" (EIA, n.d.).

299.87 million tonnes, almost 19.84 per cent of total OPEC's oil production (OPEC, 2008).Moreover, Iran's oil production continued to increase as well as its share in OPEC until the mid-1970s and the compound annual growth rate(CAGR) of its oil production during 1960 and 1973 was 12.93 per cent (OPEC, 2008).

The 1973 oil crisis resulting in a crude oil price escalation demonstrated the strategic value of oil exporting countries. Due to the crisis, the oil price increased from US$3.05 per barrel in 1973 to US$10.73 per barrel in 1974 (OPEC, 2008). Thus, it contributed significantly in the increase of their oil revenues. Iran's oil revenue rose from US$5.617 billion in 1973 to US$20.904 billion in 1974 or an almost 350 per cent increase which was second to Saudi Arabia where its oil revenue increased from US$8.956 billion in 1973 to US$35.476 billion in 1974 (OPEC, 2008).**Table 3.2** shows Iran's crude oil profile during 1973 to 2015 which not only shows its role and status as an important oil supplier of OPEC but also its share in the global production.

Table 3.2

Iran's crude oil profile since 1973 to 2015

Year	Iran's crude oil production (Million tonnes)	Iran's oil production share in OPEC (per cent)	Iran's oil production share in world (per cent)	Iran's crude oil export(Million tonnes)	Iran's share in world's crude oil export (in per cent)	OPEC's share in world's oil export (in per cent
1973	291.87	19.13	10.60	262.75	16.67	N.A
1974	299.87	19.84	10.82	267.38	17.27	N.A.
1975	266.43	19.98	10.09	232.61	16.41	N.A.
1976	292.96	19.39	10.24	259.64	16.13	N.A.
1977	282.00	18.35	9.46	242.39	14.75	N.A.
1978	261.03	17.83	8.70	221.46	13.96	N.A.
1979	157.76	10.38	5.04	119.86	7.1	N.A.
1980	90.46	6.76	3.02	39.67	2.66	75.7
1981	77.93	6.96	2.78	35.58	2.76	71.8
1982	120.54	12.92	4.52	80.83	7.24	63.7

1983	121.59	14.69	4.65	85.59	8.11	59.1
1984	101.21	12.75	3.83	75.78	7.07	55.9
1985	109.17	14.68	4.17	78.10	7.59	53
1986	101.44	11.55	3.66	72.40	6.31	56.5
1987	114.42	13.69	4.17	85.15	7.55	53.6
1988	123.31	13.12	4.31	84.46	6.97	55.3
1989	140.14	13.75	4.83	105.57	8.18	59.5
1990	155.98	14.19	5.25	110.55	7.96	60.9
1991	174.4	14.54	5.52	120.52	8.74	62.8
1992	175.7	13.84	5.51	125.89	8.69	62.1
1993	183.2	14.06	5.74	129.48	8.53	61.0
1994	183.6	13.93	5.68	131.97	8.45	59.7
1995	183.7	13.80	5.61	130.52	8.17	58.7
1996	186.6	13.52	5.52	130.97	7.93	57.7
1997	187.0	12.91	5.37	128.83	7.44	58.1
1998	190.8	12.63	5.37	125.10	6.77	58.0
1999	178.1	12.30	5.11	114.09	6.32	56.1
2000	189.4	12.41	4.92	124.11	6.41	55.5
2001	186.5	12.54	5.17	108.79	5.71	53.8
2002	172.7	12.39	4.82	104.26	5.56	52.8
2003	203.7	13.75	5.50	119.33	6.02	54.2
2004	208.2	12.64	5.33	133.67	6.28	57.4
2005	206.4	12.18	5.23	119.25	5.90	58.4
2006	209.2	12.24	5.28	118.38	5.85	58.7
2007	210.9	12.48	5.34	122.85	6.06	59.6
2008	214.5	12.28	5.37	121.42	6.08	60.3
2009	205.5	12.66	5.28	119.82	5.98	58.6

2010	208.7	12.51	5.24	111.95	5.46	60.6
2011	208.8	12.24	5.20	126.34	6.27	58.2
2012	177.3	9.96	4.30	104.68	5.11	60.6
2013	165.8	9.55	4.01	60.51	3.05	58.7
2014	169.2	9.78	4.00	55.23	2.76	57.5
2015	182.6	10.10	4.2	N.A.	N.A.	56.6

Sources- (OPEC, Several years)

Nevertheless, the overthrow of Mohammad Reza Shah in 1979 led to massive political and economic upheaval in Iran. Earlier, the Shah introduced various social, political and economic reforms in the country through White Revolution and constituted SAWAK etc. which have been discussed in detail in Chapter Five. Further, his close working alliance with the US influenced Iranian administration as well as permeated the Iranian culture (Kulkarni, 2017). As a result, it created a gap between the ruling class and the public at large. During the late 1970s, the gap was widened to such an extent that it became difficult to bridge. Therefore, the emergence of strong opposition under the leadership of Ayatollah Khomeini against the Shah regime could not be stopped and Iran became an Islamic Republic with a new constitution reflecting Islamic principles (Iran Chamber Society, 2016).

The Islamic government adopted the nationalistic approach towards its economic policies particularly the energy sector (Zahirinejad, 2010). The distrust of Iran over Western countries particularly the US was one of the reasons behind it. Consequently, Iran cancelled all oil agreements with Western states and companies, attempted to reduce its economic dependence on oil revenue. Hence, it reduced oil production and changed in rules governing foreign investment and foreign agreement (Zahirinejad, 2010). As a result, its oil production declined from 261.03 million tonnes in 1978 to 77.93 million tonnes in 1981. The impact was also seen in its oil exports which decreased from 221.46 million tonnes to 35.58 million tonnes during the same period (**Table-3.2**).

However, later it enhanced its oil production but it could not achieve the quantity of and status in oil production and exports which it had before the revolution. The CAGR of Iran's oil production remained 0.99 per cent during 1979 and 1996 (See **Table-3.2)**. The consensus over oil production cut among oil exporting countries to stabilise the oil price (Sandrea, 2003) and the US sanctions (it has been discussed in detail in Chapter Five) were among the factors which further constrained Iran to regain its oil production and exports level of the mid-1970s.

In the meanwhile, the end of Cold War in 1991 revolutionised the international politics and affected the global energy market. The Soviet Union disintegrated politically and several independent countries came into existence. The newly independent countries also aspired for economic independence. These countries especially from Central Asian region are rich in oil and natural gas. They wanted to increase production and export and to be a stakeholder in the world energy market. As the most of these independent countries are landlocked, they are dependent on either Iran or Russia (successor of Soviet Union) to reach other regions, hence were looking for the strategic and diplomatic tactics to serve their energy interests.

In these changing international political realities, Iran has to compete with several emerging oil and gas producers. At the same time, the willingness of Central Asian countries to access the large Asian energy market increased its strategic importance as it is seen as the transit corridor for these landlocked countries to access the international energy market.

Further, the development of technologies vis-à-vis oil and gas sector enabled many countries to increase their oil production. This resulted in the increase of membership of the OPEC which grew from five in 1960 to 14 as of May 2017, namely, Iraq, Kuwait, Saudi Arabia, Venezuela, Qatar, Libya, United Arab Emirates (UAE), Algeria, Nigeria, Ecuador, Gabon, Angola, Equatorial Guinea and Iran (OPEC, 2017c). Simultaneously, many other non-OPEC countries have also become significant oil exporters globally such as Canada, Mexico, Russia and Norway etc.

The growing number of oil exporters led to the concern of oil price stability so that they can sustain the oil production as well as maintain their share of oil market (Miller and Sorre, 2014; Thomas, 2016). The issue became further complicated as the quota system under OPEC (started in 1982) of limiting oil production by the member-countries failed to work (Said, 2015). Thus, there is a kind of competition among OPEC members for the share of oil market. Simultaneously, the non-OPEC oil producers and exporter also emerged as their competitor. As per report by OPEC, the OPEC's share in global oil production was 45.2 per cent in 1980 which declined to 43 per cent in 2015 while in terms of share of exports, it decreased from 75.7 per cent in 1980 to 56.6 per cent in 2015 (OPEC, 1999; OPEC, 2016). Hence, the question of energy security became important for the oil exporting countries including Iran.

Amid the changing oil market, Iran shifted its foreign policy from radicalism to pragmatism (Zahirinejad, 2010).To attract foreign investments in energy sectors, it introduced buy-back policy during the mid-1990s whereby, "the IOCs fund all investment costs and implement exploration and/or production operations on behalf of the NIOC, as per an agreed scope of work" (Farnejad, n.d.) and this aspect has been discussed in Chapter Five. Nevertheless, the policy could not become commercially attractive for the IOCs (Eqbali, 2013). Moreover the imposition of Iran and Libya Sanctions Act (ILSA) of 1996 by the US started to affect Iran's energy sector including oil and (discussed in Chapter Five) this was one of the reasons that Iran could not increase its oil production. **Table 3.2** shows that its oil production was 186.6 million tonnes in 1996 but decreased to 172.7 million tonnes in 2002.

Although the production increased from 2003, it continued only until 2011. The CAGR of Iran's crude oil production was 0.8 per cent during 1996 and 2010 (See **Table-3.2**). The imposition of Comprehensive Iran Sanctions, Accountability and Divestment Act (CISADA) by the US in 2010 and the European Union (EU) sanctions on 26 July 2010 under the EU Regulation 668/2010 (Chapter Five) adversely affected its oil production. Its oil production declined from 208.7 million tonnes in 2010 to 165.8 million tonnes in 2013, lowest in one and half decades. Later it increased slightly and produced 182.6 million tonnes in 2015 after Iran's nuclear deal .The CAGR of its oil production was in negative at -2.65 per cent during 2010 and 2015. It is noteworthy that it did not change much its share in the OPEC and world's oil production until 2011, as the world's total oil production was fluctuating accordingly. The Asian financial crisis during 1997-1999 (*PBS*, n.d.), the attack on Twin-Tower World Trade Centre in US on 11 September 2001 and the world's economic recession (2008-2013) (Pettinger, 2016) among others that kept global oil demands low. Thus, the world's oil production was low during the late 1990s and 2000s.

Nevertheless, the various sanctions on Iran in 2010 not only contributed in its oil production decline but it also reduced its share in OPEC and global total oil production. In 2011, Iran contributed 12.24 per cent in OPEC oil production which fell to 9.96 per cent in 2012 while in global terms, it's share was 5.20 in 2011 which came down to 4.30 per cent in the next year. In spite of its fluctuating oil production, Iran exported most of its share as it was the major source of its revenue. Most of the time, the size of its oil exports was directly proportionate to its production and means that Iran's oil market conditions determined its oil production.

Apart from being a key oil producer, Iran is one among major oil consumers. Its oil consumption increased from 49 million tonnes in 1991 to 95.5 million tonnes in 2013 but later reduced to 88.9 million tonnes in 2015 having the CAGR of oil consumption of 2.41 per cent during 1991 to 2015 (BP, 2002; BP, 2016).The provision of subsidy in oil and oil products contributed in increasing domestic oil consumption that resulted in strain in the state finance (Yong, 2011) as well as an adverse impact on its oil export capability to some extent (Rogado, 2014). The US sanctions further affected its oil exports especially after 2011 to a great extent. Started with the restriction on investment not more than US$20 million in a year by foreign countries and/or companies in Iran's oil and gas sector, the sanctions gradually became broader in scope and targeted various segments of Iran's energy sector encompassing ban on transactions with Iranian banks, ban on insurance to ships carrying Iranian oil, bar on export of energy related technologies to Iran etc. These crippled Iran's oil exports which has been discussed in detail in Chapter Five.

Many oil importing countries and companies cancelled or put on hold their oil contracts with Iran due to the fear of the US sanctions such as Kenya (Juma, 2012), Japan (Tsukimori, 2016) including India (Verma and Fabi, 2012) etc. Consequently, Iran's crude oil exports dropped from 126.34 million tonnes in 2011 to 55.23 million tonnes in 2014 which was 6.27 per cent and2.76 per cent of the world's total oil export in respective years (See **Table-3.2**). In case of India, Iran's oil exports declined from 15.94 million tonnes in 2011 to 9.78 million tonnes in 2013; however it increased slightly which was 10.34 million tonnes in 2015 (See **Table-5.5**).

The effect of drop in oil exports by Iran resulted in huge revenue loss, as its revenue mainly comes from the exports of oil and gas and which was US$118 billion in the 2011-12 fiscal year (ending March 20, 2012). According to the International Monetary Fund (IMF),oil and natural gas export revenue dropped by 47 per cent to US$63 billion in 2012-13, again in 2013-14 by 10 per cent to US$56 billion (EIA, 2016). Yet Iran was positive and believed that the low cost of oil production in the Gulf region compare to other parts of the world would help it to hold its oil market share. The statement by Seyed Mehdi Hosseini Iran’s Deputy Petroleum Minister for International Affairs affirmed

> Definitely, given this very low price, expensive oil production in other parts of the world cannot compete with that of low-cost OPEC Members…the cost of extracting oil in Iran stood at an average of US$5-6 per barrel, rising to a maximum of US$8 per barrel in the offshore areas. However, for North Sea crude it cost US$50 per barrel and shale oil US$60-US$85 per barrel (OPEC Bulletin, 2015).

Thus, Iran’s low cost oil price provides a better option of oil source for the countries.

Iran’s natural gas scenario

Iran is not only rich in oil but it also has a large natural gas reserves. According to *BP Statistical Review of World Energy 2016,* it has the largest reservoir of natural gas with almost 34.0 trillion cubic metres (tcm) or almost 18.2 per cent of world’s total reserves in 2015. It is followed by Russia which contains 32.3 tcm, about 17.28 per cent of the world’s reserves (BP, 2016). The data is important, as the new technologies keep helping to explore new reserves that are recoverable and it keeps changing the status of the country; hence it needs revision from time to time. For many years, Russia had been the largest reservoir of natural gas followed by Iran. However, the new findings of natural gas in Iran in addition to its low production and export compared to Russia added in upgrading its ranking as the largest reservoir since 2011. Iran’s large reserve of natural gas and comparatively low production provides it reserves upon production ratio of almost 176.8years (BP, 2016) that means it has the capability to supply gas resources to the global market for many years to come.

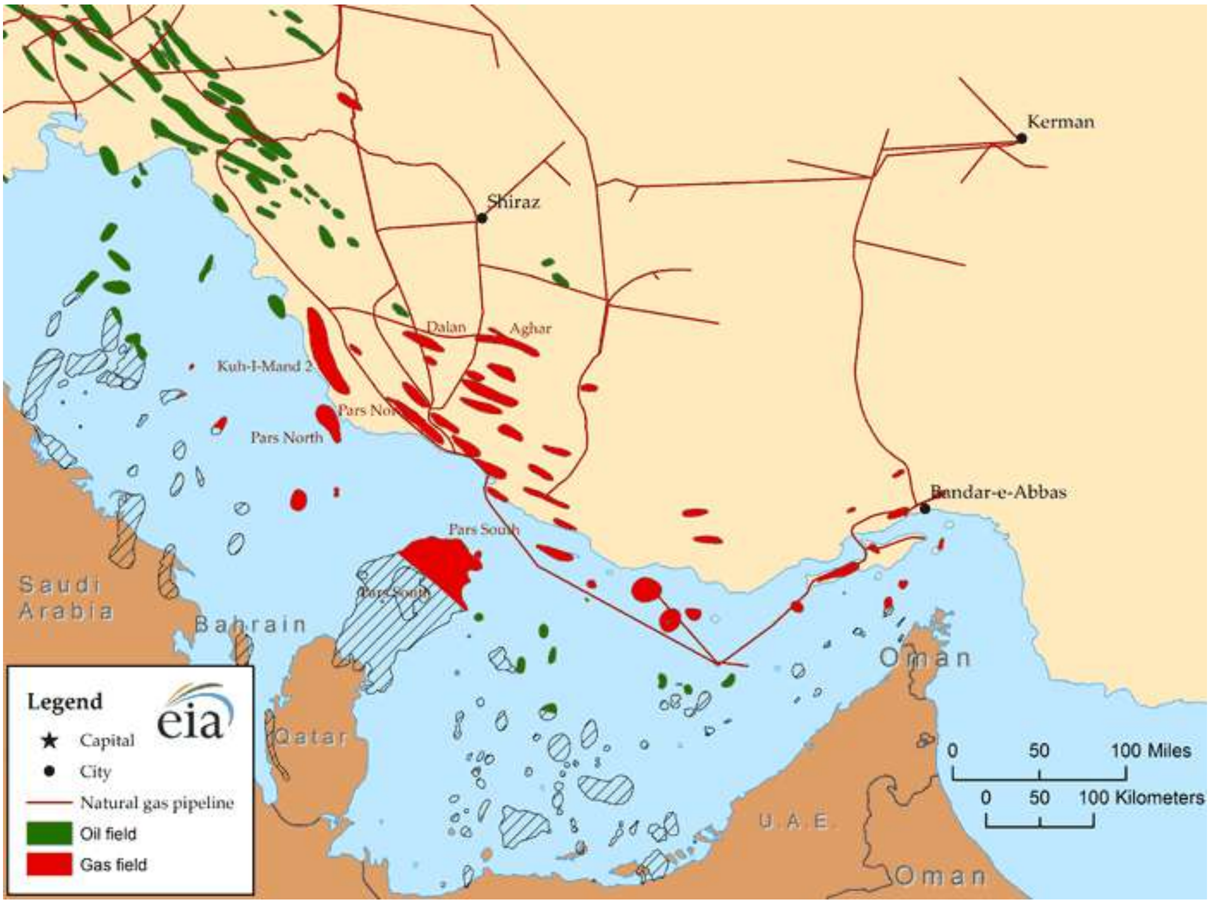
Iran's majority (more than 60 per cent) of natural gas reserves are located offshore. Non-associated gas fields[6] account for around 80 per cent of the country's proven gas reserves and have not yet been developed (*Hydrocarbons-technology.com*, 2013b). South Pars or North Field is the largest non-associated gas field of Iran as well as the world. It covers an area of 9,700 square km, of which 3,700 square km is in Iranian territorial waters known as South Pars and 6,000 square km is in Qatari territorial waters known as North Field. Covering such a large area, it holds an estimated 50.97 tcm of gas and some 50 billion barrels of condensates (Doherty, 2010). The South Pars

[6] “Non-associated natural is that which is not in contact with significant quantities of crude oil in the reservoir” (EIA, n.d.).

contains 10 per cent of the world gas reserves and for Iran, it comprises 27 per cent of its total reserves and 35 per cent of the country's natural gas output (*Hydrocarbons-technology.com*, 2013b). Apart from South Pars, there are some other major gas fields and these are North Pars, Kish, Kangan, Golshan and few more. **Map 3.2** depicts the location of Iran's natural gas fields.

Map 3.2

Iran's natural gas fields



Sources-(Energy Information Administration, 2015)

Map-3.2 shows that Iran's larger shares of natural gas are found in its south-western part. The natural gas which is the cleanest hydrocarbon energy source fulfils majority of Iran's primary energy needs. **Table-3.3** shows the share of various primary energy resources in meeting Iran's energy needs.

Table-3.3

Iran's primary energy consumption by fuel

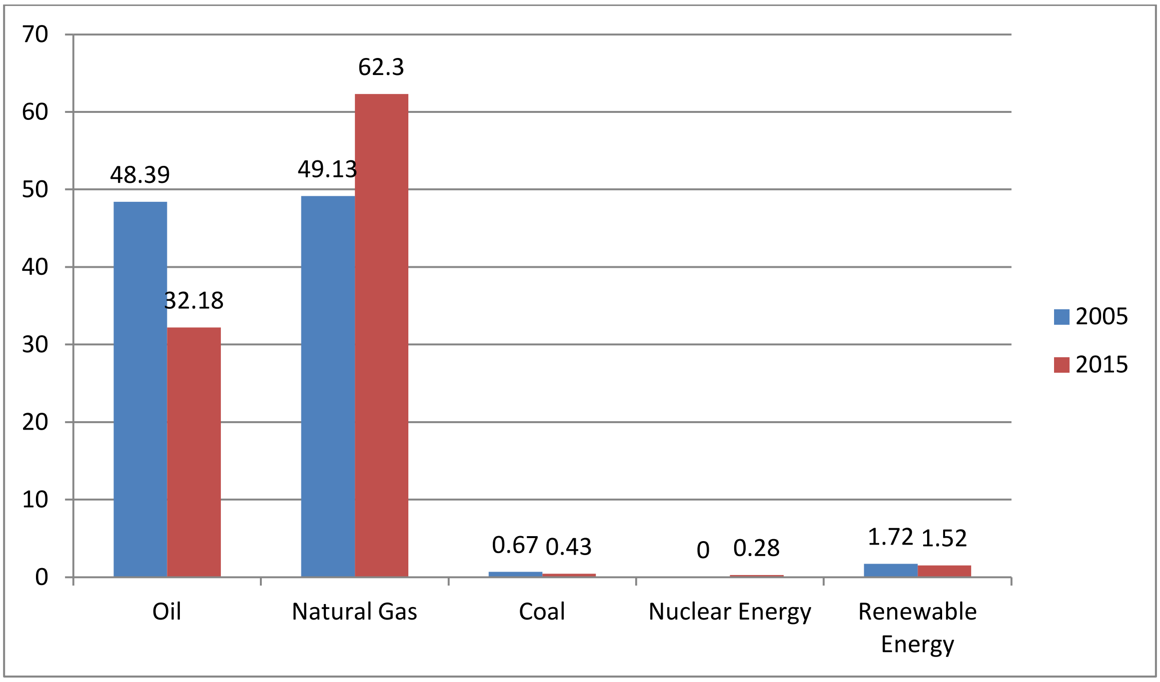
	(million tonnes oil equivalent)	
Year	**2005**	**2015**
Oil	78.4	88.9
Natural gas	79.6	172.1
Coal	1.1	1.2
Nuclear energy	0	0.8
Renewable energy	2.8	4.2
Total	162.0	276.2

Sources- (BP, 2006; BP, 2016)

Table-3.3 shows that natural gas has been the largest primary energy source of Iran. Its consumption of natural gas increased from 79.6 million tonnes of oil equivalent in 2005 to 172.1 million tonnes of oil equivalent in 2015 which were 49.13 per cent and 62.30 per cent of its total primary energy consumption in 2005 and 2015 respectively (BP, 2006; BP, 2016). The data depicts that the rise in natural gas consumption was not only in quantity but its share in total primary energy consumption has also increased significantly, almost a rise of 13.17 per cent during past one decade. **Graph-3.1** depicts the increase in the share of Iran's natural gas consumption in relations to its total primary energy consumption.

Graph-3.1

Iran's Primary Energy Consumption by Fuel 2005 and 2015



Sources-(BP, 2006; BP, 2016)

Graph3.1 shows that Iran's dependency on natural gas for its energy needs increased drastically in past one decade. Further, due to Iran's low gas production compared to consumption, it did not remain a major gas exporter particularly after 1979. **Table-3.4** shows Iran's natural gas scenario since 1973.

Table 3.4

Iran's Natural Gas Scenario Since 1973 to 2015

billion cubic metres (bcm)

Year	Consumption (bcm)	Production (bcm)	Iran's share in global natural gas production (In per cent)	Iran's share in global natural gas export (In per cent)
1973	N.A.	17.78	1.47	9.20
1974	N.A.	20.66	1.66	7.66
1975	N.A	20.28	1.62	7.94

1976	N.A.	19.99	1.60	6.95
1977	N.A.	18.85	1.45	6.53
1978	N.A.	16.94	1.26	4.75
1979	N.A.	17.91	1.25	2.34
1980	N.A.	7.13	0.49	0.11
1981	N.A.	5.95	0.38	0.13
1982	N.A.	7.20	0.46	N.A.
1983	N.A.	11.00	0.70	N.A.
1984	N.A.	13.50	0.79	N.A.
1985	N.A.	14.60	0.83	N.A.
1986	N.A.	15.20	0.84	N.A.
1987	N.A.	16.00	0.84	N.A.
1988	N.A.	20.00	1.01	N.A.
1989	N.A.	22.20	1.08	N.A.
1990	N.A.	24.20	1.16	0.49
1991	22.7	25.83	1.27	0.94
1992	25.0	25.0	1.22	N.A.
1993	26.6	27.1	1.30	0.15
1994	31.8	31.8	1.52	N.A.
1995	35.2	35.3	1.67	0.03
1996	38.9	39.0	1.74	0.02
1997	47.1	47.0	2.10	0
1998	51.8	50.0	2.18	0

1999	59.8	57.8	2.47	N.A.
2000	63.0	60.2	2.48	N.A.
2001	65.0	60.6	2.50	0.06
2002	79.2	75.0	2.96	0.11
2003	82.9	81.5	3.10	0.54
2004	98.7	96.4	3.55	0.52
2005	102.8	102.3	3.10	0.65
2006	112.0	111..5	3.85	0.76
2007	125.5	125.0	4.21	0.77
2008	134.8	132.4	4.31	0.52
2009	143.2	144.2	4.82	0.63
2010	152.9	152.4	4.75	0.85
2011	162.4	159.9	4.82	0.88
2012	161.5	166.6	4.92	0.89
2013	159.4	164.0	4.81	0.88
2014	170.2	172.6	4.99	0.81
2015	191.2	192.5	5.4	0.82

Sources- (BP, several years)

In 1973, Iran produced 17.78 bcm of gas which reduced to 7.13 bcm in 1980. In the course of time, it increased gas production which reached to almost 191.2 bcm in 2015. The CAGR of Iran's gas production was 8.37 per cent during 1991 and 2015 that enhanced its share in the world's gas production as shown in **Table 3.4.** It produced 1.27 per cent of world's total gas production in 1991 which increased to 5.4 in 2015. However, Iran's energy policy emphasised on increasing gas and decreasing oil usages in both commercial and residential sectors (Golara and et al., 2015).

Additionally, its fast growing population with increasing per capita energy consumption, urbanisation and economic development further accentuated gas consumption domestically. The population rose from 57.28 million in 1991 to 79.10 million in 2015. In case of per capita energy use, it was 1,341.56 kg of oil equivalent in 1991 which increased to 3,033.83 kg of oil equivalent in 2014 (World Bank, 2016). Consequently, the growth rate of its gas consumption was higher than its growth in the production rate whose CAGR was 8.9 per cent during 1991 and 2015 (BP, 2002; BP, 2016).

Thus, the rising gas consumption in Iran left it with little scope for the gas exports. However, it is noteworthy that it had remained one of the major gas exporters particularly during pre-Iranian Revolution period with average of 6.48 per cent of the share in global gas export during 1973 and 1979 (See **Table-3.4**). Later, its share in global gas exports continued to decrease and reached just 0.82 per cent in 2015.

Moreover, Iran imports natural gas from Turkmenistan since 1997 especially during winter season (Hafezi, 2017)through the 200 km Korpedzhe-Kurdkui pipeline (Ovozi, 2014). The demands of energy come from Iran's largely populated northern parts while its majority of natural gas fields are located in its south-western part (*Iran Daily*, 2017a). Having a large distance and lack of well-developed connectivity for the gas transport between Iran's own gas field and its large population (Ovozi, 2014) compelled it to import gas. Further, its mountainous and desolated terrain makes the land based transportation difficult. The proximity of Iran's northern population with Turkmenistan's gas fields facilitated the former to import gas from the latter. In 2015, Iran imported 7.2 bcm of natural gas from Turkmenistan (BP, 2016).

Additionally, Iran imports gas from Azerbaijan mainly in the form of swap deal which was signed in 2005 (*Iran Daily*, 2015). Under the deal, Iran imports gas from Azerbaijan and exports same amount to Azerbaijan's exclave the Autonomous Republic of Nakhchivan which is separated from Azerbaijan by the narrow strip of 46 km of Armenian territory (Aliyev, 1998).Due to the strain political relationship between Armenia and Azerbaijan, the latter has been unable to use Armenian territory to access Nakhchivan territory (Aliyev, 1998). In 2015, Iran imported 0.2 bcm of gas from Azerbaijan (BP, 2016).

In the changing energy market, natural gas is emerging as an important source of energy and means to earn revenue. “Technological advances are constantly improving efficiencies in extraction, transportation and storage techniques as well as in equipment that uses natural gas” (Partners, 2005: Page-7). Iran also wants to increase its gas exports. It is apparent from the enactment of the Targeted Subsidies Reform Act in March 2010 for the reducing of energy consumption domestically. As the fossil fuel including gas was highly subsidised in Iran, it created excessive and inefficient energy use, caused to price volatility, deterred much-needed investment in the energy sector and encouraged fuel smuggling (Hassanzadeh, 2012).

To lower the energy consumption including gas, the energy subsidy reforms increased the gas price from US$0.4 per million British thermal unit (mmBtu) in pre-2007 to US$3.1 per mmBtu in summer 2011 for the residential and commercial usage while for industrial usage, it increased from US$0.53 per mmBtu to US$2.0 mmBtu during the same period (Jalilvand, 2013, page-17). Iran’s willingness to increase its gas exports became clear from its envisagement of gas export projects via pipelines and LNG. It was estimated that Iran foresaw to export 52.8-56.4 bcm of gas per year via pipeline and 100-102 bcm per year via LNG (Jalilvand, 2013). Thus, the Iranian efforts and development of several new phases of South Pars field have resulted in the increase of its natural gas production as well as exports.

Yet, it is a minor exporter and could not move beyond regional market. Iran’s majority of gas exports go to its three neighbouring countries namely Turkey Armenia, and Azerbaijan and the gas transportation was done via pipelines namely Tabriz-Ankara pipeline between Iran and Turkey and Kazi Magomed-Astara pipeline between Iran and Azerbaijan (Zeynalov, 2016) and Tabriz to Armenian grid between Iran and Armenia (Jalilvand, 2013).

In 2015, Iran exported less than one percent of global natural gas exports and still has no infrastructure to export gas in the form of LNG (EIA, 2012). LNG is capital intensive in nature and has a chain of complex process. It needs a proper construction of some basic amenities like liquefaction plants, LNG tankers, receiving and storage terminals and re-gasification facilities to transport the gas. A typical LNG project involves a complex process of production (on or offshore), pre-treatment and liquefaction, shipping, unloading, storage and gasification. In the liquefaction process, natural gas is converted into liquid and is done at very low temperature, that is, below

-160 degree Celsius and again it is re-gasified at the receiving end. Thus, LNG is technologically complex transporting system (Dortie, 2006). Iran could not complete its LNG plant at Tombak port, located in west coast of South Pars gas field construction of which was started in 2007. The lack of investments and technology due the US sanctions hampered its development. After Iran's nuclear deal, Total, a French oil company has shown interest in the investment of this LNG project (*Press TV*, 2017).

Being a large reservoir of oil and natural gas, Iran has been an important source of energy for many energy importing countries. Officially the EU was Iran's largest trading partner until 2008; the total trade between Iran and the EU was US$35 billion while with China, it was US$29 billion (Bozorgmehr and Dyer, 2010) and energy trade had the majority share in the EU imports from Iran (European Commission, 2017). However, this number did not include Iran's trade with the United Arab Emirates (UAE) that was channelled to or from China. According to Deputy Head of the Iran-China Chamber of Commerce, the transhipments to China accounted for more than half of Tehran's US$15 billion trade with the UAE in 2008. When this was taken into account, China's total trade with Iran reached to at least US$36.5 billion in 2008 (Bozorgmehr and Dyer, 2010) which made China unofficially a largest trading partner of Iran. President Xi Jinping emphasised during his visit to Tehran in January 2016 that China had been Iran's biggest trading partner for six years in a row (Mohan and Srivastava, 2016). India is also one of the major trading partners of Iran and energy consists substantially in their bilateral trade.

India-Iran bilateral trade

The political relationship between Iran and India remained low during the Cold War period (1945-1991), however they continued to have common interests in various issues like a stronger global South (mainly includes developing countries) and an independent West Asia, mutual interest in price and supply stability of oil and natural gas, stable Afghanistan, (Chandramohan, 2014) etc. In spite of these common concerns, they could not avail the opportunity to deepen their political and economic relations.

During the Cold War period most of the countries of the world were divided politically and ideologically (Capitalism vs. Communism) between the US and Soviet Union led blocs and Iran and India were in opposite camps. Iran was a key political and military ally of the US until 1979 while India kept itself apart from any of these two blocs with a tilt towards Russia over some issues. This created mistrust between Iran and India and made adverse condition for them for their fruitful engagement.

Furthermore, Iran’s support to Pakistan in the Indo-Pakistan wars of 1965 and 1971 made the situation worse. Nevertheless, the dissolution of the erstwhile Soviet Union in 1991 and the end of the Cold War not only changed the international politics where the US remained a sole ‘super power’ but it also changed the foreign policy priorities of several countries. Under the new international realities, India viewed Iran as a key strategic and energy partner for its growing energy needs and over some common issues of regional and global importance like stability in Afghanistan, emphasis on autonomy in the conduct of their international relations etc.

Indian Prime Minister Narasimha Rao visited Iran in 1993, the first visit by Indian Prime Minister after the Islamic Revolution in 1979. It revealed that Iran emerged as an important geo-political entity in India’s West Asian policy. The economic liberalisation in India in 1991 increased its energy needs including oil and gas and Iran was perceived as a major energy sources due to its large oil and gas reserves and their geographical proximity with India. On the other side, after the death of Ayatollah Khomeini in 1989 and election of Akbar Hashemi Rafsanjani as President in the same year, Iran’s foreign policy tilted towards pragmatism (Vissa, 2013).

Due to the shift in Iran’s foreign policy orientation, Asian region was seen as its key political and economic partners. It is apparent from the day tour of Rafsanjani to major Asian countries including India in April 1995 where he highlighted the wide ranges of issues for cooperation such as terrorism, enhancement of mutual trade, energy etc. (Grummon, 1995). In Iran’s foreign policy calculation, the importance of Asia further increased as the US started to target Iran’s energy sector by imposing sanction. President Bill Clinton prevented the US companies to develop Iranian petroleum resources by the Executive Order No. 12975 on 15 March 1995 (US Department of Treasury, 1995a) and later the ILSA was enacted.

Amid the changing political and economic circumstances in Iran and India, both were desirous for cooperation in the energy area particularly in oil and gas sectors and sought the ways to realise it. The signing of Memorandum of Understanding (MoU) between Iran and India for the Iran-Pakistan-India (IPI) pipeline in 1993 could be viewed in this perspective. The importance of energy in their bilateral trade can be understood from the **Table-3.5**

Table 3.5

India-Iran bilateral trade (Hydrocarbon vs. Non-hydrocarbon)

(Unit in US$ Million)

Year	India-Iran hydrocarbon trade (US$ million)	India-Iran non-hydrocarbon trade (US$ million)	Share of hydrocarbon in its total bilateral trade (per cent)	Share of hydrocarbon in India's total import from Iran (per cent)	Share of Iran in India's global trade (per cent)
2006-07	7,329.43	1,735.6	80.85	89.17	N.A
2007-08	10,894.09	1,993.44	84.53	91.82	N.A.
2008-09	12,304.8	2,605.98	82.52	90.88	N.A.
2009-10	10,542.84	2,851.18	78.71	89.78	N.A.
2010-11	9,408.92	4,012.19	70.10	85.81	2.17
2011-12	11,813.78	4,387.71	72.91	85.30	2.04
2012-13	9,758.79	5,186.74	65.29	83.80	1.89
2013-14	8,588.85	6,689.66	56.21	83.01	2.00
2014-15	7,339.53	5,790.55	55.89	81.43	1.73
2015-16	4504.95	4555.31	49.72	71.05	1.40
2016-17	9034.63	3865	70.03	85.72	1.95

Source: [Department of Commerce(Government of India),several years]

Note- There is no specified data on India-Iran hydrocarbon trade up to 2005-06.

Table-3.5 shows that their total bilateral trade is dominated by energy in most of the years with an average of 70 per cent of the trade during 2006-07 and 2016-17 (See **Table 3.5**). Though Iran remained India's one of the major energy trade partner particularly after 2001, it could not help much to substantiate its total bilateral trade which has been below two per cent of India's global trade during past one decade.

China has been India’s largest trading partner followed by the US. In 2012-13, the contribution of China in India’s total trade was 8.32 percent which increased to 10.82 per cent in 2016-17. For the US, it was 7.76 per cent in 2012-13 which increased to 9.79 per cent in 2016-17 (Ministry of Commerce and Industry of Government of India, 2017).

Iran and India being a net oil exporter and importer respectively, the hydrocarbon trade particularly crude oil flow from Iran dominated their bilateral trade, hence their bilateral trade got affected in case of variation in its oil flow. However Iran’s share in India’s total oil import was low particularly, until 2000-01 when India imported 2.655 million tonnes of oil from Iran, a share of almost 3.5 per cent of India’s total crude oil import (See **Table-3.6**). The economic and political development in Asia and the world in the late 1990s became an obstacle before them to enhance their oil trade.

The Asian Financial crisis of 1997, due to the excessive out flow of foreign funds from the Asian countries (Dalmia, 2012),led a decline in Asian crude oil demand from 926.5 million tonnes in 1997 to 903.5 million tonnes in 1998 (BP, 2002) as well as the oil price decreased from US$18.68 per barrel in 1997 to US$12.28 per barrel in 1998 (OPEC, 2008). This lowered the scope and incentive of oil exporting countries for its trade. In the meanwhile, in September 1997, Iran’s Bandar Abbas refinery came into operation as well as the refinery capacity of Abadan was enhanced which increased its total refinery capacity from 60.15 million tonnes (1208 thousand barrel per day) in 1997 to 75.89 million tonnes (1524 thousand barrel per day) in 1998. This provided Iran an opportunity to use its crude oil domestically for the refined oil production. This led to the diversion of some of its crude oil from exports and was used in its own refinery. As a result the refined oil production in Iran increased from 48.52 million tonnes (974.4 thousand barrels per day) in 1997 to 66.62 million tonnes (1337.8 thousand barrels per day) in 1998 (OPEC, 2008) and its crude oil exports declined from 128.83 million tonnes in 1997 to 125.10 million tonnes in 1998 (See **Table-3.2**).

On the other side, India was willing to diversify its oil energy source and reduce its dependence on the Gulf (Beri, 2005). Africa, particularly Nigeria, the largest oil producer of the African region for more than past two and half decades and shared almost 30 per cent of the regional oil production, was considered as an India’s important source of low sulphur crude oil (PIB, n.d.).The production of petroleum products from low sulphur crude oil is cost effective (International Council of Clean

Transportation, 2011). Consequently India emphasised on increasing oil imports from Nigeria and imports rose from 8.07 million tonnes in 1997-98 to 15.445 million tonnes in 1999-2000 (Singh, 2010). Later, India's success in persuading Nigeria to supply of the 'low sulphur crude oil'[7] on term contract basis at 'official selling prices'[8] in March 2000 in Abuja, (PIB, n.d.), made the latter its one of the major oil suppliers. Consequently, the oil flow from Iran to India stayed low during the late 1990s.

Nonetheless, in due course of time, the mutual political and economic interests of Iran and India intensified. For Iran, the strengthening of political and economic relationship with Asian countries became necessary due to the influence of the US sanctions. For India, the winning of Iran's political support was necessary which was adversely affected by the nuclear test of 1998 as Tehran considered the test as a threat for regional stability (Siasat, 1998). Additionally, India's rising oil consumption led Indian Prime Minister Atal Bihari Vajpayee to visit Iran in 2001. During the visit, he and his counterpart Iranian President Ayatollah Mohammed Khatami signed *Tehran Declaration 2001* on 10 April. Both

> convinced that strengthened bilateral relations would be mutually beneficial and enhance regional peace and stability (and they were) desirous of realising the vast potential of bilateral cooperation in political, strategic, economic, technological and cultural fields, including trade, industry, technology, energy, transportation, agriculture (PIB, 2001).

Hence, during the meeting, energy remained one of the key areas for discussion and the two were desirous for mutual cooperation (PIB, 2011).

The relationship further concretised during the visit of President Mohammed Khatami in 2003 as a chief guest of India's Republic Day function. During the meeting Iran and India issued *New Delhi Declaration 2003* where they referred to each other as "strategic partners" and decided to explore the opportunities to co-operate in the area of defence, science and technology, economy, international peace and security, infrastructure development for the "North-South transit arrangement" and the last but not least energy security [Ministry of External Affairs, Government of India (MEA),

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[7]Low sulphur crude requires less processing and produces a slate of products with a greater percentage of value-added products such as gasoline, diesel and aviation fuel (Oil and Gas Corrosion, 2014).

[8]Prices at which National Oil Companies of Oil-Producing Nations sell their crude oil. These prices are set regularly (usually monthly) and published by news agencies like Bloomberg (Energonomics.com, n.d.).

2003]. The significance of energy in their relationship is such that it was viewed as a strategic area of their future relationship. The declaration says:

> India and Iran have a complementarity of interests in the energy sector which should develop as a strategic area of their future relationship. Iran with its abundant energy resources and India with its growing energy needs as a rapidly developing economy are natural partners. The areas of cooperation in this sector include investment in upstream and downstream activities in the oil sector, LNG and natural gas tie-ups and secure modes of transport (MEA, 2003).

However, the US sanctions on Iran were aimed at cutting its oil revenue and putting pressure on Iran to abandon its nuclear programme. Consequently, it affected India-Iran trade relations especially energy. The share of hydrocarbon in their total bilateral trade was 80.85 per cent in 2006-07 and it reduced to 49.72 per cent in 2015-16 due the threat of the US sanctions. Later, it increased to 70.03 per cent in 2016-17 after the signing of nuclear deal between Iran and P5+1which has been discussed in Chapter Four. After the signing of the Deal, many economic sanctions have been lifted from Iran like restriction on oil exports, shipping of Iranian crude, using Society for Worldwide Interbank Financial Telecommunication (SWIFT), a service for the international financial transaction etc, which has also been discussed in Chapter Five and it made possible for Iran to increase its trade including energy globally.

Iran's role in India's oil needs

Table 3.6 gives the detail accounting of their oil trade from 1995-96 to 2015-16 which exhibits the status of Iran as an oil supplier of India.

Table-3.6

Iran's share in India's crude oil import

Year	India's oil import from the world (In million tonnes)	India's oil import from Iran (In million tonnes)	Iran's share in India's oil import (in per cent)	Iran's position as India's oil supplier (ordinal number)
1995-96	27.342	3.247	11.8	5th
1996-97	33.906	4.718	13.9	5th
1997-98	34.493	3.511	10.1	5th
1998-99	39.808	2.840	7.1	5th
1999-00	57.805	3.735	6.4	5th
2000-01	74.097	2.655	3.5	5th
2001-02	78.706	8.446	10.7	4th
2002-03	81.989	7.422	9.0	5th
2003-04	90.434	8.620	9.5	4th
2004-05	95.861	9.614	10.0	4th
2005-06	99.409	11.404	11.4	3rd
2006-07	111.502	14.691	13.1	2nd
2007-08	121.672	19.422	16.0	2nd
2008-09	132.775	21.812	16.4	2nd
2009-10	159.259	21.214	13.3	2nd
2010-11	163.595	18.525	11.3	2nd
2011-12	171.729	18.077	10.5	3rd

2012-13	184.795	13.300	7.1	6th
2013-14	189.238	11.000	5.8	6th
2014-15	189.44	10.95	5.7	7th
2015-16	202.85	12.7	6.26	6th

Sources- (Verma, 2012; PTI, 2013; Department of Commerce, 2015; PTI, 2016; PTI, 2017)

The mutual visits by Iranian and Indian leaders and their willingness to increase trade including oil resulted in the increase supply of oil from Iran to India particularly from 2001-02. The territorial closeness has been an added advantage in their oil trade as the final cost of crude oil in the importing countries depends on the transport cost (Gloystein and Falush, 2014) which augments with the increase in the distance to travel. It is the importer which bears the shipping cost in general (Mahalingam, 2005).With its inability to fulfil the rising oil demands from the domestic production, India had to increase oil imports where Iran contributed significantly. The share of Iran in India's total oil import rose from 3.5 per cent in 2000-01 to 16.4 per cent in 2008-09, a year before the imposition of the CISADA which has been discussed in detail in Chapter Five. The increase in Iran's oil exports made it India's second largest oil supplier during 2006-07 and 2010-11.

However, the US whose target was to cut Iranian oil revenue, adversely affected oil supply from Iran to India. This is evident from US Secretary of State John Kerry's declaration in 2013. He mentioned that India qualified for an exception from the US-imposed sanctions because it substantially reduced imports of Iranian crude (Jayaswal, 2013). Further, the sanctions or threat of sanctions on various Iranian entities related to oil trade. The Islamic Republic of Iran Shipping Lines (IRISL) (Iran's biggest shipping operator and fleet of about 170 vessels-from sailing in international waters), international shipping company carrying Iranian oil (*Teheran Times*, 2016) was barred from getting insurance coverage from the insurance companies resulting in the lack of insured oil ships, problem of financial transaction of Iranian banks etc.

These in turn contributed in low oil supply to India. In terms of the share of Iran in India's total oil imports, it relegated to only 5.8 per cent in 2013-14 and having sixth position in India's total oil imports. Further, to make its oil more lucrative, Iran offered longer credit period on crude oil purchase and free shipping delivery to India in 2013 so that it would be continuing the oil exports which could save India's freight cost of 70 cents to US$1 per barrel (Verma, 2013). In fact, Iran had started to provide credit period of 90 days while most of the exporter struck to 30 days. In spite of these offers, the oil trade between the two could not be strengthened though it continued to remain a key area of cooperation between them.

As crude oil was the dominating part of their total trade, the balance of trade has always been in favour of Iran. To strengthen the energy relations beyond the oil, they started to explore areas of investments and cooperation in upstream and downstream industries in both countries. Moreover, their efforts to broaden their trade engagements helped them to boost their non-hydrocarbon trade (**Table 3.3**). The share of non-hydrocarbon trade between them increased from 29.9 per cent in 2010-11 to 50.28 per cent in 2015-16, later it decreased to 29.97 per cent in 2016-17. Yet, oil continued to stay a prime factor in their trade relations.

Nevertheless, the US decision to lift some of its sanctions from Iran on January 2016 has raised hopes for strong oil relations between India and Iran. Additionally, Iran's offer of longer credit period on crude oil sale than other Gulf countries and freight discount to India would also help to strengthen their oil trade. In this way, their oil relation has always been affected by the prevalent global and their domestic situations.

India's prospective on Iranian Gas

It has already been discussed that Iran has large gas reserves and untapped potential to serve global gas market. The shift in Iran's policy from radical to pragmatic over its energy sources including natural gas opened the room for countries which were willing to import gas. The gas resource is volatile in nature, hence it is difficult to store and needs specific infrastructure for transportation (Arcas and Ehab, 2014). As pipeline and LNG are used as a means to transport gas, Iran lacks required infrastructure of these systems. Though, it has gas pipelines, it is limited to Turkey for exports. Iran's natural gas exports by its other two gas pipelines connecting Iran-Armenia (Tabriz to Armenian grid) and Iran-Azerbaijan (Kazi Magomed to Astara) are generally used under swap deal. In case of Armenia, Iran receives electricity from Armenia in place of its gas export to the latter. For Azerbaijan, Iran exports gas to Autonomous Republic of Nakhchivan in place of its import of gas from Azerbaijan (Jalilvand, 2013).

For LNG trade, both starting and destination points need some specific infrastructure. Liquefaction plant locates in the gas sourcing point while receiving and storage terminals and re-gasification facilities are required in destination points. Iran could not develop the essential infrastructure for the LNG export, as it is capital intensive in nature and it did not have the required technologies and was dependent on external sources. The lack of these infrastructures was one of the reasons that Iran could not increase its gas export to its potential. This is evident from the absence of gas trade between Iran and India in spite of their willingness.

In terms of LNG, India has well developed infrastructure with four working LNG terminals namely, Dahej, Hazira, Kochi and Dhabol [Ministry of Petroleum and Natural Gas (MP&NG), 2015] which has been discussed in detail in Chapter Six. However, India and Iran continued to explore options to start gas trade both LNG and pipeline. The proposal of building pipeline to transport natural gas connecting Iran with India is a two and half decade old idea which has been discussed in detail in Chapter Four.

LNG is the other option for gas trade. The technological development in the field of LNG reduced its cost and made it feasible for the developing countries to adapt themselves for exporting and importing of gas via this transporting means. If the distance is more than 3,500 km from the gas source to the destination point or there is political, economic or environmental complexities in laying pipeline, LNG is preferred in general (Corbeau, Anne-Sophie and et al, 2014). This led to the increase of LNG trade and raised its share of total gas trade from 25.79 per cent in 2001 (BP, 2002) to 32.45 per cent in 2015 (BP, 2016).

India and Iran also viewed it as an option for their gas trade. During the visit of a delegation led by Indian Petroleum and Natural Gas Minister Ram Naik to Iran in May 2003, both agreed 'in-principle' for the trade of 5 million tonne per annum (mtpa) of LNG from Iran (MP&NG, 2004). The final Sale Purchase Agreements was signed between National Iranian Gas Export Company and Gas Authority of India Limited (GAIL), Indian Oil Corporation Limited (IOCL) and Bharat Petroleum Corporation (BPC) on 13 June 2005 after the prolonged discussion between two countries. Later, in January 2005, the two countries agreed for additional supply of 2.5 (mtpa) (Mahalingam, 2005). This became the biggest ever gas deal of 7.5 mtpa for India's raising gas needs and its first delivery was to reach Indian shores by 2009 (Pant, 2008); however, the agreement could not be executed accordingly.

Apart from Iran's inability to complete its LNG infrastructure, the issue of gas price also became the major obstacle for progress. It is noteworthy that Iran's prior offer of gas price for this project was US$2.57 per mmBtu for 5 million tonne per year, but India was not willing to pay anything more than US$2.40 per mmBtu (Pant, 2008). In 2005, the gas price formula was linked to the Brent marker crude oil with a fixed component (Mahalingam, 2005).The LNG price was estimated at US$3.51 per mmBtu [9]at the Indian border (US$3.21 in case of free on board) (Tongia, 2005) and if it was based on the calculation of a fixed component of US$1.2 per mmBtu and a variable component of about 0.065 points linked to the Brent crude where the Brent price was capped at US$31 a barrel. The gas price would have been US$4.125 if the calculation was based on the oil price at US$45 per barrel, prevailing oil price in 2005 (Pant, 2008).

Additionally, Iran also sought to have 50 per cent shipping share in LNG deal as it was also willing to involve itself in LNG's operational work while it was noted that India's public sector undertaking IOCL bore no commitment for using Iranian shipping companies. Iran wanted to engage itself economically in more comprehensive way in the project which could have helped to minimise the impact of the US sanctions on its economy. Contextualising it, Managing Director of Iran-India Shipping Company Gholam-Hossein Golparvar said:

> Iranian companies are apparently benefitting nothing from the 25-year deal which envisions FOB (Free on Board) –style export of LNG to India… Qatar obliges the purchasers of its LNG to give 25 per cent share in the transportation to its own companies. Such work develops navigation fleet(*Shana*, 2005).

The statement implied that the comprehensive engagement between Iran and India over LNG would have helped to strengthen their LNG trade. Apart from these technical concerns, India's vote against Iran at the International Atomic Energy Agency (IAEA) in September 2005 proved a major setback for the Indo-Iran LNG

[9]The price of gas at the Iran border works out to around $3.21 and it is $3.51 per mmBtu at the Indian border after taking shipping costs into account (Banerjee, 2005).

deal. Iran said “the US$21-billion, five million tonne LNG a year agreement was off” (Petronet LNG Limited, n.d.).

However, a year later, Iranian Foreign Minister Manouchehr Mottaki emphasised on the revision of Indo-Iran LNG deal during his visit to India during 16-17 November 2006. The establishment of a formula to finalise LNG gas price raised hope for its further progress (Baruah, 2006). The stringent US sanctions in the form of the CISADA of 2010 and the sanctions by the EU again stopped its development.

Though, there has been no gas trade between Iran and India, the removal of the US sanctions as well as the completion of Iran’s needed infrastructure for the gas sector might create a political environment and necessary logistic means to start the gas trade with India provided there is an agreement on gas pricing. In crude oil and natural gas trade between Iran and India whether existing or proposed is one directional that is, from Iran to India but in terms of refined oil, it has been two way and India and Iran are interdependent.

Petroleum products: Mutual Interdependence

Iran is one of the major producers of petroleum products as it has well developed refinery industries. In 2015, it shared 1.84 per cent and 2.03 per cent of global refinery capacity and production of global petroleum products respectively (OPEC, 2016) which placed it as twelfth largest refined oil producer of the world. **Table-3.7** presents Iran’s petroleum products scenario.

Table-3.7

Iran’s petroleum products scenario

(In million tonnes)

Year	Refinery capacity	Consumption	Production	Export	Import
1980	60.21	25.66	26.56	6.43	N.A.
1981	60.21	25.92	28.58	6.38	N.A.
1982	30.56	26.39	30.04	8.25	N.A.

1983	30.56	30.93	28.46	2.60	N.A.
1984	28.05	36.00	28.19	2.58	N.A.
1985	28.05	37.05	29.51	1.79	N.A.
1986	28.05	38.83	25.47	0.45	N.A.
1987	28.05	40.08	24.68	0.13	N.A.
1988	28.05	40.24	28.01	0.36	N.A.
1989	35.44	42.63	30.56	1.73	N.A.
1990	35.44	45.71	34.26	2.73	N.A.
1991	43.65	48.57	36.77	4.01	N.A.
1992	43.65	48.49	38.84	3.19	N.A.
1993	49.81	50.66	41.59	3.19	N.A.
1994	49.81	51.67	41.82	5.45	N.A.
1995	49.81	52.04	42.97	7.55	N.A.
1996	49.81	53.62	43.65	7.84	N.A.
1997	55.10	56.09	44.45	10.30	N.A.
1998	69.52	55.56	61.03	12.67	N.A.
1999	69.52	54.36	62.09	16.55	N.A.
2000	67.24	54.24	60.05	15.84	N.A.
2001	67.24	55.67	65.54	14.03	N.A.
2002	67.24	57.11	65.71	14.96	N.A.

2003	67.24	59.93	61.34	15.20	N.A.
2004	67.24	62.71	65.57	15.49	N.A.
2005	67.24	67.48	65.68	18.34	N.A.
2006	67.24	72.92	66.05	21.05	N.A.
2007	67.24	76.64	68.33	17.71	N.A.
2008	67.24	81.02	72.39	12.54	N.A.
2009	62.40	84.79	78.74	13.73	8.30
2010	78.23	83.04	79.52	16.78	4.88
2011	78.23	81.39	79.77	20.11	1.36
2012	78.23	80.50	82.65	20.80	0.27
2013	78.23	81.01	87.51	17.97	0.68
2014	81.24	84.19	80.96	21.44	1.82
2015	81.24	81.88	82.95	23.46	2.39

Sources- (OPEC, Several Years)

Table-3.7 shows that Iran's refinery capacity stayed on significantly low during the 1980s particularly after 1981 when it got reduced from 60.21 million tonnes in 1981 to 30.56 million tonnes in 1982, an almost 50 per cent decline (OPEC, 2016). The major cause of decrease in the refining capacity was the destruction of Iran's refinery plants during the Iran-Iraq War. Due to attacks, Iran's Abadan refinery got destroyed in 1980 as well as it had to delay in the "completion (projected for 1989) of a large petrochemical plant at Bandar-e-Khomeini (formerly known as Bandar Shahpur, but renamed after the Revolution), an Iranian-Japanese venture" (US Library of Congress, n.d.). Thus, its production of refined oil could be increased and its CAGR was at 1.83 per cent during 1981 and 1990. The consumption kept increasing and its CAGR was

5.84 per cent during this period which resulted in decreasing export of refined oil or petroleum products (See **Table-3.7**).

Later, Iran continued making efforts to increase its refining capacity and production but it could not cope-up with rising demands particularly until 2009. **Table-3.7** shows that the refinery capacity increased from 43.65 million tonnes in 1991 to 62.40 million tonnes in 2009 and the production increased from 36.77 million tonnes in 1991 to 78.74 million tonnes during the same period. Nonetheless, the consumption of petroleum products enhanced from 48.57 million tonnes in 1991 to 84.79 million tonnes in 2009. Hence the rising gap between production and consumption of petroleum products increased Iran's dependence on overseas supply. This opened the opportunity for its exporters including India. Thus, it is the area where Iran appeared as a market for Indian petroleum products particularly gasoline and diesel and helped to secure India's energy security to some extent, if it is seen from the perspective of energy exporter, especially when the competition for the share of petroleum products market increased globally.

Moreover, the importance of Iran in India's refinery industry can be traced back in 1950s when Iran drove nationalisation process which accidentally contributed in the construction of oil refineries in India. By nationalising refinery industries in Abadan which was managed and operated by multinational oil companies (MNCs) located in India, Iran interrupted the petroleum products supply to India. Burmah-Shell and Standard-Vacuum built two refineries at Mumbai (formerly Bombay) in 1954 and Caltex built one at Visakhapatnam in 1957 which has been discussed in Chapter Two. Additionally, Iran assisted India in the construction oil refinery during the initial phase of its refinery industry development. In 1965, Madras Refineries Limited (Now Chennai Petroleum Corporation Limited) was formed as a joint venture of the Government of India, Amoco India Inc. (US), and NIOC with the initial equity contribution in the ratio of 74:13:13 and was originally designed for processing 2.5 mtpa of imported Darius crude (Oil from Iran's Darius field at Kharg Island) from Iran (MP&NG, 2015). Hence, Iran's 20-year of oil supply deal for this refinery provided India a sense of energy security both in terms of crude oil as well as of petroleum products. In due course of period, India became successful to construct 23 oil refineries. **Table-3.8** gives the detailed list of these refineries.

Table-3.8

List of refineries in India

Company	Sector	Location	State	Capacity (mtpa) as of 31 March 2016	Commissioned (Year)
IOCL	Public	Digboi	Assam	0.65	1901
HPCL	Public	Mumbai	Maharashtra	6.50	1954
BPCL	Public	Mumbai	Maharashtra	12.00	1955
HPCL	Public	Vishakhapatnam	Andhra Pradesh	8.30	1957
IOCL	Public	Guwahati	Assam	1.00	1962
IOCL	Public	Barauni	Bihar	6.00	1964
IOCL	Public	Koyali	Gujarat	13.70	1965
BPCL	Public	Kochi	Kerala	9.50	1966
CPCL	Public	Manali	Tamil Nadu	10.50	1969
IOCL	Public	Haldia	West Bengal	7.50	1975
IOCL	Public	Bongaigaon	Assam	2.35	1979
IOCL	Public	Mathura	Uttar Pradesh	8.00	1982
CPCL	Public	Narimanam	Tamil Nadu	1.00	1993
MRPL	Public	Mangalore	Karnataka	15.00	1996
IOCL	Public	Panipat	Haryana	15.00	1998

RIL	Private	Jamnagar	Gujarat	30.00	1999
NRL	Public	Numaligarh	Assam	3.00	2000
ONGC	Public	Tatipaka	Andhra Pradesh	0.07	2001
Essar	Private	Vadinar	Gujarat	20.00	2006
RIL	Private	SEZ, Jamnagar	Gujarat	27	2008
BORL	Joint Venture	Bina	Madhya Pradesh	6.00	2011
HMEL	Joint Venture	Bathinda	Punjab	9.00	2012
IOCL	Public	Paradip	Odisha	15.00	2016

Sources: (Ministry of Statistics and Programme Implementation, 2017;MP&NG, 2017)

Among the 23 refineries, 18 came under public sector, 2 were joint ventures and 3 refineries were with private sector as of March 2017. The refinery industry is dominated by public sector undertaking (PSU). For example, in 2016, PSU had 135.066 mtpa of refinery capacity or 58.70 per cent of total refinery capacity. The development of Indian refinery industries can be understood from its enhancing refining capacity which increases from a modest 62 mtpa in 1998 to 230.66 mtpa in 2016-17. More importantly, it became a net exporter of petroleum products from 2001-02 and emerged as a refinery hub.

According to a report, India's net export of petroleum products was 31.08 mmt in 2015-16 (See **Table-2.3**). With the rising refined oil production and enhanced capability for its export, India also competes for its market share. In terms of refined oil production, India was fourth largest producer after the US, China, and Russia in 2016 (OPEC, 2016) while in exports, it was sixth in rank, preceded over by the US, Russia, Netherlands, Singapore, and South Korea (OPEC, 2016). Thus, India is a significant stakeholder in refined oil markets. As the transport cost has a major say in its price determination for the end users, the geographically proximate region keeps importance for its economic trade both in time and cost perspective.

Hence, in the competitive refined oil market, Iran with its rising petroleum product demands emerged as India’s one of the key markets. Iran’s policy to provide subsidies on petroleum products encouraged waste and increased its domestic demand significantly which is evident from the facts that the consumption of gasoline enhanced with the CAGR of 8.11 per cent during 1997 and 2006 (Sattari and et al., 2007). Nevertheless, with its aging and inefficient refineries, Iran was unable to produce sufficient amount of refined products to meet it. Due to the US sanctions, multinational energy companies kept themselves away from large-scale investments in its energy infrastructure requiring for the renovation of existing refinery industries as well as building of new one (Teslik, 2007).

As a result, the production of refined oil could not cope up with its rising demands. This is apparent from the fact that gasoline production which grew at CAGR of 4.03 per cent during 1997 and 2006 and led Iran to import 17.17 per cent of its gasoline consumption in 1997 which rose to 40.86 per cent in 2006 (Sattari and et al., 2007).In Iran’s swelling import of refined products especially gasoline, India emerged as a major supplier. At its peak in 2008-09, it exported over US$1 billion worth of these products (Madan, 2015). In the private sector, it was Reliance Industries Limited (RIL), which was the largest exporter of refined products to Iran. Its refinery with a total capacity of 62 million tonnes is located at Jamnagar, the western part of Gujarat (PTI, 2016). Based on advance technology, it can refine various range of crude oil as varied as light West African to heavy sour West Asian and Latin American grades, allowing it to switch to whatever crude is cheapest (Verma, 2016). Under the international sanction, RIL stopped exporting gasoline to Iran from January 2009 and from February 2010, oil imports was also blocked (PTI, 2016).

Amid Iran’s raising gasoline demands and its shrinking availability in global market forced it to undertake subsidy reforms. It started to phase out subsidies from energy products including gasoline in December 2010 and replace them with nationwide cash transfer as compensation for increasing energy prices. In this way, the retail prices of petrol, diesel, fuel oil, kerosene are required to increase to no less than 90 per cent of the Gulf free-on-board prices (Hassanzadeh, 2012) which meant that the cost of domestic petroleum products soared up to the 90 per cent of its Gulf’s export price.

Thus, Iran's energy subsidy reforms contributed in curbing petroleum products demands and it reduced from 84.79 million tonnes in 2009 to 80.50 million tonnes in 2012.It was reported that the demands of gasoline and kerosene, the products which Iran was importing, declined from their peak demands of 18.53 million tonnes and 9.57 million tonnes respectively in 2009 to 17.23 million tonnes and 4.82 million tonnes respectively in 2012 (OPEC, 2012; OPEC, 2016). Simultaneously, it became successful to further increase its refinery capacity from 62.40 million tonnes per annum in 2009 to 78.23 million tonnes per annum in 2012 (See **Table-3.7**)

Thus, Iran's internal factor such as energy subsidy reform, increase in refining capacity as well as external factors like the imposition of the CISADA, forced it to reduce consumption of petroleum products which helped to balance between its production and consumption to some extent. The decline in petroleum products imports was also seen as they came down from 8.30 million tonnes in 2009 to 0.27 million tonnes in 2012 (See **Table-3.7**). In 2015, Iran had refinery capacity of 81.24 million tonnes while it produced and consumed 82.95 million tonnes and 81.88 million tonnes respectively. As a result, it imported only 2.39 million tonnes of petroleum products and became able to export almost 23.46 million tonnes in 2015 (**Table-3.7**).

However, Iran is still not self-reliant for its gasoline needs. The nuclear deal between Iran and P5+1 (US, France, China, Russia, UK plus Germany) and the implementation of lifting of the US sanctions from 16 January 2016 opened new avenues for India and Iran to engage themselves commercially and strategically. According to the published information, India imported 26.94 million tonnes of Iranian crude in 2016-17 (Verma, 2017) as the refiners wanted to ramp up its crude oil purchase. Raising such volume was the highest in at least seven years of its imports from Iran (*Reuters*, 2016b). Petroleum products export especially gasoline and diesel to Iran, could be would resumed after the gap of six years (*PTI*, 2016e).

Thus, from India's energy security perspective, Iran has been a significant partner, particularly in 21st century. From the perspective of energy importer, Iran remained India's major crude oil supplier. As an export, Iran emerged as an important market for its petroleum products especially for gasoline and diesel. More importantly, despite the US sanctions, India managed to continue its oil import even after 2010-2011 (imposition of stricter sanctions like the CISADA which has been discussed in detail in Chapter Five) but had to cut its quantity to get waiver from sanctions. Hence, India’s oil import dropped from 21.214 million tonnes in 2009-10 to 11 million tonnes in 2013-14. Simultaneously, it reduced Iran’s share in India’s total oil import from 13.3 per cent in 2009-10 to 5.8 per cent in 2013-14 (See **Table-3.4**).

In the competitive hydrocarbon energy market especially for oil and gas, the energy importing countries are not confined only to sale and purchase of the hydrocarbon fuels to secure their energy supply. They also make efforts to get overseas oil and gas equities and started to participate in oil and gas field development and capital investments became one of the means to realise it.

Mutual investments in energy sector:

Amid increased competition for energy (oil and gas) sources among energy importing countries as well as share of market (oil and gas) among energy exporting countries, the issue of energy security remained a key concern. The instability in oil prices further increased these concerns. To promote stability in the energy exports and imports, the energy exporting and importing countries started to emphasise on mutual capital investments. For the energy importing countries, the investments in the upstream sector of the energy sourcing countries and for the energy exporting countries, downstream sectors are preferred in general. In the changing geo-economic scenario, the acquiring of equity in the foreign oil and gas fields by the energy (oil and gas) importing countries appeared as an important strategy to fulfil its soaring energy demands. The importing country having the ownership of oil and gas equities gets oil and gas from these equities at production costs (Mahalingam, 2005).

This energy sources can be used in case of a sudden energy price hike which occurs due to the instability in oil and gas supply or supply disruption. However, the contribution of oil and gas equities in the energy security of a country depends on the nature, terms and conditions of agreement between the host countries and equity holders. There are some major issues which determines the potentiality of oil or gas equity in contributing energy security of a country, such as

- The oil and gas fields must have an exploitable oil and gas resources;
- As the equity participation is the subject to certain contractual terms with the host government, there must be the provisions that allow the equity holders to take its share of oil or gas production and transfer it to its own countries (Mahalingam, 2013).

- The country's overseas oil and gas equity must be in its geographically proximate area which makes the transport of oil and gas economically viable from the source fields to the equity holding country.
- Apart from the above, there must be well developed infrastructure in both host country as well as in the equity holding country to transport energy sources especially for natural gas such as LNG or pipeline.

India also looks overseas oil and gas equities as one of the options for the security of its energy supplies and hence it is vying to acquire these equities in several countries. The ONGC Videsh Limited (OVL), the wholly owned subsidiary and overseas arm of ONGC, was established in 1965 and assigned for overseas engagement in form of investment and participation in foreign oil and gas assets (Naik, 2015).Initially, the company made several exploration efforts in Malaysia, Thailand, Iran, and Tanzania but became successful only in Iran where it discovered oil in Raksh Rostum field. However, it was nationalised by Iran after 1979 (Patey, 2014). To work more efficiently in terms of financial and technical support, later, the ONGC has been working in joint ventures with Indian or foreign national oil companies (NOCs) or with other IOCs. By 2016, it has the participation in 36 exploration and production projects in 17 countries (MP&NG, 2017) which have been discussed in detail in Chapter Two. Indian oil companies are present in 25 countries around the world. However, most of the OVL's overseas oil production is sold in the local or international markets and it is compensated in cash payments (Mahalingam, 2013).

Iran is among 25 countries where India has energy assets. Due to the geographical proximity between the two counties, the oil and gas field equities have the potential to enhance India's energy supply. However, Iran's Buy-back policy vis-à-vis investments and participation in its oil and gas field is not as attractive as the production sharing agreement. The Buy-back contract is

> similar to a service contract and requires the contractors (or IOCs) to invest its own capital and expertise for development of oil and natural gas fields. After the field is developed and production has started, the project's operatorship reverts back to NIOC or the relevant subsidiary. The annual repayment rates to the IOC are based on a predetermined percentage of the field's production and rate of return (EIA, 2015).

Thus, the policy has been for the involvement of foreign energy companies in Iran's oil and gas field exploration, production and development and not for sharing of production which restricts the IOCs only as service provider rather than the owner of oil and gas fields.

Yet, India has been interested in Iran's energy field and its first successful effort was in early 2002 when it secured the bid for the Farsi offshore block. This block has been handed over to an exclusive Indian consortium in the form of Exploration Service Contract where OVL (Operator), IOCL and OIL have stakes of 40 per cent, 40 per cent and 20 per cent respectively. The consortium drilled or completed four wells in this block, where crude oil was discovered in two wells but was non-commercial in nature while gas was found one well, Farzad B field (MP&NG, 2010). This gas field was discovered in 2008and estimated to contain 358.4 billion cubic metres (bcm) of recoverable gas reserves with a lifetime of 30 years. Due to the US sanctions, the gas field could not be developed. However, after the lifting of sanction from Iran, India submitted a US$3 billion field development plan to Iranian authorities to develop Farzad B (Mukherjee, 2017).

Besides, upstream sector, India also wants to invest in Iran's downstream sector namely, petrochemical and fertilizer industries, development of LNG facilities which would not only raise its stake in Iran's energy sector, but also strengthen its bargain power in determining and getting oil and natural gas at competitive prices. According to India's Petroleum and Natural Gas Minister Dharmendra Pradhan,

> India plans to invest US$20 billion in Iran's oil and gas sector in new petrochemicals, fertilizer and liquefied natural gas (LNG) facilities in Iran and sought land and cheaper natural gas for this. In this regard, he requested Iran to allocate appropriate and adequate land in the SEZ. He also requested the Iranian side for favourable treatment in the pricing of gas for India and also supply of rich gas at a competitive price and on a long-term basis for the life of the joint venture projects that Indian companies are interested in setting up…India's interest in setting up an LNG plant and a gas cracker in the Chabahar port and also the country's keenness to import liquefied petroleum gas (LPG) from Iran (*Economic Times*, 2016).

India's investment and engagement for the development of Chabahar port has been one of the most significant area of bilateral cooperation with Iran. Although it does not have the same importance as oil and gas source, it would facilitate the transport of oil and gas from the Central Asian and surrounding regions to India. The signing of MoU between Iran and India on 5 May 2015 envisaged construction of a multipurpose cargo terminal (600 metres length) and a container terminal (640 metres length).

Later, on 23 May 2016, a "commercial contract for the development and operations of Chabahar Port was signed between Indian Joint Venture India Ports Global Private Ltd (a consortium of Jawaharlal Nehru Port Trust and Kandla Port Trust) and Iran's Arya Bandar" in Tehran during the visit of Indian Prime Minister Narendra Modi to Iran (Press Information Bureau, 2016). According to the contract, India would invest US$500 million for the development of the Port (*The Guardian*, 2016) and install equipment and operate two berths in the first phase of the Chabahar Port with an investment of US$85.2 million and annual revenue expenditure of US$22.9 million on a 10-year lease (Press Trust of India, 2016). In the second phase, India would develop a 500-kilometre rail link between Chabahar and Zahedan, the capital of Sistan-Baluchistan province of Iran.

Located at Iran's south-eastern coast, Chabahar port would provide India a sea-land access route to Afghanistan and Central Asian region bypassing Pakistan (PTI, 2016) and ease the cost, distance and time of transport from India to Iran, Afghanistan and further Central Asian region. It was expected that it would cut India's transport costs and freight time to Central Asia and the Gulf by about a third (Verma and Kumar, 2015).

More importantly, India would also be able to approach Central Asian region, a region having large reserves of oil and gas. As Pakistan barred India to use its territory for accessing Afghanistan and Central Asian region, the port would facilitate to transport oil and gas from the Central Asian countries to the South Asian region and beyond. It is estimated that Central Asia has proved reserves of nearly 5.1 billion tonnes of oil and 20.6 tcm of natural gas which shares 2.13 per cent and 11.02 per cent respectively of the global oil and gas reserves in 2015 (BP, 2016).

Though, the amount of oil and gas reserves in Central Asian region is not as large as the Gulf region, from India's perspective, it would help in the diversification of oil and gas sources. Additionally, it would increase India's bargaining power in terms of price determination with its other energy suppliers. Strategically located Chabahar port would also help India to neutralise the geo-political and strategic influence of Gwadar port (positioned in Arabian Sea) which was constructed by Pakistan and China and would also mean that India would be in the position to monitor the ongoing movement in the Arabian Sea and the Gulf region.

Moreover, peace and stability in the West Asian region is important for the uninterrupted use of Strait of Hormuz as a transit route. Geo-politically, Strait is off the south-eastern coast of Iran and a narrow shipping route connecting Persian Gulf to the Arabian Sea and Gulf of Oman. It is 33.79 kilometres wide at its narrowest point, yet the significant amount of globally traded oil and LNG flows through it. In 2013, it accounted for the flow of roughly 30 per cent of all seaborne oil trade which is almost 20 per cent of the global oil production. Almost 103.6 bcm of LNG was transported from Qatar via the Strait of Hormuz in 2013, accounting for more than 30 per cent of global LNG trade (EIA, 2015).

Thus the blockade of Strait of Hormuz could disrupt the oil supply which could adversely affect the oil supply to the oil importing countries including India or lead to substantial increase in oil or gas price. The threat of blockade of the Strait used to be given by Iran from time to time for bargaining with the countries from the Gulf region or beyond (Johnson, 2016). In case of blockade, the oil tankers would travel longer distance to reach the Asian oil importing countries and that would increase the transporting cost. Thus, being with the geo-political and geo-economic leverages in the West Asian region, Iran has immense importance for India’s energy security.

India’s rising demands of natural gas has the capability to broaden the scope of energy ties with Iran. As natural is a volatile hydrocarbon energy resource, it cannot be transported easily and needs specific infrastructure as has been examined earlier. For the transport of gas, LNG and Pipeline are mostly used. As the infrastructure of the gas transporting system is capital intensive, it has been the major factor in determining gas price to be traded. Nonetheless, the choice of gas transport depends on the given circumstances. LNG is very expensive and complex in nature as discussed earlier but it is preferred to the transport of gas above the travel distance of 3,540.55 km than onshore pipeline and 1,126.54 km in case of offshore pipeline (Foss and et.al, 2007).

Pipeline has high fixed cost, however, its low variable cost makes it comparatively economical than other available options. Being it comparatively cheaper than LNG and well explored gas transporting system, it was/is preferred by developing as well as developed countries. Being dedicated in terms of its source and market, the project provides the certainty of supplier and buyer. Yet, the cross-border pipeline is a complex project. Due to the involvement of different countries, it needs the reconciliation of different legal and regulatory regimes as well as the interests of involved countries.

India has good network of domestic pipeline for the transport of oil and natural gas, but it does not have a single transnational pipeline. To procure overseas gas via pipeline, India continued to discuss with the gas rich Asian countries namely, Turkmenistan, Myanmar, Iran etc. and IPI pipeline project was one among them which would be discussed in the next Chapter.

Chapter-4
Domestic and Regional Politics

This Chapter starts with *Backdrop* which discusses the embedded political and economic reasons in Iran and India that led to the conceptualising of the Iran-Pakistan-India (IPI) pipeline project in 1989. The subsequent part gives the detail account of the chronological development of IPI pipeline under the section *Procedural Developments*. This part is followed by *Interests of the Participating Countries* which deals with the various political, economic and strategic interests of Iran, Pakistan and India associated with IPI pipeline. The final segment *Regional and Global Politics* discusses the implications of IPI pipeline on Saudi Arabia, Qatar and Russia and how these countries affected the project from time to time.

Backdrop

In the Indo-Iranian energy ties, the IPI pipeline has been a long debated issue. The idea of laying a gas pipeline from Iran to India was first mooted in 1989 during the meeting between Acting Deputy Foreign Minister of Iran Ali Shams Ardekani and Director of Tata Energy Research Institute Rajendra K Pachauri (Agarwal, 2009). The idea was the result of the contemporary political and economic developments in these two countries which provided the opportunity to serve their complementary interests.

Since the Islamic Revolution of 1979, Iran has been against the Western influence in general and the United States (US) particular, in its political and economic systems. Under the Shah the US used financial investments as one of its means to facilitate it. The US economic aid supported by investments continued to influence Iran's politics and economy especially after popular Prime Minister Mossadegh was overthrown in 1955 (Zarnegar, 1963). During the economic engagement with Iran, multi-national companies (MNCs) primarily served their own interests. Having interested in establishing capital-intensive industries in the country, they mostly focussed on assembling works for their end products which barred Iran from acquiring technical know-how (Mohammadi, 2012).Thus, Iran's local industries could not avail the benefit of advance technology. Applying this approach, the developed countries like the US continued to keep Iran dependent on the outside world.

Moreover, the MNCs started to explore the Iranian market and to increase their base, the "White Revolution" (a package of social, political, land etc. reforms) was introduced by the Iranian regime during the early 1960s (Ansari, 2001). Influenced and supported by the US, one of the key objectives of the reforms was to change Iran's social and cultural behaviour to prepare the market for the consumer products supplied by the MNCs. However, it could penetrate only a small section of political and social class of Iran (Ansari, 2001) which led to a conflict between imposed modernisation and deep rooted traditional culture. The emerging discontents among the masses were concretised by Ayatollah Khomeini, a leading religion leader and a powerful force against the Shah regime.

Consequently, the Islamic Revolution became successful and marked the prevalence of the traditional Islamic culture. Because of the past experience, from the beginning, the Islamic Republic was suspicious of foreign direct investment (FDI) which only takes care of the interests of the Western economies. However, for many FDI is a "safer way of financing than fixed debt and it represents the easiest and most efficient way to gain access to advanced technologies, skills, and export markets"(Tavakoli and Khataei, 2009:114).

Moreover, with the adoption of autarkic policy[10] in 1979, Iran could not declare a clear policy regarding foreign investments (Alizadeh, 2003). The prevailing financial uncertainty in the country and its involvement in war with Iraq created reservations among foreign investors for the safety of future growth of their investments. This in turn reduced the inflow of FDIs into the country from US$100 million in 1978 to only US$5 million in 1979 and in the following years, it remained zero until 1983. Additionally, under such circumstances the foreign inflow drained excessively and resulted in net outflow (Tavakoli and Khataei, 2009). Consequently, it slowed down the economy. During this period of the political and economic transition, Iran's entanglement in war with Iraq which lasted for eight years (1980-1988) further deteriorated its economy. It not only increased its defence expenditure which came at the expense of economic development but also destroyed many of its refineries and other energy related infrastructure due to the Iraqi attacks.

Further, Iran' economic policy in the early years of the revolution, particularly in the 1980s was heavily inspired by the socialist pattern (Isfahani, 2005) and this directed the government to take control of most of the economic institutions through

[10]A policy for economic independence or self-sufficiency (Wouters and Hansen, 2015).

nationalisation such as financial and banking sectors and foreign exchange market as well as the takeover of the country's major companies (International Monetary Fund, 2004). However, it led to the disruption of the economic system. The transitional economy and the financial hardships caused by war with Iraq slowed down its economic growth rate. It is apparent from Iran's declining gross domestic products (GDP) growth rate. The average GDP growth rate was 4.26 per cent during 1970s which remained in negative (almost -0.82 per cent) during the 1980s (World Bank, 2016).

For the Iranian government, oil income has been a major source of revenue for many years particularly after the oil crisis of 1973 during which the revenues jumped from US$4.4 billion in 1973 to US$17.150 billion in 1974 (Cooper, 1977). The crisis increased the oil price globally and the Iranian oil which was sold at US$2.163 per barrel in 1973 increased to US$8.297 per barrel in 1974 and to US$10.149 in 1975 (Cooper, 1977). The phenomenal rise of oil revenue could not continue during the 1980s. Inspired by Mohammad Mossadegh's nationalisation policy in which many entities including oil companies had been nationalised in early 1950s, many revolutionaries advocated an 'oil-free' economy whereby Iran's energy was only for its domestic consumption, not for the exports (Brumberg and Ahram, 2007).

Under this situation, the Iranian government revoked several international oil agreements. This affected its oil production which came down from its peak production of 299.87 million tonnes in 1974 (10.82 per cent of world's production) to 90.46 million tonnes in 1980 (3.02 per cent of world's production). It increased slightly in 1982 when it produced 120.54 million tonnes (4.52 per cent of the world's production) but could not touch the 1974 level (see **Table-3.1**). In addition to decrease in oil production, the country also experienced sharp fall in oil prices which was the impact of the global oil price decline in the late 1980s caused by increased production by Saudi Arabia which sought to regain its share of the market and this resulted in the over-supply of oil after December 1985. Consequently, the oil prices began to decline and touched to as low as US$10.42 a barrel (US$74.39 a metric tonne) in March 1986 from a November 1985 peak of US$31.72 (US$226.48 a metric tonne) (Loder, 2014).

As a result, Iran also had to bear the loss in its oil revenue which put immense financial pressure on the government. Keeping this concern, the government wanted to diversify its earnings which can be understood from its five year plan for the period of

1989-1993, the first one after the revolution. Its emphasis was to reduce the dependence on oil for its economy (Ziari, 2005) due to the fluctuating (and falling) oil revenue (Amirahmadi, 1995) which was adversely affecting Iranian economy. For the diversification of economy apart from oil, the plan emphasised on the development of agriculture, natural gas, industries like steel and aluminium, etc. (Amirahmadi, 1995).

Under such a financial strain and deteriorating economic condition, the discovery of large reserves of gas in Pars (South Pars in Iran and North Pars in Qatar) in 1988 emerged as a milestone in Iran's energy sector and this was the largest non-associated natural gas reserves. Although, Iran's proven gas reserves had been stagnant since 1980,the discovery of Pars gas field significantly increased its reserves which jumped from 13.9 trillion cubic metres (tcm) in 1987 to 17.0 tcm in 1989 [British Petroleum(BP), 2015] or an increase of 22.30 per cent. It is estimated that South Pars contains 14 tcm of natural gas, of which a large fraction would be recoverable (Pars Oil and Gas Company, 2008). It was first proposed to ship the gas to Iran's northern part via cross-country trunk pipelines to boost the oil output at the Aghajari, Ahwaz and Mansouri fields (Muni and Pant, 2005: 212). However, the export of this gas makes more economic sense than consuming it domestically because the country's larger population are in the north and the new source of energy in the form of gas is in South as has been discussed in Chapter Three. If it is transported from south to north, it would only be a financial burden on Iranian government due to huge transportation costs.

Meanwhile, the death of Ayatollah Khomeini on 3 June 1989, the 'supreme leader' of Iran and the principal force behind the Iranian Revolution who used to believe in conservation of oil and gas as far as possible, saw the appointment of moderate leader Akbar Hashemi Rafsanjani as President on 3 August 1989. This brought a dramatic political shift which also transformed its foreign policy. The radical foreign policy of Iran in the late 1970s and early 1980s paved way to pragmatic foreign policy in the late 1980s (Zahirinejad, 2010), resulting in the natural gas being perceived as an important source of income via export which was used earlier only for domestic use.

Under new economic and political developments, Iran started to look for gas market. Europe was the largest gas market, as most of its gas needs were met through imports. However, in the 1970s and 1980s, contractual relations based on long-term agreements between European countries and Soviet Union produced relative stability in their gas trade with little room for new suppliers (Locatelli, 2013).Additionally, under the US sanctions Iran wanted to increase its influence in its Eastern region especially Asia, and gas export was seen as a means to achieve it. This would not only provide market for its gas but also help to build closer political ties with these countries.

With the growing demand for gas as a clean source of energy emitting less polluting gases like sulphur dioxide, carbon monoxide etc. compared to coal and oil, India also started to realise the importance of natural gas in its economy. Establishment of Gas Authority India Limited (GAIL) in 1984 to develop infrastructural development for proper distribution of gas was a good example. Consequently, GAIL constructed the Hajira-Vijaypur-Jagdishpur (HVJ) pipeline whose first phase consisting of non-branched 1,750 kilometre grid was commissioned in 1987 to supply gas to the fertilizer plants located in the state of Uttar Pradesh. This was India's first cross-country gas pipeline, encouraged by the discovery of gas in the western coast (GAIL, 2014). Gas-based power generation got impetus in the late 1980s after the commissioning of HVJ Pipeline. This led to the establishment of a number of gas-based Combined Cycle Gas Turbines (CCGT)[11] along the HVJ Pipeline in the western and northern parts of India (Niti Ayog, 2015) which also increased the prospects of large gas demands. In the absence of significant domestic resources for the emerging demands, India was looking for gas resources abroad which would be economically viable to import and consume domestically.

The Asian Energy Institute (AEI)[12], established in August 1989, emerged as a first organised structure for co-operation and co-ordination among the Asian countries for their energy related issues. It's "aims and objectives are to promote greater information exchange; to facilitate sharing and dissemination of knowledge; to undertake research and training activities that are of common interest to its members; and to analyse global energy developments and their implications" (Mahajan and Ganeshan, 2011: 1).Its first meeting held in 1989 in New Delhi, was successful in bringing many Asian countries together under one platform to discuss their energy issues and helped to fill the communication gap and encourage interaction between

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[11] Combined Cycle Gas Turbines are a form of highly efficient energy generation technology that combines a gas-fired turbine with a steam turbine (BusinessGreen, 2010).

[12] The Asian Energy Institute is a network of 18 energy institutes from Asian countries. These include Bangladesh, China, India, Indonesia, Iran, Japan, Jordan, Korea, Kuwait, Malaysia, the Philippines, Pakistan, Sri Lanka and Thailand (Mahajan and Ganeshan, 2011).

them (Bhandari, 1999). In the same meeting Iran and India discussed their energy concerns and reached on a consensus for the export of gas from Iran to India through pipeline.

The genesis of the pipeline project lies on the recognition of the prospects and potential of gas trade between two countries. In the absence of Liquefied Natural Gas (LNG) terminals and other required infrastructure in India in the 1980s, pipeline appeared as the only available option. India's first LNG terminal in Dahej (Gujarat) was in developmental stage in the 1990s and its operation could start in 2004 (Sharma, 2004). If LNG would have been there, the gas transported through it could not have been in competitive price compare to gas transported through pipeline during that period, as its technology was in initial stage of development and was expensive in nature. In general, the cost of transport of gas via onshore pipeline becomes cheaper than LNG under the distance of 3,540.55 km while for off-shore pipeline, the distance gets reduced to 1,126.54 km to be competitive to LNG (Foss and et. al, 2007). The gas transport through LNG is only competitive and has economic advantage when it has to be moved beyond the above mentioned distances.

Further, "if the long-run demand elasticity is significantly higher than the short-run elasticity, gas producers prefer for an institutional arrangement that allows for long-term contracting" (Neuhoff and Hirschhausen, 2005:2) and preference of pipeline for the transport of gas is based on this notion. Moreover, it is economical and convenient to use pipeline for gas transportation than other available options. However, a pipeline via deep sea, that is, at a depth of more than 100 metre below sea level have permanent fixtures from production fields to the delivery point which is costly and needs regular maintenances. Additionally, it's laying and repairing cost would be much higher than overland pipeline. Under the high water pressure, the pipeline should be of high quality of steel as well as it needs a good quality of coating than overland pipeline to save from rusting. These make underwater pipeline comparatively costly than overland pipeline. It was estimated that "offshore pipeline are two to three times more expensive than the onshore one of the same capacities" (Diwan and Karnatak, 2009).

Moreover, in the case of deep sea route pipeline, 50 per cent of the cost of pipeline would be borne by India because in that case there would be only Iran and India as the contracting parties and both would share the cost of its construction (MEA, 2001). In the case of deep sea pipeline, this would be extra financial burden for the participating countries. However, for on-land IPI pipeline, Iran offered to bear 60 per cent of its construction cost (*Gulf Oil and Gas*, 2016), as it offers huge strategic and economic interests for Iran. Consequently, for this route, the construction cost would drop to 20 per cent for India. According to BHP Billiton, a leading global resources company based in Australia, it would be around 26 per cent (Samson, 2002) as Pakistan would contribute to the construction of pipeline though it would also take a transit fee from India.

Hence, Iran and India came up with the proposal of on-land pipeline for the supply of natural gas from Iran to India via Pakistan in 1989 and bypassed deep sea pipeline option. Further, Pakistan depends largely on natural gas for its energy and some other industrial needs like for the production of fertilizer. **Table-4.1** shows Pakistan's natural gas scenario since 1995.

Table-4.1

Pakistan's Natural Gas Scenario (1995-2015)

billion cubic metres (bcm)

Year	Proven gas reserves (bcm)	Production (bcm)	Consumption (bcm)
1995	604.0	14.6	14.6
1996	589.0	15.4	15.4
1997	595.0	15.6	15.6
1998	612.0	16.0	16.0
1999	625.0	17.3	17.3
2000	710.0	18.8	18.8
2001	750.0	19.8	19.8
2002	760	20.6	20.6
2003	790	23.2	23.2
2004	798	26.9	26.9

2005	798	39.1	39.1
2006	847	39.9	39.9
2007	850	40.5	40.5
2008	852	41.4	41.4
2009	843	41.6	41.6
2010	818	42.3	42.3
2011	810	42.3	42.3
2012	766	43.8	43.8
2013	723	42.6	42.6
2014	500	41.9	41.9
2015	500	41.9	43.4

Sources-(BP, Several years).

It is generally used for Pakistan's power generation and in the production of fertilizer. The compound annual growth rate (CAGR) of its gas consumption has been 5.32 per cent during 1995 and 2015 and gas supports major part of its energy consumption. For example, natural gas accounted for 53.40 per cent of Pakistan's total primary energy consumption in 2013, 51.35 per cent in 2014and 49.87 per cent 2015, (BP, 2015a; BP 2016) while it was 35.98 per cent in 1995 (BP, 2002). Consequently, its growing gas consumption presents good prospect for the gas suppliers. Pakistan's geographical proximity with Iran and India boosted the IPI gas pipeline proposal. The shorter distance is one of the essential features that make pipeline economically viable (Tukur and et.al, 2015).

Procedural Developments

Once the idea of the IPI pipeline project was proposed in 1989, it passed through several stages of development. Iran, Pakistan and India had several unilateral, bilateral and trilateral discussions. Many international companies and consultants did feasibility studies for the realisation of this pipeline. The Following **Chart-4.1** gives the year-wise developments concerning for the IPI pipeline project.

Chart-4.1

Chronology of the development of the Iran-Pakistan-India Gas Pipeline Project

Year/Date	Developments
1988	Discovery of gas in Pars field (South Pars field in Iran)
1989	A proposal for pipeline was mooted jointly by India and Iran at Teheran
6July 1993	Memorandum of Understanding (MoU) signed between Iran and India at Teheran for Iran-India Pipeline Project
April 1995	Pakistan and Iran signed a preliminary agreement for construction of pipeline linking South Pars with Karachi, Pakistan
February 1999	Iran signed a preliminary “in principle” agreement with India, agreeing to the idea of bi-lateral collaboration
March 2000	Pakistan agreed for the inclusion of India for the pipeline starting from Iran via Pakistan.
19-20 August 2000	The first meeting of the Joint Committee on the transfer of Iranian gas to India was held in Teheran. Both sides discussed and evaluated the issue of transportation of Iranian gas to India through different options.
22-23 November 2000	The second meeting of the Joint Committee was held in New Delhi. India and Iran agreed to commission a feasibility study on the “deep sea route” on equal cost sharing basis.
13-14 February 2001	Third meeting of Iran-India Joint Committee on the transfer of Iranian gas to India was held in Teheran.
February 2002	Iran and Pakistan signed an agreement on a pre-feasibility study for the pipeline

2003	BHP Billiton Report which certified the economic viability of the IPI Pipeline
May 2003	Iran and India constituted a Joint Working Group on cooperation in hydrocarbons sector. The first meeting of Joint Working Group was held in New Delhi during 8-9 May and during 10-11 May 2003 in Tehran
24 November 2003	The sixth meeting of the India-Iran Joint Committee was held at New Delhi to review the progress of feasibility studies of the pipeline
December 2003	First meeting of Iran-Pakistan Joint Working Group was held
2004-05	The India-Iran joint committee set up a technical sub-committee led by GAIL and NIOC to commission studies on the offshore and onshore routes
5-7 June 2005	Indian Petroleum and Natural gas minister visited Pakistan. India and Pakistan decided to constitute Joint Working Group at the Secretary level.
7 July 2005	A MoU has been signed to include India in the gas pipeline project
July 2005	First Joint Working Group meeting held between India and Pakistan at New Delhi
August 2005	First meeting of Iran-India Special Joint Working Group was held at New Delhi
8-9 September 2005	In the second Joint Working Group meeting between India and Pakistan at Islamabad the two parties agreed to adopt international standards for the transit fee, security and environmental issues under trilateral framework agreement.
October 2005	Second meeting of Special Joint Working Group was held in Tehran
19	Fourth Iran-Pakistan Joint Working Group meeting was held in

November 2005	Tehran
16December 2005	Third Joint Working Group meeting between India and Pakistan was held at New Delhi.
28-29 December 2005	The India-Iran third Special Joint Working Group on the Iran-Pakistan-India gas pipeline was held which discussed the project structure, gas pricing and schedule of further meetings
23-24 January 2006	Fifth meeting of Iran-Pakistan Joint Working Group was held
14-15 March 2006	First ever secretary-level trilateral meeting of Iran, Pakistan and India took place in Teheran
22-24 May 2006	Second Secretary-level trilateral meeting of India, Pakistan and Iran in Islamabad
4 August 2006	Third Secretary-level tripartite meeting in New Delhi
24-25 January 2007	Fourth tripartite meeting in Tehran
February 2007	Pakistan and India agreed on a base price at US$4.93 per mmBtu of gas at US$60 a barrel crude oil prices from Iran
22-23 February 2007	Fourth bilateral Joint Working Group meeting of India and Pakistan at Islamabad
22-23 March 2007	The technical sub-group of Pakistan and India met in New Delhi
28-29 May 2007	Fifth tripartite Joint Working Group meeting was held at Tehran.

27-28 June 2007	India and Pakistan met in its fifth Joint Working Group meeting in New Delhi
28-29 June 2007	Sixth trilateral meeting of Iran, Pakistan and India.
September 2007	Seventh trilateral meeting was held in Tehran. India did not take part.
23-28 May 2010	India proposed for Iran-India Joint Working Group meeting for the revival of the IPI pipeline. Tehran did not respond.
16 March 2010	A deal was signed between Iran and Pakistan for Iran-Pakistan gas pipeline.
July2011	Iran declared the completion of its section of pipeline.
By January 2017	Pakistan could not complete its section of pipeline.

Sources-(Collected from several sources)

The idea of the IPI Pipeline is based on the discovery of Pars Gas Field in 1988 which is shared between Iran and Qatar. Discovered by National Iranian Oil Company, the Iranian portion of Pars gas field is called South Pars while for Qatar, it is North Field (also known as the North Dome) (Brumberg and Ahram,2007). Lying in the territorial waters between Iran and Qatar in the Gulf, it is one of Iran's main gas sources. This gas field covers an area of 9,700 square kilometres, of which 3,700 square kilometres belongs to Iran and rest to Qatar. The South Pars gas field is located in south western part of Iran and is estimated to contain some 14 trillion cubic metres (tcm) of gas reserves and some 1.73 billion metric tonnes of gas condensates (Pars Oil and Gas Company, 2008).

The development of this field is an important agenda for the Iranian government, as it holds almost 40 per cent of Iran's total proved natural gas reserves. Under the management of Pars Oil and Gas Company, a subsidiary of NIOC, 24 phased plans have been designed to develop this field. Originally, the first ten phases was allocated for the domestic market for consumption and reinjection while rest were meant for exports. Ironically, most of these phases have not yet developed due to various reasons [Energy Information Administration (EIA), 2015] which are discussed in Chapter Five.

To export this gas to the Asian market, a pipeline was proposed in 1989. To give the momentum to the proposed project, Acting Deputy Foreign Minister of Iran Ardekani was requested to present the details of the project at the annual international conference of the International Association for Energy Economics held in New Delhi in January 1990 (Pachauri, 2006). The essential features of the proposed pipeline were based on the infrastructures and needs which Iran, Pakistan and India had at that time. Initially, the pipeline with the capacity of 36.49 billion cubic metres (bcm) was to start from Bandar Abbas, an older port in Iran, of out which about 10 per cent, almost 3.64 bcm, Iran had planned to uptake for its domestic use. However, with the development of Assaluyeh port which is comparatively closer to South Pars gas field than Bandar Abbas the former became the starting point of proposed pipeline would be easier to load gas in the pipeline.

After crossing Iran, the pipeline was to pass through Pakistan with its consumption uptake of around 7.29 to 9.12 bcm. Further, this pipeline was to enter into India through the western border and go right up to Calcutta (now Kolkata) supplying gas to the northern and eastern part of the country where it was to be processed for the end users.

> Components of the project included a gas gathering system and a gas processing system to remove hydrogen sulphide and natural gas liquids. The collected gas was to be compressed, dehydrated, and treated and fed into a liquid recovery plant where the heavier hydrocarbons were to be recovered and pipeline grade gas obtained for transportation" (Pachauri, 2006: 5).

The cost of whole pipeline was estimated at around US$11.75 billion (Pachauri, 2006).

In spite of its great energy value for these three countries, the initial reactions from them, particularly India and Pakistan, were negative and sceptical (Pauchauri, 2006). The deteriorating relationship between India and Pakistan over the Kashmir (Bremmer, 2016) was the major obstacle. Their contentious relationship raised the question of security of the pipeline. However the compulsion of domestic needs of

Iran and India (finance for Iran and gas energy for India) and its economic advantages forced them to move forward for the Iran-India pipeline.

The first formal initiative for the construction of pipeline to transport the natural gas from South Pars to India was taken on 6 July 1993 with the signing of a MoU on an overland natural gas pipeline between Indian Petroleum Minister Satish Sharma and Iran's Minister of Petroleum Gholam Reza Aghazadeh *(The Muslim*, 1993). Additionally, they agreed to set up a committee for the feasibility study to build a pipeline project (*The Economic Times*, 1993). Being its strong fundamentals, BHP Billiton had been promoting the project since 1993 (Samson, 2002) but periodic tension between India and Pakistan over the terrorism issue created mistrust between them.

However, the increasing pressure on the gas resources for fulfilling its growing energy demands, led Pakistan to propose a separate gas pipeline to import natural gas from Iran. In 1995, Pakistan and Iran signed a preliminary agreement for the construction of around 1,400 kilometre onshore gas export pipeline, linking South Pars gas field (Iran) with Karachi (Pakistan) at the cost of US$3 billion. This pipeline did not include the city of Multan in Pakistan and excluded the transport of gas to India (Chaudhary, n.d.).

Yet in subsequent years, India continued to remain an important market for the Iranian gas. Hence, there were several meetings between India and Iran which resulted in the formation of several committees to discuss the feasibility of the pipeline project. In February 1999, Iran signed a preliminary in-principle agreement with India, agreeing to the idea of bi-lateral collaboration (Behrouzifar, 2005). Two months later, in April, a bi-lateral committee of business and government officials was set-up to look into the economic and industrial feasibility for pipeline. Further, in September, the talks were held among National Iranian Gas Company, and GAIL and Ministry of Petroleum and Natural Gas (MP&NG) to discuss the feasibility report for the pipeline project.

However, benefits accruing to Pakistan from the IPI pipeline were both financial and material (for its energy needs) and this resulted in Pakistan formally agreeing to engage India along with Iran in March 2000. Both Iran and Pakistan reached to a conclusion over some issues associated with the pipeline, like security of the pipeline in Pakistani territory, duration of its construction and the length of pipeline. In July

2000, Pakistan assured the security of pipeline to Iran and India (Chaudhary, n.d.). Nevertheless, the security of pipeline in the Pakistani territory continued to remain a concern for India, hence it was sceptical about it.

Under these circumstances, Iran and India formed bilateral joint committee not only to find available options for the transport of Iranian natural gas to India but was also entrusted with examining all aspects of the issue concerning transfer of Iranian gas to India. During 19-20 August 2000, in the first meeting of Iran-India bilateral Joint Committee held in Tehran, both discussed and evaluated the issue of transportation of Iranian gas to India through different options. Further, in the second meeting of this joint committee (22-23 November 2000), both "agreed to commission a feasibility study on the "deep sea route" on equal cost sharing basis".[13] To give momentum to the proposal, they held their third meeting before the schedule (Iran-India Joint Committee) which was during 13-14 February 2001 in Tehran for the further discussion (MEA, 2001). Nonetheless, the interest shown by Iran and Pakistan over the IPI pipeline, resulted in the signing an agreement for a pre-feasibility study in February 2002 (Samii, 2005) as well as the constitution of a Iran-Pakistan bilateral JWG which held its first meeting in December 2003 in Islamabad (Nawab, 2006).

In terms of procedural developments for the proposed IPI pipeline, the year 2005 was crucial. In the absence of any attractive alternative to the IPI pipeline for gas, India was compelled to join the project to meet its growing gas demands. On 9 February 2005, MP&NG was authorised to conduct negotiations with Iran and Pakistan for the overland gas pipeline running from Iran to India via Pakistan taking into account the security concerns, cost effectiveness and supply security. Consequently, India started to negotiate with both countries to realise a "safe and secure world class project" (MEA, 2007) and three of them decided to constitute bilateral JWG for the regular meeting for discussions. In spite of the US objection to the IPI pipeline project which is discussed in detail in Chapter Five, on 18 April 2005, in a joint statement, both India and Pakistan decided to pursue this project originally estimated at US$4 billion (KS, 2006).

[13]The Indian delegation to both the meetings was led by Secretary (East) of Ministry of External Affairs of India, while the Iranian delegation was led by Iranian Deputy Foreign Minister for Economic Affairs, S.M.H. Adeli (MEA, 2001).

To exchange the views, Minister of Petroleum and Natural Gas Mani Shankar Aiyar visited Islamabad and met Minister of Petroleum and Natural Resources of Pakistan Amanullah Khan Jadoon during 4-8 June 2005. Both sides agreed that the IPI pipeline would play a significant role in meeting their energy security requirements and agreed to exchange information regarding financial structuring, technical, commercial, legal and related issues to realise a safe and secure world class project. To this end, they were ready for constituting a bilateral JWG at the Secretary level and decided that the meeting would be alternately in India and Pakistan (MP&NG, 2005). This was a major breakthrough in the way of the procedural progress of the project and led to the signing of a MoU on 7 July 2005 between Iranian Petroleum Minister Bijan Namdar Zangeneh and Pakistani Minister of Petroleum and Natural Resources Amanullah Khan Jadoon to include India in the gas pipeline project (*Energy-pedia news*, 2005; Nawab, 2006).

Thus, the overland IPI pipeline starting from Assayuleh port of Iran to India via Pakistan would be 2,775 kilometres long whereby Iran, Pakistan and India would share 1,115 km, 760 km and 900 km respectively (Samson, 2002). Each of them also decided to construct their sections of pipeline. By making this decision, Pakistan and India were in the position avoid the US Iran and Libya Sanctions Act (ILSA) sanctions that barred foreign investments in Iran more than US$20 million in a year, as the domestically constructed pipeline was not considered as the foreign investment in Iran. This can be viewed in the context of Iran and Turkey gas pipeline which was constructed after the implementation of the ILSA in 1996. By constructing their respective sections, both these countries successfully avoided ILSA-related sanctions (Kinnander, 2010). As pipeline is a capital intensive project, the cost of the construction was initially estimated around US$4.16 billion which was revised US$7.4 billion in 2007 (Pant, n.d.).

With the constitution of bilateral Secretary-level JWG of these trios (Iran, Pakistan and India), they intended to meet regularly and to report the progress to their respective ministers to facilitate the decision regarding pipeline. For this purpose, Iran-Pakistan JWG, India-Pakistan JWG and Iran-India Special Joint Working Group (SJWG) were formed. The first meeting of the India-Pakistan JWG was held in New Delhi during 12-13 July 2005. During the meeting where the Indian delegation was led by Secretary in Ministry of Petroleum Natural Gas S.C. Tripathi, while the Pakistani delegation was led by Ahmad Waqar, Secretary in Ministry of Petroleum Natural Resources, the two sides reaffirmed their commitment to the project (*IPRI*, 2005). In Parallel, India also continued discussion with Iran through their SJWG. The Iranian delegation visited India for the first meeting of their SJWG on 4 August 2005 where M. H. Nejad Hosseinian, Deputy Petroleum Minister for International Affairs and S.C. Tripathi from India led the respective delegations (*WAM*, 2005).

Moreover, India and Pakistan agreed to sign the Energy Charter Treaty (ECT)[14] as observers for further facilitation of the IPI pipeline (KS, 2006). It was followed by the second meeting of Pakistan-India JWG which was conducted in Islamabad during 8-9 September 2005. Pakistani side briefed the status in regard to the appointment of their financial advisory consortium for the project and Indian side informed about the appointment of Ernst and Young as financial consultant and its ongoing efforts for the appointment of legal and technical consultants. They also discussed about "Gas Reserve Certification and Allocation, Gas Quantity and Build-up, Gas Quality, System Configuration and Project Structure. Other discussed issues were pipeline routing, delivery points, transportation tariff, transit fee, capital and operating costs and pipeline security etc"(MP&NG, 2005).

Later, during the meeting with Iran in October 2005, in the second SJWG meeting, India suggested separate joint ventures consisted of national oil companies (NOCs) of Iran, Pakistan and India (PTI, 2005). Having expertise in construction and operation of pipeline project, the oil companies would help in its smooth and steady development. Simultaneously, Iran-Pakistan JWG continued to meet to discuss. In the fourth Iran-Pakistan JWG meeting which was held on 19 November 2005 in Teheran, both discussed various aspects of the project including financial, commercial, technical and legal. Iran planned to provide the details of the Gas Sales and Purchase Agreement (GSPA) until the end of December 2005 (*The News*, 2005).

In December 2005, the delegations from India and Pakistan gathered for their third JWG meeting and discussed about evolving project structure for its implementation

[14] The Energy Charter Treaty provides a multilateral framework for energy cooperation that is unique under international law. It is designed to promote energy security through the operation of more open and competitive energy markets, while respecting the principles od sustainable development and sovereignty over energy resources. The Energy Charter Treaty was signed in December 1994 and entered into legal force in April 1998 (International Energy Charter, n.d.)

and operation (KS, 2006). They decided that the officials of the three countries should meet at a tripartite meeting in February 2006. Later, during the two-day visit in December 2005by M H Nejad Hosseinian for the third meeting of the India-Iran SJWG,[15] Iran welcomed the proposal of trilateral meeting. The Iranian side offered to host the tripartite 'officials working group' meeting in early February 2006, and the tripartite Ministerial meeting in Tehran in March. During SJWG meeting, the two sides agreed on the early finalisation of framework agreement of the project and noted the need for an early finalisation of a consensual view relating to project structure. The Iranian side reiterated its commitment to the earlier agreed scheme of sale and purchase of gas at the Indian border. After reviewing the international and regional oil and gas market situation, the two sides discussed various options pertaining to gas price structure and agreed that the matter would be further discussed in the subsequent meetings (MP&NG, 2006b).

Meanwhile, Iran and Pakistan was working to create consensus over some crucial issues of the project in the fifth meeting of its JWG during 23-24 January 2006 in Islamabad. The deliberations focused on important technical, financial and commercial issues related to the pipeline and included project structure, framework agreement, principles of gas pricing mechanism, feasibility study, and gas sales and purchase agreement. Both sides agreed that their bilateral JWG meeting would be held in the month of March and trilateral ministerial meeting in April, both in Teheran (*IRNA*, 2006).

The significance of these bilateral meetings was that the discussion, conclusion and developments of various issues of the project in one bilateral meeting were shared by the parties with the third party in other bilateral meetings. These mutual interactions and co-ordination helped them to understand the inherent problems associated with the project. This ongoing negotiation on the proposed pipeline project got a new momentum and the trio started to experience better coordination when the bilateral meetings were supported by trilateral talks. The first round of trilateral talks took place in New Delhi in January 2006 at the level of technical experts which was followed up by the first ever secretary-level trilateral meeting in Teheran during 14-15 March 2006 (PIB, 2016). During talks, project structure and gas price were the main agenda. For

[15]The Indian delegation was led by S.C. Tripathi, Secretary, MP&NG, Government of India (MP&NG, 2006).

the project structure, the three sides discussed on both options, that is, either through a consortium involving companies from the three countries or each country would build its respective part of pipeline on its own. For the gas price, Iran offered it for US$6 per million British thermal units (mmBtu) to be delivered at Pakistan-Iran border. Yet, they could not reach a consensus and agreed for further discussions (PTI, 2006a).

During the process, Iran had been seeking a declaration of intent to be signed by three countries that would assert their political commitment to the project. The US had declared its reservation over the IPI pipeline in February 2005, before India's formal joining of the IPI pipeline and hence Iran needed an assurance amid emerging apprehension that the laying of pipeline would go waste. However, emerging differences over several issues related with the project among three of them, such as the pricing formula, project structure and framework agreement became obstacles for Pakistan and India for signing of a declaration of intent (MEA, 2007).

To talk over contentious issues regarding the project, delegations from the three countries gathered in Islamabad for its second secretary-level trilateral meeting during 22-24 May 2006 where Pakistani Petroleum Secretary Ahmed Waqar, Deputy Oil Minister of Iran M.H. Nejad Hosseinian and Indian Petroleum Secretary M.S. Srinivasan led their respective delegations. The meeting discussed technical, financial and legal aspects of the project besides issues of project structure, and a feasibility study including the route (Lall and Lodhi, 2007).

Discussion over gas price remained an important agenda of third secretary-level tripartite meeting held on 4 August 2006 in New Delhi. Under the gas pricing formula suggested by Iran, gas price was linked to Brent crude oil with a fixed escalating cost component (10 per cent of Brent crude oil) of US$1.2 per mmBtu to the Iran-Pakistan border (PTI, 2006b). The demand of US$1.2 per mmBtu was in the form of transmission cost and India and Pakistan did not want to pay beyond one-fourth of this cost. Additionally, Iran was willing to charge US$0.4 per mmBtu as gas processing fee (Mukul, 2006).

The gas price based on this formula amounted to almost US$8 per mmBtu (Farshadgohar and Badpar, 2012) while India wanted to pay no more than US$4.25 per mmBtu (Singh, 2008). This has also been discussed in detail in Chapter Six. Due to differences over gas price between Iran on one side and Pakistan and India on other, all agreed for the appointment of independent consultants to work out a gas price formula for the pipeline. According to Iranian Deputy Oil Minister M H Nejad Hossenian “all sides were unanimous on the importance of the project but the buyers (India and Pakistan) were offering a price which was half the price the seller (Iran) wanted” (Mukul, 2006).

To work out a gas price formula, Iran appointed a United Kingdom based consultant, Gaffney, Cline and Associates which worked out a price based on certain parameters given to it by Iran. Due to the unavailability of information regarding these parameters, gas price formula and the gas price which was suggested by the Gaffney, Cline and Associates in November 2006, these details could not be mentioned here. However, the price was not found acceptable to India and Pakistan, and the consultant was given revised parameters to work it out afresh (MEA, 2007a). In the fourth tripartite meeting (24 and 25 January, 2007) in Tehran, a gas pricing formula regarding pricing of gas at Iran-Pakistan border was agreed between Iran and Pakistan sides, subject to approval from the respective Governments, yet India was not in the position to finally approve it. The agreed gas price formula was based on Japan custom cleared crude (JCC) which was to be calculated as follows:

- For the JCC price less than US$30 per barrel, gas price (US$ per mmBtu) = 0.05*JCC(US$ per barrel)+1.54
- For the JCC in the range of US$30-US$70 per barrel, gas price (US$ per mmBtu) = 0.0633*JCC(US$ per barrel)+1.15
- For the JCC greater than US$70 per barrel, gas price (US$ per mmBtu) = 0.05*JCC(US$ per barrel) +2.06 (Diwan and Karnatak, 2009:479).

The expected gas price at the Iran-Pakistan border based on the above formula has been shown in **Table-4.2**.

Table-4.2

Natural Gas Price based on JCC

JCC (US$ per barrel)	Natural gas price US$ per mmBtu
10	2.040
20	2.540
30	3.040
40	3.670
50	4.300
60	4.930
70	5.560
80	6.060
90	6.560
100	7.060

Sources-(Diwan and Karnatak, 2009: 479)

India conveyed to the Iranian side that the total price payable at the India-Pakistan border would also include transportation cost and transit fees payable by India to Pakistan for the passage of gas through Pakistan. Hence the net price at India-Pakistan border would depend on it. As there was no consensus between India and Pakistan over these issues, it was not possible for India to decide regarding the total price implication (MP&NG, 2008).

Amidst long discussions the agreement over gas price between Pakistan and India in February 2007 appeared as a surprise. Based on JCC, they accepted to pay a base price of US$4.93 per mmBtu of gas at Iran-Pakistan border calculated at US$60 a barrel of crude oil prices but the gas price was originally priced at US$3.2 per mmBtu (PTI, 2010). To finalise the transportation cost and transit fee payable by India to Pakistan, they had their fourth bilateral JWG meeting at Islamabad during 22-23 February 2007 where both sides agreed to share expected gas supplies in equal quantity (Kronstadt, 2007).For further discussion on the issues like transit fee, transportation cost and some other technical issues, the technical subgroup meeting was held at New Delhi during 22 and 23 March 2007 (Patel, 2007). Subsequently, Iran demanded introduction of a price revision clause in the 5th Tripartite JWG meeting held at Tehran during 28 and 29 May 2007 because the price of crude oil was rising at that time and Iran wanted to increase gas price accordingly and did not want to lose by fixing its gas price for the long term contact.

The efforts of India and Pakistan to resolve the existing bilateral issues related with project resulted in their fifth JWG meeting which was held during 27-28 June 2007 in New Delhi. Details regarding transportation tariff and transit fee for passage of pipeline through Pakistan, price review, gas availability, governing law, etc were discussed (MP&NG, 2008). In parallel, three of them also met for their trilateral meeting during 28-29 June 2007 which was sixth in series and several issues, including gas price review clause, were discussed.

To continue the discussion, Iran recommended for the seventh trilateral meeting in Teheran during the last week of September 2007. However, India wanted to have bilateral meetings with Pakistan first, as several crucial bilateral issues such as transportation tariff and transit fee as well as certain technical and commercial issues relating to the project were yet to be resolved. Nevertheless, the seventh trilateral meeting was held in Tehran in September 2007 without India having the bilateral JWG meeting with Pakistan. Hence, India did not become the part of last trilateral meeting vis-à-vis the IPI pipeline project (MP&NG, 2008). However, India and Pakistan discussed the matter at the ministerial level in Islamabad on 25 April 2008 but could not reach a consensus on several crucial issues like, delivery point of Iranian gas, project structure, guarantees related to safety of the pipeline and security of supply, besides pricing of gas (MP&NG, 2012).

Later in February 2009, Iran unilaterally revised[16] the gas price which resulted in the rise of the natural gas price to US$8.3 per mmBtu at Iran-Pakistan border if oil price was at US$60 a barrel (earlier it was US$4.93 per mmBtu). Besides this, India would have to pay US$1.1-1.2 per mmBtu as transportation cost and transit fee for pipeline transmitting through Pakistan, thereby making it the costliest gas in the country as of date (*Gulf Oil and Gas*, 2016).

[16]As per the previously agreed formula of charging 6.3 per cent of the 10-month average of Japanese Crude Cocktail (JCC) plus a fixed US$1.15 per mmBtu in 2007, the gas price at the US$40 per barrel of crude oil, price would have come to US$3.67 per mmBtu. The formula was changed to 12 per cent of JCC plus US$1.1 per mmBtu fixed cost in 2009, adding, the gas price would be US$5.9 per mmBtu at the US$40 per barrel of crude oil at Iran-Pakistan border (*PTI*, 2009).

Thus, between May 2003 to September 2007, India held four bilateral JWG meetings with Iran, six bilateral JWG meetings with Pakistan and six trilateral meetings with Iran and Pakistan where New Delhi took part actively (MEA, 2008). However, Iran and Pakistan continued to take bilateral efforts to agree on some crucial issues related with the project. In the meanwhile, India stopped to participate in the talks and meetings related with the project since 2008 over concerns on security of pipeline and frequent changes in price of gas (PTI, 2010).For the resumption of dialogue for the project, India proposed a meeting of India-Iran JWG during 23-28 May 2010 in New Delhi but Teheran did not confirm the date.

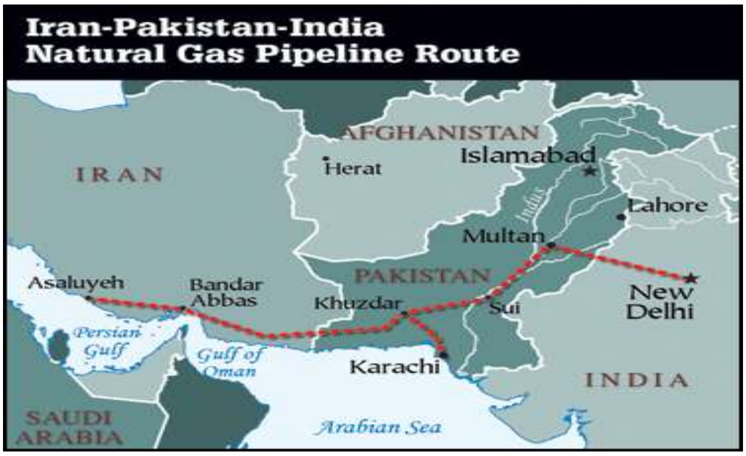
Desperate to export natural gas, Iran was ready for bilateral pipeline project with Pakistan without India and this led the formal signing a deal on 16 March 2010 with Pakistan for the Iran-Pakistan gas pipeline (Kiani, 2013) and the former committed the supply of natural gas to later from 2014. Iran has declared in July 2011 about the completion of construction of its section of the pipeline (Fareed, 2016) Pakistan could not start the construction of its share of structure by January 2017 (Kaletovic, 2017). Further, it was also considered that Iran-Pakistan bilateral gas pipeline was on the verge of receiving a quiet burial (Kulkarni, 2017).

This shows that organisational development of the IPI pipeline moved slowly in its initial period but got momentum after 2005 when India approved the joining of the proposed overland pipeline via Pakistan. The formulation of the JWGs which facilitated their bilateral meetings and later trilateral meetings, further gave momentum to the organisational set up of the IPI pipeline. In spite of being a win-win situation for all involved countries politically as well as economically, the pipeline could not be materialised even after more than two decades since it was first proposed. Visualising its importance in the Asian region, it is also considered as a ‘peace pipeline’ (Balakrishnan, 2008).

The bargaining for the maximum commercial gains by the participating countries over pipeline resulted in the differences among them over some crucial issues and many of these issues could not be resolved. However, “A land-based pipeline would be four times cheaper than any other option, even after taking into account the transit fee payments to Pakistan”(*Gulf Oil and Gas*, 2016), as this pipeline route can avoid the extra technological cost of deep sea pipeline. Apart from it, the construction cost can be shared among three of them (Iran, Pakistan and India) instead of two (Iran and India or Iran and Pakistan) which would the case for other options. The proposed pipeline would carry natural gas from Iran's Assayuleh port to Khuzdar district, located in the centre of Baluchistan province of Pakistan. Later it would be bifurcated and one would go through Karachi, a port in southern Pakistan and other main pipeline would move to Pakistan's north-eastern direction and pass through Multan city, located in the Punjab province of Pakistan which then would further move onto India. Earlier, Karachi was the destination point of Iran-Pakistan gas pipeline. But the inclusion of India led to its bifurcation towards Multan. The **Map-4.1** shows the tentative route of the IPI pipeline project.

Map-4.1

Iran-Pakistan-India Pipeline Project



Sources- (*Gulf Oil and Gas,* 2017).

Throughout the procedural journey, the proposed project was influenced by political and economic developments at regional and global level which has been discussed in the later part of this chapter. Upon completion, it was expected that the pipeline would be transporting 21.89 bcm of gas in Phase-One and that was to be shared equally between India and Pakistan. In Phase-Two, it was likely to increase to 32.84 bcm (MP&NG, 2008). Commercially it is considered as a mutually beneficial project for all the participating countries; however, they also intended to use it to maximise their political, economic, strategic and other gains beyond the gas trade. These caused the politicisation of pipeline and complexities aroused. The scope for politicisation is very much in the nature of the cross-border project, as it incorporates two or more sovereign states having different political, economic and social systems with diverse aspirations. Being different in domestic level, they also have different perspectives on the issues in which they come across and that results in their different national interests.

Even if the pipeline is cheaper option for the transport of gas, it is capital intensive in nature and encourages a chain of investments which ranges from the upstream to downstream sections. Integrated in nature, disruption in any part of the project can destabilise the whole chain of investments. Bargaining is not limited to the inter-governmental level but it also happens between governments and companies which have the contract for the construction of pipeline. Due to the high fixed cost of pipeline, the situation of obsolescing bargain generally comes in which, "once the investment has been sunk and operations begin, relative bargaining power switches to the government from company. This encourages the government to secure unilaterally a greater share of the rent" (*ESMAP*, 2003:10).

Interests of Participating Countries

The IPI pipeline which was proposed to serve the complementary energy interests of Iran, Pakistan and India is also considered as a matrix of different gains for the different stakeholders like oil companies, local communities or extra-regional countries. The pipeline became the means for every stakeholder to maximise their interests. Some tried to regain their strategic status in the world politics through affiliation with the project while others by creating problems for it. The following section of this chapter discusses the different interests of the involved stakeholders and analyses how the project was politicised.

The gas statistics of Iran, Pakistan and India present their complementary interests in gas energy. Iran has a large gas reserve while India and Pakistan have low gas reserves compared to their gas consumption. *BP Statistical Review of World Energy 2016* unveiled the natural gas scenario in Iran, Pakistan and India. The latest natural gas statistics which is available for the year 2015 was taken as an example to look at the complementary interests among Iran, Pakistan and India with respect to gas energy. The **Table 4.3** shows the gas statistics of these countries.

Table-4.3

Natural Gas Statistics as of 2015

Country	Natural Gas Proved Reserves (tcm)	Natural Gas Production (bcm/year)	Natural Gas Consumption (bcm/year)	Reserves upon Production (Years)	Share of Global Reserves(Per cent)
Iran	34.0	192.5	191.2	176.8	18.2
Pakistan	0.5	41.9	43.4	12.9	0.3
India	1.5	29.2	50.6	50.9	0.8

Sources- (BP, 2016).

Iran having 34 tcm of proved natural gas reserves has the capability to supply to the global gas energy market for many years to come, as its reserve upon production (R/P) ratio is very high. For Pakistan and India, they have relatively low gas reserves. However, the large gas production rate of Pakistan and India vis-à-vis their reserves reduces their R/P ratio to 27 and 50.9 years respectively (See **Table-4.3**). Thus, their rising gas consumption put pressure on their governments to look for new sources of gas. Geo-strategically, Iran seems one of the best available options to them and the IPI Pipeline is the most convenient and cost effective means for the transport of gas for these emerging gas markets. Geographical proximity of Iran to Pakistan and India would make it feasible for laying gas pipeline. As the distance covered by proposed pipeline would be 2,775 km which is well within the limit of 3,540.55 km that makes being gas transportation through pipeline cheaper than LNG (Foss and et al, 2007).

The cross border pipeline project involving Iran, Pakistan and India underlies that the political dynamics of these countries are being impacted by the energy economy. It would be oversimplifying to suggest that the politics of the project is totally defined by the economies. All the three countries have been weighing political and economic cost-benefit matrix in deciding their policies towards the IPI pipeline. Although a win-win contract, it is being perceived by different stakeholders differently. This created complexities and proved to be an obstacle for the project and the following section examines the role and interests of involved national, regional and global stakeholders in defining the politics of the IPI pipeline.

Stakes of Iran

Iran is a country with potential to become regional power in the West Asian region (Nakhoul, 2016). It perceives energy as a source not only for strengthening its society but also as an instrument of foreign policy and intends to use energy diplomacy to expand its regional profile and global contour (*UPI*, 2009). During the meeting with the clergy in Qum in September 1991, Gholamreza Aghazadeh Minister of Petroleum of Iran said, "If the Islamic Republic is to maintain its regional pre-eminence, it must improve its economy by increasing its oil production" (Zahirinejad, 2010). However, Iran is unable to attract required investments and technologies to develop its energy sectors primarily due to the US sanctions since 1996 after the enactment of ILSA. According to the ILSA, the countries and oil companies were initially prohibited for investing in Iran more than US$40 million in a year but later the amount was reduced to US$20 million a year (Estelani, 1999). This act authorised the US government to impose sanctions on the investor whether company or country and the US sanctions are discussed in detail in Chapter Five.

Thus, Iran has been facing economic isolation which is also resulted in its political isolation. Amid these situations, Iran lacks new technologies in different sectors which are being developed globally. Pipeline is seen as a major instrument to export gas to enhance the earning source. Since 2015, Turkey and some former Soviet Union countries are Iran's main gas markets. In 2015, it exported around 7.8 bcm of gas to Turkey and 0.5 bcm to the others (BP, 2016). If the gas export in the latter is considered, it is mostly gas swapping arrangement whereby Iran exchanges gas with them. In short, Tehran's export of gas is negligible.

On the other side, the fast increasing consumption of natural gas by Pakistan and India would provide Iran a big market which would help to enhance its energy profile globally. In the absence of global natural gas market, the gas price determining factors and mechanism are based on the region which varies differently and hence, the gas price also. Amid this situation, the pipeline would provide Iran a secure gas market. It would be the first experience for Teheran for the cross-border gas pipeline. As it views the gas as a major revenue source, it kept bargaining for the increase in gas price with Pakistan and India and it became successful to some extent as discussed in earlier section of this chapter. Apart from strengthening its economy, it would bring new technologies for the industrial development and have broader implications for the energy industry and its economy also. Additionally, Iran perceived that the project would help in its trade facilitation with Pakistan and India.

Due to the US sanction, Iran was willing to reduce its dependence on its Western trade allies for the consumer goods and was looking for the eastern region as alternative. For it, the pipeline was not a one way trade (gas from Iran to Pakistan and India) but a push for trade from other ends. As the head of the Zahedan Chamber of Commerce (an economic pressure group of Iran) Mohammad Reza Ehsanfar pointed out the transit of goods from Iran to India via Pakistan should be explored for the establishment of a transit link and cooperation among the three countries (*ICCIM Publication*, 2002).

Iran also wanted to maximise its monetary gains by linking its gas price with the rising price of crude oil. It insisted on "take-or-pay" agreement, whereby India would pay for the agreed amount of gas even if it did not take gas delivery and wanted to secure its gas customers (Zaidi, 2009). This seems that Iran did not want to bear the risk of insecure transit area of Pakistan for its gas transport. With these plans, Iran wanted to hold bargaining power in its hand. While, India reportedly preferred "supply-or-pay" contract to avoid the risk of security associated with gas passing through the transit country (Zaidi, 2009). In the latter arrangement, Iran would have to deliver gas at the Indian border or pay for the contracted quantity. Even if, India would get monetary compensation for any gas supply disruption, it would adversely affect India's downstream sector linked with gas energy. Additionally, Teheran also rejected India's request for natural gas that was rich in petrochemicals, preferring instead to deliver "lean" gas that does not contain butane, ethane or propane (Samii, 2005).

The economic gains do have political inference and would indirectly help to strengthen Iranian regime which has been facing economic and political isolation. Viewing the project as a means to enhance the political influence in the Asian region, Iran wanted to secure their support in its favour in the international arena. Under this scenario, Iran perceived that the pipeline would reinforce its political ties with Pakistan and India and intended to gain political support from them as it had been facing strong international pressure, especially from the US, over the nuclear controversy (Trembath, 2006).

Nevertheless, India voted against Iran in International Atomic Energy Agency (IAEA) on three occasions, namely in September 2005, February 2006 and November 2009 on resolutions which asked for "censuring the Islamic nation over its controversial nuclear programme and demanding that it stop uranium enrichment" (PTI, 2009). The nuclear deal on 14 July 2015 between Iran and P5+1[17] countries known as Joint Comprehensive Plan of Action (JCPOA) that "aimed at resolving all outstanding issues related to the possible military dimensions of Iran's nuclear programme" (Einhorn, 2015) lessened these concerns. Under the deal, Iran agreed to restrain its nuclear programme until it would be difficult for it to develop nuclear bomb such as "Iran cannot install more than 5,060 of the oldest and least efficient centrifuges at Natanz for 10 years". It would reduce uranium stockpile by 98 per cent to 300 kilogram for 15 years as well as it must keep its level of enrichment at 3.67 per cent. Additionally, Iran agreed for allowing inspectors to access any site anywhere in the country they deem suspicious (BBC News, 2016). In return, Iran got relaxation from various sanctions such as it "stands to gain access to more than US$100 billion in assets frozen overseas, and will be able to resume selling oil on international markets and using the global financial system for trade". However, the UN arms embargo on Iran would continue for up to five years (BBC News, 2016).

Iran's relation with Pakistan has its own strategic importance. With the American troops stationed in Iran's neighbouring countries like Afghanistan in 2001 and Iraq in 2003, Iran wanted to restrict Washington's influence in the region by strengthening its ties with Pakistan, one of America's most needed allies in the war on terror (Kuszewska, 2012). The US government planned to maintain about 8,400 troops in Afghanistan by 20 June 2017 (*The Associated Press*, 2016) while the number of officially assigned forces in Iraq remained 3,870 as of March 2016 (2017 Index of US Military Strength, 2017).

Iran, thus, is trying to maximise its political interest besides economic interests. It, is obviously, the biggest stakeholder in this deal, not only in the sense of substantial revenues from the sale of natural gas, but the largest part of the pipeline would pass through Iran's territory and also a large part of the investment would be made in it. The by-product of this project means rapid development of diverse industries which would help Iran to come out from the economic crisis caused by the US sanctions.

[17]Five permanent member of United Nations like-US, UK, France, Russia and China plus Germany (Davenport, 2016).

Stakes of Pakistan

Natural gas has the largest share in Pakistan's primary energy consumption particularly after 2005 (**Table-4.4**) and has been increasing at CAGR of 5.33 per cent (1990-2015). For oil, which follows the natural gas, it is 3.35 per cent for the same period (BP, 2016). This shows that natural gas is going to play a significant role in Pakistan's primary energy needs. Having a significant role in its economy, it is important for Pakistan to look for other gas sources while trying to increase its own gas production. The **Table-4.4** shows Pakistan's primary energy consumption pattern where natural gas has the major share.

Table-4.4

Data of Primary Energy Consumption in Pakistan (1990-2015)

(Million tonnes oil equivalent)

Primary Energy	1990	1995	2000	2005	2010	2015
Oil	10.7	15.8	18.8	15.3	21.2	25.2
Natural gas	10.1	13.1	17.0	35.1	38.1	39.0
Coal	2.1	2.2	2.0	4.1	4.9	4.7
Nuclear	0.1	0.1	0.2	0.6	0.5	1.1
Hydroelectricity	3.9	5.1	4.0	6.9	6.7	7.8
Renewable Energy	N.A.	N.A.	N.A.	N.A.	N.A.	0.4
Total	26.8	36.4	41.9	62.1	71.5	78.2

Sources- (BP, 2016).

The Iranian gas is supposed to be the cheapest source of energy for Pakistan to import among the other available sources. The combination of geographical proximity, cost and competitive gas price would reduce the cost of import. If the IPI project was completed as scheduled, it would have started to supply gas to Pakistan and India by 2010-2011 (*Dawn*, 2007). As an energy source, Pakistan was supposed to get 10.95 bcm of gas per year during first phase of the project starting from 2010 and would continue to next five years. This would increase to 21.89 bcm after the start of its second phase which was planned from 2015 (*The Financial Express*, 2007). It had the potential to provide gas to Pakistan for the next 30-50 years. These monetary and energy gains were so important for Pakistan that it was ready to move further even without India. To highlight its importance for Pakistan Muhammad Naim Khan said on 25 July, 2005, “even if India gave in to US pressure, Islamabad would build a natural-gas pipeline from Iran” Further he said, “We would welcome Indian association with this project, but if it is not feasible with India, we are going to go ahead with the project in any case,” Khan said, adding that Pakistan needs the Iranian gas (Maitra, 2005).

Additionally, being a developing country, Pakistan also viewed the project as a source of income which would help to boost its economy. Being a transit country with of about 760 km for pipeline of the whole project, Pakistan could earn about US$200-500 million per year in the form of transit fees from India (*Gulf Oil and Gas,* 2016). By passing through the Baluchistan region, the project would help to develop this deprived tribal area as it is a big threat for the stability of the country due to its comparatively low development than other areas. The industrial and other developments resulting as the spill over of laying pipeline would help to strengthen its local economy (Munir and et al., 2013). It can be helpful in the employment generation of the local people in the line of construction of Pipeline. Based on advance technology and being a capital intensive in nature, the project would support the country to become technologically advanced and attract more FDI which would result in strengthening its economy. Seeing its benefit to all involved stakeholders, Pakistani Prime Minister Shaukat Aziz declared, “The gas pipeline is a win-win proposition for Iran, India and Pakistan” (Klare, 2005).

Pakistan also perceived this pipeline project for a rapprochement with Iran. The relationship between Iran and Pakistan got further deteriorated over the issue of Taliban in Afghanistan (Milani, n.d.). Taliban, an obscure group of young Pushtun religious students, seized power in Afghanistan in 1996. They were followers of ideology which was the combination of Wahhabism and Deobandism. Based on these ideologies, Iran was against the Taliban regime of Afghanistan. However, being its supporter and sympathiser, Pakistan stood at the opposite camp of Iran over Afghanistan issue and this led to a big rift between two neighbours (Milani, n.d.).

The pipeline was being viewed by Pakistan as an opportunity to improve its relations with Iran which would help to bring regional peace and security. Indicating to the IPI pipeline project, Pakistan Foreign Minister Khurshid M. Kasuri said that "implementation of the gas pipeline project would bring Pakistan and Iran closer and would vest the friendly relationship between the two countries with economic content" (*Associated Press of Pakistan*, 2008). Thus, for Pakistan, the pipeline is important not only for its gas energy needs and monetary gains but also as a means to strengthen its ties with Iran.

Though, Pakistan has major stakes in the project and accepts its importance for its economy and other political gains, its intra-political and economic conflict emerged as a big threat before the prospective pipeline. The deteriorating law and order situation and civil unrest in Baluchistan became a big challenge for Pakistan to give assurance for the security of the pipeline in its territory (Haider, 2006). In spite of having Pakistan's largest gas reserves in Baluchistan's Sui gas field, it is one of the country's poorest provinces. The lack of development made it the most restive province of the country.

The area of Baluchistan through which the IPI pipeline was supposed to pass continued to remain under sporadic armed clashes and it also resulted in the damage to several government-backed infrastructures like water pipelines, power transmission lines and gas installations (Luft, 2005). For example, in 2003, Balochis damaged gas pipeline coming from Sui gas field of Baluchistan Province and this cut off the gas supply to the Punjab province of Pakistan. Moreover, there were 44 deaths and 100 people were wounded in attacks in the Baluchistan's province in two years since China-Pakistan Economic Corridor (CPEC) was started in 2014. These people were employed in road construction in the region for the CPEC (Reuters, 2016).In 2015, two natural gas pipelines were bombed in two district of Baluchistan (Mazumdar, 2015). This shows that Pakistan's own pipeline is not safe. These attacks substantiated India's concern over security of the IPI pipeline. The attackers were aware of the strategic gains which were achieved by conducting a sustained sabotage campaign against oil infrastructure in Iraq (Luft, 2005).

However, Baluchistan is the only potential land route for the pipeline for supply of gas from Iran to South Asian region. The importance of region can be understood from the Baloch nationalist Akdar Khan Bugti's statement in 2005 when said that "only the goodwill of the Baloch people can allow the proposed gas pipeline from Iran and Central Asia to India to pass through their soil" (*Dawn*, 2010). Being politically, economically and socially alienated, the Balochis have suspicion over the central government of Pakistan as they were not taken into confidence during the negotiation over the pipeline.

A resolution passed with the support of the members of the treasury and opposition benches in the Baluchistan Assembly in June 2006, sought "royalty for the province in the proposed multi-billion dollar IPI gas pipeline project". Further, it also demanded "Baluchistan's representation in the IPI talks, free gas for adjacent populations, a 100 per cent job share and a major share in any royalty paid by India" (*Dawn*, 2010). However, there is no such initiative taken by the Pakistani government and it remains issue of political bargain between them in Pakistan's political system.

India's Stakes

Natural gas is the cleanest of all the fossil fuels which is composed primarily of methane and after combustion it produces carbon dioxide and water vapour. In terms of sulphur dioxide and nitrogen oxides, the combustion of natural gas releases it in very low quantity compare to coal and oil. The latter have a higher carbon ratio and higher nitrogen and sulphur contents and after combustion, it releases higher level of harmful emissions like nitrogen oxide and sulphur dioxide with ash particles which harms the environment (*Natgas*, 2011). Thus, India is increasing the share of natural gas in its total primary energy needs. It is more important when the global warming issue emerged as one of the major concerns internationally. With the adaptation of gas-based industries and development of infrastructure related to gas energy, India emerged as a big gas consumer globally. According to the projection of *International Energy Outlook*, its gas consumption is to grow at an average annual rate of 5.1 per cent. It would increase its demand from 25.2 bcm in 2002 to 78.4 bcm in 2025 (EIA, 2005).

Chapter Two, discussed about India's natural gas scenario in detail which shows that for its rising gas demand, import is the only option, even if it increases its own production. India is geographically as well as demographically a big country, emerging as a major economic power in Asia. For the fulfilment of its energy need, it has to diversify its energy sources where coal has been in a dominant position. But now India and the world are more concerned about the environmental pollution. Their effort to create awareness about polluting environment and take initiative to reduce the green house gases resulted in the agreement over Kyoto Protocol of 1997. It is a “legally binding agreement under which industrialised countries will reduce their collective emissions of greenhouse gases by 5.2 per cent compared to the year 1990” (*Environbusiness*, n.d.). The goal is to lower overall emissions from six greenhouse gases and these are Carbon Dioxide, Methane, Nitrous Oxide, Sulphur-hexafluoride, Hydro-fluorocarbons, and Perfluorocarbons which is calculated as an average over the five-year period of 2008-12 (*Environbusiness*, n.d.). Nevertheless, India was not mandated to reduce green house gases as it has been a comparatively small contributor in the emission of carbon dioxide in past century (Henson, 2011).

Still the Indian government wants to increase the share of clean energy including natural gas in its total primary energy requirements. The growth rate (CAGR) of India’s natural gas consumption during the period 1991-2015 was at 5.24 per cent while for Asia Pacific, it was 5.87 percent. This shows that India is still behind in natural gas consumption for the fulfilment of its total primary energy needs, though it is ahead in terms of world average growth rate (CAGR) for the same which was at 2.21 per cent. According to the latest data which is available for 2015, natural gas constituted 6.49 per cent of India’s total primary energy consumption, compared to 23.84 per cent in the world, 11.47 per cent in Asia Pacific and 31.29 per cent in the US (BP, 2015). It means there is a scope for the increase of the share of natural gas in India’s primary energy basket in future (MP&NG, 2015).

It is projected that the consumption of natural gas in India would be 78.4 bcm in 2025 (EIA, 2005). As discussed in Chapter Two India has been importing natural gas since 2004, as its demand surpassed its domestic production and the import continued to increase. During 2015-16, the production was 32.24 bcm (MP&NG, 2017) and it is projected to be 53.60 bcm in 2018-19 and its gas production does not match its rising demands. The Working Group on Petroleum and Natural Gas Sector for the 12th five years plan (2012-17) projected that the gas demands would increase to 190.87 bcm in 2018-19. It is the power and fertilizer sector which would absorb most of the demand of gas, but in projection, the larger share of gas demands would come from the power sector (MP&NG, 2015b). In 2015-16, India imported 33.95 per cent of its gas needs through LNG, as **Table-2.5** of Chapter Two shows. This implies that India is highly dependent on other countries for its rising gas demands.

With this rapid growth of energy consumption, for developing countries like India, the total dependence on LNG for its rising import would be a costly affair. The other available option is deep sea route from Iran via Arabian Sea to India. However, it needs a large capital investment as well as it is full of technological complexities. Amid the available options, IPI pipeline was the only comparatively low cost option for India's gas import particularly from Iran. The price of LNG which India had been importing from Qatar's RasGas was US$12-13 per mmBtu, and has been revised on 1 January 2016 in response to declining global oil prices. The gas price is indexed to a moving average of crude oil price and after 1 January, 2016, it costs US$6-7 per mmBtu (Raghavan, 2015).

However, the Iranian gas by the IPI pipeline which was originally priced at US$3.2 and later increased to US$4.93, a price India agreed to pay and that was still a cheaper source of natural gas than other available options. If the imported gas price is at US$4.93 per mBtu (at US$60 per barrel or US$439.88 per metric tonnes), it converts into US$28.5 per barrel of oil equivalent or US$203.57 per metric tonne of oil equivalent-which is less than half of the oil price (Lall and Lodhi, 2007). During the period of 2001 to 2016, the Organisation of Petroleum Exporting Countries (OPEC) average price of crude oil was US$64.61per barrel (*Statista*, 2017). This would definitely help India to generate cheap electricity. It is considered that "a land-based pipeline would be four times cheaper than any other option, even after taking into account transit fee payments to Pakistan"(*Gulf Oil and Gas*, 2016). After the completion of first phase, the pipeline was supposed to supply 21.89 bcm of gas to India and to increase it by 32.84 bcm by 2014.

In addition to clean source of energy, India also looked it as a means of confidence building measures with Pakistan which would further help in combating cross-border terrorism, a major problem that India has been facing since the early 1990s in the Kashmir and other parts of the country. It could become a means for India to improve its relation with Iran, a leading member of Organisation of Islamic Cooperation (OIC) and to get political support over the persisting contentious issues with Pakistan. Apart from political rapprochement between Iran and India, it could be helpful in strengthening their economic ties as both "Tehran and New Delhi perceive the trade ties as inseparable from political ties" (*IRNA*, 2005).

Thus, if the pipeline becomes operational, it would intensify their bilateral trade. Besides these advantages, India visualised the building of Asian gas grid by linking all its major regional pipelines which was not only envisaged the linking of the IPI pipeline with Central Asian pipeline but it was also being considered for the possibility of extending the pipeline until Southern China (Bhatt, 2005).Under such a common energy network, the cost of transporting gas would come down for all participating countries. For India, it would prove a major source of energy security for its rising consumption but its viability would depend on the gas price supplying via pipeline. It has already been discussed that India insisted for the lower gas prices from Iran, but the later asked for the higher gas price. Under the existing Indian gas market, the viability of the IPI pipeline depends upon the price of gas that India would get.

The gas is mostly used in the fertilizer industry and power sector. The fertilizer is used in the agriculture sector and farmers do not want to pay more which would directly affect their cost of production. In the power sector, coal is a direct competitor to gas. Power is given in India at lower rate and cannot be supplied at the market rate. The effect would be that higher the prices of gas, the lower would be the demand. According to R. P. Sharma, president of the gas division at India's privately owned Reliance Industries, "if the price of gas is US$3 per mmBtu, demand is 170 units. But a price increase of US$0.5 per mmBtu would cause demand to fall to 140 units and at US$4 per mmBtu, demand falls to 100 units" (*Petroleum Economist*, 2006: 39).

Likewise, Petroleum Minister Mani Shankar Aiyar announced that his country might withdraw from the gas deal say, "We will not buy gas from Iran if we cannot sell it in India". Aiyar explained that "Iran wants to charge as much for natural gas as it does for LNG (about US$4 per mmBtu), whereas the main Indian consumers—the fertilizer and power sectors—were unwilling to pay more than US$3 per mmBtu. With the addition of transportation and transit charges to the Iranian price, Aiyar said, the gas would end up costing US$4.50 per mmBtu" (Samii, 2005). During the period of 2000s, India's administrative price mechanism (APM) of natural gas was US$1.79 per mmBtu (*PTI*, 2013a) hence there was a difference of US$2.71 between the price offered by Iran and India's APM gas price. In this sense, the purchased gas could have either not sold in Indian market or Indian government had to bear the differential gas price. In continuity the above statement, Aiyar added that "India and Pakistan would need approximately 72.99 bcm, and hence Iran should offer a special price for such a large order" (Samii, 2005).

Apart from the bargaining at inter-state level, India's infrastructural development for LNG has weakened the prospect of pipeline. Presently, India has well developed infrastructure for the import of natural gas in LNG form from various countries. The US with its increasing gas production is emerging as a leading gas exporter in the global energy market (Blum, 2017). With established LNG infrastructure and growing gas consumption, India is perceived as a major gas market for US gas (Clemente, 2017). Due to this apprehension, Iranian Ambassador Glolamreza Ansari said, “People who have invested in LNG in India, I don’t think they will let any pipes to come in.” He added, “Americans are looking for the Indian market for the future and any sort of pipeline will put an end to these investments. So, I don’t think pipeline can be a serious project. I am sure Americans will not let this project go ahead” (*IANS*, 2016). Nevertheless, if the pipeline comes, it would be preferable source of gas for India than LNG, both in terms of cost of gas for the end-user as well as the certainty of agreed amount of supply.

Besides these broader impacts upon the participating countries, the proposed pipeline has some regional and global implications. Perceiving from their interests, some countries from the West Asian region and from the other region are either supporter of the pipeline or oppose it. Accordingly, various stakeholders tried to influence the IPI pipeline project according to their regional and global interests.

Regional and Global Politics

In the increasingly competitive commercial and political environment in West Asia, zero-sum calculation over energy supplies and transit has become an important factor. In West Asian region, the study focuses on two countries, namely, Saudi Arabia and Qatar. While one is a political competitor of Iran in the region, the other gives competition in the gas sector.

Saudi Arabia

For long, Saudi Arabia has been a political competitor of Iran in the West Asian region. Economically strong and home to two holy shrines Mecca and Medina, it projected itself as a leading exponent of Sunni Islam while for the Shia sect, it is Iran (Poole, 2016).Iran is a Shia majority country having strong civilisation. Before 1979, Iran had strong economy as well as political say over regional affairs. Nevertheless, later the US sanctions and Iran’s other internal and regional developments such as adoption of nationalistic policy over oil and gas resources, Iran-Iraq war etc. deteriorated its energy sector and hence its economy. Additionally it has to face political isolation to some extent which has been discussed in detail in Chapter Five.

The proposed IPI pipeline would not only increase Iran's energy profile globally but it would also help it to bring closer to South Asian region politically, economically and strategically. The strategic importance of these developments can be understood when their regional issues come in the international forum. Considering it, Saudi Arabia would not be willing to have apolitically and economically stronger Iran (Riedel, 2016). The IPI pipeline would help Iran to increase its gas exports and that eventually would become the means to enhance its income. This shows that Saudi Arabia considers the IPI pipeline against its national interests.

In spite of threat of the US sanctions and India's reluctance over the IPI pipeline, Iran and Pakistan took initiative for the Iran-Pakistan (IP) pipeline and signed an agreement for the same on 16 March 2010. Iran has completed its share of construction by July 2011. Due to the lack of funds, Pakistan could not start its share of construction. In the meanwhile, Pakistan received US$1.5 billion loan from Saudi Arabia in March 2014 without any clear deal terms and its purposes (*Reuters*, 2014). This was exactly the amount which Pakistan required for the construction of its part of the IP pipeline. Instead of starting its construction, Pakistan's Oil Minister Shahid Khaqan Abbasi reportedly said that "work on the pipeline was not possible because of sanctions imposed by the United States and the European Union (EU) on Iran over its nuclear programme."

In response to this, Iran warned that Islamabad was contractually obliged to complete the project which would allow Tehran to export gas to its south-eastern neighbour (Haider, 2014). According to a columnist with *The News International*, Adnan Aamir the IP pipeline would not become a reality anytime soon and "even if economic sanctions are in Iran are finally lifted, Saudi pressure on Pakistan to abandon the project remains". He also said, "The construction of pipelines under the CPEC and Turkmenistan-Afghanistan-Pakistan-India (TAPI) have reduced the significance of the Iran-Pakistan gas project for Pakistan. Now, Pakistan cannot afford to earn the ire of Saudi Arabia for the IP project when it can get gas from elsewhere" (Notezai, 2015).

Qatar

The other country which would be directly affected by the pipeline is Qatar. It has the third largest reserves of natural gas in the world after Iran and the Russian Federation with 24.5 tcm and 135.2 of reserve upon production, as of 2015 (BP, 2016). Moreover, its consumption of gas is low compared to its production. Its consumption of natural gas was growing at the CAGR of 5.92 per cent while the production was at 13.17 per cent during 1995-2015 which provided Qatar a large amount of gas for exporting to the global market. **Table-4.5** illustrates the competence of Qatar in global gas market.

Table-4.5

Qatar's potentiality in global gas market

Year	Proven reserves (bcm)	Production (bcm)	Consumption (bcm)	Export (bcm)	Qatar's gas export of the world (per cent)	Qatar's gas export to India (bcm)	India's share in Qatar's total gas export (per cent)
1995	8,500	13.5	13.5	N.A.	N.A.	N.A.	N.A.
1996	8,500	13.7	13.7	N.A.	N.A.	N.A.	N.A.
1997	8,500	17.4	14.5	2.86	0.66	N.A.	N.A.
1998	10,900	19.6	14.8	4.79	1.07	N.A.	N.A.
1999	11,157	22.1	14.0	8.10	1.66	N.A.	N.A.
2000	14,443	23.7	9.7	14.04	2.64	N.A.	N.A.
2001	25,783	27.0	11.0	16.54	2.98	N.A.	N.A.
2002	25,783	29.5	11.1	18.39	3.14	N.A.	N.A.
2003	25,783	31.4	12.2	20.24	3.20	N.A.	N.A.
2004	25,783	39.2	14.9	24.20	3.51	2.63	10.93
2005	25,636	45.8	18.7	27.10	3.76	5.80	21.40
2006	25,636	50.7	19.6	37.10	4.15	6.80	21.87
2007	25,257	63.2	23.6	43.50	4.67	8.27	21.05
2008	25,466	77.0	19.0	56.78	5.84	7.98	14.05
2009	25,366	89.3	19.9	63.53	7.05	8.25	12.09
2010	25,201	131.2	32.1	107.00	10.77	10.53	11.09
2011	25,110	145.3	20.7	113.55	10.95	13.0	10.67
2012	25,069	157.0	25.9	115.66	11.22	16.1	12.92

2013	24,681	177.6	42.7	122.87	11.65	15.3	12.19
2014	24,531.3	174.1	39.7	122.62	11.89	16.2	13.11
2015	24,500	181.4	45.2	129.87	12.40	13.5	10.69

billion cubic meters (bcm)

Sources- (BP, Several years; OPEC, Several Years).

This shows that Qatar would continue to remain an important gas energy player in many years to come. As a gas exporter, it is the second largest in the world after Russian Federation (BP, 2016) and an established gas energy player globally (Pritchard, 2015).

Qatar's gas export through pipeline is not significantly high and is limited to two countries only, namely, are United Arab Emirates and Oman. It has well established LNG infrastructure and it could emerge as one of the major gas supplier of the world. Its LNG exports are spread worldwide and captured around 31.45 per cent of the global LNG trade in 2015 (BP, 2016). Most importantly, it shares Pars gas field covering area of 9,700 square km with Iran (Doherty, 2010). With the help of IOCs like ExxonMobil, Total, Mitsui, Marubeni, ConocoPhillips and Royal Dutch Shell, Qatar's national energy companies-Qatargas and Rasgas developed its portion of gas fields while the development of South Pars got hampered by the imposed sanctions on Iran (Doherty, 2010).

In absence of pipeline infrastructure, India sourced its gas supply from Qatar via LNG. Amid its rising LNG demand, Qatar continued to increase its supply and in 2015, India became its third largest market. In 2015, it exported around 13.5 bcm of LNG to India or 12.68 per cent of its total LNG exports. The IPI pipeline would also penetrate the same market. If the pipeline comes into existence, India would prefer gas through it because of the reasons which have been mentioned earlier. Amid increasing number of LNG suppliers and hence increased competition for the gas market, Qatar is not in the position to lose such a large gas importer.

This can be understood from the steps taken by Qatar regarding India in 2015. India imported below the agreed quantity of LNG that was 7.5 million tonnes annually and that resulted in the imposition of penalty for the breach of deal. However, Qatar not only waived off Rs.12,000 crores [18] or US$1.87 billion of penalty imposed on Petronet LNG Limited (PLL) (a contracting partner for LNG import from Qatar) resulting from its low import from the agreed amount of 7.5 million tonnes annually, but it also lowered the LNG price from US$12-13 per mmBtu to US$6-7mmBtu, almost half of the previous price. India's Petroleum and Natural Gas Minister Dharmendra Pradhan said, "The new formula between the two companies is in the interests of a win-win. Where the previous contract meant that Petronet had to buy LNG from RasGas at US$12-13 per mmBtu, the new contract means a price of US$6-7 per mmBtu" (Raghavan, 2015).

However, for some, the sliding global crude oil price was the reason for Qatar's slashing of gas price for India (Vukmanovic and Verma, 2015). To hold its gas market, Qatar persuaded India to increase its LNG purchase by one million tonnes apart from 7.5 million tonnes agreed in past based on the long term contract ending in April 2028 (Raghavan, 2015). Thus, the new developments between these two countries would weaken the viability of the IPI pipeline and affect its further development. Besides these regional players, Russia and the US also have impact of the IPI pipeline.

Russia: A distant player

Russia, though not participating directly in the IPI pipeline project, views it as an immense strategic importance. First of all, Russia wants to keep the US away from its erstwhile dominated areas (Curtis and et al., 2008), so that it may continue its dominance informally. Moreover, Russia has good relations with Iran particularly since the 1990s (Borshchevskaya, 2017) and support for this pipeline would somehow indicate support of Iran in international politics which would help the latter to come out from the political and economic isolation. Russia wanted its direct participation in the construction of this project as it is technologically advanced in oil and gas related industries and has expertise in laying oil and gas pipeline. Thus, it could become its source of income.

According to the head of the Tehran-based office of Russian company Gazprom Abubakir Shomuzov Gazprom was ready to participate in the construction and procurement of the IPI pipeline. He said in May 2007

[18] The rupees was converted into dollar at the rate of 64.152 per dollar remained in 2015 (World Bank, 2017).

> We are willing to cooperate with these two states and the IPI pipeline is one of the giant projects in which that Russia can play its role, adding the pipeline could extend to China, where a great number of people were living there and a big market welcomed the project"(*Shana*, 2007).

In response to the Russian interest in the project, Hamid Reza Asefi a spokesman of the Iranian foreign ministry said that the country had agreed to Russia's participation in the project to construct the IPI gas pipeline. He further said "Russia is a powerful state with advanced technologies." Russian Industry and Energy Minister Viktor Khristenko said in late November 2005 that "Gazprom, a Russian energy company was prepared to take on a share of the IPI Pipeline Project risk" (*Sputnik International*, 2005). If Russia becomes the part of the pipeline, it would not only be helpful to increase its influence in the South Asian region but would also strengthen its energy ties with Pakistan as well as India, especially in its oil and gas fields developments.

Thus, in the 21st century energy is going to play key role in the country's economy be it a consumer or a producer. Consequently, the IPI pipeline project could be vital for the economic prosperity and political stability of Indian sub-continent region. The pipeline could be helpful in resolving the existing problem among the stakeholders. However, their efforts to use it also as a means to fulfil their political, strategic and other interests are also the cause for its delay. Importantly, the US sanctions on Iran and its pressure on the participating countries to keep themselves away from the project became the big hurdle for the project. The US has been imposing several sanctions on Iran since 1980 which not only affected the IPI but Iran as a whole. The next chapter deals with the major sanctions imposed by the US, United Nations (UN) and EU on Iran which not only affected Iran's energy sector but its overall economy.

Chapter-5

The US Sanctions on Iran

Divided into seven sections, the Chapter starts with the *Background*. It deals with the political, economic and social conditions of Iran and the latter's relations with the US and how this led to the Islamic Revolution in 1979. It also discusses the US's sanction policy in general. The next section *The US Sanctions on Iran* explains various imposed sanctions on Iran by the US and the European Union (EU).The various provisions of US sanctions have been discussed under the sub-sections *Iran and Libya Sanctions Act of 1996, Comprehensive, Iran Sanctions, Accountability, and Divestment Act, Iran Threat Reduction and Syria Human Rights Act, EU Sanctions against Iran.* Further, it analyses its impact on Iran's energy sector. The next part *Sanctions and IPI* examines the impact of sanctions on the Iran-Pakistan-India (IPI) pipeline. *Resumption of Iraq's oil production* discusses how Iraqi oil production provided oil source option for Iranian oil importers. Subsequently, in *Iran's efforts to mitigate the US Sanctions* the Iranian endeavours to mitigate the impact of various sanctions on its energy sector have been discussed. The next portion *India-US Nuclear Deal* discusses how nuclear deal between India and the US has been used as a carrot policy by the US to deter India from the IPI pipeline.

Background

Sanctions, especially economic sanctions have been one of the important tools of diplomacy. The world that is lashed with the advanced lethal weapons and opposite to this, the rising prominence of human rights in the international relations have brought down open armed conflicts as a policy tool to change the behaviour of the targeted countries or actors. Hence, sanctions have become an important substitute for the use of military force. In general terms, "sanctions are a tool used by countries or international organizations to persuade a particular government or group of governments to change their policy by restricting trade, investment or other commercial activity" (Kolodkin, 2017). To put it in a nutshell, the use of economic power is for the political gains.

The extent of the sanctions often depends upon the severity of the violation of 'international norms' or the damage incurred to one's national interests (Kolodkin, 2017). David A. Baldwin, a renowned political scientist, has given a broad and general definition and according to him, "offering economic rewards or withholding economic advantages in order to make other international actor(s) do what they would not otherwise do that means using economics as an instrument of politics" (Delevic, 1998) .Hence, the "economic sanctions attempt to change the target state's behaviour" (Baldwin, and Pape, 1998: 190). Viewing the use of economic power for political gains, Baldwin labelled it as "economic statecraft" (Delevic, 1998).

Thus, economic sanctions are punitive in nature whose prime objective is to isolate the targeted country/ies or actor/s for political gains. It may include trade embargoes, boycotts, freezing of assets, banning on cash transfers, prohibition on technology transfers and restrictions on travel (Kolodkin, n.d.). The conventional understanding of sanctions perceives that economic pain creates political gains; the greater the economic hardship caused by sanctions, the higher the probability of political compliance by government authorities of the targeted regime (Hashmi, 2010).

However, the evidence for sanctions as a viable means of peacekeeping seemed ambiguous (Cortright, et al, 2000). It was exercised by many countries throughout the 20th century for their foreign policy goals. Moreover, it is United States (US) which is the largest user of the coercive economic tool (Hufbauer and Schott, 1985) as a response to many geopolitical challenges of the world since the early 1960s. This is based on the US foreign policy and national security goals against targeted countries and regimes, terrorists, international narcotics traffickers or those engaged in activities related to the proliferation of weapons of mass destruction, and other threats to the national security, foreign policy or economy of the US. Under the US political system, it is administered and enforced by the Office of Foreign Assets Control (OFAC) of the US Department of the Treasury (US Department of the Treasury, 2016).

Though, the US applied sanctions on countries and entities on many times, the present research confines itself to the US sanctions on Iran which started since the Islamic Revolution of 1979. With the emerging issues in relation to Iran, the US continues to impose sanctions from time to time that covered many sectors of Iran like economic, political, energy and military etc. However, the sanctions on its energy sector have been the most targeted segment which was considered as a means that might help the US to achieve various goals, like curbing Iran's nuclear programme etc. According to the requirements of this research, the Chapter deals with the impact of the US sanctions on Iranian economy, especially its energy sector. The US considered the revenue received by Iran from its oil and gas exports as a means for the development and acquisition of WMD. In Iran's gross domestic product (GDP) and the revenue, oil contributes significantly. During the period of 2000 to 2014, the average share of oil of its GDP was 26 per cent (World Bank, 2016) and according to the *Economist Intelligence Unit*, oil exports made up 80 per cent of Iran's total export earnings and 50 per cent to 60 per cent of its government revenue (Cordesman, 2016). Hence, to punish Iran, its oil and gas sector has been in centre focus of the US sanctions.

The US sanctions on Iran have been the result of the strained relationships between the two over Iran's involvement in several incidents which were against the American national interests, particularly after the Iranian revolution. However, contrary to it, the period during early 1950s to 1978 witnessed strong bilateral relationships between the two. The US was depended on Iran as one of the most important sources of oil and a promoter of 'Western interests' in the West Asian region and for its part, Iran sought political, technological and military supports from the US for the security of its regime (Behestani and Shahidani, 2015:20).

The Shah of Iran returned to power in 1953 through a British-American coup which had overthrown to the democratically elected Prime Minister Mohammad Mossadegh as he fought for against internal corruption and foreign interference. Later, he also nationalised the Iranian oil industry (Ebrahim, n.d.). Hence, the establishment of Shah regime, though not popular, could manage to improve its relationship with the US. Time and again, both worked to promote their mutual interests that strengthened the Shah's position in Iran and the American position in the West Asian region (Saikal, 1991; Shabafrouz, 2009).

Reinstated by the support of the US and Britain, the Shah lacked popular political and social base and there was a lack of political legitimacy. Amid the fear of dethronement due to the absence of support, he kept maintaining the coherency in his interests with the interests of the US and this led the two states coming closer gradually. Consequently, the Shah allocated 40 per cent share of Iran's oil to the US which was equal to Britain's share over Iran's oil in the 1930s and 1940s (Behestani and Shahidani, 2015). The US not only started to penetrate Iran's oil sector but also became successful to pull Tehran into its military camp during the Cold War period. Iran was sharing a very long border with the Soviet Union until the disintegration of the latter in 1991 and hence was a potential target of Soviet expansionism during the Cold War (1945-1991). Yet, it was not only protected from the Soviet influence, was also used against the communist bloc. Iran was one of the founding members of the Baghdad Pact along with Iraq, Pakistan, Turkey and the United Kingdom, formed in 1955 (it was renamed as Central Treaty Organisation (CENTO) in 1959), promoted by the US, whose main purpose was to prevent the communist incursions in Iran and in the West Asian region.

As the Shah Regime was reinstated by the external powers, it required an organised mechanism to control over the political and social system. To avoid coup as well as unrest in the country and substantiate the regime, SAVAK (Sazeman-iEttelaatvaAmniyat-iKeshvar), the National Organization for Intelligence and Security was formed under the guidance of the US and Israeli intelligence officers in 1957 which developed into an effective secret agency (Pike, 2016). The Iranian secret police and intelligence service, although officially a civilian agency, had close ties with the military which protected the regime by arresting, torturing, and executing many dissidents (Ford, n.d.).

However, the externally imposed institutions to safeguard the Shah's political position in the country and the American support and involvement were not enough. They needed a support at the grass roots level. Moreover, "the US economy was also in need of new markets" and Iran was also seen as a consumer of its products. But the big problem was that there was a social and cultural gap between the US and Iran. Consequently, this led to a fear that Iranian traditional society might not accept "modernisation and American lifestyle". Additionally, it was also perceived in the US that a "backward and underdeveloped nation would provide a good ground for the propagation of and attraction to Communism" (Behestani and Shahidani, 2015). The increased activity of Tudeh party, a follower of communism ideology, in Iran augmented this fear (Behestani and Shahidani, 2015).

Consequently, the US directed the Shah to initiate social and cultural reforms in the country. In a short time, with the assistance of the US, the Shah carried out major social, economic, political and cultural reforms where he had intended to provide a new atmosphere to the Iranians. This mainly came as a bunch of reforms and was generally known as 'White Revolution' which started in 1962. Through the Revolution, the Shah reversed the nationalisation programme which was initiated by Mossadegh (1951 to 1953). It not only focussed on the political, social, economic and land reforms but also in the development of country's infrastructure. Iran being an agricultural economy, land reforms became the centrepiece for his modernisation campaign which was more for political reason than the development of the sector itself. By the reform, he intended to break up the traditional dominance of landlords (few in number) over rural areas through wide redistribution of land and capitalise it to get peasant's support to present himself as a "progressive advocate of the peasant's reform ideas" (Ghebleh, 2013).

In the meantime, the regime also started to work for the industrial growth. For the infrastructural development, the construction of new road, rail and air network for transportation, building of schools, construction of a number of dams and irrigation projects were the priority areas (Abrahamian, 2009). In social sector, the Shah focused on the development of health facilities. For the interior areas, particularly the isolated rural population, the health corps was established and eradication of diseases such as malaria remained one of the important issues for the government. The economic and infrastructural reforms were appreciated by the masses and this also helped the Shah to consolidate his domestic support (Ghebleh, 2013).

Yet simultaneously, some political and social changes created furore among the religious Islamic groups against the regime. The struggle between modernisation and traditional Islamic value to become the base of the Iranian society was evident from the disagreement between the regime and religious groups over the contents of the reforms. Thus, in the patriarchal society like Iran, the political reforms especially the introduction of voting right to women (Ghebleh, 2013) remained one of the most striking features of White Revolution. The clerical community of the state vehemently opposed the law. Ayatollah Khomeini, a key figure in the protests over this issue, even equated the women voting rights with the prostitution (Camara, 2012).

In the early 1960s under the new policy of "national independence", the Shah sought to develop a more independent foreign policy resulting in the establishment of working relationships with the Soviet Union and Eastern European nations (Chubin and Zabih, 1974).However, later in the 1970s "unlike following the foreign policy of national independence, the Shah moved towards one-sided dependence and allegiance over the American government" (Behestani and Shahidani, 2015). In short, it was basically the relationship between the Shah of Iran and the US.

Over this period, Iran not only deepened its ties with the US but also proved itself as a reliable partner of the US in the West Asian region. Prior to the 1979 revolution, the trade between Iran and the US greatly increased. In 1978, American goods accounted for US$4 billion or 21 per cent of all Iranian imports, making the US Iran’s number one trading partner (Estelani, 1999). Reciprocally, Iran was also one of the largest crude oil and petroleum product exporters to the US. According to Energy Information Administration (EIA), in 1978, a year before the revolution, Iran exported 27.63 million tonnes of oil to the US, accounting for 6.63 per cent of American total imports (EIA, 2016). “Amoco, Exxon, Mobil, and Shell were among the US companies importing Iranian crude oil. By the late 1970s, the US companies had also invested US$457 million in Iran’s oil industry” (Glenn, 2015).

Further, Iran’s proximity with the US could be understood when the latter selected Iran as part of its twin pillar policy (along with Saudi Arabia) which was adopted following the withdrawal of British military from the region in the 1960s (Guittard, 2010). The US viewed them as a caretaker of its interests in and around the West Asian region. This policy was the substitute for a direct US involvement in the extra-regional affairs and was primarily adopted after its strategic failure in Vietnam War in late 1960s where its direct involvement in the war had not only put financial burden on the US but also maligned its super power status.

In spite of his all efforts to widen his political legitimacy, the Shah could not stop the emerging of domestic public dissent. The autocratic nature of his rule, “corruption in his government, the unequal distribution of oil wealth, forced ‘Westernisation’ and the activities of Savak (the secret police) in suppressing dissent and opposition to his rule” created a powerful force which started to oppose the Shah. After the increase of oil revenue in the wake of the oil crisis of 1973, the above crisis remarkably accentuated (Graham, 1978: 84).

In this way, the Shah’s imposition of ‘American’ mode of development in Iran could not get support from the majority of the people and generated distrust over the reforms. The imposed reforms built a feeling of cultural and political gap between the regime and its masses. As a result, it led the emergence of discontents among a large section of the society such as lower classes, intellectuals, bazaar merchants, students etc. and Khomeini, a Shia leader became successful to mobilise this sentiment against the Shah (Lirong, 2010). In 1979, a revolution ousted the Shah from the power and established an Islamic Republic which went against the US dominance in Iran's internal affairs. Under the new regime, the relationship between Iran and the US got hostile and could not improve later. Since then, the sanctions have been an important foreign policy tool of the US in dealing with Iran.

Nevertheless, it was not the Iranian revolution of February 1979 by itself which caused the US to impose sanctions on Iran but it was the result of subsequent actions taken by new Iranian regime and its people against the US interests. It primarily started after the seizure of the US Embassy in Tehran by Iranian students on 4 November 1979, that is, eight months after the revolution. They detained more than 50 Americans, ranging from the Chargé d'Affaires to the most junior members of the staff and hostage crisis lasted for 444 days (Bureau of Public Affairs, n.d.). The President addressed the hostage crisis as an extraordinary threat to the US's national security, economy and foreign policy. Responding to this crisis, on 14 November 1979, the US President Jimmy Carter, through an Executive Order No. 12170, declared national emergency and froze all Iranian assets such as all property and interests in property of the Iranian government and its various entities including Central Bank of Iran which came under the jurisdiction of the US (US Department of Treasury, 2016a).
Thus, through the above order, the US basically targeted Iran's financial sector which also included Central Bank of Iran, a key entity for the financial transaction.

However, it confined to the stagnation of Iranian capitals in the US and its jurisdiction and yet it had the larger repercussion on the Iranian economy. Later, on 7 April 1980, the US broke off its diplomatic ties with the latter. Though since 1980, Iran has been bearing a series of sanctions targeted at various sectors of Iran the present research confines itself to some of the significant sanctions which affected Iran's economy particularly, its energy sector. By these sanctions, the US sought to curb Iran's ability to produce, export and transport oil and gas and finally the revenue generation from these natural resources for its economy.

The US sanctions on Iran

The major step taken by Carter against Iran was by the Executive Order No. 12205 on 7 April 1980 which aimed to break the economic engagements with Iran. The Order restricted to any person who was the subject to the jurisdiction of the US for further engagement with Iran. For example, they were barred for the sale, supply or other transfer of any items or commodities which was destined for Iranians or Iranian government except food or the items for the medical purposes. The Order was not only limited to the items originated from the US but it was applied on any foreign country. It also prohibited them for engaging in any service contracts in support of an industrial project in Iran except the contract which was concerned with medical care or entered prior to the date of this Order as well as financial transactions involving Iran, an Iranian government entity, a project controlled by Iran or an Iranian government entity or any person in Iran. Further, it proscribed the shipment by vessel, railway, aircraft which was registered under the law of the land (the US) or owned by the person subject to the jurisdiction of the US (The US National Archives and Records Administration, n.d.).

However, the Order was not applied on those transactions done by any person subject to the jurisdiction of the US which was a non-banking association, corporation or the other organisation that was organised and doing business under the laws of any foreign country (The US National Archives and Records Administration, n.d.).

Thus, "by Executive Order No. 12205, the US prohibited sale, supply or transfer of commodities or products, except food and medicines to Iran as well as use of US's shipment by vessel, aircraft, railway or other land transport" (US Department of the Treasury, 2016b).

Further, apart from the ban on the import of Iranian oil along with other goods, Executive Order No. 12211 on 17 April 1980 also had provisions of revocation of existing licenses done with the National Iranian Oil Company (NIOC) and the National Iranian Gas Company. This remarkably affected the US oil imports from Iran. As highlighted in **Table-5.1** the US crude oil imports from Iran was 27.59 million tonnes in 1978 which came down to 0.40 million tonnes in 1980 and was nil in 1981. If seen as the share of Iran in America's total crude oil imports in per cent terms, it was 8.71, 0.15 and 0 per cent respectively for these years.

Table-5.1

US-Iran Oil Ties Since 1973

Year	Iran Oil Production (million tonnes per year)	Iran's global oil Export (million tonnes per year)	US -Total Crude Oil Imports (million tonnes per year)	US crude oil import from Iran (million tonnes per year)	Share of Iran in US's total crude oil import (In per cent)
1973	291.87	N.A.	161.55	10.76	6.65
1974	299.88	N.A.	173.15	23.06	13.3
1975	266.43	N.A.	204.43	13.84	6.77
1976	292.97	N.A.	263.29	14.84	5.63
1977	282.01	N.A.	329.42	26.39	8.01
1978	261.04	N.A.	316.52	27.59	8.71
1979	157.76	N.A.	324.64	14.79	4.55
1980	90.47	39.68	262.09	0.40	0.15
1981	77.94	35.58	218.92	0	0
1982	120.55	80.83	173.70	1.74	1
1983	121.60	85.59	165.78	2.39	1.44
1984	101.21	75.78	170.61	0.50	0.29
1985	109.18	78.10	159.40	1.34	0.84
1986	101.45	72.40	208.06	0.95	0.45
1987	114.42	85.15	232.76	4.88	2.09
1988	123.88	84.46	254.32	0	0
1989	140.14	105.57	290.98	0	0
1990	156.14	110.55	293.52	0	0

1991	169.66	120.51	287.94	1.59	0.55
1992	170.89	125.89	302.93	0	0
1993	170.57	129.48	337.99	0	0
1994	179.08	131.97	351.73	0	0
1995	179.03	130.52	360.05	0	0
1996	179.08	130.97	373.89	0	0
1997	179.45	128.83	409.605	0	0

Sources- (Library of Congress, 1997; Organisation of Petroleum Exporting Countries (OPEC), 2002; Energy Information Administration, n.d.)

However, after the signing of Algiers Accord on 19 January 1981 for the release of hostages, the US President Ronald Reagan revoked some provisions contained in Executive Order No. 12205, Executive Order No. 12211, and Proclamation 4702 of 12 November 1979 (The US National Archives and Records Administration, n.d.) and a day later, that is, on 20 January 1981 US hostages were released.

Though, in the wake of the Algiers Accord, the US resumed oil imports from Iran, it remained below one per cent of total crude oil imports of the US except in 1983 when it was 1.44 per cent. Later, in January 1984, the US imposed additional sanctions on Iran along with designating it a state sponsor of terrorist due to the involvement of Lebanon-based militant group Hezbollah an Iranian ally, in the bombing of the US Marine base in Beirut in October 1983 (Laub, 2015). The Arms Export Control Act and Export Administration Act of 1984 restricted the export of list of products of military importance to Iran. "Exports of certain goods such as aircraft and vehicles, as well as products with potential military applications, were effectively terminated" (Estelami, 1999). However, the US oil companies continued to extract Iranian crude oil and imported into the US (Estelami, 1999).

The above data shows that the US kept importing oil from Iran but nevertheless it reduced them substantially after 1983. Later, the Executive Order No. 12613 in 1987 was used over Iran's aggressive and military action against the US-flagged vessels and merchant vessels of other non-belligerent nations in the Gulf region and prohibited imports of services and goods of Iranian origin (except some like petroleum products refined from Iranian crude oil) into the US (US Department of the Treasury, 1987). Subsequently, there has been no oil import from Iran into the US except in 1991 when the Kuwait crisis disrupted the oil supplies from Iraq and Kuwait, both important oil suppliers to the US. **Table 5.2** shows the total trade between US and Iran since 1985 as data for earlier year are not available.

Table-5.2

US Trade in Goods with Iran

(Million US$)

Year	US-Iran Trade	US's Export	US's Import	US's Balance of Trade
1985	799	73.9	725.1	-651.2
1986	603	34.1	568.9	-534.8
1987	1721.5	54.0	1667.5	-1613.5
1988	89.5	80.5	9.0	71.5
1989	63.8	55.2	8.6	46.6
1990	169.3	162.5	6.8	155.7
1991	758.3	527.6	230.7	296.9
1992	748.2	747.5	0.7	746.8
1993	616.3	616.2	0.1	616.1
1994	329.6	328.8	0.8	328.0
1995	277.6	277.4	0.2	277.2
1996	0.2	0.2	0.0	0.2

Sources- (United States Census Bureau, 2016)

The Executive Order of 1987 did affect the US-Iran trade ties especially oil significantly. The trade between two declined drastically from 1987, when it was of US$1721.5 million and came down to US$89.5 million in 1988 (**Table-5.2**). However, the Order was applied to the US companies only and did not bar to the foreign subsidiaries of the US companies. As the foreign subsidiary companies came under the laws of the countries they were located (Bussiness Dictionary, n.d.), they continued to lift Iranian oil and supply it to non-US markets. To further curtail the influence of Iran along with Iraq in the region Dual Containment Policy was initiated in May 1993 by President Bill Clinton. The objective of the policy was to isolate both these countries politically, economically, and militarily (Mraz, 1997).

However, the existing loopholes of the Order did not technically prevent the overseas subsidiaries of American companies from importing Iranian oil into the US or the export of Iranian goods to other foreign markets elsewhere in the world and such. "loopholes meant that by the mid-1990s the US companies were buying and exporting a very large quantity of Iranian oil" (Howard, 2007: 1). For example in 1994, Iran exported 129.48 million tonnes of oil and 23 per cent of this was moved by US companies such as Exxon, Coastal, Bay Oil, Caltex etc. By 1995, two years into Dual Containment policy, this trade had grown substantially as American businesses continued to find and exploit legal loopholes that allowed the US to become Iran's third largest trading partner and its sixth largest export market (Howard, 2007).

This shows that the US, indirectly continued to remain as an important trading partner of Iran until 1995, especially for its export to the US. However, most of the purchased oil by the US companies was diverted to other countries, especially Europe and Asia Pacific region. Thus, the loss of the US as Iran's oil market was filled by Europe and Asia Pacific where majority of its oil went since 1980, as shown in **Table-5.3.**

Table-5.3

Iran's Crude Oil Exports by Destination

(Million Tonnes per Year)

Year	North America	Latin America	Europe	West Asia	Africa	Asia Pacific	Total World
1980	1.13	2.81	18.62	0.35	0.21	16.54	39.68
1981	0	3.35	17.09	0.42	0.25	14.47	35.58
1982	2.96	3.84	45.41	8.96	0.32	19.33	80.83
1983	7.20	2.49	45.22	6.97	0.30	23.41	85.59

1984	3.32	0.70	45.32	7.97	0.75	17.73	75.78
1985	3.94	1.00	42.58	8.47	1.25	20.87	78.10
1986	5.87	1.25	35.67	4.73	1.74	23.16	72.40
1987	13.94	0.50	43.08	2.99	1.25	23.41	85.15
1988	0.55	3.24	54.03	1.25	1.49	23.90	84.46
1989	0.90	4.93	67.83	1.29	1.84	28.78	105.51
1990	0	5.48	71.06	1.34	1.99	30.68	110.55
1991	2.06	4.98	71.21	1.34	1.99	38.92	120.51
1992	0.39	6.23	68.72	1.49	2.24	46.82	125.89
1993	1.41	3.49	71.71	1.49	2.24	49.13	129.48
1994	0.52	3.98	65.49	1.49	2.99	57.50	131.97
1995	0.08	1.99	70.97	1.00	5.98	50.51	130.52
1996	1.97	2.99	64.74	1.00	9.46	50.80	130.97
1997	1.62	1.74	60.26	1.24	9.96	54.00	128.83
1998	0	2.49	57.46	1.24	9.46	54.44	125.09
1999	0	2.49	52.25	1.24	7.47	50.64	114.09
2000	0	2.99	51.33	1.49	9.96	58.34	124.11
2001	0	2.24	42.25	1.37	8.01	54.92	108.79
2002	0	1.74	35.39	1.24	5.98	59.91	104.26
2003	0	2.59	41.52	1.32	8.29	59.89	119.34
2004	0	2.93	46.51	1.48	9.28	67.08	133.67
2005	0	0	52.85	10.54	0	55.86	119.25
2006	0	0	43.41	0	7.43	67.26	118.38

2007	0	0.11	42.20	0	7.38	73.16	122.85
2008	0	0	37.30	0	7.32	76.79	121.42
2009	0	0	28.29	0	6.32	76.59	111.15
2010	0	0	43.72	0	6.67	78.24	128.63
2011	0	0	36.90	0	6.32	69.32	126.34
2012	0	0	8.07	0	5.03	91.58	104.68
2013	0	0	6.37	0	0.11	54.03	60.51
2014	0	0	5.83	0	0	49.41	55.24
2015	0	0	5.55	0	0	48.29	53.84

Sources- (OPEC, Several Years)

The data shows that it was EU which was the largest importer of Iranian oil from 1980s until 1999 but was later replaced by the Asia Pacific region.

Though, the trade between the US and Iran remained low in the 1990s compared to the pre-1979 period, the US was Iran's second largest trading partner, after Germany (Folkeson, 2012). The overseas subsidiaries of American companies continued to maintain their working relationship with the Iranian government and in its economic stability, as the parent companies and subsidiary companies have separate legal identities and this meant that one is not liable for the actions of the other (Sanders, 2016).

However, on the political front, the US continued to isolate Iran. With the changing US political and economic interests vis-à-vis Iran throughout the 1980s, it continued to try to lessen its dependence on the latter as an alliance partner in the West Asian region. Thus, Iran being a reliable partner of the Twin Pillar policy for the American regional interests in West Asian region since the late 1960s became a threat to US national and regional interests in the 1980s and beyond. To contain Iran's influence, the Dual Containment Policy was adopted. For US, the focus was to cut Iran off from the world economic and trading system. It also made efforts to persuade Europe, Russia and Japan to deny Iran access to international capital and arms markets. To contain regionally, the US emphasised in making Gulf Cooperation Council (GCC) countries militarily stronger and hence, continued its military commitments to Saudi Arabia and the smaller monarchies that make up the GCC (Gause III, 1994).

Amid increasingly growing political isolation, Iran's oil and gas sector continued to remain a lucrative area for the major oil and gas companies of the world and it was trying to attract large-scale investment in its oil and gas sectors to come out of the economic fallouts of the Iran-Iraq war. To modernise its energy sector, Iran abandoned its autarkic policy whereby foreign investments were banned from its energy sector on the grounds that foreign firms would gain undue control over its resources (Katzman, 2006). It introduced buy-back policy to attract international companies in the mid-1990s. "A buy-back contract is basically a service-type contract that limits non-Iranian participation to Seven years. Under the buyback contract the international oil companies (IOCs) fund all investment costs and implement exploration and/or production operations on behalf of the NIOC, as per an agreed scope of work" (Farnejad, n.d.).

The foreign companies which develop oil or gas resources in Iran are repaid fixed fee from sales revenues unrelated to production rates (OGJ, 2016) and has no share in the project's profit after being repaid. Once started producing, the investment is handed over to the NIOC or its representative who operates and manages it (Groenendaal and Mazraati, 2006). Under buy-back policy, Iran offered to develop two of its offshore oil fields on Sirri Island which were discovered in 1972 and 1976 (Salpukas, 1995). Amid competition among Conoco (for the US), and Elf Aquitaine S.A. and Total (from France) for the contracts, Iranian President, Hashemi Rafsanjani offered a lucrative US$1.6 billion contract to Conoco to develop two of its offshore oil fields- Sirri A and E of Sirri Island in first week of March 1995.The deal did not require prior US government approval because the deal involved only its Conoco Iran NV, a Netherlands-based affiliate of Conoco (Howard, 2007; Salpukas, 1995).

This was the first energy agreement between Iran and the US since 1980 when both broke off diplomatic ties. While the above deal was not illegal (Salpukas, 1995), it could have been a major setback to the Dual Containment policy. Hence, to further contain Iran's economy, President Clinton issued Executive Order 12957 on 15 March 1995 which prohibited to US companies including their foreign branches from certain transactions with respect to the development of Iranian petroleum resources (US

Department of Treasury, 1995a). Thus, the order prevented the US companies from doing any kind of trade with Iran (oil or non-oil) with criminal penalties for violating corporations ranging up to US$500,000 (Estelani, 1999).

Consequently, under the pressure of the US Congress and Executive Order 12957, the Conoco declined the offer given by Iran on March 1995 (Glenn, 2015). Later, Total, a European company became successful to avail the opportunity and inked the deal. The US sanctions on Iran through the Executive Order 12957 which prevented only US companies from the engagement with Iran had broadened its landscape through the Executive Order No. 12959 of 6 May 1995 which banned US trade and investments in Iran completely (US Department of Treasury, 1995b).

Total's participation in Iran's oil and gas development, kept the US away from Iran's oil and gas sector but remained hindrance in the implementation of the Dual Containment policy. The Executive Orders in March and May 1995 which were intended to affect the interests of US in Iran in larger way left the opportunities for other countries to capitalise. To overcome this problem and delink countries of the major economy of the world from Iran, the US came up with a comprehensive economic sanction on 5 August 1996 (Katzman, 2006), called Iran and Libya Sanctions Act.

Iran and Libya Sanctions Act of 1996

The Iran and Libya Sanctions Act of 1996 (ILSA) was enacted by the Clinton Administration "to impose sanctions on persons making certain investments directly and significantly contributing to the enhancement of the ability of Iran or Libya to develop its petroleum resources". The initial limit for investment was US$40 million in a year [Congress.Gov (United States), n.d.] which was later reduced to US$20 million in 2001 (Congress.Gov, 2001). The purpose of the Act was "to deny Iran the ability to support acts of international terrorism and to fund the development and acquisition of WMD and the means to deliver them by limiting the development of Iran's ability to explore for, extract, refine, or transport by pipeline petroleum resources of Iran" (Congress.Gov, 1996). Two or more of the six sanctions described in the Act were reserved against individuals or entities that make an investment of US$20 million or more that would contribute to the development of Iran's petroleum resources. These sanctions included

(1) denial of Export-Import Bank loans, credits, or credit guarantees for US exports to the sanctioned entity;

(2) denial of licenses for the US export of military or militarily useful technology;

(3) denial of US bank loans exceeding $10 million in one year;

(4) if the entity is a financial institution, a prohibition on its service as a primary dealer in US government bonds; and/or a prohibition on its serving as a repository for US government funds (each counts as one sanction);

(5) prohibition on US government procurement from the entity; and

(6) restriction on imports from the entity, in accordance with the International Emergency Economic Powers Act (IEEPA)" [19] (Katzman, 2009:3)

Hence, the US sanctions on Iran from 1979 to 1995 mostly affected its own oil and other trades with Iran. For the emerging problem in Iran's oil and gas field development, it was Iran's own autarkic policy which was mostly responsible. As a result of which, neither there were any major investment in its energy sector nor was there any import of technology, which were required for increasing oil and gas production for its domestic consumption and export earnings. Nevertheless, the introduction of buy-back policy by Iran can be considered as a measure to attract investments and procure advance technologies and fix the problem for the development of its oil and gas fields (Ilias, 2010: 12; Moore, 2014). Iran abandoned its autarkic orientation and initiated buy-back policy in 1995 but in the next year, the implementation of the ILSA not only barred the US from investments in Iran but also other countries and put limitations for them in energy related investments in Iran. Consequently, ILSA was a landmark in the series of the US sanctions vis-à-vis Iran that legally limited the latter's access to foreign funds in a larger way.

Critic of the US economic sanctions, especially EU considered the ILSA as an "extra-territorial application of US law" and threatened to take this issue to World Trade Organisation (WTO) (Alikhani, 2000: 326). However, in April 1997, EU and the US

[19] During national emergency, particularly if this extra ordinary threat has its source in whole or in parts outside the US, IEEPAauthorises the President to regulate a wide range of financial and commercial transaction in which foreign parties are involved (US House of Representatives, 2010, page-251).

agreed to avoid trade confrontation over ILSA and settled for mutual cooperation. According to the concurrence, “the US President may waive ILSA sanctions on Iran if the parent country of the violating firm agrees to impose economic sanctions on Iran or if he certifies that doing so is important to the US national interest” (Katzman, 2006). In response, the EU pledged to cooperate with the US over non-proliferation and counter-terrorism and the US indicated that EU firms would likely get waivers for investment in Iran (Katzman, 2003:4).

Consequently, the Clinton Administration waived ILSA sanctions against Total SA (France) and its partner, Gazprom (Russia) and Petronas (Malaysia), first project determined to be in violation in May 1998 for the agreement of the investment of US$2 billion for the development of 2 and 3 phases of 25 phased South Pars gas field[20] of Iran in September 1997 (Katzman, 2007). **Table-5.4** gives the details of the imposed sanctions under the Iran Sanction Act (ISA).

Table-5.4

Sanctions imposed under the ISA

Companies/Countries	Status of sanctions	Date of designating sanctions
Total SA (France); Gazprom (Russia); Petronas (Malaysia)	Waived	18 May 1998
Naftiran Intertrade Co. (NICO), Iran and Switzerland	Lifted under JCPOA (Joint Comprehensive Plan of Action)[21]	30 September 2010
Total (France); Statoil (Norway); ENI and Royal Dutch Shell	Exempted under ISA special rule[22]	30 September 2010

[20] Somewhere the development plan of South Pars gas field was 28 phased (Oil and Gas News, 2017).

[21] On 14 July 2015, the P5+1 (China, France, Germany, Russia, the UK and the US), the European Union and Iran reached a Joint Comprehensive Plan of Action to ensure that Iran’s nuclear programme will be exclusively peaceful (Bureau of Economic and Business Affairs, n.d.).

[22] ISA provides a means- a so-called “special rule”-for firms to avoid ISA sanctions by pledging to verifiably end their business with Iran and such business with Iran in the future (Katzman, 2017).

Inpex (Japan)	Exempted under ISA special rule	17 November 2010
Belarusneft (Belarus, subsidiary of Belneftekhim)	Sanctions remain	29 March 2011
Petrochemical Commercial Company International (PCCI) of Bailiwick of Jersey and Iran; Royal Oyster Group (UAE); Tanker Pacific (Singapore); Allvale Maritime (Liberia); Societie Anonyme Monegasque Et Aerienne (SAMAMA, Monaco); Speedy Ship (UAE/Iran); Associated Shipbroking (Monaco); and Petroleos de Venezuela (PDVSA, Venezuela)	Sanctions lifted under JCPOA	24 May 2011
Zhuhai Zhenrong Co. (China); Kuo Oil Pte Ltd. (Singapore); FAL Oil Co. (UAE)	Sanctions lifted under JCPOA	12 January 2012
Sytrol (Syria)	Sanctions remain	12 August 2012
Dr. Dimitris Cambis; Impire Shipping: Kish Protection and Indemnity (Iran); and Bimeh Markasi-Central Insurance of Iran (Iran)	Sanctions lifted under JCPOA	14 March 2013
Tanker Pacific; SAMAMA; and ALLvale Maritime	Sanctions lifted under JCPOA	12 April 2013
Ferland Co. Ltd. (Cyprus and Ukraine)	Sanctions lifted under JCPOA	31 May 2013
Dettin SPA (Italy)	Sanctions lifted under JCPOA	29 August 2014

Sources- (Katzman, 2017).

According to the **Table 5.4**, among 12 occasions of designating sanctions on companies and countries under the ILSA, the sanctions were applied on nine and on three occasions, they were exempted under 'special rule'. Additionally, the US had the waive plan for the firms from other countries based on its 'national interest'. However, it continued to restrict its own trade with Iran. This can be understood from the Executive Order 13059 of 19 August 1997 whereby the "US prohibited the exportation, re-exportation, sale or supply, directly or indirectly, US or by a US person wherever located to Iran" (US Department of Treasury, 1997).

With the amendment through Iran Freedom Support Act in 2006 where Libya was omitted from the purview of ILSA, it is known as ISA. In spite of the introduction of new stringent sanctions on Iran, the ISA has remained active (with amendments and extensions) as a deterrent for the foreign countries to engage with Iran economically and militarily. It continued to work as a deterrent against the foreign countries and companies in their engagement with Iran.

However, during the one and half decade of its existence, its first application was on 30 September 2010 when President Barack Obama imposed sanctions on the Naftiran Intertrade Company (NICO), a Swiss-based subsidiary of the National Iranian Oil Company, for its activities to develop Iran's energy sector. Though the subsidiaries of Belneftekhim were sanctioned earlier in 2007 it was under Executive Order 13405 (Katzman, 2016) and not under the ISA. In a testimony before the Senate Banking Committee on 13 October 2011, Undersecretary of State for political Affairs Wendy Sherman stated that the designation of Naftiran Intertrade Company (NICO) was "the first sanctions any administration had ever imposed under the Iran Sanctions Act" (Sherman, 2011).

Amid uncertain business environment in Iran and the loss of incentives given to its multinational national companies (MNCs) by the US (Biglaiser and Lektzian, 2011), weakened the confidence of investor companies particularly from the US willing to invest in Iran. According to a report, none of the US companies invested in Iran's oil and gas sectors during 1999-2016 (Katzman, 2017) and that affected Iran's oil and gas sector in a large way. While addressing the House Committee on Oversight and Government Reform on 29 July 2010, Robert J. Einhorn, Special Advisor for Arms Control and International Security, told that the threat of ISA sanctions has resulted in loss of at least US$50-60 billion in "the last few years" which was supposed to be invested in Iran's oil and gas sector. He further added "US pressure has contributed to the decisions by major international oil companies such as Total, Statoil, ENI, Lukoil, and Repsol not to undertake any new activities in Iran" (Einhorn, 2010).

However, the ISA could not prevent Iran to continue to indulge in its clandestine nuclear programme. Its persistent involvement in the secret uranium enrichment facility at Qom while refusal to cooperate fully with inspectors from the International Atomic Energy Agency (IAEA) substantiated the global concern over its nuclear programme. Further, its announcement that it would build 10 new uranium enrichment facilities (Bureau of Economic, Energy and Business affairs, 2011) aggravated this concern which led the US to put some more sanctions on Iran.

Apart from the ISA which was extended in 2001, 2006 and 2010 until 31 December 2016 (Rajiv, 2016), the US, in the meanwhile, added some harder sanctions that were implemented in parallel. After one and half decade of ILSA/ISA, the Comprehensive Iran Sanctions, Accountability, and Divestment Act (CISADA) was the first major sanction signed by President Barack Obama on 1 July 2010. It was based on United Nations Security Council Resolution (UNSCR) 1929 which was passed on 9 June 2010. Although the resolution mainly targeted Iran’s nuclear programme it also highlighted “the potential linkage between Iran's energy sector revenues and procurement and its nuclear activities and proliferation” (Council on Foreign Relations, 2010). To prevent transactions regarding nuclear proliferation, it also asked the need to exercise vigilance over all Iranian banks including the Central Bank of Iran (Council on Foreign Relations, 2010).

Comprehensive Iran Sanctions, Accountability, and Divestment Act

The Comprehensive Iran Sanctions, Accountability, and Divestment Act (CISADA) not only amended ISLA of 1996 but also widened the scope of the sanctions. Under the original text of the ILSA, energy sector meant oil and natural gas while the CISADA added LNG, oil or LNG tankers, pipelines etc. (Katzman, 2013). By targeting Iran’s petroleum products sector, it inserted “sanctions with respect to the development of petroleum resources of Iran, production of refined petroleum products in Iran and exportation of refined petroleum products” to Iran in place of “to Iran” in the provision of ISA (Department of Treasury, 2010). According to the Energy Information Administration (EIA), the petroleum products defined under the CISADA include

> … unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks,

> special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds (US Department of the Treasury, 2017).

Interestingly, in the EIA's standard definition, "petroleum products do not include natural gas, liquefied natural gas, bio-fuels, methanol, and other non-petroleum fuels" (US Department of the Treasury, 2017). The imposition of sanction over the supply of refined petroleum products to Iran was a strategically calculated step as Iran was highly dependent on the foreign countries to meet its growing demand domestically, as has been discussed earlier.

The foreign financial institutions were targeted under the CISADA and intended to become its subject if the foreign banks facilitate WMD transactions including transactions relating to support for terrorist activities as well as significant transactions involving the Iranian Revolutionary Guard Corps (IRGC) or its affiliates, transactions with respect to property subject to US jurisdiction, import to the US from sanctioned persons and engage in money laundering (US Department of the Treasury, 2017).

The Section 104 (c) of the Act also subjects NIOC and National Iranian Tanker Company (NITC) of IEEPA to economic restrictions if they were found to be affiliated with the IRGC (Rennack, 2016). The IRGC is a military force created after the 1979 revolution for the Iran's internal security but the US believed that it was involved in planning and supporting terrorist acts and groups (*Iran Watch*, 2015).

Under this Act, various issues had been included for the sanctions to cripple the Iranian economy; for example, investments in the development of petroleum resources of Iran was limited to US$5 million which could not be beyond US$20 million in a year. The act refrained countries to export refined petroleum products to Iran beyond a limit which had a fair market value of US$1 million or more at a time and an aggregate fair market value of US$5 million or more in a year (Congress of United States , 2010). The above sanction was technically very important for the US, as Iran was highly dependent on imported refined petroleum products for its rising domestic demands especially for gasoline and diesel. Since-mid 2000s, Iran had been net importer of refined products and in 2005 it imported 1.80 million tonnes of refined products which gradually increased. In 2008 it had a net import of 8.63 million tonnes of the products (OPEC, 2008; OPEC, 2012).

Among all the petroleum products, the dependence on gasoline was highest. For example, in 2006, Iran imported 8.46 million metric tonnes of gasoline which was 43 per cent of its domestic consumption (Cordesman and Kleiber, 2007). This was mainly due to low refining capacity of Iran which was caused by low foreign investments in the petroleum industry as well as the lack of technologies needed to upgrade the industry due to the effects of sanctions.

Additionally, the CISADA expanded "the basket of potential sanctions" and added three more provisions of sanctions apart from existing in the ISA amounted to nine. It threatened to impose three sanctions out of the nine in case of violation of the preventive activity while the ILSA had two out of the six sanctionable provisions. The additional three measures included under the CISADA were the "prohibitions in transactions in foreign exchange by the country, the prohibition on any credit or payments between the entity and any US financial institution, and prohibition of the sanctioned entity from acquiring, holding, using, or trading any US-based property which the sanctioned entity has a (financial) interest in" (Katzman, 2013:8).

The act made the US firms responsible if their subsidiaries engage in the sanctionable act under the US laws and extended the restrictions of ISA to these firms (Crail and Sugrue, 2010). Under this act, the next victim was state-owned Belarusian Company, Belarusneft for having entered into a US$500 million contract with Naftiran Intertrade Company, a Swiss-based subsidiary of the NIOC on 29 March 2011 to develop Jofeir oil field in Iran. Further, in May 2011, eight companies were sanctioned which were involved in the activities related to Iran's energy sector like providing refined petroleum products, providing a tanker to the Islamic Republic of Iran Shipping Lines (IRISL), among others (Katzman, 2016). In a testimony before the Senate Banking Committee in October 2011 Undersecretary for Political Affairs Wendy Sherman acclaimed that it was the threat of sanctions under CISADA that became responsible for major energy traders to stop their activities in and with Iran. For example, Lukoil (Russia), Reliance Industries Limited (India), Vitol, Glencore and Trafigura (Switzerland), Independent Petroleum Group (Kuwait), Tupras (Turkey), Total (France), Royal Dutch Shell (the Netherlands) and Petronas (Malaysia) among others, stopped selling of refined petroleum products to Iran (Katzman, 2017).

Decision taken by Reliance Industries Limited was based on the larger interests of the Company in the US as it did not want loose that over its narrow commercial interest in

Iran. The RIL was exporting petroleum products worth US$14 billion annually, of which around 5 per cent went to the US while for Iran, it was 2 per cent of its total output or around UU$280 million (Cheema, 2012). Additionally, to pressurise the companies, several US lawmakers urged the EXIM Bank to suspend the extension of US$900 million worth of financial guarantees to RIL to help it to expand its Jamnagar refinery. The RIL was also making efforts to engage itself in the US gas market and was in talk with the US-based Pioneer Natural Resources to buy a stake in the shale gas assets of the firm. In 2010, Reliance had also bought a 40 per cent stake in the Marcellus Shale operations of Atlas Energy to form a joint venture at one of the most promising natural gas deposit regions in the US (Dadwal and Rizvi, 2010).

In the meanwhile, Iran was also making efforts to decrease its dependence on imported refined petroleum products via the subsidy reforms. “Subsidies for energy products alone accounted for 10 per cent of Iran’s GDP in 2010”, according to the World Bank (Nikou and Glenn, 2015). Though the subsidy reforms were proposed under President Mohammed Ahmadinejad in 2008, the implementation of its first phase could start only in December 2010, codified under the Targeted Subsidy Reform Law (Nikou and Glenn, 2015). Consequently, the demand of refined petroleum products particularly gasoline started to decrease. The demand of petroleum products declined from 84.80 million metric tonnes per year in 2009 to 81.40 million metric tonnes in 2011 while gasoline declined from 18.27 million metric tonnes in 2009 to 16.08 million metric tonnes in 2011(OPEC, 2014).

Simultaneously, Iran also worked to increase its refining capacity. The data shows that it increased from 62.41 million metric tonnes per year in 2009 to 78.24 million metric tonnes per year in 2011. With the enhanced refining capacity, Iran increased the production of petroleum products which was even beyond its refining capacity. Data shows that it was 78.75 million metric tonnes per year in 2009 while 79.784 million metric tonnes per year in 2011. Though the production of gasoline decreased from 14.36 million metric tonnes per year in 2009 to 13.32 million metric tonnes per year in 2011, it increased to 18.08 million metric tonnes per year in the next year (OPEC, 2014).

Thus, the expansion of its petroleum products production capacity made Iran capable to cope-up two-pronged pressure; on one side, rising domestic demands for the products and on the other side, inability to import to meet its demand from the international market due to sanctions. This resulted in the reduction in Iranian import of petroleum products. According to some data gasoline imports fell from 8.8 million metric tonnes per year in June 2007 to at least a 10-year low of 0.43 million metric tonnes per year in June 2011 while seasonal peak imports were down nearly 70 per cent in January 2011 from highs of 10.53 million metric tonnes per year in January 2007 (Fineren, 2011).

In spite of threat of sanctions, some of the oil companies breached the sanctions limit of supplying petroleum products to Iran which as earlier mentioned was US$1 million or more at a time or US$5 million or more in a year. Amid such development, the ISA related sanction under the CISADA were applied on some companies like-the Zhuhai Zhenrong Company (China), Kuo Oil Pte Ltd. (Singapore), and Fal Oil Company (UAE) as well as the Syrian oil company Sytrol (10 August, 2012) for selling gasoline worth US$36 million-much beyond the CISADA limits. The latest sanctions under the ISA were imposed on an Italian-based company Dettin SPA on 29 August 2014 for supplying goods and services to Iran's petro-chemical industry" (Katzman, 2017).

Amid the US restrictions over its sanctioned financial institutions, Iran found ways by exploiting the loopholes. To evade these restrictions, different tactics were applied by Iranian financial institutions; for example, "using non-sanctioned banks to process transactions of sanctioned banks, or using exchange houses or trading companies to hide destinations of transactions" (Samore, 2015:16). Consequently, the US imposed another set of financial sanctions targeting evasion and money laundering. Under section 311 of the PATRIOT Act, the US assigned Iran as a jurisdiction of "primary money laundering concern" in 2011 and "identified the entire Iranian financial sector, including Iran's Central Bank" as a threat to the global financial system (Samore, 2015:17). Later, with the passing of National Defence Authorization Act (NDAA) – 2012 in January 2012, the Iranian financial sector came under the radar of US sanctions. The section 1245 of this act targeted Iran's financial sector which mentioned "imposition of sanctions with respect to the financial sector of Iran" (Department of Treasury, 2011).

The Act "designated Central Bank of Iran (CBI) as of primary money laundering concern" as it was accused for transferring several billion dollars to designated banks, including Sedarat, Mellat, EDBI and Melli, in mid-2011 through a variety of payment schemes (Department of Treasury, 2011). Hence, Section 1245 barred a foreign bank to open its account in the US or maintain the existing one if it "knowingly conducted any significant financial transaction with CBI or other Iranian financial institutions designated by the Secretary of the Treasury" under the above Act (Department of Treasury, 2011). For imposing sanction, the Act has provisions if a foreign financial institution engages in a financial transaction for the sale or purchase of petroleum or petroleum products to or from Iran after 180 days of the enactment of NDAA.

Such restrictions could be waived if the US president determined that the bank's home country significantly reduced its volume of crude oil purchases from Iran or certified that the oil market was insufficiently supplied from countries other than Iran (Clawson, 2015). Later on 19 January 2016, the word "significant reduction" for the waiver of sanctions was clarified by Senators Mark Kirk and Robert Menendez which meant "18 per cent of purchase reduction based on total price paid (not just volume)" and was finally adopted by the American administration (Katzman, 2017). Iran Threat Reduction and Syria Human Rights Act (ITRSHRA) of 2012 further clarified that these 'significant reductions' have to be both in "terms of volume and price" (Rajiv, 2016).

Amid the problem of financial transaction under the NDAA, most of the countries including India reduced their oil imports from Iran. India had to reduce its oil import from 15.94 million tonnes in 2011 to 10.34 million tonnes in 2015. The data of crude oil purchase by Iran's major Asian oil importer has been provided and discussed in latter part of this Chapter (See **Table-5.5**). This facilitated to almost 20 countries including India, to get waiver from the sanctions (Katzman, 2017) and this eventually affected Iran's crude oil exports. According to **Table-3.1**, Iran's crude oil exports declined from 126.34 million tonnes in 2011 to 55.23 million tonnes in 2014, a decline of around 56.28 per cent. It also affected India-Iran oil trade; the Indian imports of oil from Iran declined from 18.52 million metric tonnes in 2010-11 to 10.95 million metric tonnes in 2014-15 (**Table-3.4**) or a decline of almost 40.89 per cent of decline. Hence, India got the waiver from sanctions.

Iran Threat Reduction and Syria Human Rights Act

With the enactment of Iran Threat Reduction and Syria Human Rights Act on 10 August 2012, the US sanction became more stringent whose provisions entered into force on 6 February 2013. The Act further broadened the basket of potential sanctions which now required the imposition of at least five sanctions and expanded the list of available sanctions from 9 to 12 by adding the "ban on investment in equity or debt of the sanctioned person, rejection of visa to the corporate officers of sanctioned entities and sanctions on principal executive officers of sanctioned entities" (Bureau of Economic and Business Affairs, 2012).

The Act declared that five or more of the ISA sanctions would be imposed on a person if that person "knowingly participates in a joint venture with respect to the development of petroleum resources outside of Iran. Sanctions would not be imposed if such participation is terminated within six months of enactment of the Act" (Congress.gov, 2012). This Act was the major setback for Iranian oil and gas companies which not only curtailed their global engagement but also made difficult to import advanced technologies to develop its energy fields and industries (Christoff, 2010).

Further, under section 312 of the ITRSHRA, the Secretary of the Treasury had to enquire, no later than 45 days after the date of the enactment of the ITRSHRA, about the NIOC and NITC whether they were an agent or affiliate of Iran's Islamic Revolutionary Guard Corps. After enquiry, on 24 September 2012, the NIOC was declared as an affiliate of IRGC but NITC escaped the charge. However, the irony is that the US President by Executive Order 13622 of 30 July 2012, had already issued a ban on foreign financial institutions if they knowingly conducted or facilitated any significant financial transaction with the NIOC except the relief under amended ISA of 1996 (US Department of Treasury, 2012). The Act has also the provision for blocking of property or interests in property of entities subject to the US jurisdiction which provides, enables or facilitates access to specialised financial messaging services for the CBI or a US-designated Iranian-linked financial institution (Bureau of Economic and Business Affairs, 2012).

The expanded form of the Act curtailed Iran's ability for the financial transaction for its imports and exports and "led to the creation of 'escrow' accounts in countries importing Iranian oil, and severely curtailed Iran's foreign exchange earnings" (Rajiv, 2016). Reports noted that these resulted in the accumulation of US$1.5 billion in such accounts every month in 2013, amounting to nearly US$18 billion. As the funds were available to purchase local goods from those countries or humanitarian goods from others, Iran could spend only half of the monthly accumulated earnings (Rajiv, 2016). Kenneth Katzman noted that sanctions made inaccessible more than US$120 billion by 2014 of Iranian reserves held in banks abroad (Kenneth, 2016).

Moreover, as a result of the sanctions targeting Iran's energy sector, its value of petroleum exports reduced from US$114.75 billion in 2011 to US$61.29 billion in 2013 (OPEC, 2014). The above data have the interesting point. Firstly, Iran had to bear with the decline in its oil revenue and Iran had been restricted to spend the comparatively low oil income. Hence, it was unable to use significant amount of its oil income according to its wishes and needs. On the other side, it also affected Iran's oil production which fell from 208.8 million tonnes in 2011 to 165.8 million tonnes in 2013 (**Table-3.1**), the year when the US and Iran started the nuclear negotiations towards the Joint Plan of Action (JPOA). Iran's trade surplus also fell from US$70 billion in 2011 to US$44 billion in 2012 to US$38 billion in 2013 (Rajiv, 2016).

Later, with the enactment of Iran Freedom and Counter-Proliferation Act (IFCA) of 2012 under National Defence Authorisation Act 2013, the engagement of foreign firms with Iran became even more difficult. Enacted on 2 January 2013, the Act, as its name suggests, emphasised that the US "should deny the Government of Iran the ability to continue to oppress the people of Iran" (Department of Treasury, n.d.). Nonetheless, the focus of the Act was to curb Iran economically via paralysing its energy sector by barring export earnings and import of technology into the sector. Consequently, it broadened the range of sanctionable activities which directly or indirectly could have contributed to strengthen Iran's economy and military capabilities and included shipping and shipbuilding sectors. The persons involved in the sale, supply, or transfer of precious metals and certain materials like graphite or semi-finished metals like steel that can be used for the WMDs were also brought under the provisions of sanctions. Additionally, the IFCA has the provision of sanctions on certain service providers, like guarantee, insurance or reinsurance to activities and persons targeted by the US sanctions against Iran (Department of Treasury, n.d.).

Apart from curbing Iran's energy sector, the US was also enacting legislations and passing Executive Orders directed to Iran's WMD such as Iran-Non-proliferation Act in March 2000 (US Government Printing Office, 2000), Proliferation Security Initiative (PSI) in 2003 (Nikitin, 2012) etc. As the study focuses on the impact of US sanctions on Iran's energy sector, these were not dealt in detail here.

Thus, the sanctions on Iran from 1979 to 2005 remained unilateral but increasingly getting broadened and extended in its scope. Started from the ban on the import of Iranian crude oil into the US, they increasingly covered most of the areas which was directly or indirectly related to the Iranian energy sector including ban on investments in Iran's oil and gas sector by the US and others; export of petroleum products to Iran; financial transactions with Iranian banks, services like insurance and reinsurance and guarantees; and sharing and exporting technologies for example ship building. Under the US sanctions, both individuals and entities were targeted and made Iran more vulnerable to the impact of sanctions. Though, the sanctions covered most of the parts of Iranian economy, the main target was its energy sector which was considered as the supporter of Iran's nuclear programme.

However, there were repetitions and overlapping of these sanctions as succeeding enactments made them more complex and confusing. According to Erich Ferrari, the overlapping and extension of sanctions on Iran by the US like ISA, CISADA, NDAA 1245, Executive Order 13622 and ITRSHRA became an increasingly confusing phenomenon. Adding to this he said that "it could be part of the government's strategy to make the law so confusing and burdensome that foreign financial institutions may just avoid dealings with Iran altogether, rather than figure what they can and cannot do under this mess of regulatory scheme of sanctions. Or it could just be another unintended consequence of the growing Iran sanctions regime" (Ferrari, 2012). Hence, the US sanctions on Iran not only affected former's relationship with the latter but they also had larger ramification.

Under globalisation, a country or entity tends to diversify its economic linkages and emphasises to integrate itself with the global economy while the prime objective of the US sanctions has been isolation of Iran politically as well as economically. Thus, there was a conflict between the US economic interests and political and security concerns. This led to the occurrence of diplomatic furore between the US and other countries, especially European countries which were willing to engage themselves with Iran and this forced the US to have a provision of waiving sanctions.

To accommodate the economic interests, the US awarded more than US$107 billion in contract payments, grants and other benefits during late 1990s and 2000s to 74 foreign and multinational US companies while they were having commercial engagement with Iran (Becker and Nixon, 2010). Out of this amount, US$15 billion was paid to those companies which violated the ILSA and made large investment in Iran's oil and gas sector, such as Daelim (South Korea), ENI (Italy), Petrobras (Brazil), Repsol YPF, S.A. (Spain), Royal Dutch Shell (Netherlands), Statoil ASA (Norway) and (Total (France)(Becker and Nixon, 2010). This further weakened the effect of sanctions on Iran and the US was less likely to be successful to achieve its set goals.

To make the sanctions more effective, the US required the back up of international organizations. If this happens, it not only increases the size of sanction imposers, but also coordination among them and eventually its legitimacy. The imposition of sanctions by UN and EU have the same impact over the US sanctions on Iran which enhanced the legitimacy of the US sanctions that gathered the support from international organisations and raised the economic costs to Iran (Biglaiser and Lektzian, 2011). In addition to enhancing investment risk in Iran, this also adversely affected Iran's oil and other trade with its partners (See T**able-5.3)**

Amid the US and the EU efforts to curb Iran's nuclear programme, the UN also took efforts. In 2005, the negotiation for the suspension of Iran's uranium enrichment programme between France, Germany and United Kingdom on one side and Iran collapsed following the election of Mahmoud Ahmadinejad as president of Iran. The UN Security Council passed six resolutions against Iran from 2006 to 2010 and there were Resolution 1696 (July, 2006) (UNSC, 2006a), 1737 (December, 2006) (UNSC, 2006b), 1747 (March 2007) (UNSC, 2007), 1803 (March, 2008) (UNSC, 2008a), 1835 (September, 2008) (UNSC, 2008b) and 1929 (June 2010) (UNSC, 2010) and all were centred on its nuclear and other weapons of mass destruction (Samore, 2015). However, Resolution 1929 implied "the potential connection between Iran's revenues derived from its energy sector and the funding of Iran's proliferation sensitive nuclear activities." Later, this connection eventually became the basis for stringent sanctions targeting Iran's energy sectors by the US and the EU. The adoption of various sanctions by EU which was Iran's largest trading partner, affected Iran's economy and energy sector to a large extent.

EU Sanctions against Iran

After the declaration in September 2005 by IAEA that Iran was not in compliance with its international obligations regarding its nuclear programme (Laub, 2015), the EU too opted sanctions as a policy choice against Iran over its deepening concerns about the nuclear programme. As the EU sanctions covered various activities related with Iran's nuclear programme, energy, trade, finance etc. (European Council, 2017), it was opposed by some of its member countries including Sweden, Spain, Cyprus, and Germany. While for Sweden, sanctions were an ineffectual foreign policy tool, the countries like Spain, Cyprus and Germany were concerned about their economic interests particularly in Iran's oil and gas sector (Dadwal and Rizvi, 2010). Out of its sanctions by the EU on activities on Iran, this part of the research focuses on those sanctions which eventually affected Iran's energy sector.

The EU put first sanctions on Iran in February 2007 but it targeted only Iran's nuclear programme and other WMDs such as ban on export of sensitive nuclear and ballistic missile technology, prohibition on financial and technical assistance related to nuclear or missile activities and freezing assets and denial of travel of designated individuals and companies (Samore, 2015). The first major sanctions were imposed on 26 July 2010 under the EU Regulation 668/2010 (Patterson, n.d.) and covered broad range of Iranian economy, but their target was primarily Iran's energy sector. It barred the sale, supply or transfer of equipment and technology related to refining, production and exploration of oil and gas and LNG of Iran. It prohibited the technical assistance and financing for these energy sectors and banned extending financial help in the form of any loan, credit or guarantee for the development of Iranian oil and gas sector.

In terms of financial ban on Iran, the EU prevented for further opening of its new branches of banks in Iran as well as Iran's banks in its territory. However, the entities got exemption from these provisions to fulfil their obligation under contracts concluded prior to 26 July 2010 (Samore, 2015; Patterson, n.d.). In the service sector, the EU prohibited the insurance or reinsurance to the Government of Iran and its entities; yet health and travel insurance of the individuals were exempted under these provisions (Clyde and Co, 2010).

The next major decision on sanctions was taken on 23 January 2012 where several restrictive measures including a phased embargo of Iranian crude oil imports to the EU was imposed. Additionally, it also prevented the financing, insurance or reinsurance related to Iranian crude oil sale or transport (Samore, 2015). The above provision had the immediate impact on Iran's oil trade. This not only affected Iran's crude oil exports to the EU which dropped from 36.90 million tonnes in 2011 to 8.07 million tonnes in 2012 and then 6.37 million tonnes in 2013 (See **Table-5.3**) but also Iran's total crude oil exports which dropped from 126.34 million tonnes in 2011 to 104.68 million tonnes in 2012 and then 60.51 million tonnes in 2013 (See **Table-5.3**). For further restriction on Iran's trade, in March 2012, the EU banned designated Iranian banks under sanction from accessing the financial messaging services like Society for Worldwide Interbank Financial Telecommunication (SWIFT) which is a global provider of secure financial messaging services and became essential in international financial transactions (Fexco, 2017).

Amid the lack of progress in nuclear talks between Iran and P5+1, the EU expanded its range of sanctionable activities related with Iran. Apart from strengthening and broadening its existing sanctions, it added new ones. In the energy sector, the EU incorporated natural gas for sanctions which not only banned its imports and transport into its territory but also finance and insurance vis-à-vis these activities. Vessels belonging to the EU citizens and companies were banned for transporting or storing Iranian oil and petrochemical products. Further, the EU industries were not permitted for further construction of new oil tankers for Iran. Supply of key naval equipment and technology for ship building and maintenance to Iran were stopped. The European Council also banned flagging and classification services for Iranian oil tankers and cargo vessels (Council of European Union, 2012).Under the above sanctionable activities, "the Council targeted 34 additional Iranian entities providing substantial financial support to the Iranian government and one person involved in the Iranian nuclear programme with an asset freeze and a travel ban" (Ibid.,).

Considering that Iran's oil revenue was also being used for its nuclear programme, the EU broadened its sanctions on Iran aimed at its nuclear programme as well as its energy sector. As the EU was one among the largest Iranian crude oil importers as well as exporter of many key technologies required by Iran, these sanctions deeply affected Iranian economy especially energy sector which reduced its crude oil exports worldwide. However, the Asian countries continued to import Iranian oil but they also had to reduce it to that extent where the importers could avoid sanctions by the US and the EU. **Table-5.5** shows Iran's top four Asian oil importers.

Table-5.5

Iran's Major Asian Oil Importers (2011-2015)

(Million Tonnes Per Year)

Year	Iran's Total Crude Oil Export	India	China	Japan	South Korea
2011	126.34	15.94	27.64	15.69	12.45
2012	104.68	15.72	21.83	9.29	7.70
2013	60.51	9.78	21.40	9.23	6.68
2014	55.24	13.75	27.37	8.43	6.22
2015	53.84	10.34	26.53	8.49	5.80

Sources- (Thirarath, 2016)

The sanctions not only affected Iran's oil export especially after 2012, they also reduced its oil earning drastically which fell from US$114.75 billion in 2011 to US$27.31 billion in 2015. Interestingly, it also diminished the share of oil revenue in its total export earnings. This was 86.83 per cent in 1996 and remained 79.21 per cent in 2011 while came down to 35.02 per cent in 2015 (OPEC, several years). For the OPEC, the earning from petroleum exports was US$172.27 billion in 1996 which increased to US$518.22 billion in 2015. Importantly, the share of values of petroleum exports of Iran in OPEC'S total value of petroleum exports also got reduced; it was 11.28 per cent in 1996, decreased to 8.50 per cent in 2012 and further 5.26 per cent in 2015 (OPEC, Several Years).

The US sanctions not only adversely affected Iran's oil sector but also its gas sector. In spite of large reserve of natural gas of Iran, it could not be developed. As a gas exporter, Iran even could not touch one per cent of the world's total gas supply in a single year during 1990s and 2000s (See **Table 3.2**). Hence, it did not play any significant commercial role in global gas market. However, Iran's proposal of gas transporting system like the IPI pipeline continued to remain an issue for discussion in the international politics. Consequently, Iran's gas field also fell a victim to the US sanctions especially the development of its South Pars gas fields which is the source gas field for the IPI pipeline.

Though Iran managed to complete its first 10 phases of its 24-phased development plan for South Pars gas fields, these were originally designed to be allocated for the domestic market for consumption and reinjection. Among other 14 phases which has been planned for export via various means like pipelines, liquefied natural gas (LNG) and/or gas-to-liquid (GTL), only phase-12 is complete, according to the EIA, 2015. The progress on the development of the remaining phases of this field are behind schedule resulting from the problems in getting essential inputs from the service companies (Stevens, 2015) like technologies, investment etc. According to World Bank, South Pars alone requires US$100 billion (World Bank, 2015).

This shows that the gas field is yet to be developed to reach the level of exports and become the revenue source for the Iranian government.

Sanctions and the IPI

Amid the trickledown effect of sanctions on the IPI pipeline, the US authorities directly targeted the IPI pipeline which further hindered its progress. On many occasion, several representatives of the US Government gave indication to India and Pakistan, the partners in the IPI pipeline, to stay away from the project. According to the published information in a meeting in 2005 the US ambassador to New Delhi David Mulford informed India's Oil Minister Mani Shankar Aiyar that the Bush administration had reservations about Indian attempts to strike a deal with Iran on the long proposed IPI gas (*Dawn*, 2015). The similar view was expressed by Secretary of State Condoleeza Rice as it would strengthen Iran but negatively affect the interest of the US in Asian region. In the response of a question by the media about the reservations over cooperation between India and Iran on the gas pipeline, she said, “Our views concerning Iran are very well known by this time, and we have communicated to the Indian Government our concerns about gas pipeline cooperation between Iran and India” (Rice, 2005).

According to Gordon Prather,[23] Condoleeza Rice also whizzed down to New Delhi to prevent India from finalising technical and commercial contracts for the pipeline in 2005 (Prather, 2006). The statement given by senior State Department official Steven Mann in a forum in Washington further clarified it when he said, “The US government supports multiple pipelines from that (the Caspian) region, but remains absolutely opposed to pipelines involving Iran” (AFP, 2006).

The opposition to the IPI pipeline project by the US and its cautions to India and Pakistan opened debates over India’s ‘independent’ foreign policy (Ollapally and Rajagopalan, 2011). To circumvent it, in May 2007, Oil Minister Murli Deora assured opposition parties of the ruling UPA coalition, especially, the Left Front parties that India “will not be cowed down by any threat” regarding its relations with Iran, saying that India’s participation in the IPI pipeline project “is not the business of the United States” (Kronstadt, 2007).

Iran’s Response to US sanctions:

However, the US sanctions not only negatively affected Iran’s oil and gas production capability and its transport and financial transaction systems but also started to impose restrictions on Iran’s trading partners to maintain or increase their commercial ties with it. Amid increasingly harsher sanctions, Iran continued its efforts to introduce new policy to attract foreign investments. The enactment of the Foreign Investment Promotion and Protection Act in 2002 increased the confidence of overseas investors in Iran and the Foreign Direct Investment (FDI) jumped from US$0.41 billion in 2001 to US$3.52 billion in 2002 but the increase was mostly in non-oil and gas sector (UNCTAD, 2005).

[23]Physicist James Gordon Prather has served as a policy implementing official for national security-related technical matters in the Federal Energy Agency, the Energy Research and Development Administration, the Department of Energy, the Office of the Secretary of Defense and the Department of the Army under the Government of US.

The buy-back policy which was discussed in the earlier section of this chapter could not help to meet the required investment in Iran's hydrocarbon sector.[24]Narsi Ghorban pointed out that it was the lack of interest of IOCs in contractual framework of buy-back policy that was responsible for the low investment during the past 10 years (2005-2015) (Ghorban, 2015). Despite being inflexible in terms and conditions and limited returns to IOCs, Iran could not attract these companies for the investment in its oil and gas sectors. According to an observation presented by legal firm Clyde & Co.,

> … the IOCs feel that the buyback model is prone to huge potential losses because the IOC has very limited options to put a ceiling on its capital costs. Additionally, the way that the contracts are structured means that at the time of signing, long term pre-defined operating targets are set that do not take account of prevailing market conditions, new drilling plans, reserve estimates, financing costs, etc (*The Gulf Intelligence*, 2016).

In spite of being updated twice, it could not do much for Iran's oil and gas industries. According to estimates by the World Bank, Iranian oil and gas sector requires US$130-145 billion of investment by 2020 to maintain its oil production capacity (World Bank, 2015).

To make its energy industry lucrative for the IOCs, Iran has been working on another energy policy for the investment and development, that is, Iran Petroleum Contract (IPC). Its terms are yet to be disclosed and remain subject to change; however there are some key features which have been reported in the media (*Oil and Gas News*, 2017). Under IPC, the association of IOC with NIOC or a subsidiary of NIOC will be described as a joint venture or partnership structure. The foreign investors are expected to be able to book reserves on their balance sheets, though under some circumstances. The participation of IOCs in upstream would last through the production phase and potentially through the enhanced oil recovery phases. This provides foreign companies longer time and greater opportunity than buy-back for cost recovery. In addition to being compensated per barrel produced and the price per barrel, the profit paid per barrel will also vary depending on the risks involved and fluctuations in oil prices. There will be provision for review of work programme and budget, though they need of NIOC's approval that will allow for recovery of related costs. This is one of the key risks with the buy-back contracts. In return, Iranian companies are expected to get

[24] Because of lack of data, it could not be explained further.

technology as well as management and marketing expertise from their allied foreign investors (*Oil and Gas News*, 2017) to access to their supply network and thus to increase Iran's export market base.

According to Mohsen Shoar, Managing Director at Dubai-based Continental Energy DMCC and an expert on Iranian energy, IPC model has better commercial promise for the foreign investors than buy-back model. He said that "the new IPC model varies markedly from the existing buyback schemes in that it proposes the establishment of a joint venture between NIOC (or one of its subsidiaries) and a foreign partner for field exploration, appraisal, development and—for the first time since 1979—production" (*The Gulf Intelligence*, 2016).

Apart from continued efforts to strengthen its oil and gas sector, Iran also worked to support its non-hydrocarbon energy sector to mitigate the impact of sanctions on its overall economy, as its oil and gas sectors were the main target of various sanctions. During the 1970s particularly after the oil crisis of 1973, the average share of oil rent in Iran's GDP was 25.43 per cent during the period of 1974 and 1979. After the Islamic Revolution and imposition of the US sanctions, it decreased to 14.56 per cent during 1980s and 1990s (World Bank, 2016). This shows that the contribution of non-oil sector in Iran's economy enhanced during these periods. During the 1980s, the low share of oil in Iran's GDP was due to the contemporarily developed some issues like the adoption of the policy of the long-term preservation of oil as a national resource by Iran (Reed, n.d.); disruption in Iranian oil production due to Iran-Iraq War and reduction in Iranian oil imports by the US (See **Table 5.1**) among others.

Though, Iran is vying to increase its oil and gas production the resumption of Iraqi oil supply to the global energy market emerged as an option for many Iranian oil importers.

Resumption of Iraq's Oil Production

In the meantime, Iraq could resume its oil production and exports which were hindered after the US led invasion of 2003. **Table-5.6** shows that the oil production from Iraq started to decrease significantly since 2002 when it produced 104 million tonnes, almost 20 million tonnes less than in 2001 but the production in 2003 was remarkably low with 66.1 million tonnes only.

Table-5.6

Share of Iraq in Global Oil Market

(Million Tonnes Per Year)

Year	Production	Export
1996	30.0	4.38
1997	58.3	37.18
1998	105.6	70.59
1999	126.1	106.11
2000	128.6	101.58
2001	123.9	85.16
2002	104.0	74.43
2003	66.1	19.35
2004	99.9	72.21
2005	89.9	73.31
2006	98.0	73.10
2007	105.1	81.82
2008	119.3	92.38
2009	119.9	94.92
2010	121.5	94.12
2011	136.7	107.87
2012	152.5	120.67
2013	153.2	119.02
2014	160.3	125.27

2015	197.0	149.64

Sources- [British Petroleum (BP), Several Years; OPEC, Several Years]

Iraq's oil exports were simultaneously decreasing and in 2003, it could export only 19.35 million tonnes. Though, the resumption in oil production started from 2004 only but it could reach its pre-invasion level of oil production of 2002 in 2007 when it produced 105.1 million tones and since then it continued to increase. In 2015, it was able to produce 197 million tonnes of crude oil while exporting 149.64 million tonnes. The flow of Iraqi oil in the global oil market helped the major oil importing countries to reduce their oil dependence on Iran and come under the waiver limitation of US sanctions.

In addition to 'stick policy' in the form of various sanctions which were devised by the US against Iran as well as its major trading partners especially for their energy trade, 'the carrot policy' was also applied by the US and remained a policy choice that intended to provide the options for Iran's oil and gas sources to its importers. The nuclear deal between India and US was one of its 'carrot' policies.

India-US Nuclear Deal

On 18 July 2005, US President George W. Bush and Indian Prime Minister Manmohan Singh announced nuclear-deal in a joint statement in Washington DC during the latter's visit to the US. The two leaders agreed that 'The Next Steps in Strategic Partnership' initiative launched in January 2004 became the basis for "expanding bilateral activities and commerce in space, civil nuclear energy and dual-use technology" (DAE, 2005). After long discussions and debates in their respective countries as well as internationally, the deal was finally signed on 10 October 2008, and then became operational (Kulkarni, 2009).

For accommodating the deal, both countries were ready to modify their national laws to facilitate the deal. For India, it would separate its civilian and military nuclear programmes and the former would be open for the international safeguards, called the Additional Protocol (Perkovich, 2010). Further, India agreed to support the global non-proliferation regime by avoiding the transfer of enrichment and reprocessing technologies to the other state that do not have them. Additionally, India pledged to continue its "unilateral moratorium" on nuclear testing (Perkovich, 2010). In return, the US agreed to stop its insistence of rolling back of India's nuclear weapons programme and “change its domestic law and tweak international rules to facilitate civil nuclear cooperation with Delhi” (Mohan, 2015).

The US-India nuclear deal which later got the support of Nuclear Supplier Group (NSG) resulted in making and unmaking of several international rules of nuclear non-proliferation to accommodate the deal (Perkovich, 2010). These rules developed especially after the Nuclear non-Proliferation Treaty (NPT) of 1968 signed by large number of the countries. Under the prevalent rules, the state which is either non-signatory to NPT or refuses to put all of their nuclear facilities under international safeguards is denied nuclear cooperation from the national or international entities. In spite of India being a non-NPT state, the NSG agreed to exempt India from non-proliferation rules that are supposed to remain applicable to all other states. Under this agreement, the NSG was permitted to sell reactors and related components, fuel, software and other dual-use equipments to India (Perkovich, 2010).The support of NSG for the deal was of great importance for India, as NSG and its working principles were the repercussion of India’s nuclear test in 1974 (NSG, 2015).

However, the prime objective of the deal was the energy security whereby India would be able to lessen its dependence on hydrocarbon energy especially oil and gas but also on the volatile West Asian region. The visit of then US Secretary of State Condoleeza Rice in March 2005 indicated about the American willingness to help in meeting India’s energy requirement. She said while addressing the joint press conference in March 2005 in New Delhi,

> We do need to look at the broader question of how India meets its energy needs over the next decades..... Since that is something that is a goal that we very much support, we believe that a broad energy dialogue should be launched with India because the needs are there. We have our own energy needs and indeed given the technological sophistication of our economy, of India’s economy, I would hope that we can also explore ways that new technologies can help us over the next decades to meet what are undoubtedly going to be burgeoning energy needs (Embassy of India, 2005).

Further, then US ambassador to India David Mulford also contended that the US-India nuclear deal was an “answer to India’s long-term energy problems” (Vinod, 2007).

India also viewed that this deal would enhance its energy security. This was manifested in the statement in the Parliament by Prime Minister Manmohan Singh on 29 July 2005. He said,

> India's quest for energy security as an essential component of our vision for our development was a significant theme of my talks." He also emphasised the "need for India to have unhindered access to all sources of energy, including nuclear energy, if we are to maintain and accelerate our rate of economic growth....It was in this context that we affirmed the importance of cooperation in the civilian nuclear energy sector (Mahalingam, 2012).

Nevertheless, the deal concentrates on the small section of the India's entire energy spectrum, namely electricity. Moreover, the electricity generated by hydrocarbon fuels gas, naphtha and diesel has a very small share of actual electricity generation sought to be displaced.

The Government has the goal of 20,000 megawatts of additional nuclear capacity by 2025 (Mahalingam, 2012) but the installed capacity of nuclear power was 5,780 megawatts in 2015, almost 1.8 per cent of the total installed electrical capacity of India (Mohan, 2016). As the infrastructure for the generation of nuclear energy is capital intensive in nature, finance would be one of the biggest problems in achieving the projected goal of another 20,000 megawatts of nuclear capacity by 2025. Hence, the US-India nuclear deal even if comes into operation would not bring major changes vis-à-vis the contribution of nuclear energy in meeting India's primary energy needs anytime soon.

Though, the deal would have the marginal but crucial role in India's energy security if comes into operation, it provides India the opportunity for the broader engagement with the US and other international communities and entities like NSG and these would also be political, economic, strategic etc. apart from energy. But more substantially, the US through the deal intended to lobby against the IPI pipeline (Prashad, 2008) which was not only to replace Iran's gas energy but further isolate Iran politically and economically.

Interestingly, under such circumstances, India did not take part in Seventh trilateral meeting held in September 2007 regarding IPI pipeline and gave the reason that the meeting was held without having bilateral India-Pakistan JWG meeting which India wanted to. Thereafter the IPI pipeline was being developed bilaterally by Iran and Pakistan. Although India flagged procedural issue for its alienation from the IPI pipeline, the impact of the US sanctions cannot be ignored.

India's participation in the IPI pipeline and Indo-US nuclear deal promoted by Iran and the US respectively, put New Delhi in perplexed situations. Additionally, the parallel development of these deals further put India in trouble like India formally became the part of the IPI pipeline in June 2005 and also announced its nuclear deal with US in July 2005.According to P.R. Kumaraswamy, “India’s willingness to transform its energy ties with Iran beyond purely commercial transactions coincided with its desire to negotiate a civil nuclear deal with the US” (Kumaraswamy, 2013). Hence the timing of India’s deal for the IPI pipeline and Indo-US nuclear cooperation proved to be a setback for the pipeline project. Simultaneously, the US also applied carrot policy on Pakistan and offered it to assist in the construction of LNG terminal and import of electricity from Tajikistan if Pakistan was ready to quit the IPI pipeline project (Kiani, 2013).

Though, the domestic, regional and global politics played a major role in the delay of the IPI pipeline but the responsibilities of some critical technical, commercial and strategic issues in it cannot be ignored which are been discussed in detail in Chapter Six.

Chapter-6

Commercial, Technical and Strategic Challenges

Divided into four sub-sections, Chapter-Six starts with *Characteristics of Global Gas Market* which discusses the nature of gas and the involved complexities in its transportation. It also explains the inability of international institutions to regulate the global gas market. This is followed by *Energy Charter Treaty*(ECT) which deals with its importance in the global energy trade. It also focuses on the involved issues for being Iran, Pakistan and India a non-signatory to Energy Charter Treaty. Under *Involved Commercial, Technical and Strategic Issues* Price issue, Transit Fee, Security Issues, Finance, Competition from LNG have been discussed. The last section focuses on India's available means to import gas under *Gas Transporting Means: India's Other Available Options*. It includes LNG option from Iran, Iran-Oman-India gas pipeline, Myanmar–Bangladesh-India Pipeline, Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline as well as India's gas imports by existing LNG imports facilities.

Characteristics of Global Gas Market:

Demands for natural gas are on rise across the world taking into consideration the need for energy security through diversification of energy sources beyond oil and coal. It has become more significant with the increasing concerns over global warming and it is evident from the fact that the global consumption of natural gas has increased at the compound annual growth rate (CAGR) of 2.5 per cent during the period of 2001 and 2015. Its share in total primary energy consumption has also increased, though marginally from 23.7 per cent in 2001 to 23.84 per cent in 2015 [British Petroleum(BP), 2002 and 2016].

The strategic significance of natural gas lies in the fact that it is required and wanted internationally but only a few regions of the world are endowed with this resource. Though North America, Russia, and Central Asian countries also have significant amount of natural gas reserves, the West Asia occupies a unique geo-strategic place in the sense that it has the largest reserves not only for oil but also of natural gas. **Table-6.1** shows the richness of West Asia in terms of natural gas.

Table 6.1

Natural Gas Reserves in West Asia (1985-2015)

Year	**Global gas reserves (tcm)**	**Gas reserves in West Asia (tcm)**	**Share of West Asia in global gas reserves (per cent)**
1985	99.54	27.67	27.79
1986	107.67	30.41	28.24
1987	106.86	31.18	29.17
1988	109.72	34.34	31.29
1989	122.40	37.83	30.90
1990	125.7	38.0	30.23
1991	131.2	42.7	32.54
1992	117.6	44.0	37.41
1993	141.08	44.43	31.49
1994	142.89	45.56	31.88
1995	119.9	45.3	37.78
1996	147.89	49.31	33.34
1997	146.46	49.53	33.81
1998	148.01	53.17	35.92
1999	148.55	54.74	36.84
2000	150.19	52.52	34.96
2001	168.5	70.9	42.07
2002	175.15	71.69	40.93
2003	175.78	71.72	40.80
2004	179..53	72.83	40.56
2005	179.83	72.13	40.10
2006	181.46	73.47	40.48
2007	177.05	74.17	41.89

2008	185.28	75.82	40.92
2009	187.49	76.18	40.63
2010	196.1	79.4	40.48
2011	187.8	80.4	42.81
2012	187.3	80.5	42.97
2013	186.5	80.0	42.89
2014	187.0	80.0	42.78
2015	186.9	80.0	42.80

Sources- (BP, Several Years)

In 1995, 2005, and 2015, the West Asia had 58.9 per cent, 55.0 per cent and 47.3 per cent respectively of global oil reserves (Table-6.1)and 37.78 per cent, 40.10 per cent and 42.80 per cent respectively of global gas reserves (BP, 2016).

Although the concentration of natural gas is less in the West Asian region compared to oil but it is still high enough to be of strategic significance. These actualities provide the natural gas a unique economic characteristic amid its other features like exhaustibility and market volatility as indicated by Junji Nakagawa (Nakagawa, 2016). Being used as a base and intermediate materials for many end products, natural gas has immense importance for a country’s economy. The above characteristics differentiate it from other manufactured products which can be reproduced and are mostly regulated by demand and supply factors. Hence, natural gas needs a special treatment under international law for trade (Arcas and Gosh, 2014).

Natural gas being volatile in nature and of a peculiar physical form, it is often difficult to store this fossil fuel. It requires the particular infrastructure and techniques for storage and transportation (Arcas and Gosh, 2014). For long, pipeline had been the key means of transporting natural gas from one place to other. Nevertheless, the technological developments during the recent past have provided another option of transportation, that is, Liquefied Natural Gas (LNG). The commercial use of LNG for the gas transport was started in 1964 with the United Kingdom being the first LNG importer (British Chamber of Commerce, 2014) and Algeria the first exporter (*Energy.ca.gov* (California), n.d.). Amid the technological developments in LNG, its share in the transport of gas is increasingly growing worldwide. In 2001, LNG accounted for 25.97 per cent of total gas transport which increased to 28.21 per cent in 2006 and to 32.45 per cent in 2015 (BP, 2016).

Though the usage of LNG has increased during the course of time, it is still a technically complex mechanism and is comparatively more capital intensive than pipelines. Consequently, pipeline continues to be used for the majority of gas transport particularly for the shorter distance that is less than 3,540.55 km. Hence the majority of gas trade is limited at the regional level. The inter-regional gas trade is mainly visible between Russia and Europe; Russia exported 159.8 billion cubic metres (bcm) of gas to Europe out of its total gas exports of 193.0 bcm in 2015 (BP Statistical Review of World Energy, 2016). Due to its being a regionally traded commodity, natural gas market is substantively guided by political, economic, strategic etc. factors of the concerned region. In the absence of global gas market and its international trading norms, the terms and conditions of the natural gas trade like gas pricing, transit fees (in the case of cross-border pipeline) etc. differs from region to region. In other words, it can be said that natural gas has regional market often having "with very limited connections between regional gas markets" [Energy Information Administration (EIA), 2012].

Moreover, governments of the source countries generally have the major control over gas reserves which is applied via national oil companies (NOCs). Having the strategic value due to its unique characteristics as mentioned above, many countries of the world over took control of oil and natural gas companies via nationalisation drive in the 1970s and has been reaffirming sovereignty over their natural resources (Al-Zayer, 2012). It is evident from the fact that in October 2009, NOCs controlled 68 per cent of world gas reserves and produced 52 per cent of world gas production (Thurber, 2012).

The Iranian government also has control over its oil and gas companies and established its first national oil company in 1951 by nationalising Anglo-Iranian Oil Company which was the sole concessionaire of Iran's oil resources. The NOCs were named as National Iranian Oil Company (NIOC). Interestingly, Iran was the first country in the West Asian region which took initiative in this direction and it was done under the leadership of Mohammad Mossadegh who was the Prime Minister from 1951 to 1953. However, Mohammad Reza Shah was reinstalled with the help of the Western powers and he took control not only over Iran but also over the NIOC. He continued to run the company like his personal fiefdom through a succession of ministers. Until 1979, the Shah, a de facto executive head had the final say on the policy and priority of the NIOC though the Company's managers had considerable autonomy to execute the plans under set policy (Jalilvand, 2013). Hence, there was a clear distinction over the sphere of responsibility to own, develop, and manage the Iranian oil and gas resources between Shah and the managers of NIOC before the revolution.

However, in the Islamic regime, the changes to oil sector governance exposed the complexity and contestation regarding control over NIOC which was not visible before 1979. After the revolution, the Ministry of Petroleum under the Government of Iran was created in September 1979 for the supervision of NIOC but in practice, it remained symbiotic with NIOC. The lack of clear institutional distinction between the two barred Ministry of Petroleum to execute controlling powers over NIOC (Zahirinejad, 2012).

Moreover, the fragmented political system of the Islamic Republic led to a particular type of factionalism in its political economy (Jalilvand, 2013). Various political entities namely, Guardian Council, President, Ministry of Petroleum, Supreme Leader etc. can be broadly categorised as the players where reformist and radicalist were also contesting and struggling to gain control over oil and gas sectors via NIOC. The lack of functional clarification of these entities or the overlapping of their roles and responsibilities in oil and gas sectors affected the NIOC (Yong, 2013) and opened the space for their manoeuvring of policies according to their vested interests which impeded the performance of the Iranian energy sector.

As a result, the oil and gas policy of NIOC continued to oscillate between reformist and conservative oriented policy. For instance, the Guardian Council vetoed several proposals for privatisation suggested by President Mohammad Khatami and initiated an independent probe for irregularities in NIOC and Oil ministries. Other good example is like Khatami's subsidy reform agenda which was criticised by conservative parliamentarians in early 2000s but, was supported during Ahmadinejad's tenure, as the latter had the support of the Supreme Leader (Zahirinejad, 2012).

The control over its oil and gas reserves were not the final goal for a state and its nationalisation drive but it was also viewed as a means to achieve its various overseas interests. Privileged by possessing oil and natural gas resources, the energy producing and exporting countries used it as a tool, among others, to pursue foreign policy objectives (Thurber, 2012) which are more than mere commercial energy trade. This can be illustrated from the incident like 1973 of oil crisis when oil producing and exporting countries, including Iran, imposed ban on the sale of oil to the United States (US) and other Western countries over their pro-Israeli policy. The Arab countries used it as a punishment against the US and its allies who were heavily dependent on Arab oil for their own needs for their support to Israel during Arab-Israeli War in October 1973 (Cooper, 2012).

Thus, it would be appropriate to say that politics influences oil and gas sectors but the latter too affects politics to some extent. The latter part can be understood from the oil price hike in 1973 where Shah of Iran was a leading proponent of an Organisation of Petroleum Exporting Countries (OPEC) oil price rise. He lobbied oil exporting countries for the oil price rise during their embargo over oil exports to the US and other Western countries to increase its oil revenues and become able to cope-up with its rising spending. While, Saudi Arabia was not in favour of oil price hike it still supported the lobby. In an investigation, the Central Intelligence Agency explained the reason behind the compulsion of Saudi Arabia to be part of the oil price hike lobby. According to the agency, the Saudis were unlikely to take risk of political isolation in the West Asian region, especially in the Arabian countries and a possible breakup of OPEC (Anderson, 1979).

The oil and gas market continued to remain politically susceptible. Under these circumstances, the role of market gets significantly reduced in oil and natural gas trade or it can be said that the political influence can distort the performance of market in oil and gas trade. Additionally, the lack of clarity of the provisions for trade in energy in World Trade Organisation (WTO) further weakened the role of market in the energy trade.

Moreover, the international laws do not deal export restrictions adequately while trade disputes in natural resources including oil and gas tend to be caused by export restrictions of resource rich countries (Nakagawa, 2016). In contrast, the WTO laws primarily deal with the trade disputes in import restrictions that generally pertain to manufactured products. As the gas reserves are concentrated in a few regions and if any dispute emerges between gas importer and exporter due to export restrictions, the existing laws of WTO are not sufficient to deal with this kind of dispute. Hence, the energy importing countries are concerned about security of gas supply.

Consequently there are ambiguities in the WTO laws for addressing disputes especially emerging over fixed infrastructure like pipeline (Arcas and Gosh, 2014). There are flexibilities on rules dealing with the energy trade under WTO which are not implemented on the manufactured products (Nakagawa, 2016). The flexibilities further increased the vagueness in dealing with energy related issues. For example an energy exporting country can restrict the exports of gas in order to preserve gas reserves in its territory (Nakagawa, 2016) which distorts the demand-supply mechanism. This also provides the space for a country possessing energy reserves to use dual energy policy, that is, differences between its domestic and international policies and pricing for energy and in that case WTO law cannot force the energy exporting countries to adopt the single policy for domestic and international markets (Cottier and et al., n.d.). The lack of explicit explanation of natural resources including natural gas in the WTO to deal with its trade related issues remained one of the reasons that hindered its free trade. The need for an international institution in dealing particularly with energy issues was somehow met by Energy Charter Treaty (ECT).

Energy Charter Treaty

For enhancing international energy cooperation and trade, the ECT was signed in Lisbon in December 1994 which entered into force on 16 April 1998. This is a unique instrument which "provides an important legal basis for the creation of an open international energy market" (Bamberger and et al., 2000). Being an inter-governmental multilateral agreement, it enhances its legal sanctity. Whilst majority of oil and gas reserves and their production are under the governmental control, the emergence of ECT with the right to give decision which is legally binding on the member states provides major protection to the foreign investor against the State (Bamberger and et al., 2000).

Based on the principles of open, competitive markets and sustainable development, the Treaty is an effort to prepare a legal basis for the energy cooperation and global energy security. Aiming to strengthen the rule of law on energy issues, the ECT emphasises on the "minimising the risks associated with energy-related investments and trade" (Kemper, 2004). To minimise the risks and prevail the free flow of energy,

> the ECT focuses on the protection of foreign investments, based on the extension of national treatment, or most-favoured nation treatment (whichever is more favourable) and protection against key non-commercial risks; non-discriminatory conditions for trade in energy materials, products and energy-related equipment based on WTO rules, and provisions to ensure reliable cross-border energy transit flows through pipelines, grids and other means of transportation; the resolution of disputes between participating states, and - in the case of investments - between investors and host states; the promotion of energy efficiency, and attempts to minimise the environmental impact of energy production and use (International Energy Charter, 2015b).

Apart from being the institution that particularly deals with the energy issues, the ECT is also universal in nature and covers broad and diverse range of countries of world.

The ECT not only includes energy producers and consumers but also transit countries which have a significant role in connecting energy exporters with importers. The transit countries come in between exporters and importers and provide their territory for the transport of energy like in cross-border pipeline project. By covering transit country, the ECT also reduces the chances of political use by transit countries against the smooth transport of energy. In this context, Russia also pointed out that the ECT obligates member countries to facilitate energy materials and products transit across their territory and in line with the principle of freedom of transit (Roche and et al., 2009). To avail the energy trade facilities under ECT, 52 states as well as European Union (EU) and Euratom signed it by April 2015 (International Energy Charter, 2015a).

However, Iran, Pakistan and India are not among the signatories of ECT. According to Article 10(1) of the ECT, its key objective is to “facilitate trade and investments in the energy sector by reducing political and regulatory risks”, the country which seeks foreign investments in its energy sector is required to “maintain a stable, predictable and transparent legal and regulatory framework” (Nochevnik, 2015). As a result, the Treaty provides protection by limiting the regulatory power of a state (Nochevnik, 2015). Therefore, the signing of the ECT by Iran would also restrict its governmental power over its hydrocarbon energy resources including natural gas. Nonetheless, Iran has the nationalistic aspirations over these resources which authorises the state via its government to own and regulate it (Yong, 2013), hence the government would not be willing to lose its holds over it. Thus, Iranian government continued to avoid the signing of ECT which seems due to its political interests associated with the oil and gas sectors. Additionally, it was considered that the provisions of the ECT tilted towards the interests of consumer countries (Baltag, n.d.) while Iran is an energy producer. As a result, it affected commercial development of its energy sector resulting from the lack of required capitals and technologies.

Though the provisions of the ECT sound encouraging for the energy consuming countries especially oil and gas, Pakistan and India are not among its signatories. Emphasising on sustainable development, the ECT encourages non-fossil fuel consumption and energy efficiency, as discussed in earlier section of this Chapter which dealt with the objective of the ECT. Consequently, energy subsidy reform in a country is one of its prime targets. The ECT has some provisions with respect to the fossil fuel subsidy reform. According to the provisions, a country has to improve transparency and reporting of fossil fuel subsidies. Further, it has to reduce and eliminate subsidies for fossil fuel. For monitoring and ensuring compliance with commitments to reduce these subsidies, a mechanism has to be established in the member countries who are also encouraged to share of the best practice and cooperate on the reform of subsidies into each other (Cameron, 2013). If the subsidy is removed, it would increase the domestic oil and gas price (International Monetary Fund, n.d.). It is considered that these price rises generally help to reduce the consumption of fossil fuel. Simultaneously, it also promotes non-fossil fuel based energy production and consumption which is considered as a comparatively costlier than fossil fuel for the electricity generation. However, many countries including Iran, Pakistan and India continued to have difficulty in the adoption of subsidy reforms, especially in the period of high international oil prices. The benefits of the fuel subsidy were availed by the large section of the population of these countries. As a result, the subsidy reform lacked public supports. Additionally, the energy price rise also contributes to a higher rate of inflation (International Monetary Fund, n.d.) which could have led to widespread public protests.

In case of Iran, Pakistan and India, they continue to spend a significant amount of their Gross Domestic Product (GDP) in energy subsidies. **Table-6.2** gives data of total fossil fuel subsidy as a share of GDP of these countries for few years.

Table-6.2

Fossil Fuel Subsidies as a share of GDP

(In per cent)

Year	Iran	Pakistan	India
2012	9.17	5.12	2.47
2013	11.86	3.63	2.54
2014	18.33	2.78	1.87
2015	N.A.	1.26	0.91

Sources- (World Bank, 2016; International Energy Agency, 2017).

Table-6.2 shows that Iran spends large amount of its revenue earning over providing fossil fuel subsidies which has increased from 9.17 per cent of GDP in 2012 to 18.33 per cent in 2014 showing the energy subsidy reform of 2010 in Iran could not work effectively to control the subsidy related expenditure. Pakistan also spent a significant share of GDP for energy subsidy, though it decreased from 5.12 per cent in 2012 to 1.26 per cent. While for India, it remained comparatively low. For instance, India's overall cost of energy subsidies was about 2.47 per cent of GDP in 2012 which decreased to 0.91 per cent in 2015 and the government also had plan to reduce it by 0.5 per cent of GDP by 2016 (*The Economist*, 2014) as India had already started its energy subsidy reform policy. Hence, there are the political and legal obligations upon the signatory countries regarding subsidy reforms. Additionally, the Treaty also puts pressure on the signatories to separate the energy sector from the political influence which could be one of the reasons for being Iran, Pakistan and India a non-signatory to the ECT. Under the prevalent circumstances, their energy relations including their association in the Iran-Pakistan-India (IPI) pipeline are based on their mutual consensus and they are not responsible towards any international body having the authority to regulate their energy relations. Iran signed the International Energy Charter (IEC) in November 2016 which is a declaration of political intention aiming at strengthening energy cooperation between the signatory states. To promote global energy trade as well as support of sovereignty over energy resources, the IEC is based on principles like

> "political and economic cooperation, sovereignty over energy resources, the development of efficient energy markets, non discrimination, the promotion of a climate favourable to the operation of enterprises and the flow of investments and technologies, and environmental issues" (International Energy Charter, 2014: 1).

It was formally adopted and signed at the Ministerial Conference in The Hague in May 2015. However, it does not bear any legally binding obligation or financial commitment (International Energy Charter, 2015a).

In addition to these political, commercial and strategic complexities, three of them particularly Pakistan and India did not have the experience of cross-border pipeline project thus they are unaware of the working culture and procedure of the big cross-border projects like the IPI pipeline. Moreover, there is not a single cross-border pipeline project for the transport of oil or gas in South Asia in spite of being a huge oil and gas markets.

Involved Commercial, Technical, and Strategic Issues:

Under the prevalent circumstances, some crucial commercial, technical and strategic matters generally appear in the major international project. Amid the absence of any strong international entities dealing with energy trade and energy related cross-border project, if dispute arises between the participating countries over some issue related with the project during its procedural, construction or operational period, the disputes could take long time to resolve. Due to the lack of law enforcing mechanism, many commercial disputes like gas pricing remain unsolved and become the reason of the failure of the project which can be understood from some emerging technical and commercial issues in the proposed IPI gas pipeline project (Dickel, 2007; Ranjan, 2015)such as prices issue, transit fee, security issues, finance, competition from LNG. Moreover, the project could also not have joint consortium which India wanted (Shahid, 2007) to form with the participation of several international companies in order to undertake the execution of the project which has been discussed in later part of this Chapter. Iran was against the set up of consortium, as it did not see any advantage from such a structure and did also not want to give opportunity to the US for the sanctions. Hence, Iran emphasised that each country would implement their part of the project which would pass through their territory with their own capital investments (*Shana*, 2005). The absence of consortium like structure led the emergence of the gas price dispute among the participant countries. It also provided opportunity to Iran to increase gas price unilaterally.

Price issue

As has been discussed earlier, in the absence of global gas market, the gas trade is influenced by regional factors in general. As a result, the gas pricing mechanism varies from region to region (EIA, 2015) and so are the gas prices. It is evident from the average regional gas prices in 2011 which were indexed differently. For example, the average regional gas prices in US at Henry Hub, UK at the National Balancing Point, German imports from Russia at Waidhaus and Japanese LNG (as liquid) were US$4.00, US$9.20, US$11.33 and US$14.67 respectively in 2011 (Jensen, 2012). The *World Energy Outlook 2011* expected that this disequilibrium in gas prices would continue and would be US$6.70, US$13.00 and US$16.20 for the US, Europe and Japan respectively by 2020 (Jensen, 2012).

In the absence of international norms and regulation, there is always a conflict of interests between exporters and importers. Amid the lack of transparency, stability and gas pricing mechanism (Arcas and Gosh, 2014), in common practice, the gas exporting countries try to get highest possible income from the sale of their gas while the importing countries strive for minimum gas price. Iran also wants to maximise its income by putting maximum possible gas price. Moreover, Iran is also blamed for its higher gas price compared to other exporters from the nearby regions. For instance, Turkey was paying US$418 per thousand cubic metres of natural gas from Russia and US$340 per thousand cubic metres from Azerbaijan while Iran sold gas to Turkey for US$487 per thousand cubic metres (*Natural Gas World*, 2015).

Additionally, Iran’s gas price disputes with potential customers like Kuwait, Oman, and United Arab Emirates (UAE) etc. has remained one of the crucial issues that led to the failure of many of its gas export project. For example, Iran and Kuwait had signed a Memorandum of understanding (MoU) in 2005 for a gas pipeline intended to export almost three billion cubic metres(bcm) of gas per year from Iran to Kuwait, but disputes over gas price was one of the major reasons for its non-realisation. Further, in case of UAE-Iran gas pipeline, despite the completion of this gas pipeline in 2008, the gas export could not be started due disagreement over gas price and Iran finally decided to use it domestically (Jalilvand, 2013). Even the ongoing operational project on gas supply from Iran to Turkey got hampered many times due to dispute over gas price (Jalilvand, 2013).It was observed that gas pricing is part of Iran's internal politics including bureaucratic disputes and factional competition for higher price (Jalilvand, 2013). This became more difficult when the higher gas price was considered as a symbol for being tougher on foreigners. In several negotiations the Iranian parliament often called for higher gas prices which led to subsequent price re-negotiation not only during the procedural period but also during the operational period, that is, after the commencement of gas flow. This calls into question Iran's reliability as a trade partner for the long term contracts (Jalilvand, 2013) like the IPI pipeline.

Though the natural gas via the IPI pipeline was originally priced at US$3.2 per mmBtu, Iran continued to seek a higher price. According to one Indian government official, Iran forwarded a gas-pricing formula in August 2006 wherein gas price was linked to Brent crude oil with a fixed escalating cost component (10 per cent of Brent crude oil) of US$1.2 per million British thermal unit (mmBtu) to the Iran-Pakistan border (PTI, 2006). The gas price based on this formula amounted to almost US$8 per mmBtu (Farshadgohar and Badpar, 2012) while India wanted to pay no more than US$4.25 per mmBtu (Singh, 2008). Apart from Brent crude oil indexation, Iran did not prescribe a floor and ceiling for its gas pricing formula and hence both India and Pakistan opposed this gas pricing formula (Farshadgohar and Badpar, 2012).

The natural gas based upstream and downstream industries are integrated in nature. In the absence of floor and ceiling gas price, the country would have to spend more foreign exchanges for rising gas prices and if the price of Brent crude oil would go up it could negatively affect the economic planning of the developing countries like India and Pakistan. However, Pakistan and India agreed to a formula on gas pricing suggested by the international consultant Gaffney, Cline and Associates (GCA) in February 2007 (Singh, 2008). This formula "envisaged linking the price of natural gas from Iran to Japanese crude cocktail price (JCC) or Japan's average custom-cleared crude oil imports price. The consultant recommended linking the gas price to the average of the six-month Japanese crude basket, preceding the month of delivery" (Domain-b.com, 2007).

Under agreed formula between Iran and India, Iran was to charge 6.3 per cent of the 10-month average of crude oil plus a fixed amount of US$1.15 per mmBtu (PTI, 2015). Hence, the gas price would stand at US$4.93 mmBtu at Iran-Pakistan border if the JCC price stands at US$60 per barrel. Further, if the JCC price would increase to US$70 per barrel, US$80 per barrel, US$90 per barrel, and US$100 per barrel, the gas price would stand at US$5.56 per mmBtu, US$6.06 per mmBtu, US$6.56 per mmBtu and US$7.06 per mmBtu respectively. However, the gas price would decrease, if the JCC price would fall. Based on the above calculation, if the JCC price stays at US$10 per barrel, US$20 per barrel, US$30 per barrel, US$40 per barrel and US$50 per barrel, the gas price would be of US$2.04 per mmBtu, US$2.54 per mmBtu, US$3.04 per mmBtu, US$3.67 per mmBtu, US$4.30 per mmBtu at the Iran-Pakistan border (*The News*, 2007). The gas pricing formula between India and Pakistan has also been discussed in detail in Chapter Four.

Later during the fifth trilateral JWG meeting held in May 2007, Iran demanded to put the clause for price review which India and Pakistan opposed (Diwan and Karnatak, 2009). Moreover, Iran further sought a revision in the indexation to crude oil to 12 per cent while lowering of the fixed component to US$1.1 per mmBtu in 2009 (PTI, 2015) which led to the 20 per cent hike in gas price that was to flow through the IPI pipeline. Having been calculated on this revised formula, the gas price would be US$5.9 per mmBtu if the crude oil price was US$40 a barrel at Iran-Pakistan border and US$7.1 per mmBtu and US$8.3 per mmBtu if crude oil price at US$50 and US$60 per barrel respectively. It seems that factionalism that meant lack of consensus among different state entities such as religious supervisory bodies led by Supreme leader, republican institutions (executive, legislative and judiciary) etc. over the energy policy (Jalilvand, 2013) also prevailed in determining gas price for the IPI pipeline and that led to continuous increase in Iranian gas price.

Apart from the hiked gas price, India also would to pay US$1.1 to1.2 per mmBtu towards transportation cost and transit fee to Pakistan for availing latter's territory for the gas transport. Adding all these costs, the Iranian gas became expensive for the Indian market. Hence, India was against the unilaterally hiked gas price suggested by Iran and considered it against the stable contract regime. Additionally, the absorption of gas in the country with such a high price was also an issue. During the mid-2010s, the price of India's domestically produced gas from rather complicated sources like Panna or Mukta and Tapti fields in Mumbai offshore was at the maximum price of US$5.70 per mmBtu, while gas from Krishna Godavari basin which is owned by

Reliance Industries was at the price of US$4.20 per mmBtu if crude oil price was US$60 or more (PTI, 2009). Both were lower than the price demanded by Iran.

Consequently, there could be problem in selling gas in India having been imported at such a high price. Pakistan also opposed to the new gas price formulation for the same reason, as average gas production price in Pakistan was at US$2.6 mmBtu (Kiani, 2007). New Delhi was also opposed to Iran's insistence on revising the gas price every three years and rather wanted the agreement on gas pricing formula between the three nations for the entire 25-year tenure of the project (PTI, 2008). Later, India by giving some procedural reason (which has been discussed in Chapter Four) skipped the trilateral meeting and the project was confined to Iran and Pakistan. Viewing the crucial disagreements over gas price between the exporters and importers in realising the IPI pipeline, India's Finance Minister P. Chidambaram said at an interactive session at the Peterson Institute for International Economic in 2007, "I think if the price of the gas is agreed upon, the pipeline will become a reality" (Krishnaswami, 2007).

Iran also recognised that the lack of defined pricing mechanism remained a hurdle for many of its gas exports projects including the IPI pipeline project. Realising the problem of gas price dispute with its potential customers and the need to define pricing mechanism at the global level, Iranian President Mahmoud Ahmadinejad said in an address to the 2nd summit of the Gas Exporting Countries Forum (GECF) in Moscow in 2013, "Clear pricing mechanisms for different types of gas should be defined, approved and jointly implemented". He further added, "Fair price and supply of different sources of energy especially gas will tackle inequalities and prepare the grounds for the elimination of opportunism and dominance" *(Press TV*, 2013).

Transit Fee

In general for cross-border pipeline projects which crosses one or more countries to reach the destination market, "the producer government pays a transit fee to the transit country or the transit country receives an off-take of the commodity in agreed fractions or a combination of both occurs" (Omonbude, 2013). Nevertheless, the determination of transit fee is based on a number of issues. Omonbude in his book, *Cross-border Oil and Gas Pipelines and the Role of the Transit Country* mentioned some of the important issues for determining transit fees including the following –

- the costs to the transit country
- the value of the transit country
- the availability of the alternative transit routes and
- the relative bargaining power of the parties involved (companies, producer, government, transit country) (Omonbude, 2013)

As the pipeline is a capital intensive project, once the construction of pipeline is completed, the bargaining power shifts towards transit country and "tempting it to seek new, more attractive transit terms" (Herberg, 2010).

Thus, it is not necessary that the transit fee will not change. Due to the lack of strong universal international institution to regulate the energy trade, especially gas trade, there is a big space for the transit country to manoeuvre the circumstances in its own favour. The IPI pipeline is a cross-border project which has to pass through Pakistan before it reaches India. It is noteworthy that it was India, an importer of gas via the IPI pipeline, which had to pay transit fee to Pakistan. Being a transit country, Pakistan wanted to extract maximum rental gains for providing its territory for the cross-border pipeline. In this context, the transit fee remained the issue between Pakistan and India. The former wanted to charge 60 cents per mmBtu as a transit fee which New Delhi was unwilling to pay (*PTI*, 2008b). To make gas price more competitive for its domestic market, India want to give not more than 15 cents per mmBtu to Islamabad on gas transmission to India (*PTI*, 2008b).

Through Pakistan, the IPI would cross Baluchistan including its Sui area and then Multan before entering India. It is noteworthy that Baluchistan is an unstable region of Pakistan which has also been discussed in detail in Chapter Four. A major risk associated with secured supply of gas through this region could also increase the cost of the transit country, that is, for Pakistan for ensuring security of the pipeline. It was estimated that Pakistan could earn around US$200-500 million per year in the form of transit fee (*Gulf Oil and Gas*, 2016).

Thus, India's dispute over transit fee with Pakistan continued to remain a significant issue which could not be resolved until their last bilateral JWG meeting held in mid 2007. The other key obstacle was the concerns over security of pipeline which led to more complexities in the development of the IPI pipeline which can be analysed in the context of Pakistan and its relation with its province of Baluchistan as well as mutual India-Pakistan relations.

Security Issues

The upstream and downstream gas industries are integrated in nature. Any disruption in the link of producers and consumers of gas would "risk devaluing the entire investment both upstream and downstream of the pipeline" (World Bank, 2003). Additionally, most of the gas trade is done in long-term contracts for both pipeline and LNG (European Central Bank, 2013) where the latter is costlier than pipeline below the travel distance of around 3,500 km, as discussed in Chapter Four. The regionally oriented gas market or in other words, the lack of well developed global gas market limits the opportunity for the gas importers to buy gas from open market, both in terms availability as well as affordability.

In this scenario, the security of gas supply is an important aspect of the pipeline project once its operation starts. For India, security of gas supply through the IPI pipeline has been a major concern from the beginning particularly for two reasons; one, it was the end user of gas along with Pakistan and had planned to establish other gas based industries; second, a large part of the pipeline, that is 760 km would cross through Pakistan, particularly through the Baluchistan region, an unstable province in that country (*AFP*, 2016). The latter's deteriorating relationship with as well as diminishing control over Baluchistan and how it could harm the project has been discussed in detail in Chapter Four.

Pakistan continued to give assurance for the security of the pipeline in its territory. Talking to a TV channel on 24 April 2006, Minister of State for Petroleum and Natural Resources of Pakistan Mir Naseer Mengal said, "The project must be executed, adding that no compromise would be made and the country's national interest would be kept supreme in all circumstances" (*The News*, 2006). He further added, "Foolproof arrangements have been made for ensuring the security of the IPI pipeline, which would carry 150 million cubic meters of gas" per year (*The News*, 2006). However, the assurance could not satisfy India, as both countries fought four wars including one undeclared war (1947, 1965, 1971 and 1999) since their independence in 1947 which created trust deficit between India and Pakistan (Ali, 2016). The security concerns over the IPI pipeline would be more, once the construction would be completed and the relative bargaining power would shift towards transit country and in the case of the IPI pipeline, it would be Pakistan.

Hence, India wanted Iran to be responsible for the security of gas supply through Pakistan while Iran was willing to transfer the ownership of gas to India only at the Iran-Pakistan border (PTI, 2010a). As a result, the issue of take-or-pay and supply-or-pay emerged in the IPI pipeline. In take-or-pay contracts, the buyer requires to pay for an agreed deal for a specific quantity of gas whether or not that gas is actually taken, and it also requires the producer to deliver this quantity (Neuhoff and Hirchhausen, 2005). According to take-or-pay contract, Iran's ownership for the IPI gas would be until the Iran-Pakistan border.

Contrary to this, in supply-or-pay, the sellers are responsible for the non-delivery of gas and hence Iran's gas ownership would continue until the Pakistan-India border. Hence, India wanted to apply the supply-or-pay to hedge the supply risk through Pakistan while Iran was willing to adopt the take-or-pay clause (Zaidi, 2009). Moreover, Iran was reluctant to accept India's suggestion for trilateral mechanism for securing delivery of gas at Pakistan-India border (Zaidi, 2009) and this further aggravated India's security concern for the gas supply. According to the mechanism, "if Pakistan was to disrupt supplies to India, Iran would make a proportionate cut in the quantities to be delivered to Islamabad" (Zaidi, 2009). Additionally, amid security of supply issue, Iran did not have any alternative provision to provide gas to India if the gas supply via the IPI pipeline gets disrupted. The unresolved security issue regarding the IPI pipeline also affected its funding especially from the international institutions and financers.

Finance

Huge financial support is required for the capital intensive project like pipeline and the IPI pipeline was not an exception. Its cost was originally estimated around US$4.16 billion but later it was revised to US$7.4 billion (Saez, 2012). Many international institutions and companies had shown their interests in the project. In 1996, a group from World Bank visited Pakistan to assess the commercial viability of the project (Ebinger, 2011) which was also done by BHP Billiton in 2003. It was accepted that the project fundamentals were strong and its pre-feasibility results were encouraging. The study done by BHP Billiton assured that the gas supply via the IPI pipeline would be lowest in cost for the decades to come if large volumes of gas would be transported (Samson, n. d.). Even a consortium was proposed with the inclusion of BHP Billiton of Australia, Petronas of Malaysia, Total of France, Shell of Netherlands and British

Petroleum of United Kingdom in addition to Iranian, Pakistani and Indian national gas companies (Shahid, 2007). The proposal got strength when Gazprom, Russia's natural gas company, China and Norway expressed their interests for the investment in the IPI pipeline (Baloch, 2012).

More importantly, the World Bank showed its willingness to participate in the project in May 2007. The interests shown by these international institutions helped to increase the project's credibility, though, none of the three participating countries approached the organisation.

Contextualising the funding of the IPI pipeline, the World Bank's Vice-President Praful Patel said in 2007, "If Pakistan would come to ask for funding for any (the IPI and Turkmenistan-Afghanistan-Pakistan-India (TAPI)) of the pipelines, the World Bank would seriously consider extending the funding" (PTI, 2007). Amid the interests shown by various entities, it was considered that funding was not the problem for the IPI pipeline (Baloch, 2012). Nevertheless, Paul Samson Vice-President of BHP Billiton stated that finance would only be available if various associated issues including the political differences over the project and security of supply would have been mitigated (Samson, n.d.).

This shows that funding by itself was not an issue for the IPI pipeline but it was dependent on the resolution of other crucial factors. This can be seen in the subsequent developments on the project following India not taken part in its procedural development. Regarding the Iran-Pakistan pipeline, while Iran could complete its portion of pipeline, Pakistan was unable to construct its share of pipeline due to lack of funding. As a financial help, Iran had offered US$250 million as a loan which was not sufficient for Pakistan to complete it. Later, Iran had withdrawn this offer (Chatterjee and Joshi, 2014). This shows that Pakistan did not get financial assistants for the Iran-Pakistan pipeline from any of the international institutions except from Iran. This can be interpreted that the absence of India for the pipeline project made it commercially unviable or the increasingly stricter sanction provisions by the US and others on Iran deterred these institutions to take part in the IPI pipeline, though investments in Pakistan did not technically come under the purview of the US sanctions.

The complexities in the IPI pipeline continued to delay its construction and so the initiation of gas trade between Iran and India. Simultaneously, India was also adapting itself for the LNG imports for its gas requirements. As a result, India which had started LNG imports in 2004 became the fourth largest LNG importers of the world in 2015. (BP, 2016)

Competition from LNG

As it has already been discussed in Chapter Four LNG is commercially competitive than the onshore pipeline above the distance of 3,540.55 km from gas source to destination point and for offshore pipeline, it is 1,126.54 km and more. However, developments in LNG related technology helped it to come closer to pipeline commercially as a means for transportation of gas for comparatively to shorter distance.

As a result of technological developments in various components of the LNG value chain like "improved efficiency through design innovations, economies of scale through larger train sizes and competition among manufactures" the capital costs for liquefaction plants dropped from US$600 per tonne of capacity in the late 1980s to about US$200 per tonne in 2001 (Simunovic and Mumme, 2007). According to a report by International Gas Union, "the liquefaction projects have faced considerable cost escalation since 2000. The unit costs for liquefaction plants increased from an average of US$379 per tonne during 2000 to 2007 period to US$807 per tonne during 2008 to 2015" (International Gas Union, 2016). Further, the construction costs for transporting ships have declined. For example, the construction costs for the 138,000 cubic metre capacity ship have declined from US$280 million in 1995 to US$150 to US$160 million in 2005 in which the construction of insulated tanks absorbs significant share of the costs. The development of floating storage and re-gasification vessel which first came into operation in 2005 further made LNG cheaper than conventional onshore storage terminals. It can be deployed in months rather than 3 to 4 years which conventional onshore terminal takes to complete. Companies are also vying to build floating liquefaction plants and Shell, a US based oil company sanctioned its first project in 2011 which was under developmental process as of December 2016. (British Chamber of Commerce, 2014; Nikkei, 2016).

With the technological improvements in LNG, there are also changes in the nature of the LNG market. The LNG market became more flexible. Apart from long-term contracts in LNG trade, it is also done for short-term as well as for spot market which has become the important part of LNG trade (Simunovic and Mumme, 2007). A short-term is considered as the period of less than four years (Corbeau and Ledesma, 2016) or less than five years (Simunovic and Mumme, 2007). Various factors including some global over-capacity in liquefaction, availability of excess supply, increase in the number of LNG tankers, and increase in import capacity of LNG (Simunovic and Mumme, 2007) contributed in the development of spot market and short-term contracts in LNG. Consequently, gas trade via this complex means became more flexible both for exporters as well as importers which also enhanced confidence vis-à-vis LNG for their gas trade.

The data discussed here shows how the LNG related infrastructures are being developed worldwide. The global liquefaction capacity was about 173 million tonnes per annum (mtpa) in 1993 and almost 165 mtpa in 2005 which increased to 301.5 mtpa in 2015, an increase of almost 174.2 per cent in 22 years. On the other hand, the global re-gasification capacity also increased from almost 210 mtpa in 1993 to almost 340 mtpa in 2005 (International Gas Union, 2014), and then to 757 mtpa in 2015 (International Gas Union, 2016), an increase of almost 314.2 per cent in 22 years. This shows that LNG importing countries are more enthusiastic about LNG trade and are engaged in preparing to buy gas via LNG in the absence of gas pipeline. As a result, the global LNG gas trade which was 142.95 bcm (105.78 million tonne) in 2001 (BP, 2002) jumped to 188.81 bcm (139.71 million tonne) in 2005 (BP, 2006) and then to 338.3 bcm (250.34 million tonne) in 2015 (BP, 2016).

If calculated as a share of transporting means for total gas trade, it increased from 25.79 per cent in 2001 to 26.17 per cent in 2005 and then 32.45 per cent in 2015 (BP, 2002, 2006, 2015). **Table-6.3** shows the status of LNG in the global gas trade.

Table-6.3

Global LNG Trade Scenario

[billion cubic metres (bcm)]

Year	Global Gas Trade (bcm)	Trade via LNG (bcm)	Trade via Pipeline (bcm)	Share of LNG in global Gas Trade (per cent)
2001	554.27	142.95	411.32	25.79
2002	N.A.	N.A.	N.A.	N.A.
2003	623.71	168.84	454.87	27.07
2004	680.01	177.95	502.06	26.16
2005	721.46	188.81	532.65	26.17
2006	748.14	211.08	537.06	28.21
2007	776.08	226.41	549.67	29.17
2008	813.77	226.51	587.26	27.83
2009	876.54	242.77	633.77	27.69
2010	975.22	297.63	677.59	30.51
2011	1025.4	330.8	694.6	32.26
2012	1033.4	327.9	705.5	31.73
2013	1035.9	325.3	710.6	31.40
2014	997.2	333.3	663.9	33.42
2015	1042.4	338.3	704.1	32.45

Sources-(BP, Several Years)

The natural gas trade via LNG increased from 142.95 bcm in 2001 to 338.3 bcm in 2015 at compound annual growth rate (CAGR) of 5.91 per cent during 2001-2015. For pipeline, it carried 411.32 bcm of gas for its trade in 2001 which increased to 704.1 bcm in 2015 whose CAGR was 3.65 per cent during 2001 and 2015 (See **Table-6.3**).

This shows that LNG appeared as an affordable as well as reliable means for the gas trade particularly in the last one decade and started to increase its share in the global gas transportation at the expense of pipeline. The growing importance of LNG for the gas trade can be understood from the statement of Director of gas and power at Shell India Ltd Marc den Hartog when he said, “There were genuine concerns in 2005 among customers that spot LNG was expensive and that it would set a precedent for other gas prices.” Further, he said. “It took time to convince customers” (Sethuraman, 2007).

India is also one of the LNG importers with the well established LNG related infrastructure. Petronet LNG Limited (PLL), a joint venture company promoted by Gas Authority India Limited (GAIL), Indian Oil Corporation Limited (IOCL), Bharat Petroleum Corporation Limited (BPCL) and Oil and Natural Gas Company (ONGC) was formed for the imports of LNG to meet the growing demand of natural gas. With the commissioning of Dahej (Gujarat) terminal in February 2004, it had started to import LNG from Qatar (2004), a year before India formally joined the IPI pipeline in 2005.Moreover, the LNG terminal capacity in India was 7.5 mtpa with the commissioning of Dahej and Hazira (Gujarat) in 2005 [Ministry of Petroleum and Natural Gas(MP&NG), 2006] which increased considerably to 22 mtpa with the existing operational re-gasification terminal of Dahej (10 mtpa), Hazira (5mtpa), Kochi (5 mtpa in Kerala) and Dhabol (2 mtpa in Maharashtra) in 2014-15 (MP&NG, n.d.). It is also projected that it would increase to 83 mtpa by 2029-30 if India becomes successful to materialise its all the existing and planned terminals (Petroleum and Natural Gas Regulatory Board, 2013).

Among the planned LNG terminals in which the work is going on, one is at Ennor in Tamil Nadu, being built by state-run Indian Oil Corporation, with a capacity of 5 million tonnes; Adani group is developing a 5 million tonne capacity at Dhamra in Odisha; and Shell and GAIL planned to set up a 5 million tonnes terminal at Kakinada in Andhra Pradesh (Choudhary, 2016). Thus, India is gradually adapting to LNG trade. Importantly, the established LNG infrastructure opened the options for India to diversify its gas sources from different regions which is relatively low in gas pipeline, as it is dedicated to the fixed producer and consumer. Moreover, the association of international oil companies (IOCs) like Shell and Total in India’s LNG business made it more commercially oriented and viable than pipeline. This can be understood from the statement given by India's Minister of Oil and Natural Gas Dharmendra Pradhan, in the response to a question in Lok Sabha in March 2015 when he said, "Government has no direct role in setting up of LNG terminals. Decision to set up LNG terminals is taken by different entities based on their techno-commercial considerations" (Pradhan, 2015).

Gas transporting means: India's other available options

Delays in the IPI pipeline in the midst of India's inability to cope-up with the growing gas demands with its domestically produced gas compelled it to look for other available options worldwide including Iran. As Iran has large reserves of gas, India kept trying to find the way to get it. Hence, latter is also searching for other feasible options to get Iran's gas resources. Besides IPI pipeline, Iran and India also discussed other alternative means for the transport of Iranian gas to India which not only included LNG but pipeline also.

LNG: Option from Iran

The LNG remained one of the prime areas for the cooperation between India and Iran since 2001 (Press Information Bureau, 2001) and the signing of MoU for LNG between them in 2003 showed a remarkable development for the future engagement in the growing gas trade. Importantly, the bilateral deal does not transit any country hence, the complexities of transit country is absent. Under the ambit of the New Delhi Declaration of 25 January 2003,a MoU was signed by India's Minister of Petroleum and Natural Gas Ram Naik, and Iranian Foreign Minister Kamal Kharrazi (Ministry of External Affairs, Government of India, 2003).

For cooperation in LNG, the MoU emphasised that Indian side would support its public sector units and private companies engaged in oil and gas industries to participate in the development of LNG projects in Iran. The document also pointed out that India would purchase LNG from Iran at competitive prices at mutually agreed commercial terms (MEA, 2003). Further, on 13 June 2005, a sale purchase agreement for 5 million tonne per year was signed between National Iranian Gas Export Company and Indian companies encompassing GAIL (for 2 mtpa), IOC (for 1.75 mtpa) and Bharat Petroleum Corporation Limited (BPCL) (1.25 mtpa) (MP&NG, 2008).

In 2004, India wanted to clinch LNG at the price of US$1.85 per mmBtu while Iran was willing gas price at US$2.22 per mmBtu (PTI, 2004). However, later they had agreed for US$2.9 per mmBtu for five years which thereafter had to go up to US$3.20 per mmBtu. Later, Iran sought a revision in gas price and demanded US$5.10 per mmBtu (*TNN*, 2006) which would have increased India's total cost of LNG project to US$34 billion, previously estimated around US$22 billion.

The demanded gas price was higher than Qatar's gas price which India was importing at the rate of US$2.53 per mmBtu which was to revise at US$3.50 per mmBtu in 2008. The revised gas rate by Iran was supposed to add the cost of US$12 billion that was made the project unviable for India. In the context of gas price hike, a senior Indian government source said, "Tehran seems to be reluctant in honouring the LNG deal. Their demand for a higher price is not acceptable to us. It will cost us an additional US$12 billion adding that Tehran has, however, expressed its willingness to discuss the issue (*TNN*, 2006).

However, the LNG deal could not materialise until 2016 as Iran was unable to complete its liquefaction plant due to various sanctions which was discussed in detail in Chapter Five. Iran could not complete more than 60 per cent of its LNG terminal located in west coast of South Pars gas field development, at Tombak by early 2016, though its construction was started in 2007 (*Press TV*, 2016). Further, the source of gas for LNG would be South Pars gas field which was also for the IPI pipeline. It could not be developed to the level of exports which has been discussed in detail in Chapter Four. Hence, the LNG trade between Iran and India depends especially on the completion of LNG infrastructure in Iran as well as agreement over gas price between them. In addition to LNG, India's other available option to get Iranian gas is Iran-Oman-India (IOI) gas pipeline which has been in discussion for a long time.

Iran-Oman-India gas pipeline

The idea of laying an IOI gas pipeline was first proposed by Indian Prime Minister P.V. Narasimha Rao during his visit to Oman in June 1993 and an agreement on principal terms for long term gas supply from Oman to India was signed on 26 September 1994 (Embassy of Oman, n.d.). However, it would have to pass through deep water of Arabian Sea to reach India. In the 1990s, the deep water pipeline was not well developed and hence the IOI gas pipeline faced several technical complexities. This can be understood from these following technical issues like

> "no qualified deepwater pipeline repair system available, requisition of pipe mill upgrades to manufacture the Line pipe, lack of lay vessels with enough tension capability to lay pipes in 3,500 metre water depth, incomplete understanding of seismic activities, lack of mitigation methods for mudflows, fault lines and slope failures, significant hydro testing and drying concerns" (SAGE, n.d.).

To fix these complexities, the technologies were yet to be developed. Additionally, the project had also the financial difficulties and as a result, the project could not get much attention after the initial agreement in 1994 *(Energy News Monitor,* 2011).

During the course of time, various technological developments in the field of offshore oil and gas industries including deep sea offshore pipeline gave strength to the projects like IOI gas pipeline. As a result, many large diameters offshore gas transmission pipelines, for example, Blue stream and Medgaz could successfully be installed at the depths up to 2,200 metre (SAGE, n.d.).The successful construction of these offshore pipelines encouraged Iran, Oman and India to revive IOI gas pipeline. On the other side, as the future of the IPI pipeline is uncertain it is in India's interest to look for a stable source of gas.

Further, the nuclear deal between Iran and P5+1 once again opened the opportunity for India to engage with Iran (Madan, 2015) and the IOI gas pipeline could have the chance to get materialised. A key development for the IOI gas pipeline took place on 28 February 2013, when the Indian Minister of External Affairs Salman Khurshid, Iranian Foreign Minister Jawad Zarif and Omani minister responsible for foreign affairs Yusuf bin Alawi bin Abdullah met and agreed for the deep water pipeline from Iran via Oman to India (Dietl, 2016). Later in February 2015, Sushma Swaraj, Minister of External Affairs and Yusuf bin Alawi showed interests in the revival of Oman-India pipeline during the meeting in Muscat (Prabhu, 2015). Ian Nash, project director for South Asia Gas Enterprises (SAGE), which is developing the IOI gas pipeline project said "With the sanctions being lifted, that has definitely changed the game, and the level of interest (for Iran-Oman-India gas pipeline) is accelerating now" (*Iran Daily*, 2017).

The feasibility study conducted by SAGE offered an encouraging picture for the IOI gas pipeline which once again brought it into India's energy diplomacy. The cost of project would be US$4.5 billion which would transport gas from southern Iran via Oman Sea and the Indian Ocean to Gujarat in western India bypassing the exclusive economic zone of Pakistan (SAGE, n.d.). The pipeline was planned to transport 31 million cubic metres per day of gas to India. The proposed 1,400 km multipurpose pipeline has also geo-strategic importance. Being a connecting pipe between West Asian region (reserves of large volume of gas) and South Asian region (emerging big gas market), the project is being seen in larger perspective. It would not only transport Iranian gas to India but there is also plan to feed the project with gas taken from the other surrounding countries of the West Asian and Central Asian regions having significant amount of gas like Iraq, Turkmenistan, Qatar etc (SAGE, n.d.). In this context, Iran was discussing with Turkmenistan for the overland pipeline to carry its gas to the Iranian terminal (Dietl, 2016) which could be transported through the IOI gas pipeline to the gas markets.

For India, it would reduce its dependence on LNG imports and contribute in saving foreign exchanges. Fox Petroleum's (India based oil and gas Company) Chairman, Ajay Kumar pointed out that gas imports to India via IOI gas pipeline would be less expensive than India's LNG imports by US$1.5-US$2 per mmBtu (Tanchum, 2015). More importantly, Oman and India maintain good political relations and it is India's one of the most trusted partners in the Gulf and therefore comfort levels are high between New Delhi and Muscat (Bagchi, 2014). Thus, the security problem would not become the issue in the IOI gas pipeline as this troubled the IPI pipeline.

However, the IOI gas pipeline has some major technical challenges which were came across in a preliminary geological and geo-hazard assessment conducted for the project. According to a study, out of the total pipeline route, 94 per cent would be on an almost flat terrain thus, technically would not generate much problem. For the remaining 6 per cent of the route, the study identified some problems. For example, "shallow water and hazards of ship anchoring and ship grounding can be a risk to the undersea pipeline. Additionally, internal and external corrosion of the pipeline could also add on to the risks attached to the pipeline" (Confederation of Indian Industry, 2016). Some of the technical problems which were identified in the 1990s for the offshore pipeline still exist like incomplete understanding of seismic activities and mitigation methods like mudflows, fault lines and slope failures. Consequently, these could also become a hurdle in laying of pipeline as well as its maintenance. Additionally, the offshore oil and gas industries do not have qualified deep water pipeline repair system (Confederation for Indian Industry, 2016). Nevertheless, the signing of a deal between Iran and Oman to lay an undersea pipeline in 2013 gave the momentum to the IOI gas pipeline. The duo agreed to ship 20 million cubic metres per day of gas to Oman via pipeline for 25 years (*Iran Daily*, 2017).

Apart from Iranian gas source, India is also looking for gas sources from other countries and the transporting means have been a crucial issue. New Delhi has been discussing over few pipeline projects though it is also engaging in LNG trade simultaneously. The following section deals with the highly discussed pipeline projects to which India saw as a means to get gas source from the gas rich countries.

Myanmar-Bangladesh-India (MBI) Gas Pipeline Project

The proposal of MBI gas pipeline project is the result of India's search for gas energy to meet its growing demand. India intends to diversify its energy dependence as a part of its energy security and Myanmar with large reserves of gas, has the potential to play an important role. Geographical proximity between the two has added to Myanmar's significance for India as a source of gas energy. Its proven natural gas reserves was 0.5 trillion cubic metres with 27 years of Reserve upon Production in 2015 (BP, 2016), though some sections estimated gas reserves up to 2.52 trillion cubic metre (Chandra, 2012). Sourcing gas from Myanmar meant India's less dependence on the volatile West Asian region.

Energy continued to remain an area for the engagement between India and Myanmar for long and India's state-owned oil and gas companies are involved in Myanmar gas fields development particularly Shwe offshore gas fields located in Bay of Bengal. The gas field was discovered in 2004 and ONGC and GAIL have a stake of 17 per cent and 8.5 per cent respectively for the exploration and production of its A-1 and A-3 block along with other partners where Daewoo International, a South Korean company has the largest share with 51 per cent (MP&NG, 2016). For the rising gas demands domestically, India viewed this new discovery as a source to meet its requirements and pipeline from Myanmar to India via Bangladesh was considered as an option and the idea for this pipeline was first mooted in 1997 by Mohona Holdings Limited, a company from Bangladesh (*Express News Service*, 2015).

The major breakthrough in the development of the MBI gas pipeline occurred in January 2005 when a MoU for the cooperation in the petroleum sector between India and Myanmar was signed and was followed by the trilateral meeting between the Minister of Energy of Myanmar, Minister of power, Energy and Mineral Resources of Bangladesh and Minister of Petroleum and Natural Gas of India. After the meeting, a Joint Press Statement was issued by the three Ministers on 12 January 2005 whereby all sides agreed to transport of natural gas from Myanmar to India by pipeline transiting through Bangladesh. According to one estimate made in 2005, the 900 km in length could probably costUS$1 billion (Chandra, 2012) which was far shorter in length and cost than the IPI pipeline. GAIL which had conducted the feasibility study of MBI gas pipeline, offered to pay US$5.01 per mmBtu (PTI, 2008a).

A Techno-Commercial Working Committee was constituted to prepare the MoU (MP&NG, 2006) which was signed between India and Myanmar on 9 March 2006 (PTI, 2008a). However, Bangladesh did not sign it as it had certain bilateral issues with India to be sorted out (Ministry of Petroleum and Natural Gas, 2006b). Bangladesh started to bargain with India in return of renting its territory for the crossing of MBI gas pipeline. Viewing its importance for India's gas import from Myanmar, Bangladesh demanded access to electricity and trade commodities originating from Bhutan and Nepal to pass through India and implement corrective measures by India to reduce trade imbalances (Kulkarni, 2013).

Later, in August 2007, Myanmar announced that it would sell gas from its A-1 and A-3 blocks to China, though the decision taken by Myanmar was leveraged with its political and strategic calculation in addition to commercial. China is the fastest growing economy in the Asian region since past one decade. Its average GDP growth rate was 9.76 per cent during 2005 to 2015 while for India, it was 7.59 per cent. For rising economy and energy needs, China has been looking for the overseas oil and gas sources. As a result, it emerged as a big oil and gas market for major exporters including Myanmar. Apart from being the biggest arms-supplier to Myanmar, China is viewed as its supporter in the international forum especially on the issue of human rights violation (*The Economist*, 2007).

In June 2008, the China National Petroleum Corporation (CNPC) and Government of Myanmar signed a MoU for the construction of 1,800 km long pipeline which starts from Kyauk Phyu (also Kyaukryu) in Arakan to Kunming of Yunnan Province, China (Shwe Gas Movement, 2010). The cost of the pipeline was estimated around US$1.04 billion. Finally, the pipeline started to transport gas from Myanmar to China from

October 2013 which has the capacity to transport gas up to 13 bcm per year (Hydrocarbons-technology.com, 2017). Terming this development, one analyst articulated that "India's investment foray in Myanmar as somehow (ending) up helping to build a pipeline to transport Indian gas to China" (Chandra, 2012).

However, India is working for the revival of the MBI gas pipeline which has been conceived under the *Hydrocarbon Vision 2030* (Sharma, 2017) for North-eastern region and is planned to connect Chittagong in Bangladesh, Sitwe in Myanmar with north-eastern states of India (Sharma, 2017). The proposed pipeline will be 6,900 km in length as there is a plan to link most of the North-eastern states by this pipeline. Bangladesh Petroleum Corporation (BPC) and ONGC are in negotiation for the progress of the project (Sharma, 2017) and hence India's gas import from Myanmar via pipeline is still open. Due to its preliminary stage, the project will take time to materialise even if all the involved issues are resolved.

For India's diversification of energy sources, Central Asia also has the potential as it is rich in oil and gas resources. By connecting Central Asia and South Asia, TAPI pipeline provides a significant opportunity to the South Asian region including India to get the gas resources from the Turkmenistan, a landlocked country of the Central Asian region.

Turkmenistan-Afghanistan-Pakistan-India pipeline

Turkmenistan has a large reserve of natural gas and the country's proved reserve of gas has increased from 2.3 tcm to 17.5 tcm from 2005 to 2015 which made it the fourth largest gas reservoir in the world in 2015 (BP, 2016). Viewing the importance of TAPI in tapping gas resources from Turkmenistan on 18 May 2006 India accepted the offer given by Asian Development Bank (ADB), a promoter of the project and to participate in the project (MP&NG, 2008). Further, it became the official member of the project during its 10th Steering Committee Meeting held during 23 to 24 April 2008 in Islamabad (MP&NG, 2010). However, the origin of the project can be traced back to the 1990s.

Unocal, a US company came with the proposal of oil and gas pipeline directed towards south of Turkmenistan in 1995 and signed an US$8 billion deal with Turkmenistan to construct separate oil and gas pipelines. The project was planned to start from Turkmenistan and cross through Afghanistan and then to Pakistan. Subsequently, Unocal-led Central Asia Gas Pipeline Ltd. consortium was formed for the construction of pipeline in August 1996. However, the bargaining of Taliban regime of Afghanistan for its recognition by the US in return to its support for the project and rising instability in Afghanistan forced Unocal to abandon the project in 1998 (Ghazali, 2011).

However, India's joining of TAPI in 2008 further boosted the project's commercial viability as the former provides the large gas market. More interestingly, India started to avoid participating in discussions over the IPI pipeline since 2009 and security of pipeline in Pakistan was one of the key concerns but it continued to participate in the discussion of TAPI pipeline at a different level. The four countries involved in the project namely Turkmenistan, Afghanistan, Pakistan and India signed an inter-governmental agreement along with a gas pipeline framework agreement on 11 December 2010 in Ashgabat, Turkmenistan where they discussed the security and safety of the pipeline.

A major development regarding the TAPI pipeline occurred on 13 December 2015 when the leaders from the four countries gathered in Mary, Turkmenistan on the occasion of its groundbreaking ceremony. These countries were represented by President of Turkmenistan Gurbanguly Berdimohamedov, President of Afghanistan Ashraf Ghani, Prime Minister of Pakistan Nawaz Sharif and Vice-president of India Hamid Ansari (Press Information Bureau, 2015). Further, the project was in a developmental stage and the work was being done on the route survey and detailed engineering in Pakistan in the early period of 2017 and there was a plan to do the same in Afghanistan *(PTI*, 2017c).

If the pipeline is completed, it would carry gas from the Daulatabad gas field of Turkmenistan, a south east area of the country, travel through Herat, Farah and Helmand provinces of Afghanistan, enter Pakistan in Baluchistan and then cutting across Pakistan Punjab to reach the border area of Fazilka-Abohar in Indian Punjab (Haidar, 2016). With the total capacity of about 36 bcm per year, the length of pipeline in Turkmenistan, Afghanistan and Pakistan up to Indian border is 145 km, 735 km. and 800 km respectively or a total of about 1,680 km (MP&NG, 2010). The **Map-6.1** shows the transit route of TAPI pipeline originating from Daulatabad area of Turkmenistan and moving through Afghanistan, Pakistan ends into India.

Map-6.1

Turkmenistan Afghanistan Pakistan India pipeline project

Sources- (Reuters, 2015)

The ADB in 2005 estimated the cost of TAPI at US$7.6 billion which was US$2.6 billion in 2002, making the pipeline profitable only at throughputs of 30 to 33 bcm per year (Vaid and Kar, 2016). Expected to be completed by 2019, the cost of project was again revised to US$10 billion (Reyaz, 2015). As TAPI has the total capacity of about 36 bcm per year (MP&NG, 2010), it seems the transport of gas through it would have been cost effective if its cost was around US$7.6 billion. However, the continuous delay in the project will further put the question mark for its cost effectiveness. Gas through TAPI would cost India around US$13 per mmBtu at its border after the adding transit fee and transportation charges if the crude oil price would be at US$100 per barrel. Based on the formula, the gas from Turkmenistan would be at a rate equivalent to 55 per cent of crude oil price and if the crude oil was at US$100 per barrel, the gas from TAPI would be at the rate of US$9.17 per mmBtu (PTI, 2012). This shows that the gas price would vary with the fluctuation in crude oil prices.

Though, the US is supporting TAPI pipeline, as it would bypass Russia as well as Iran, the project has the major security issues in Afghanistan and Pakistan. As TAPI pipeline would also cross through the Baluchistan province of Pakistan like the IPI pipeline, this could create problem in pipeline related investments. Thus, the completion and operation of the pipeline would take time, if other issues are sorted out amicably. According to information given in 2016, it would take at least six-to-seven years for its completion (Haidar, 2016). In this scenario, India is left with no option for gas imports other than LNG.

India’s LNG imports-option for natural gas

With the greater flexibility in LNG trade and diversification of gas sources, it appeared as an important option for India’s gas imports. India has been importing LNG since 2004. Starting with Qatar, India successfully diversified its gas sources from more than thirteen countries. For example India imported LNG from Trinidad and Tobago, Peru, other Europe, Oman, Qatar, UAE, Yemen, Equatorial Guinea, Nigeria, Australia, Indonesia, Malaysia and Papua New Guinea in 2015 (BP, 2016). In case of volume, it increased from 2.63 bcm (1.9462 million tonnes LNG) in 2004 (BP, 2005) to 21.7 bcm (16.06 million tonnes LNG) in 2015 (BP, 2016). India’s largest LNG supplier has been Qatar since the beginning which is also the largest LNG exporter in the world.

After the incorporation of PLL, India’s joint venture company in 1998, it started to look options for the purchase of LNG worldwide. It successfully clinched its first LNG imports contract with RasGas, Qatar’s LNG producing company, in July 1999. The company agreed to export 7.5 mtpa of LNG to India for a period of 25 years. As per the contract, RasGas had to supply of 5 mtpa for the first five years which was to increase by 7.5 mtpa from 2009. Further, PLL and RasGas signed one more contract in July 2007 for the additional supply of 1.25 million tonnes of LNG to meet the requirement of Ratnagiri Gas and Power Private Limited, though the deal was for one year starting from July 2007 (MP&NG, 2008).

Initially, the offered LNG price was US$2.53 per mmBtu for the first five years and then it had to follow a rate based on a five-year moving average crude oil price. As a result, the rate of LNG price was raised to US$12 to US$13 per mmBtu. However, the fall in global crude oil and gas price in mid 2010s brought down the spot prices of gas to US$6 to US$7 per mmBtu (Chowdhury, 2015). Hence India declined to pay such a high price for its long-term contract with RasGas. Subsequently, PLL became successful for the signing of revised long-term LNG contract with Qatar at rate of US$6 to US$7 per mmBtu in December 2015 which would last until 2028 (Choudhary, 2015). “The revised formula bases the price on a three-month average figure of Brent crude oil, replacing a five-year average of a basket of crude imported by Japan” (PTI, 2016d).

India also agreed on a provision of buying an additional one million tonnes of LNG annually. Furthermore, Qatar waived off a US$1.5 billion of penalty which India was carrying for lifting less than agreed quantity of gas (Natural Gas Asia, 2016). In addition to the above long-term contracts, LNG is also being sourced from spot market by PLL and Hazira LNG Private Limited (HLPL) (MP&NG, 2008).

Thus, the complex characteristic of natural gas as well as its undeveloped global market led to several commercial, technical and strategic issues like gas price, transit fee, security etc. that kept raising the question of viability of the IPI pipeline. Amid India's rising gas demands, it has been seeking other gas sources and it is considering both pipeline and LNG options. Apart from the IPI pipeline, there are several other proposed pipelines for gas imports sourcing from Malaysia, Turkmenistan and Iran as well, as these countries have large reserves of natural gas. However, various political and commercial issues kept delaying these pipeline projects. In the absence of materialisation of pipelines, India is left only with the option of LNG imports to meet its demand and supply gap. LNG is a costlier option for India as a gas source compared to its proposed pipeline projects. However, India is able to diversify its gas sources from various countries via LNG which is not possible in pipeline, as the pipeline is dedicated for the certain gas source and gas market. With the use of LNG, India is able to execute the policy of diversification of energy sources for its energy security.

Chapter 7

Conclusion

Energy resources are a pre-condition for economic growth across the globe and oil and natural gas occupy a vital place as primary energy sources. However, the substantial share of oil and natural gas reserves are located only in few regions of the world and the demand-supply asymmetry leads to concerns over energy security. The issue of energy security got international attention primarily after the oil crisis of 1973 during which the oil importing countries experienced a steep increase in prices and to some extent even supply disruptions. Since then the security of oil supply has became one of the key concerns for the energy importing countries.

In the course of time, the nature of international energy market continued to change and the concept of energy security is expanding horizontally and vertically in the changing energy market; the horizontal expansion means, energy security concern is not limited to the energy importing countries but has also become important for the energy producing countries and the transit countries in case of cross-border energy projects.

The technological development in the oil and gas industries made it possible to extract and produce oil and gas from the reserves which were earlier difficult. Consequently this led to addition of new oil and gas producing countries globally and gave them the capacity to export. This was accentuated with the disintegration of Soviet Union in 1991 which resulted in the emergence of a number of independent countries having large reserves of oil and gas. The increasing number of oil and gas producers and their production reduces the influence of Organization of Petroleum Exporting Countries (OPEC) in determining prices and production levels. Simultaneously, competition to increase the share of oil and gas market between OPEC and non-OPEC continued to exist. Consequently, a secured market for their exports has become the matter of concern for the oil and gas producing countries. Hence the energy security has the significance for both energy exporters and importers.

Vertical expansion means the adequate oil supply is not the only issue under this concept but the natural gas is also placed under it. Due to its growing demands, natural gas has become an importance primary energy source. The global warming has emerged as a key concern internationally leading to environmental protection and sustainable development critical for the security of oil and gas supplies. Hence, these two issues have also become the part of discussion under the scope of the concept of energy security. Consequently, it resulted in the broadening of the scope of the energy security concept.

Like other countries, India is also concerned about energy security. Its largest primary energy source is coal and almost 70 per cent of its total coal demands are met by domestic production. However, its dependence on coal import is increasingly growing. In 1995, it imported almost 5 per cent of its total coal requirements while in 2005, it was 10 per cent. India's dependence on other countries for its oil and gas needs are even higher than coal. During the 1940s and 1950s, it was depended upon imports for its refined oil requirements due to the deliberate policy of the multinational oil companies (MNCs) which controlled the Indian oil market. Later, the enhanced refinery capacity helped the country to become self dependent to some extent. Nevertheless, India's economic reforms in 1991 and subsequent economic growth aggravated its energy demands, including oil. By analysing the data, it can be concluded that the growing domestic oil and natural gas demands and the country's inability to cope up with it through domestic productions forced India to import a portion section of its oil and gas needs.

In India's energy security calculation, Iran has a major importance. Geo-strategically located in the Gulf, Iran is the fourth largest reservoir of oil and the largest in terms of gas. Additionally, it continues to be one of the largest oil producers of the world and accounted for 19.13 per cent of the total OPEC oil production in 1973. Though its production declined to 12.24 per cent in 2011 and 10.10 per cent in 2015, Iran is still a significant player in the international oil market. It has large territorial water along the Gulf and Gulf of Oman where majority of its oil and gas reserves are to be found. Consequently, apart from being easier to load oil in tanker plying in the sea, it has been cost effective in nature compared to the oil and gas found in the hinterland.

The research found that Iran's large oil and gas reserves amid its geo-strategic location made it a choice for oil and gas source for India. The geographical proximity between the two further added the advantages in making their energy trade more cost effective. Thus Iran has been one of the major oil suppliers to India for many years. Moreover, the study uncovered that the energy relationship between the two countries was not one directional and India is not just sourcing oil from Iran. India's success in increasing its refinery capacity and the production of petroleum products provided it the opportunity to tap the emerging market in Iran for its petroleum products, especially for gasoline. This has made the Indo-Iranian energy trade interdependent. With reference to oil and gas equities, India secured bid for Farsi offshore block which is estimated to contain 358.4 billion cubic metres of recoverable gas reserves with a lifetime of 30 years. India has proposed the plan for its development and production. However, the gas sector remained an untapped area in their bilateral trade and the problem lied in the lack of transporting means to carry gas from Iran to India. The proposal of the Iran-Pakistan-India (IPI) pipeline was a major initiative to make gas resource a means not only of their energy security but also strengthen their political and economic ties.

The synergy of interests of the involved stakeholders is essential for building of pipeline. In the IPI pipeline project, which was to link West Asian region to South Asian region, includes Pakistan and India besides Iran, the largest reservoir of natural gas. It has been analysed that the proposed pipeline fulfilled all the conditions which were necessary for the economic viability of any pipeline project. It would link the large reserve of gas in South Pars to the large market of India via Pakistan without any major technological hurdle. Therefore, it was the economic imperative which brought together these countries where Iran wanted to sell its gas energy and India wanted a reliable source of gas energy for its growing economy.

Pakistan was to be benefited commercially though transit fee of about US$200-500 million per year besides getting natural gas for its domestic consumption. The IPI being transnational in nature, it was not only viewed for the transport of gas energy but was also employed by the involved stakeholders to fulfil their political, economic and other interests. Thus, apart from the complementary economic interests, the pipeline was also perceived by these host countries for the rapprochement among them. As the gas energy would move towards Iran's eastern region, it would have helped in Asian energy integration.

However, the domestic politics of the participating countries affected the project such as the political tension between Pakistan and its Baluchistan province. Baluchistan continued to remain under sporadic armed clashes and it also resulted in the damage of several government-backed infrastructures like water pipeline, power transmission lines and gas installation in the past. As the large section of pipeline was to pass through this province, the security of pipeline and possible supply disruption continued to become an issue for India. The high fixed cost of the pipeline and specificity of the project which means specific production for a specific market unveiled the importance of security issue in the IPI pipeline.

Further, the factionalism in Iranian political system prevented it to come out with the coherent energy policies such as on gas price. As a result, Iran frequently increased gas price which remained the part of continuous debate between three participating countries. Iran's increase in gas price to US$7.1 million British thermal unit (mmBtu) (when oil was sold at US$60 per barrel) in 2009 unilaterally from the agreed gas price of US$4.93 mmBtu. With such an expensive gas price it would have become difficult for India to sell it domestically. Hence, the high gas price became one of the major obstacles in the progress of IPI pipeline. Thus, the second one hypothesis, namely *Domestic political difficulties in Iran, Pakistan and India have complicated the IPI pipeline and delayed its fruitation,* is validated.

The pipeline has the potential to change not only energy landscape of the involved countries but also to influence the region as a whole. Hence, many regional countries continued to influence the IPI pipeline either by their association with or in opposition to the project. If this pipeline got materialised, it would have helped Iran to emerge as a key gas exporter and could have become a competitor to Qatar, another major gas exporter. Moreover, the project was to target the same market which has also been a major market for Qatar such as India. Hence, the IPI pipeline was not in Qatar's commercial interests. Though, there is no any direct evidence to suggest that Qatar was against this project, it was apparent that it did not want to lose its share of gas market in India. This can be substantiated as it lowered the LNG price of gas exported to India from US$12-13 per mmBtu to US$6-7 per mmBtu in 2015 as well as waived off the penalties of US$1.87 billion which the latter had borne due to the breach of deal. In gist, the cheap LNG supplies from Qatar has weakened the viability of IPI pipeline project and adversely affected its further development.

If the pipeline was realised, it would also have contributed to strengthen Iran's economy which would have the political implications regionally. For Saudi Arabia, it was not in its benefit to have a strong political and economic Iran. Nevertheless, Saudi Arabia did not oppose the project overtly but it was claimed by many Iranian analysts that there was a Saudi pressure on Pakistan to abandon the project. It can be understood as Pakistan received US$1.5 billion loan from Saudi Arabia without any clear deal terms and its purposes in March 2014. This shows that the Saudi Arabia and Qatar affected the progress of IPI pipeline adversely but covertly.

On the other side, the United States (US) considered Iran as a supporter of terrorism and viewed Iran's nuclear programme with suspicion. Hence, it continued to impose sanctions on Iran that adversely affected the development of the latter's oil and gas sectors particularly since 1996 with the enactment of ILSA. This also made it difficult for Iran to get foreign capital investments for the development of South Pars gas field, the gas source of the IPI pipeline. As a result, it could not be developed within the given time frame. Additionally, the US continued to discourage Pakistan and India from joining the IPI pipeline project. It was considered that the successful completion of the project would not only help Iran to defy and come out from the impact of the US sanctions but also build its relations stronger with its eastern neighbour. It was also accepted by Pakistani officials that the US sanction became an obstacle for the construction of IP pipeline. This validates the second hypothesis, namely, *The US Sanctions are the principal reason behind delay of IPI pipeline project.*

Additionally the US signed nuclear deal with India as well as offered assistance to Pakistan for the construction of its LNG plants. It can be implied that it was one of the responsible factors that barred India and Pakistan to continue interest in the IPI pipeline project.

Moreover, the proposal of IPI pipeline did not have any major technological problem but it did experience many commercial, technical and strategic issues in the form of security, transit fee, finance, gas price etc. Iran, Pakistan and India could not agree on gas price as Iran kept increasing its gas price from time to time and made it difficult for the two importing countries to sell it in their domestic markets. The security of pipeline in the transit country, namely Pakistan, remained one of the major concerns for India. It becomes crucial as there is lack of open and developed global gas market. The gas pipeline is linked with the upstream and downstream gas industries which are tightly integrated. Disruption in any point from source of gas to the delivery point may disrupt the whole chain of industries.

Thus, India demanded for supply-and-pay arrangement whereby it would pay for the quantity of gas delivered at the Indo-Pakistan border but Iran was not ready for it. The study analysed that these issues adversely affected the negotiation processes of the IPI pipeline projects and indicated a peculiar oscillating pattern, that is, the negotiation processes have moved back and forth depending on wide-ranging commercial, geopolitical and security factors within the exporting, transit and consumer countries.

Thus, in spite of being IPI pipeline a win-win project for all of the involved countries, the politicisation of the pipeline remained the big hurdle in its materialisation. India's rising gas demands pushed it to adapt itself for LNG imports. The successful completion of four LNG terminals made India capable to diversify its gas source from more than 13 countries where Qatar is the largest supplier. These factors in turn contributed to the prolongation of the negotiation and non-realisation of the IPI project.

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