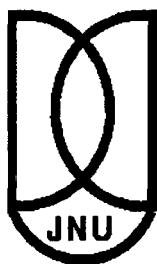


JAPAN AND ECOLOGICAL MODERNIZATION

**Dissertation Submitted To Jawaharlal Nehru University,
in Partial Fulfillment of the Requirements
for the award of the Degree Of**

MASTER OF PHILOSOPHY

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Declaration

I declare that the dissertation entitled “**Japan and Ecological Modernization**” submitted by me for the award of the degree of Master of Philosophy of Jawaharlal Nehru University is my own work. The thesis has not been submitted for any other degree of this University or any other university.

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Certificate

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

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Titli Basu
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This work is dedicated to my family

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Chapter One

JAPAN AND ECOLOGICAL MODERNIZATION

1.1 Introduction

Environmental debate, within the Social Sciences, has evolved over the concept of sustainable development which is increasingly being proposed as a means to erase the faultlines between the pro-development and the pro-environment school of thought. In 1987, United Nation World Commission on Environment and Development (WCED) issued a report called *Our Common Future* which popularized the concept of sustainable development. The Report defines sustainable development as “development that meets the needs of the present without compromising the ability of the future generation to meet their needs”. In 1991, United Nations Environment Program (UNEP) defined the concept as “improving the quality of human life while living within the carrying capacity of the supporting ecosystems”.

Environmental Social Scientists argue that, with the 1987 Bruntland Commission Report¹ and particularly the 1992 United Nations Conference on Environment and Development², the trajectory of environmental governance in industrialized nations marked a fundamental shift. Pressure further intensified with the 1997 Kyoto Protocol³. The Fourth Intergovernmental Panel on Climate Change⁴ (IPCC) Report *Climate Change 2007* has

¹ In 1983, United Nations convened the World Commission on Environment and Development (WECD). This is also known as the Bruntland Commission after the name of the Chair Gro Harlem Bruntland. The Commission was established by the General Assembly adopting the Resolution 38/161, “Process of Preparation of the Environmental Perspective to the Year 2000 and Beyond”. In 1987, Bruntland Commission issued its Report called “*Our Common Future*” which popularized the concept of Sustainable Development.

² In 1992, United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro, Brazil. It is also known as the Earth Summit or the Rio Summit. It evolved United Nation Framework Convention on Climate Change (UNFCCC), United Nation Convention on Biological Diversity, Agenda 21, Rio Declaration on Environment and Development and the Statement of Forest Principles.

³ Kyoto (Japan) hosted the Third Conference of Parties to UNFCCC in December 1997. After intense negotiations, *Kyoto Protocol* was adopted on December 11th, 1997 and came into force on 16th February, 2005. This international environment treaty is intended to achieve “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevail dangerous anthropogenic interference with the climate change”(Art.2 UNFCCC). It allows for Emission Trading, Clean Development Mechanisms and Joint Implementation to achieve the target of reducing emission.

⁴ In 1988, World Meteorological Organization (WMO) and United Nations Environment Program (UNEP) established IPCC. This scientific body is an objective source of information on climate change.

moved beyond debate that “climate change is unequivocal”. The post-Kyoto framework is being intensely debated as we are heading for the United Nation

Framework Convention on Climate Change (UNFCCC) Copenhagen Conference scheduled for 6th-18th December, 2009. Response to the seeping ecological credit crunch requires collective political will to restructure the dominant economic development model. Under intense pressure, advanced industrial economies have started responding to the crisis.

Like many other industrial economies, change has been witnessed in Japanese environmental political landscape since the 1990s. A marked shift in the Japanese environmental governance dawned with the new environmental reforms. However, there is a need to dig deeper to analyze whether ecological interests and concerns have made successful inroads into the Japanese governance especially when the economy is under severe stress.

In the 1980s, “hegemony of interest groups favoring economic development and the powerlessness of those favoring environmental protection would continue to undermine measures to integrate meaningfully environmental policies into the administrative planning process in Japan. Every thing changed in 1990s.....Consequently, the traditional Japanese approach to environmental management have been both challenged and transfigured in response to internal pressures and transnational demands.....Japan gradually began to turn green” **Brendan F.D. Barrett 2005**

Environmental Social Science often uses Ecological Modernization theory as an analytical tool to comprehend the complex process of integrating and restructuring environmental and economic concerns. According to Branden F. D. Barrett, “ecological modernization has come to be known as one of the most promising ways to explain the potential for a societal shift to a less wasteful form of interaction between humans and the natural environment.....the theory deals with the practicability of attaining environmental improvements through transformation of production and consumption patterns”.

1.2 Ecological Modernization Theory

In 1980s, Ecological Modernization theory started to evolve in Western Europe primarily in Germany, Netherlands and the United Kingdom. In 1985, German Sociologist, Joseph Huber presented the theory in German language. English and a further modified version of the theory were presented in 1992 by Arthur J. Mol and Gert Spaargaren. Social Scientists namely, Martin Janicke, Volker Von Prittwitz, Udo Simonis and Klaus Zimmermann (from Germany) Joseph Murphy, Maurie Cohen and Albert Weale (from United Kingdom) and Maarten Hajer (from Netherlands) immensely contributed to the development of this theory. Furthermore, numerous empirical researches used this theoretical framework to analyze the ecological restructuring among various nations. For instance, Europe (Gouldson and Murphy, 1996; Mol, Lauber and Liefferink, 2000), Southeast Asia (Sonnenfeld, 2000), Canada (Harris, 1996), Finland (Jokinen and Koskinen, 1998), United States (Pellow, 2000), Sweden (Lundqvist, 2000), Denmark (Anderson, 1994), Lithuania (Rinkevicius, 1998 and 2000), Hungary (Gille, 2000) and Kenya (Frijns, 1997).

The basic argument of the Ecological Modernization Theory is the centripetal movement of ecological interests and ideas into institutional developments and social practices, which result in constant ecological restructuring of modern societies (Mol, 2003). According to Mol, ecological restructuring refers to the ecology inspired and environment induced processes of transformation and reforms going on in any country.

The theory seemed to have developed and matured through three distinctive stages (Mol and Sonnenfeld, 2000). In the first stage, during the 1980s, scholars (Joseph Huber) laid heavy emphasis on technological innovations providing solutions to environmental crisis. In the second stage, between late 1980s and early 1990s, cultural dynamics and the role of environment induced social transformation were endowed more importance. In the third stage, since the mid 1990s, it is characterized by innovations in three fields (a) studies on industrial production are complemented by attention paid to ecological

transformations related to consumption processes (b) an increasing emphasis on national studies in non-OECD countries in addition to OECD countries and (c) growing attention paid to the global dynamics of ecological modernization (Mol and Spaargaren, 2000).

The core tenets of Ecological Modernization theory as analyzed by Arthur J. Mol are essentially

- *The changing role of science and technology*: science and technology should not be judged for their role in creating environmental havocs but be valued for their potential role in curing environmental problems. The traditional curative and repair options are replaced by a more preventative socio-technological approach that incorporate environmental considerations from the design stage of technological and organizational innovations.
- *The increased importance of market dynamics and economic agents in ecological restructuring*: credit institutions, insurance companies, consumers, producers, business associations are the new social carriers of ecological restructuring, reform and innovation. The notion of eco-efficiency and economizing ecology are popular within industries. This reflects the evolving State- market relations with respect to environmental reforms.
- *Transformation in the role of the State*: the traditional top-down, hierarchical, command and control regulatory State model has given way to a more decentralized, flexible and consensual styles of national governance. The role of the non-state actors and international/supranational institutions are ever-expanding which undermine the traditional domain of nation-state with respect to environmental reforms.
- *Changing role of social movements*: in the process of ecological restructuring, instead of positioning themselves on the periphery or even outside the central decision making institutions, environmental movements have made successful

inroads into the decision making process. Today, social movements are essentially reformists as they are increasingly involved in policy prescriptions with respect to environmental decision making.

- *Changing discursive practices and emergence of new ideologies*: neither fundamental counter positioning of the economic and environmental interests nor total disregard for the environmental issues are accepted any longer as legitimate positions. Intergenerational solidarity in the interest of preserving the sustenance base seems to have emerged as the undisputed core and the common principle.

The theory identifies four social actors namely: science, industry, civil society and the State (Barrett Barrett and Dana Fisher, 2005). Moreover, the theory talks about the growing autonomy and independence of ecological sphere and ecological rationality with respect to economic and political sphere (Mol, 1995 and 1996; Spaargaren, 1997). Today, the economic processes of production and consumption are designed and organized considering the economic and ecological perspectives (Mol, 2003). For instance, this became evident with the emergence of environmental management systems⁵, environmental insurance⁶ arrangements and eco-efficiency⁷.

1.3 The Case of Japan

Japan has witnessed vibrant debates evolving around ecological restructuring issue. This debate are polarized into two distinct schools of thought namely the *Conventionalist/Traditionalist school* of thought and the *Modernist/Reformist school* of

⁵ International Organization for Standardization(ISO) 14001 defines Environmental Management System as “the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

⁶ One of the most effective instrument for ensuring environmental safety of industrial operations is environmental insurance. It is a legal and regulatory framework for environmental protection and management purposes and also address the environmental liability issues.

⁷ In 1992, World Business Council for Sustainable Development(WBCSD) popularized the concept of eco-efficiency. WBCSD defines eco-efficiency can be achieved by means of “competitively priced goods and services that satisfies human needs and bring quality of life by progressively reducing environmental impact of goods and resource intensity throughout the entire life cycle to a level at least in line with the earth’s estimated carrying capacity”.

thought. The first school of thought argues that Japanese environmental governance is essentially elitist and that emphasis is concentrated on economic growth and capital accumulation at the cost of the environment. The ongoing restructuring is superficial as the base remains unaltered. The second school of thought vociferously argues that ecological considerations are seriously adopted in important policy decision making and practices. There is a third line of argument as well by the *Moderate school of thought*. This school of thought talks about “permeable insulation”. Japan is changing on dual tracks differentiated by sectors, policies and issue areas (Ulrike Schaede and William Grimes, 2003).

Japan has been categorized as one of the members of the group of five most ecologically modernized states in the world. The others in the group are namely Germany, Netherlands, Norway and Sweden (Dryzek, 1997). It is widely considered as an ecological frontrunner nation (Mol and Sonnenfeld, 2000). Japanese policymakers have widely adopted the ecological modernization position (Murphy, 2000). Does this imply that Japan has unlocked the secrets of sustainable development? Does this imply that ecological interests and concerns have made successful inroads into Japanese governance particularly when the economy is under stress? Japan has been referred as the first non-western industrialized democracy to exhibit features of ecological modernization (Anderson and Massa, 2000; Christoff, 2000). Yet, little attempt has been made to rigorously analyze the degree to which Japan conforms to the core tenets of ecological modernization theory.

There has been a call from the Ecological Modernization scholars to investigate how non-European nations are ecologically modernizing to combat one of the most defining challenges of the 21st century. Situating this theory on Japan stands justification as Japan retains its position as the second largest economy of the world (International Monetary Fund and World Bank, 2007). Japan is the first sophisticated industrial economy in Asia. Since the early 1990s, there has been fundamental adjustments and restructuring of policy decisions and practices in Japanese environmental governance. However, this shift in the environmental governance approach is often attributed to the immense dual track

pressure from the domestic and international actors.

1.4 Literature Review

Ecological Modernization theory has developed through considerable diversity and critical debate. Critics have repeatedly harped on its Eurocentrism. In response, Ecological Modernization scholars have encouraged empirical research situating the theory on various non-European industrialized economies to test its validity (as already mentioned in the earlier part of this chapter). However, existing literature reflects that little attempt has been made by the scholars to analyze the extent to which Japan conforms to the central themes of the theory.

Responding to the call, extensive research situating the theory on Japan was undertaken by Brendan F.D. Barrett. In his book *Ecological Modernization and Japan* (2005), he argued that Japan is an ecologically modernized nation as Japan projects itself as a relatively good model of clean and green State. However, one of the major lacunae of this work is that it ignores one of the important tenets of the theory namely the role of science and technology. In 2003, Andrea Revell, applied this theoretical paradigm to her study on Japan. In her article, *Is Japan an ecological frontrunner nation?* she argues that Japan has a long way to go before scholars can legitimately call it an 'ecologically modern State'. She opines that the "key feature of the Japanese environmental governance structure do not fit the theory". Her conclusion was based on her research focusing solely on Japanese small and medium enterprises.

However there is a voluminous literature on Japanese environmental technology, policy making and civil society activism on which this theory can be situated.

Existing literature on the role of science and technology reflects that there are two schools of thought that dominate the debate. The first are the *techno-nationals* who argue that Japan's technical mastery serves as a catalyst for its ecological progress. Japan ranks third in the world for environmental technology sophistication only after Germany and the United States. According to 2004 data, Japan dominated 20% of the environmental

technology market. Yumi Akimoto believes that “if not led by technology, a decarbonized society can never be realized”. Japan needs a rational and steady development of policy that develops environmental technology. Japan has one of the lowest ratios of energy consumption per unit of GDP as well as one of the lowest energy intensity rates per capita (Organization for Economic Cooperation and Development, 1994). In pollution abatement and energy efficiency, Japan has state of art technology. The pollution crisis of the 1960s yielded technical innovations (for instance, flue-gas desulphurization and denitrification, computerized monitoring techniques, automobile exhaust gas control technologies, unleaded petrol, catalyst converter and so on and so forth).

In 1990s, more than thirty companies joined MITI (Ministry of International Trade and Industry, now known as METI i.e. Ministry of Economy, Trade and Industry) and provided \$76.9 million to set up RITE (Research Institute of Innovative Technology for the Earth) in Kyoto. The primary objective is to contribute to the preservation of global environment through development of innovative green technology. In 1980, Japanese Government established NEDO (New Energy and Industrial Technology Development Organization) to develop new oil alternative energy technologies. In 1990, NEDO's research diversifies to develop advanced environmental technology. At the 1990 Houston Summit, Japanese government launched the “New Earth 21 Initiative” as an effort to respond to climate change over the next 100 years through high end technology development. This is a long term strategy devised to stabilize the carbon dioxide concentration in the atmosphere and to investigate the role of nuclear power in addressing global warming (Kenji Yamaji).

While the *second school of thought* vehemently argues that technology is not a solution but a part of the problem. Japanese government and industry encouraged a technocratic approach in its effort of modernization (Samuels, 1995). It is “rampant industrialization without the fear of consequences” (Taylor, 1999). However, as a political program this technocratic approach has been criticized by those who perceive technological fixes as part of the problem rather than a solution to environmental crisis (Andrea Revell, 2003).

Japanese environmental degradation reached unprecedented levels following this technocratic development model. In 2001, Kerr, for instance, opined that 60% of the Japanese coastline is covered in concrete. Much of the nation's natural habitat and wildlife species has been destroyed following this developmental model (OECD, 1994).

Literature on ecological restructuring of policies unwinds a debate between the *conservatives* and the *modernizers*. The conservatives put forward the argument that Japanese environmental governance is dominated by the corrupt “ruling triad” of business-bureaucracy-politicians constraining environmental space. Japan has failed as far as sustainability is concerned. Ichiro Sumikara opined that environmental policy is usually a product of a complicated interaction and power struggle between the Ministries with intervention from the corporations. In 1999, Jeffrey Broadbent suggested that LDP has consistently couched its environmental policies in line with the interests of big business, furthering corporate hegemony by allowing producers to dilute the objectives of environmental reforms to defend their narrow economic interests. John Crump, in 1996, was skeptical about Japanese politicians, bureaucrats and corporations whose tears for the environment have always been of the kind crocodiles are reputed to weep. He continues to perceive Japanese environmental governance as symbolic politics as the recent restructuring are neither extensive nor deep. Japanese “developmental State” characterized by strong bureaucratic centralization gives very little space to pluralistic influences (Mc Cormak, 1998 ; Woo Cummings, 1999).

The *modernizers* argue that environment induced process of reforms are unfolding in the policy arena to inculcate eco-efficient practises. Joseph Murphey, in 2000, opined that Japanese policy makers have “broadly adopted an ecological modernization position”. The 2002, OECD “Environmental Performance Review of Japan”, highlights the advancements achieved with the enactment of a stream of progressive environmental legislations since the 1990s along with the efficient and effective mix of policy instruments. Harutoshi Funabashi believes that environmental responsibilities are being increasingly internalized into government structures and into other entities including corporations. Brendan F.D. Barrett (2005) argued that ecological concerns and pro-

environmental considerations have crept into every lair of important policy decision making. In 1995, an empirical study of environmental policy and innovation in Japan was undertaken by Wallace. He argued that policy makers and industrialists perceived local government as pivotal force behind environmental policy because it imposed tougher voluntary standards on local industry than existing regulations called for, which in turn pushed future environmental regulations towards stricter standards. According to Wallace, environmental objectives in Japan, because of the highly cooperative state-industry relationship, were achieved at lowest cost via flexible processes of recommendation and voluntary action, which in turn encouraged innovation. Aligning with the Ecological Modernization theory, Wallace highlights the voluntary, negotiated nature of environmental policymaking in Japan and the partnership between industry and government.

Tracing the trajectory of Japanese environmental civil activism, two opposing arguments emerge. The first line of argument or what can be referred to as the *western school of thought* holds that because Japanese State and business has been extricably joined since the beginning of the Meiji era, both have shaped and molded public discourse on public good in such a way that it is extremely difficult to discern the existence of a public sphere standing between the two. The scope of public sphere in modern Japan has been extremely limited (Helen Hardacre, 2003). A study of environmental attitudes by Gallup affiliated in 24 countries found that Japanese respondents had low levels of desire to participate in environmental movements, with less than 5 per cent of the population belonging to environmental groups (compared with 11 percent in the US and 10 per cent in the UK) (Dunlap et al., 1992). In 1996, Miranda Schreurs's corroborated that the Japanese State created sufficient barriers to prohibit institutionalization of the environmental movement in Japan. She maintains that because of these institutional barriers, there is currently a lack of public participation in environmental policy making, and this has undermined Japan's desired position as a global environmental leader. Andrea Revell argues that the role of social movements in Japan runs counter to EM theory, for they have not become key stakeholders in environmental decision making. Instead, under-funded, under-supported and disenfranchised, they remain very much on

the periphery of institutional power. Jeffery Broadbent contends that the 'Ruling Triad' weakened the protest movements after their success in the 1960s by staging a quiet campaign to undermine local support. Manipulation of information by the bureaucracy and difficulties to acquire the non-profit status was a huge challenge. Environmental organizations referred to as the 'third sector groups' were also set up which were sponsored by corporations and led by retired ministers. These served as proxy groups rather than genuinely delivering their responsibilities.

However the second line of argument which otherwise can be referred to as the *Japanese school of thought* argue that Japanese environmental movement has brought about changes in the conventional mode of bureaucratic decision making process through establishing a new public sphere that represents the growing maturity of civil society in Japan (Hasegawa Koichi, 2004). The 1998, Special Non- Profit Activities law (NPO Law), weakened much of the barriers facing civil society in Japan. The 2001, Information Disclosure Law, enhanced the effectiveness of the environmental NGOs. The 'network style' of environmental governance, based on joint efforts of government, citizens , business and NGOs, was called for by the 1994 Basic Environmental Plan. The initial years of 1990s witnessed the erosion of public faith on the corrupt nexus of Liberal Democratic Party- business- bureaucrats. This also acted as a catalyst for the organized development of the environmental associations.

1.5 Scope of the Research

Japan's status as an "ecological front runner" will be studied using Ecological Modernization theory as an analytical tool. The analysis will allow an opportunity to explore the explanatory powers of the ecological modernization theory in the industrial world outside Europe in the context of recent evolution of Japanese environmental governance. It aims to examine the complex web of pressures on and the changes to the domestic environmental structures. Moreover, the analysis intends to understand the extent to which such an approach has furthered environmental goals.

The fundamental question that the research tries to address is: **does Japan qualify as an ecologically modern nation?** For the purpose of the research, the central hypothesis holds that *Ecological restructuring of policies, sophisticated technologies and greater environmental civil activism depicts Japan as an ecologically modernized state in the midst of a transitional political opportunity structure.* “Ecological restructuring of policies”, “sophisticated technologies” and “greater environmental civil activism” served as the three *independent variables* for the research. “Japan as an ecologically modernized state” is *dependent* on them. While “transitional political opportunity structure” is treated as the *intervening variable*. Deductive method of research will be applied to understand Japan’s recent efforts to integrate environmental and economic concerns.

1.6 Chapterization

Chapter 1- **Introduction**: this chapter will lay the theoretical foundation of the proposed research and the various ecological concepts prevalent in Japan. Chapter 2- **Japanese Environmental Policy Discourse**: by way of situating the Japanese debates, this chapter intends to trace and analyze the shifting trajectories of Japan’s approach to environmental concerns. Chapter 3- **Environmentalism and Japanese Civil Society**: tracing the historical trajectories and treating the arguments of the Japanese and the Western school of thought, this chapter intends to analyze and evaluate the changes occurring in Japan since 1990s. Chapter 4- **Environmental Technology and Japan**: treating the opposing schools of thought, this chapter will analyze and evaluate the Japanese policy initiatives. Chapter 5- **Conclusion**: this chapter will categorically answer the proposed research questions by way of treating the hypothesis.

Chapter Two

JAPANESE ENVIRONMENTAL POLICY DISCOURSE

2.1 Introduction

Sophisticated environmental policy is often argued to be the facilitator of sustainable development. Policies are often interpreted as ‘purposeful experiments in the face of uncertainty’. In the 21st century, there has been a fundamental transition from managing environmental effects to the much more complex goal of evolving a sustainable model of development. Sustainability is the pivot around which environmental policymaking is supposed to revolve. It no longer continues to be a mere aspirational window dressing but has percolated as a serious goal of public administration. In 2002, United Nations Environment Program (UNEP), categorically puts across

that effective environmental policies form part of mainstream politics and should be incorporated into all political sectors and levels of government, specially into economic decision making. Effective national plans and sustainability strategies bring together government, civil society and the private sector; they incorporate diverse initiatives such as green and brown agendas and country specific best practices

Arthur J. Mol argues that ecological modernization is economically and politically feasible. Two strategies to overcome the deficiencies of the traditional environmental policy making are (a) transformation of state environmental approach from curative and reactive to preventative, from exclusive to participatory, from centralized to decentralized wherever possible and (b) transfer of responsibilities, incentives and tasks from the state to the market. Ecological modernization conceptualizes the State as working with, rather than directing this new mode of governance. The State has shifted from the role of protector of common interest to a facilitator between different interests (Dryzek, 2003).

Situating the ecological modernization theory on Japan for the purpose of the research inevitably leads us to some questions: does the policy restructuring witnessed in the Japanese environmental political landscape qualify Japan as an 'ecological front runner'? Have ecological interests and concerns made successful inroads into Japanese governance when economy is under severe stress? The hypotheses, that has been treated in this chapter holds that *Ecological restructuring of policies depict Japan as an ecologically modernized State in the midst of a transitional political opportunity structure.* "Ecological restructuring of policies" is the independent variable for this chapter. "Japan as an ecologically modernized State" is dependent on it. While "transitional political opportunity structure" is treated as the intervening variable.

Academic debate over Japanese ecological restructuring of policies contest around two schools of thought- the *conservatives* and the *modernizers* as has been discussed in the previous chapter. Precisely, the *conservatives* argue that Japanese environmental policy making has been subservient to the pro-development agenda, diluting respect for the green issues to a regrettable extent. On the contrary, the *modernizers* argue that synthesizing the economic and environmental concerns and respect for green issues has been internalized into every aspect of industrial and economic activities in Japan.

2.2 Concept of Environmental Control System

In 2002, Japanese environmental sociologist, Professor Harutoshi Funabashi, presented the concept of *Environmental Control System* to trace the trajectory of interaction between environment and economy in Japan. Drawing from Funabashi's *Environmental Control System* concept, Japanese environmental discourse has evolved through four stages. He argued that there are four different degrees of intervention of environmental controls in the economic system. The fourth stage is characterized by the incorporation of the

environmental concerns as a primary administrative task in the economic system. It is imperative to push the society into the fourth stage of intervention in order to prevent the impending environmental disaster.

Initially, he conceptualized the model of harmonious equation between the society and the nature in the pre-industrial era. With the dawn of the Edo era, Japan opted for a self-imposed isolationist policy. During this period, a harmonious relationship was maintained between man and the nature assuring natural capital productivity. Scholars often referred to this era in Japan as a model of sustainable development (Ishikawa, 1994; Makino, Oishi and Yoshida, 1991). The 2001, Ministry of Environment's *Annual Report on Sound Material Cycle Society* identifies Edo period as an example of an efficient society that reused and recycled. However, Meiji Restoration of 1868, triggered by the confrontation with the West, is symbolic of inception of Japanese modernization. With the unfolding of the industrial revolution in Japan, the foundation of capitalist market economy was laid strong.

Rapid industrialization served as a catalyst for mushrooming of environmental problems. In the quest to catch up with the West, Japan rushed through the complex process of industrialization which was slowly walked by the West as industrial revolution started much earlier in England and spread over Europe and North America. Japan's history of industrialization is only a century old. Air and water pollution emerged as a monumental challenge. The Ashio Copper mine case is particularly well known because the farmers of the region received the support of the Diet member, Shozo Tanaka (1841-1913). With the unwinding of the ugliness of the pollution crisis, Tanaka, in 1901, directly called for attention of the Emperor to address the problem. Response was in the form of weak legislation, for instance, the Factory Law of 1911. However, legislative showcasing was

rudely abruptly by the great depression of 1929. With the emergence of the military, environmental concerns were severely disrespected, particularly during the Pacific War from 1937-45 (Hashimoto, 1999).

Before we move on to Funabashi's four logical stages of intervention of the *Environmental Control System*, it is essential to take note of the *political opportunity structure* to comprehend Japanese environmentalism. This essentially implies to look onto the way Japanese institutional structures constrain or promote environmental space. Japan conveys a notion of a closed political opportunity structure incapable of responding to demands arising outside the 'ruling triad' (big business-bureaucracy – politicians). It has been repeatedly argued that in Japan, the formal political institutions do not adequately describe the real channels of power. Scholars opine that real decisions are not made by public debate in the Diet but rather made in direct negotiation between the members of the dominant triad (Masumi, 1995).

However, the 'ruling triad' is not monolithic (Imura, 2005). There are multiple factions and clusters. Within the Liberal Democratic Party (LDP), there are multiple factions distinctly lobbying for construction, labor, social welfare, environment so on and so forth (Inoguchi and Iwai, 1987). The 'pro-growth cluster' consists of the LDP leadership, business peak associations and economic ministries (Ministry of Economy, Trade and Industry; Ministry of Finance; Ministry of Land, Infrastructure and Transport). Apart from furthering national economic goals, the triad served mutual interests. For instance, LDP politicians of *Kensetsu zoku* (the construction tribe) arranged for lucrative government contracts for *dango* (the contractors), which in turn fed them huge kickbacks, feeding the LDP political corruption mechanism. The pro growth elite network oppressively excluded non-members particularly general public. Government and elite business assumed a

vertical, paternalistic stance toward society evolving a 'nationalist-paternalist-capitalist State' (Fukui, 1992).

However, this structure is said to be undergoing transition since the 1990s. The top down-elite driven-exclusive-reactive environmental policy structure of the 1980s has undergone dynamic changes characterized by opening up of the policy structures.

The four logical stages of intervention of the *Environmental Control System* are essentially

- (A) lack of constraints on economic system
- (B) imposition of constraints in the economic system
- (C) incorporation of the environmental concerns as a secondary administrative task
- (D) incorporation of the environmental concerns as a primary administrative task

At every stage, there are factors that push the transition to the next stage and other factors that resist this transition (Funabashi, 2002).

(A) Stage 1: lack of constraints on the economic system

The initial stage of the *Environmental Control System* resembles much of the trademill of production model of laissez faire economic growth. In the initial post war period, the pro growth elite coalition effectively supported the creation of a Japanese style of trademill of production. The paramount objective was greater productivity regardless of its social needs or impact. In Japan's Asian style capitalism, the State essentially through METI, played a significant role in organizing the economy with military like efficiency to bring about rapid expansion (Okimoto, 1989; Sakakibara 1993). METI successfully made plans and implemented programs to enhance industrial infrastructure, promote exports and

strengthen the international competitiveness of the Japanese economy internationally. The industrial policies of METI worked effectively in helping the country reconstruct its destroyed economy (Sakaiya, 2000). Favorable international condition helped Japan's postwar economic growth. Market globalization and movement toward free trade regime benefited Japanese economy immensely. It enjoyed abundant supply of oil from the Middle East at prices that were cheaper than domestic coal.

This rapid paced reconstruction of the economy occurred with little appreciation of the risks involved. There were minimal understanding of the ecological constraints to growth. Japan's industrialization reflected the strains of 'compressed industrialization' (Teranishi and Oshima, 1997).¹ Japan's expansion took a heavy toll on the environment in the form of pollution. Japan's major energy source during this period was hydro power and domestic coal. Black smoke from coal fired chimneys were symbolic of economic prosperity. In the 1950s, very high values of dust, exceeding 100 tons/km square per month, were recorded in industrial cities. During this period, Japan concentrated on expansion of heavy industries, for instance, iron and steel, shipbuilding and petrochemicals. In 1955, heavy industries accounted for 44.7% of total industrial production while the share of total industrial exports was 37.8 %. The Japanese state did not impose much environmental restrictions on the industries. When environmental disruptions occurred, government served as a broker between opposing social and political blocks. The interaction between the locally affected communities and the ruling triad tended to be characterized by social exclusion and repression of the victims (Ui, 1992; Kada,1999).

¹ 'compressed industrialization' is a direct translation of the Japanese word *Ashuku-Kogyouka* which very rapid industrialization in a short period of time. It is very common feature of the East Asian economies.

(B) Stage 2: imposition of constraints on the economic system

Scholars argue that this stage has some similarities to Ulrich Beck's 'reflexive modernization'. Expanding from mid 1960s to the early 1970s, this stage is characterized by widespread environmental disruptions. Simultaneously, there was an explosion of environmental protests and initiation of lawsuits against the polluters. Air pollution from the petrochemical complexes had a devastating implication. There were severe water pollution in the Tokyo Bay, Ise Bay, Osaka Bay, Seto inland sea. The water pollution of Dokai Bay in Kitakyushu, one of the four major industrial areas specializing in iron and steel industries, became notorious because of the accumulation of the contaminated sludge. It was popularized by the name of 'sea of death'.

In Toyama, where a mining company's activities polluted the water basin of the Jinzu river, residents came down with what is known as itai-itai disease. In the late 1960s, the Japanese cities namely Tokyo, Kawasaki, Yokohama, Yokkaichi, Osaka, Kobe and Kitakyushu recorded annual average concentration of sulphur dioxide ranging from 0.06 to 0.11 parts per million (ppm). Minamata mercury poisoning was experienced not only in Minamata on the island of Kyushu, but also in Niigata, the main island of Honshu. Residents were inflicted by organic mercury poisoning because chemical companies dumped organic wastes directly into water stream contaminating the food chain.

The first industrial complex in the country (*kombinat*) began in Yokkaichi area. With the completion of the three petrochemical complexes in 1973, the city had an oil refinery capacity of 505 thousand barrels and an ethylene production capacity of 701,000 tons per year. However, in 1960, the municipal government's special investigation argued that the total emission of SO_x in the city amounted to 130,000-140,000 tons per year, thirty times greater than current emissions. Residents suffered from what is known as Yokkaichi

asthma. Companies disrespected the public concern and focused on business expansion. So in 1967, inhabitants filed a damage suit against six companies of the industrial complex. In 1972, court handed down the decision that the defiant companies were guilty of illegal actions (Metropolitan Environmental Improvement Program 1990, Annex 10). This further facilitated the creation of the health damage compensation scheme, formally operating in 1974.

Analyzing the Prime Minister's Office public survey conducted in August 1966, December 1971 and October 1975 demonstrates a remarkable shift in public attitude concerning environment and development. In 1966, 27.4 % respondents felt that environmental pollution must not be allowed. In 1971, 48.3 % and in 1975, 51% of the respondents opined that pollution must not be allowed. There was a sustained pressure on the ruling triad to showcase concrete initiatives. The environmental administration in Japan during this period was essentially viewed as reactive (Barrett and Therivel, 1991). The volatility was treated with the famous pollution Diet of the 1970 where 14 pollution laws were enacted. In 1971, Environmental Agency was institutionalized. However, these were soft control measures to weaken the emergence of an autonomous civil society and opposition political parties. Less visible, creeping forms of pollution, such as toxic waste, soil contamination or ground water pollution, did not call forth immediate public outcry and so government conveniently ignored it (Yoshida, 2002).

(C) Stage 3: incorporation of the environmental concerns as a secondary administrative task

Expanding from mid 1970s to the late 1980s, this stage coincided with the unfolding of ecological modernization in Europe. Hit hard by the energy crisis (the first oil shocks of 1973), Japan suffered a major setback and the subsequent economic restructuring pushed the issue of environment to the backseat for a while. But the ruling triad seemed to have

learned lessons from their previous experience with the environmental movements and started respecting the cause. However, if there appeared to be a conflict between the economic and the environmental goals, then the priority was tended to be given to the economic goals.

OECD's Environmental Policy Review, 1976-77, offered valuable policy guidance to Japanese environmental authorities. The Policy Review highlighted the poor quality of urban amenities in Japanese cities. The Review appreciated and positively evaluated the achievements in pollution control. The Report observed that Japan's approach to pollution control relied heavily on the setting of high standards by the national government, coupled with the setting of emission standards by the local governments. Japan relied heavily on planning rather than on market mechanisms by using extensively *gyousei shido*, i.e. administrative guidance, in the spirit of a planned economy. Pollution abatement became vital for the industries. Pollution control was achieved by sophisticated control technologies. Under intense pressure from the citizens and media, the business enterprises and the government, with the goal of improving the quality of the environment, were obliged to devote attention and resources towards pollution control. Pollution control technologies, for instance, flue-gas desulfurization and denitrification were developed and disseminated (Himi, 2000). But critics argue that improvements in the Japanese environmental status is essentially a result of the structural adjustment of the Japanese economy. Empirical studies refer to the pollution flight as Japan relocated its heavy polluting industries at its backyard. Japan's ecological shadow is significantly high in southeast Asia (Dauvergne, 1997).

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However, if we look deeper then we realize that the shift in the energy policy contributed greatly to the betterment of the environment. After the oil shocks, Japanese economy



focused on national energy security measures. The heavy industries immensely suffered with the rise of the international oil prices. With the policy shift from 'rapid economic growth' to 'steady economic growth', the use of imported coal was encouraged. However, the potential expanded risk with the expanded use of coal was taken care of by the availability of advanced environmental technologies (Imura, 2005).

Kakuei Tanaka's book, *Building a New Japan: A plan for remodeling the Japanese archipelago* (1972) , vociferously advocates the infrastructure development boom. Subsequently the Consolidated National Development Plan drew its grand design from the original Tanaka idea. The September 1985 Plaza Accord strengthened the Japanese yen. Japanese government pursued an easy monetary policy, keeping the interest rates low in an effort to help the firms. This easy money policy led to a surplus money phenomenon. Financial institutions began to invest huge surpluses in enterprises, which in turn began to look for ways to invest this money. This huge money was channelized to the real estate sector. There was a huge boom in speculative investment by Japanese capital domestically and abroad. This eventually took a heavy toll on the environment. It has been rightly argued that environmental concerns were considered as secondary administrative tasks with respect to the economic concerns. This is evident from the debate between MITI (now METI) and the EA (now MOE) over a comprehensive Environmental Impact Assessment law. The Japanese environmental administration failed to make EIA system mandatory for all major public and private projects. After three decades of intense debate, EIA was finally enacted on 13th June, 1997. The development of major infrastructure projects has been central to Japanese economic and political life for so long that it has evolved into a cult with its own vocabulary, for instance, *doken kokka*, *kensetuzoku-gin* and *dango* (Inoguchi and Iwai, 1987).

(D) Stage 4: incorporation of the environmental concerns as a primary administrative task

The fourth stage of the *Environmental Control System* synergies with the notion of ecological modernization. The basic feature of this stage is the interpenetration of the environmental concerns into the central institutions at a primary basis. Funabashisan suggests that effective utilization of the instruments of governmental policies, environmental technology and civil society movement will help Japan achieve the goals of the fourth stage. International community has witnessed a shift in Japanese environmentalism since the 1990s. Branden F.D. Barrett has rightly argued that in the 1980s, hegemony of interest groups favoring economic development and the powerlessness of those favoring environmental protection, continued to undermine measures to integrate meaningfully environmental policies into the administrative planning process in Japan. But the 1990s marked a new shift in Japanese environmental policy with progressive environmental reforms. Traditional Japanese approach to environmental management have been both challenged and transfigured in response to internal pressures and transnational demands.

Japan is an interesting case of being a sophisticated economic superpower with severely limited capability to influence international politics despite genuine desire to shoulder larger international responsibilities. Internationally, Japan's political clout failed to match its economic clout. The peace clause of the Japanese constitution (Art.9)² and the aggressive historical baggage³, more often than not, stands on the way of Japanese desire

2 Chapter II of the 1946 Constitution of Japan renounces war. The peace clause, Art.9, of the Constitution states that "aspiring sincerely to an international peace based on justice and order, the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international dispute.

In order to accomplish the aim of the preceding paragraph, land, sea and air forces, as well as other war potential, will never be maintained. The right of belligerency of the State will not be recognized".

3 Japan has aggressive history with the Chinese, Russians and the Korean in pursuit of extending its imperialistic intentions in East Asia. In the first Sino-Japanese War (August 1894-April 1895) Meiji Japan fought fierce battles with the Chinese (Qing Dynasty) over domination of Korea which was

for *kokusaika* (internationalization).

In the 1980s, the public opinion polls revealed the strength of Japanese desire for *kokusaika*. For instance, Prime Minister's Office opinion poll of 1987, started including a feature called "Internationalization of Japan". The high value yen and the bubble economy at home served to inflate the aspiration for Japan's internationalization. The second wave of the global environmental movement following the United Nations Conference on Environment and Development in 1992 served beneficiary to the aspiration of Japan which was getting increasingly impatient to mature as an influential international power. The mood was one of *kokusai koken byo* i.e. international contribution disease⁴.

However, political sensitivity proved an stumbling block when it came to the issue of dispatching the SDFs (Self Defense Forces) to West Asia or Cambodia. Dispatching the SDFs overseas is often problematised given the peace clause of the 1946 Constitution. Art. 9, the issue of right to collective self defense, participating in non-combat operations in combat zones, passing of special legislations in the Diet on every occasion often triggered challenging political debates. The alternative issue of protecting the global environment offered an attractive opportunity to Japan to satisfy the desire for *kokusaika*.

Dealing with the global environmental affair was much easier and politically safer than dealing with the Peace Keeping Operation(PKO) Bills. Akao Nobutoshi, Ambassador for Global Environmental Affairs and Asia-Pacific Co-operation, said in the final round of

considered a "critical variable for the stability in the Far East region". Japan, concerned about national security, was all out to win the battle as it considered Korea as a "dagger pointing at the heart of Japan". Sensing Russia's expansionist policy over Korea and Manchuria, Japan fought Russia in 1904-1905 and became the first modern Asian power to defeat a powerful European army. Japanese imperialist ambitions grew further and this culminated in the second Sino-Japanese war in September 1937-July 1945 with the surrender of Japan in the World War II. There was "forced occupation" of Korea by the Japanese from 1910 till the end of the World War II.

⁴ The term *kokusai koken byo* were ever present in newspapers, magazines, speeches and conversations of the politicians, bureaucrats, businessman and the general public.

UNFCCC negotiation at New York in 1992,

we tend to see Rio and the environment as offering Japan a key leadership role. It is tied directly to what we call kokusaika - the Internationalization Policy, which is essential. Kokusaika is almost an obsession with our political and business leadership and with our people in general. Our media bombarded the public with articles about how we must internationalize. Rio is happening against that background. It was tailor-made for us⁵.

Prime Minister, Takeshita Noburu said in 1992, “whereas Japan’s participation in the UN PKO stirs up political controversy, the protection of global environment is an issue area to which Japan can contribute without hesitation”⁶.

Internationally, Japan was increasingly criticized for its “shadow ecology”⁷. Japan was repeatedly accused of out pacing all the fellow competitors in the international market at the cost of the environment. Japan was referred as the “showcase of environmental pollution”⁸. Japanese response to these criticisms and the success in environmental performance was further criticized as structural changes of the Japanese economy practicing pollution export or pollution dumping on its backyard. Japan, successfully, relocated its heavy polluting industries to the newly industrializing countries of South East

5 John Newhous, “The Diplomatic Round: Earth Summit”, The New Yorker, 1st June 1992, p.68. During the interview with Ambassador Akao on 23rd February 1993, it was confirmed that this anonymous quotation was his statement.

6 The Press Crops for the Earth Summit, “The Earth Summit is at Risk” Asahi Shimbun, 18th February 1992.

7 Peter Dauvergne, developed the concept of “shadow ecology” in his book “*Shadows in the Forest- Japan and the politics of timber in South East Asia*”(1997).It assessed the total environmental impact of one country on the resource management in another country.

8 Helmut Wedner, “*Japanese Environmental Policy in an International Perspective: lessons for a preventative approach*”, in “*Environmental Policy in Japan*”. ed. Shigeto Tsuru and Helmut Weidner (Berlin : Edition Sigma, 1989), pp. 481-482.

Asia capitalizing on their weak environmental regulations. This move proved to be ecologically costly to the host nations. Unfortunately, more often than not, developing economies do not respect the merits of environmental protection. Environmental protection is likely to come at the expense of some economic growth. So, they are reluctant to make the trade off.

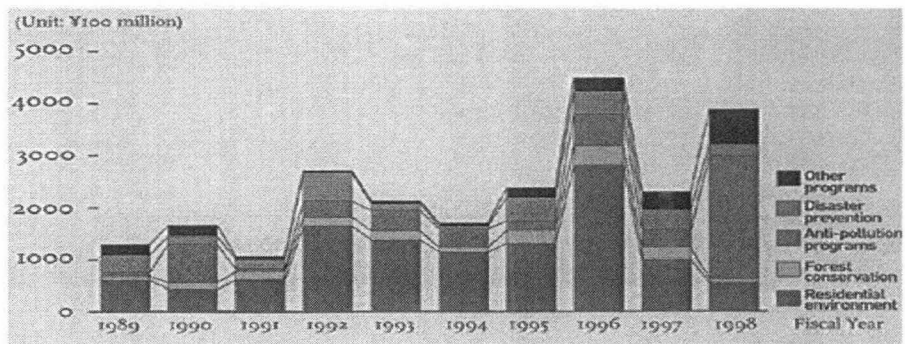
To cite some instances, in 1977, Kawasaki Ironworks moved to Mindanao Island in Phillipines after severe protest by environmental groups in Chiba. In the same year, Japanese Companies Marubeni, Sumitomo Shoji and Itochu established the Basar Copper Smelting Plant in the Isabela region of Leyte Island in Phillipines. They were accused of creating environmental security threats by irresponsible resource extraction and also of polluting the fishing resources. Major Japanese trading companies were involved in tropical rain forest logging in Sumatra and Papua New Guinea. In 1982, in the suburban area of Ipoh city in Malaysia, Mitsubishi Kasei Corporation established a joint venture called Asia Rare Earth's Company. The health of the workers were jeopardized by the plant's waste products which contained radioactive thorium. In certain cases, these projects were supported indirectly by Japanese Official Development Assistance(ODA) and Aid designed to assist the private sector.

Work on pollution export extensively featured in *Jishu Koza* (Independent Forum), the environmental magazine edited by Uni Jun. The Japanese Environmental Agency's (EA) annual *White Paper on Environment*, 1999 states that "thinking about the problems about the global environmental burdens caused by (Japan's) economic structure.....it becomes clear that substantial environmental burdens are imposed on various foreign countries through extraction and the manufacturing processes". Accordingly, Japan "feels it necessary to reduce overseas environmental burden attendant upon the import of materials

and manufacturing products'⁹.

During the late 1980s, the ruling triad heavily emphasized on Japan's leadership role in environmental technology. There were noticeable greening of Japanese politicians which had a great impact on national practices. Japan's visibility in overseas environmental programs has increased considerably. Japan's Official Development Assistance (ODA) Charter, approved by the Cabinet in 1992 (revised in 2003), has been the foundation of Japan's aid policy. The first principle to qualify for Japanese ODA states that "Environmental conservation and development should be pursued in tandem". The Government of Japan identifies environmental protection as one of its most crucial areas of cooperation. In fiscal year 2002, environment related projects accounted for approximately 35% of its ODA. At the World Summit on Sustainable Development (Johannesburg Summit), held in August and September 2002, Japan announced the Environmental Conservation Initiative for Sustainable Development (EcoISD), and Japan's environmental ODA has been based on this initiative since then.

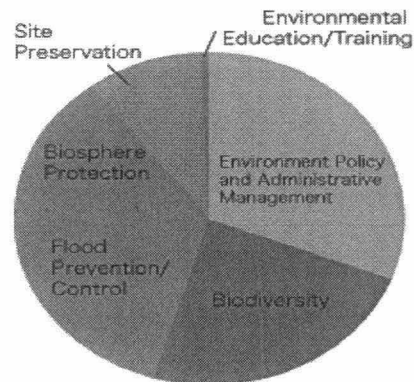
2.1 Environmental conservation within the Japanese ODA framework



Source: Ministry of Foreign Affairs

9 Derek Hall (2001), "Japan's role in Asian Environmental Crisis: comparing the critical literature and the Environmental Agency's White Papers", *Social Science Japan Journal*, Vol.4, No.1, pp. 95-102.

2.2 Japan's ODA Commitments by Category: 2003-2005



Source: Ministry of Foreign Affairs,

Category	Commitments
Environment Policy and Administrative Management	208
Biodiversity	160
Flood Prevention/Control	158
Biosphere Protection	77
Site Preservation	65
Environmental Education/Training	4
Environmental Research	1
Total	673

Unit: US\$1 million (based on commitments)

Source: OECD/DAC-CRS Online Database (as of March 2007)

In 1989, Council of Ministers for Global Environmental Conservation was constituted to further the development of Japanese global environment policy. With the 1992 Rio Earth Summit, changing discursive practices were rapidly unfolding in the Japanese environmental politics. The 1990s marked a fundamental shift in Japanese environmental governance with emphasis being placed on 'network style' of environmental decision

making bringing together government, citizens, business and NGOs. This shift can be traced from three distinct sources.

- *First*, the collapse of the bubble economy and the subsequent economic stagnation, financial crisis, corporate bankruptcies and growing unemployment led to the erosion of public trust on LDP, bureaucrats and corporations for nurturing end less cycles of public debt financing for massive infrastructure projects impacting on environment across the archipelago. With the emergence of a politically sensitive, educated middle class possessing liberal democratic values resulted in shift in Japanese approach creating some new opportunities for a relatively more participatory policy making.

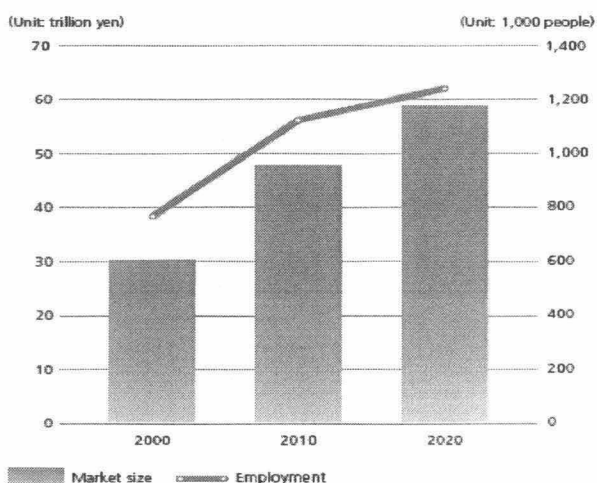
- *Secondly*, in the 1997, MOFA, nurturing Japan's green leadership aspirations, decided to host the Third Conference of Parties to the Climate Change Convention (Kyoto Protocol). However, Japan was uncomfortable about the incredibly low profile of the Japanese civil society prior to the international conference as compared to its Western counterparts. An unintended consequence of this decision was that the State placed pressure upon itself to undo the institutional barriers that it had created to the formation of a vibrant civil society.

- *Thirdly*, in the 1990s, some segment of the ruling triad began to perceive huge potential in the environmental sector. Environmental issue area was no longer seen as a burden rather cherished as an lucrative opportunity in the world market. According to JETRO , the eco business market is projected to grow from 28.9 trillion yen in 2000 to 47.2 trillion yen in 2010. Japan ranks third in the world in environmental technology sophistication after Germany and US. In 2004, Japan

captured 20% of international environmental technology market. Eco business provide green technology, production and services that contribute to the protection of the environment.

2.3 Eco business market size

A 47 trillion Yen market by 2010:
Changes in market size of ecobusiness



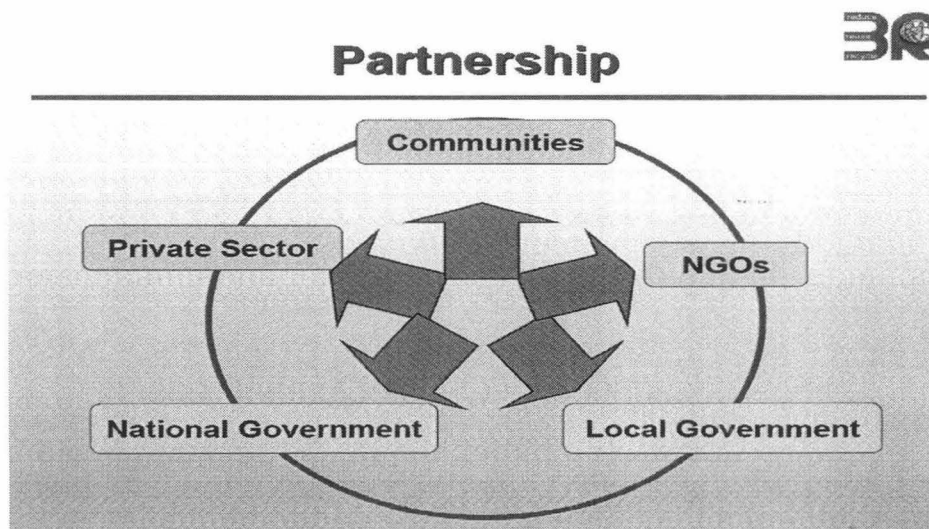
Source: Prepared by JETRO based on the Environment Ministry's "Market size of ecobusiness in Japan and present situation and outlook of employment."

Source: JETRO

This period witnessed a new form of political opportunity structure with fewer barriers to civil society participation. In 1989, the opposition parties won unprecedented control of the Upper House of the Diet. Subsequently, in 1993, shattering the LDP's almost half a century rule, a coalition of opposition parties was in charge of the powerful Lower House of the Diet. This electoral loss marked the end of the LDP's dominance in Japan and shocked the ruling triad as it challenged their institutionalized control over the state. Numerous environmental initiatives were undertaken during this period which infused breath of fresh air in Japanese environmental governance. In November 1993, Prime Minister, Morihiro Hosokawa, passed a revised Basic Environmental Law, embracing environmental regulatory administration advocating that Japan should pursue economic development through activities that will reduce load on the environment

as much as possible and help maintain sound economic development while enhancing the blessings of the environment. It further puts forward the message of Japan's responsibility for promoting international efforts to cope with global environmental issues, for instance, global warming, ozone layer depletion, marine pollution and decreasing biological diversity (Art. 5 and Art 32) (Asano 1994; Ishizaka 2000; Kurasaka, 2004). This was given further boost by the passage of the Basic Environmental Plan in 1994. This marked a departure in Japanese environmental governance as it called for 'network style' of environmental governance. The Plan was built on earlier forms of Japanese business-government cooperation along with the incorporation of greater civic participation.

2.4 network style environmental governance



Source: Ministry of Environment, Japan

Environmental Performance Review of Japan (OECD 2002) suggests that in the 1990s, Japan's environmental legislation was further developed. Overall, the mix of instruments used to implement environmental policy is highly effective. Regulations are strict, well enforced and based on strong monitoring capacities. Significant progress has been made in tackling non-conventional air pollutants (e.g. dioxins, benzene), and waste management can be expected to improve further with the recent overhaul of the relevant legislative

framework. Espoused by the concept of sustainable development, the Japanese environmental administration has focused attention on the notion of 'ecoefficiency', 'sound material cycle society' (*junkan-gata shakai*), 'environmental load', 'zero emission', 'recirculatory society'. The ecological modernization position reflects in the epicenter of Japanese economic planning.

It is urgently necessary to construct a new economic system in which the environment and the economy can coexist. To ensure the sustainable development of Japan in the 21st century it is vital to dispense with the conventional economic system of mass production, mass consumption and mass disposal, and to aim at a fundamental revolution towards a recycling oriented economic system by means of the "environmentalization of the industries" (business activities of measures for conservation of the environment and resources) and "industrialization of the environment" (creation of market value through measures for conservation of the environment and the resources), with private sector vitality brought fully into play.....recycling oriented economic system is one in which measures for protection of the environment and conservation of the resources are built into every aspect of industrial and economic activity, and in which the social and behavioral standards that were accepted in conventional economic society, which generally gave little thought to measures for conservation of environment, are converted into a society in which the environment and economy are integrated.

**Towards Advancement of a Recycling Oriented Economic System,
Environment Committee, METI, February 2002.**

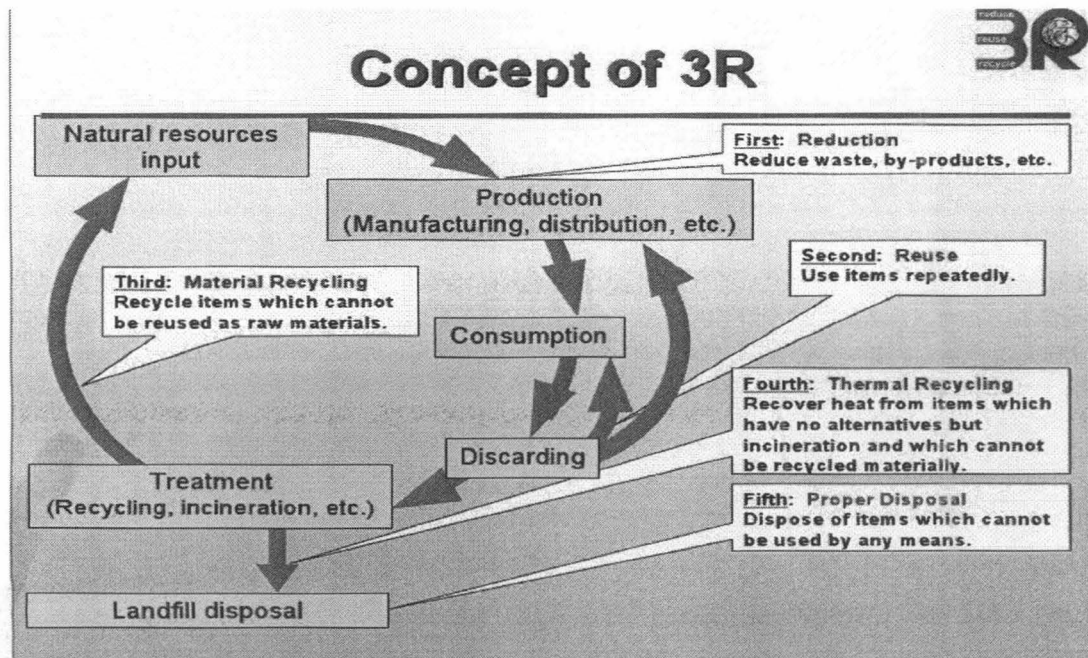
In this fourth stage of intervention, Japanese policy approach reflects that there is a fundamental shift from the conventional system of mass production, mass consumption and mass disposal to a sound material cycle society where measures to minimize the environmental burden is inbuilt at every stage of economic and industrial planning,

yielding the desired advancement of ecological modernization.

In order to make it possible to minimize natural resource consumption, waste generation and environmental impact in the entire life cycle of products, Japan should work forward establishing a system in our economy and society that covers “from cradle to cradle”, that is, from use to reuse, with the utilization of recycled materials and parts in view (change to a life-cycle-oriented society), rather than a system that covers “from cradle to grave”, that is, from use to disposal, considering the process from production to disposal.

For Establishing the Green Product-Chain, Waste Prevention and Recycling Subcommittee, Environment Committee, Industrial Structure Council/ METI, August 2005.

2.5 concept of 3 R (Reduce, Reuse and Recycle)



Source: Ministry of Environment, Japan

2.3 Institutional dynamics in environmental decision making

Environmental decision making in Japan has been a fiercely contested area across Ministries and particularly between the Ministry of Economy, Trade and Industry (METI), Ministry of Environment (MOE), Ministry of Land, Infrastructure and Transport (MLIT) and Ministry of Foreign Affairs (MOFA). The dominant theme in the existing literature alludes the subservient status of the Environment Agency with respect to the other development oriented Ministries in the 1970s and the 1980s. Under the jurisdiction of the Prime Minister's Office, the Environment Agency was institutionalized in 1971, following the explosion of environmental disruptions and severe protests across Japan in the late 1960s. Its scope was severely constrained by restricting the Agency to promote policies for pollution and nature conservation. During the first two decades, the Agency struggled to influence national policy making dominated by the pro-development Ministries (Barrett and Therivel, 1991). It was responsible for planning of the basic environmental policies and overall coordination of environmental measures across Ministries. It promoted environmental research through National Institute of Environmental Studies (NIES) and Center for Global Environment Research and the National Environment Training Institute (Kondo 2001).

However, with the fundamental shift in the Japanese environmental approach in the 1990s, Environment Agency was upgraded to the Ministry of Environment in January 2001. Institutionalization of the Ministry of Environment enhanced the status of the Agency putting it at equal status with other powerful Ministries. The Ministry held the responsibility of Government wide environmental policy (a coordinating function), environment basic planning at the national and regional pollution control programming, waste measures, pollution regulation and monitoring and conservation of nature and biodiversity. In January 1994, Central Environment Council (CEC) was established in

accordance with the Basic Environment Act of 1993. It provided a platform for effective policy consultations and negotiations, with some of its meetings open to public. Extensive public hearings take place on policy proposals.

As environmental decision making encompass various Ministries (METI/MLIT/MOFA/MOE), furthering opposing lobby interests, all try to exert considerable influence to shape the policy approach. In 2001, Wong argued that powerful ministries often dwarf the MOE which is restricted to an advisory role with respect to control of chemicals, industrial waste control and recycling, factory location control, radioactive substance monitoring, climate change, conservation of forest, rivers, lakes and coastal areas. Today every Ministry places considerable emphasis on pro-environmental policy, for instance, METI has a separate Environmental Committee. Within the overall expenditure of the national environmental regime, MOE enjoys around 9% of the total budget (Barrett, 2005). In 2003, this amounted to 262 billion yen from a national environmental budget of around 2.7 trillion yen essentially representing tripling of the budget compared to Japan's Environment Agency in 1999. In 2003, MLIT had a total budget of around 6.7 trillion yen which included an environmental component of 1.3 trillion yen. METI's 2003 environmental budget of yen 320,282 million exceeded the total budget of the MOE standing at Yen 262,277 million.

METI laid the foundation of Japan's recirculatory society by enacting 9 effective recycling laws in and around 2000 to facilitate its 3R policy of Reduce, Reuse and Recycle. MOE was institutionalized in 2001. It is often argued that this was METI's attempt to take the lead and retain its authority on the issue of environment with respect to MOE. MLIT is shouldering the responsibility of promoting a recirculatory society through effective recycling of construction waste and car recycling. MLIT is essentially responsible for

much of the infrastructure development, national planning function, land use and transportation issues. So it is problematic for MOE to attain many of its goals without the cooperation of MLIT as Japan is often referred to as the archetypal and construction state.

Overseas Development Assistance (ODA) and multilateral agreements are the two effective instruments utilized by MOFA to project Japan's global environmental leadership image. World has witnessed Japan's initiatives in the United Nations Stockholm Conference, World Commission on Environment and Development, in hosting Third Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and more recently in evolving an effective post Kyoto regime. Japan's ODA, keeping in tandem with the United Nations Millennium Development Goals of 2000, promotes meaningful development in Asia. In August 2002, Japan announced the Environmental Conservation Initiative for Sustainable Development. In September 2002, Japan also launched the Clean Water for People Initiative at the World Summit on Sustainable Development. Japan International Cooperation Agency (JICA) plays an instrumental role in furthering this goal. Constructive efforts are on the way to integrate the civil society in the ODA process and to build new modes of NGO-MOFA cooperation (Hirata, 2002). Council for comprehensive ODA strategy was instituted on 2002 which incorporated the academics, NGOs and the business representatives.

Since April 2002, Japan Bank for International Cooperation (JBIC) outlined new guidelines for the confirmation of environmental and social considerations of international financial operations and overseas economic cooperation. The new guidelines categorically outlines that right from the planning stage onwards the implementing agency should solicit stakeholder's participation in the project. After the unpleasant experiences in the past, for instance the case of pesticide aid to Cambodia/Narmada Dam construction in

India/Kotopanjang Dam in Indonesia, there has been careful modernization of the Japanese ODA program, which is often considered to be one of the most significant tools of Japanese foreign policy.

Japan is expected to pursue proactive yet balanced environmental diplomacy. In 2007, Prime Minister Shinzo Abe, initiated the Cool Earth 2050 initiative, a new framework which moves beyond the Kyoto Protocol, in which the entire world will participate in emissions reduction. His vision of Cool Earth 2050 is based on three fundamental pillars (A) a long-term strategy to reduce the emissions of greenhouse gases globally (B) three principles for establishing an international framework to address global warming from 2013 onwards. These are (a) All major emitters must participate, moving beyond the Kyoto Protocol, leading to the global reduction of emissions. (b) The framework must be flexible and diverse, taking into consideration the circumstances of each country and (c) The framework must achieve compatibility between environmental protection and economic growth by utilizing energy conservation and other technologies. (C) Launching a national campaign for achieving the Kyoto Protocol target. All the world's countries need to unite to make best efforts to establish a low-carbon society by "reducing global emissions by half from the current level by 2050." For example, if CO₂ emissions per capita were the same worldwide when the 50% reduction is realized, the developed countries would need to reduce its per capita emissions by 70 to 80 % from the current level, and the developing countries would need to keep approximately the current level while achieving economic growth and improved quality of life.

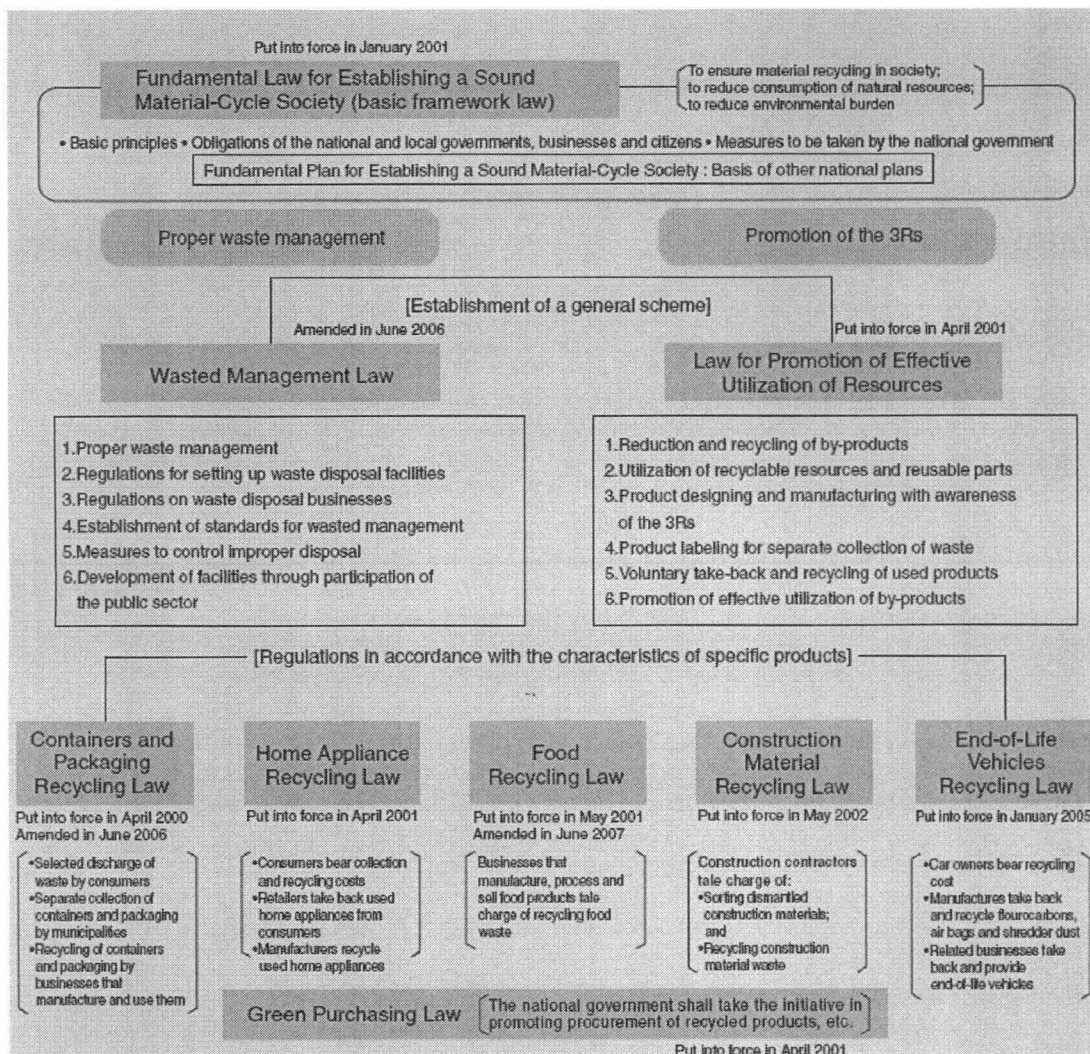
Climate Change was one of the most important Summit themes of the G8 Hokkaido Toyako Summit (July 7-9, 2008). The G8 has send a strong message to the world for development of post-2012 framework on climate change (after the first commitment period

of Kyoto Protocol). Japanese Prime Minister Fukuda asserted that

“It is essential to have a ‘total participation’ framework that includes all the major economies, not just the EU and Japan.....Japan will negotiate tenaciously in order to build international agreement on ‘fair and equitable rules’ which are approved by all.”

At the annual World Economic Forum held in Davos in January 2008, Prime Minister Fukuda outlined his new proposal aimed at ensuring equity in the target setting for the post-Kyoto framework. On June 9, Prime Minister Fukuda announced Japan’s new proposal “In pursuit of ‘Japan as a Low-carbon Society’. Strategy for Building a Low-Carbon Society calls for desirable action from the citizens, corporations and government. “Eco-participation,” “eco-thinking,” “eco-sharing”, “eco-learning,” “eco-buying,” “eco-use,” and “eco-disposal” are encouraged. Low-carbon-oriented products, the promotion of technological innovations on a global level and creation of new low carbon business models to be emulated in the developing economies are evolved. Minister of the Environment Dr. Saito announced "The Innovation for Green Economy and Society" on April 20th, 2009. This plan triggers the recovery of Japan’s active economy through green innovation of economy and society. Innovation toward green social capital, green consumption, green investment and green technology is expected to push integrated improvement of the environment and economy. With the realization of a 'low carbon society', 'a sound material cycle society' and ' a society in harmony with nature', Japan is expected to consolidate its environmental leadership role to evolve a 'green Asia’.

2.6 ecological restructuring of Japanese legal framework



Source: Ministry of Environment, Japan

2.7 Waste Recycling

unit: million tons

Industrial Waste	FY 1995	FY 2000	FY 2004	FY2005
Total Volume of Waste Generation	393,812	406,037	417,156	421,677
Recycling	146,620	184,237	213,862	218,888

Source: Ministry of Environment, Japan

2.4 Features of Japanese environmental policy making/formation

In the 1990s, the Japanese environmental policy underwent large scale restructuring and the environmental administration was consolidated so that environmental considerations could be more effectively integrated in sectoral policies (Asano, 1994). The 1960s was the era of regulatory standards, technical guidelines, monitoring and inspection systems to deal with environmental problems. During the 1970s, a command and control approach was devised to tackle the monumental crisis of pollution. In the 1980s, there was a shift from the loco centric environmental policy approach dealing essentially with pollution to global environmental problems like climate change, global warming, ozone depletion so on and so forth. Traditional pollution control approaches based on standards and regulations proved ineffective to solve these challenges of global dimensions (Amano, 1994). Japanese style command and control approach made way for voluntary actions that are premised on the spirit of partnership and participation. Greater emphasis is being placed on the enhancement of partnerships and collaboration among the government, citizens and the business (Imura, 2005).

The concept of 'harmony' and 'consensus' is interwoven into the Japanese *shingikai* method of decision making. Simply put, it is a typical Japanese way of group decision making and building consensus among various interest groups. Important policy decisions of government ministries are made based on discussions and reports of *shingikai* and *kentokai* i.e. the expert committees (Imura, 2005). Expert committees are organized by the decisions of the director of the respective administrative departments. This is a good method to get an insight into the different views of the various interest groups and build a consensus. It is often argued that by incorporating the business into the discussions, the government actually improves the likelihood that the laws and regulations would be strictly implemented once they are put into force. Only after an detailed assessment of the

technological capabilities and feasibility, the environmental regulations put are into force. However, it has been severely criticized for its closed nature essentially because the selection and nomination of the committee members are up to the discretion of the government Ministries and agencies (Suda and Nakamura, 1995). In 1999, with the enactment of the Freedom of Information Law, much of the bureaucratic barriers with regard to access to information in policy making has been taken care off. So governmental policies and projects pertaining to environmental issues are much more conveniently accessible to the civil society.

The 1990s mark a shift in Japanese business attitude towards the environmental cause. Companies realized that it is imperative for them to exhibit concerns for the issue of environmental protection in order to compete with its European and American counterparts, where consumers were highly aware of the green issues. This effectively reflected in the *keidanren*'s (Japan Federation of Economic Organization) "Global Environment Charter" of May 1991. The Charter states that

in carrying on its activities, each company must maintain respect for human dignity and strive toward a future society where the global environment is protected. We must aim to construct a society whose members cooperate together on environmental problems, a society where sustainable development on a global scale is possible, where companies enjoy a relationship of mutual trust with local citizens and consumers, and where they vigorously and freely develop their operations while preserving the environment. Each company must aim at a good global corporate citizen recognizing that grappling with environmental problems is essential to its own existence and its activities

In 1997, *keidanren* published a Voluntary Action Plan, a compilation of industry wide action plans of 37 industrial associations, that addresses four action areas: global warming, waste disposal, environmental management systems that is the International Standard Organization (ISO 14000) and overseas business activities. Ten-Points-Environmental Guidelines for the Japanese enterprises operating abroad upholds the (a) establishment of a constructive attitude toward environmental protection and try to raise complete awareness of the issues among those concerned (b) makes environmental protection a priority at overseas sites and, as a minimum requirement, abide by the environmental standards of the host country. Apply Japanese standards concerning the management of harmful substances (c) conduct a full environmental assessment before starting overseas business operations. After the start of activities, try to collect data, and, if necessary, conduct an assessment (d) confer fully with the parties concerned at the operational site and cooperate with them in the transfer and local application of environment related Japanese technologies and know-how (e) establish an environmental management system, including the appointment of staff responsible for environmental control. Also, try to improve qualifications for the necessary personnel (f) provide the local community with information on environmental measures on a regular basis (g) be sure that when environment related issues arise, efforts are made to prevent them from developing into social and cultural frictions. Deal with them through scientific and rational discussions (h) cooperate in the promotion of the host country's scientific and rational environmental measures (i) actively publicize, both at home and abroad, the activities of overseas businesses that reflect our activities on the environmental consideration, and finally (j) ensure that the home offices of the corporations operating overseas understand the importance of the measures for dealing with environmental issues, as they effect their overseas affiliates. The head office must try to establish a support system that can, for instance, send specialists abroad whenever the need arises.

Apart from the *keidanren*, there are other influential business associations participating in the environmental decision making in Japan. For instance, *Keizai-Doyukai* (Japan Association of Corporate Executives), a society of influential business leaders and the Japan Chamber of Commerce. In 1999, *Keizai-Doyukai* came up with recommendations addressed to private corporations called 'Our Resolution Towards the Prevention of Global Warming'. These associations have also kept close ties to international business initiatives such as the Eco Audit program of the International Chamber of Commerce and the 'Changing Course Report' of the World Business Council of Sustainable Development (Imura, 2005).

One of the most conventional tools to achieve the desired environmental goals is the command and control approach based on regulatory laws and standards. Contrary to this is the approach advocating for the economic instruments, for instance, eco-taxes, charges, emission permits. OECD's Environmental Committee puts forward that both the approaches are complimentary and mutually reinforcing. The third is the unconventional approach of voluntary actions. This approach may be defined as encompassing different forms of commitments, agreements or contracts whereby polluters agree to achieve specific environmental objectives, possibly above and beyond current regulations. It reflects the search for greater flexibility and a reduced regulatory burden (Imura, 2005).

Japan has successfully evolved an effective voluntary approach in environmental policy decisions. For instance, in the 1960s, PCA's (pollution control agreements) were evolved by the local environmental authorities and the Japanese enterprises; the *keidanren* has their own VAP (voluntary action plan) and there is an ever increasing voluntary environmental management compliance by the Japanese companies under the ISO 14001. The number of ISO 14001 certifications is an index that demonstrates the rise of environmental

preservation awareness. According to the International Organization for Standardization, the number of ISO 14001 certificates in Japan reached 23,000 at the end of December 2005, the highest number in the world (Invest in Japan, Attractive Sector Report, JETRO)

With the enactment of the Basic Environment Law in 1993, Japan has encouraged voluntary actions by all the stakeholders to achieve the outlined collective targets. In establishing framework regulations, the government sets targets but refrain from strictly regulating stakeholders actions. Instead government establishes laws that require relevant entities to achieve targets by appropriate voluntary measures. For instance, the Voluntary Action Plan of the *keidanren* under which industry wide collective target are set, but each company is allowed to choose which method to adopt to meet those targets. There has been a marked shift from the traditional command and control method of environmental protection to market based approaches and voluntary schemes.

Carraro and Leveque classifies voluntary approaches into three distinct categories, namely, unilateral commitments, public voluntary schemes and the negotiated agreements. Unilateral commitments are set by the industry acting independently without any involvement of a public authority. These are often called business led initiatives. VAP (voluntary action plans) are unilateral commitments by the industries. Negotiated agreements are settled between the public regulatory authority and the industry. The agreement is the outcome of negotiations between the two parties. At the industry side, individual firms or industrial association signs the agreement and both parties may influence the design of the voluntary agreement based on a number of factors. For instance, PCA (pollution control agreements) in Japan can be considered to be negotiated agreements. Public voluntary programs are designed by the public authorities. There are no negotiations about the targets in this programs. The authorities wait for the firms to support

the program but they may put up positive inducement to motivate the industry to participate in the program.

Some economic models approve of carbon tax as one of the most effective way to reduce emission. Although METI and MOE acknowledges the potential benefits of environmental taxes, there has been some hesitation in case of introducing environmental taxes in Japan because the Ministries failed to reach a consensus on the actual scheme. In December 2005, The Ministry of the Environment (MOE) released the outcome of a questionnaire survey conducted on the environmental tax to be imposed on emitters of carbon dioxide (CO₂) according to levels of their emissions as one of the measures to tackle climate change. The MOE conducted the survey via the Internet from November 28 to December 1, 2005 and received answers from 1,442 people aged 20 and over across Japan.

Q1: Recently, more and more municipalities are introducing fees on waste treatment. Similarly, it is necessary to share the costs of protecting the precious global environment from adverse impacts of climate change. The basic concept of the environmental tax is to share the cost according to the levels of CO₂ emitted. What do you think about this idea of environmental tax?

A1:

Approve	194 (13.5%)
Generally approve	755 (52.4%)
Generally disapprove	259 (18.0%)
Disapprove	113 (7.8%)
Do not know	121 (8.4%)

Q2: Germany and the UK have already introduced the environmental tax. In Japan, the MOE has recently put forward a concrete proposal on its environmental tax scheme. The

proposal suggests the tax rate to be about the price of a cup of coffee (180 yen) per month for an average household. Even with this low rate, the environmental tax can help pay for 5.2 million ha of forest management, solar panels for 500 thousand households, 1,820 units of wind mills, 900 thousand units of environmentally-friendly houses ("eco-houses"), 33 thousand units of eco-buildings and 350 thousand clean energy vehicles. Do you approve of this proposal on environmental tax?

A2:

Approve	384 (26.6%)
Generally approve	737 (51.1%)
Generally disapprove	168 (11.7%)
Disapprove	82 (5.7%)
Do not know	71 (4.9%)

FY 2006 Tax Reform Pertinent to the Ministry of the Environment

Source: Ministry of Environment, Japan

Major items pertinent to the Ministry of the Environment:
1.Global Warming Prevention and Atmospheric Environment Conservation
Tax measures to promote popularization of low-emission and fuel-efficient vehicles include: -For the greening of automobile tax, prioritizing eligible vehicles for tax reduction, and then extending the reduction period. -Prioritizing eligible vehicles and extending the application period for tax preferential measures (such as setting the tax base at 300,000 yen less than the acquisition price) for the acquisition of fuel-efficient vehicles achieving a certain level of exhaust gas emission. -Limiting diesel vehicles eligible for the acquisition tax preferential measure to those meeting the fuel efficiency standard for heavy-duty vehicles as well as achieving a certain level of exhaust gas emission. -Creating a property tax reduction measure for non-road special motor vehicles that comply with the emission control standards.
In order to promote the use of biomass, add facilities using biomass to the list of those eligible

for the taxation system for stimulating investment to promote structural reform in the supply and demand of energy and also to the list of those eligible for the special depreciation system, such as recycling facilities.

2. Waste Management and Recycling Measures Aiming at the Creation of a Sound Material-Cycle Society

In order to promote the improvement of recycling facilities, extend the period of the special depreciation system regarding the recycling facilities and preferential measures for the property tax base regarding waste recycling and treatment facilities.

In order to promote waste treatment measures -Extend the period of preferential measures for the property tax base regarding waste treatment facilities. -Expand preferential measures regarding waste asbestos treatment facilities.

3. Environmental Pollution Prevention, Securing of Relief and Safety of People

Extend the periods of the special depreciation system and the property tax base preferential measures for pollution control facilities.

4. Future Issues

As for the environment tax, the following was stated at the beginning of the "Future Issues" section of the FY 2006 Tax Reform. In order to play a leading role in combating global warming in the world, Japan, as an environmentally advanced nation, has decided to attain the 6% reduction target under the Kyoto Protocol Target Achievement Plan. In April, 2005, the cabinet decided to have both the national and local governments initiate various policies and measures in this regard. Bearing in mind that the first commitment period of the Kyoto Protocol will begin in 2008, Japan will examine environment taxes (carbon tax) comprehensively, by taking the following into consideration: its role in overall policy measures, its overall effect, its influence on the national economy and international competitiveness of industries, and its relation to the existing tax system, while gaining the understanding and cooperation of taxpayers.

2.5 Conclusion

Since the 1990s, Japanese environmentalism has graduated to the fourth stage of the *Environmental Control System* and thereby synergies with the ecological modernization theory. The strength of restructuring the policies during this period lie in its promotion of a win-win solution to ecological risks. In the age of an increased environmental risk, the logic of ecological modernization has never been so compelling. Ecological modernization promises a theory that is both sustainable and dynamic, both green and productive. It provides considerable scope of reforming the economy along the ecological lines.

Post 1990, Japanese green policy innovations and more so the decision making process, conveys the underlying fundamental equation of a win-win situation in economy-environment interaction. Aligning with the basic premise of the ecological modernization theory, there has been a centripetal movement of ecological interests into policy arena on a primary basis in Japan. Greening of the economic policies, grounded on the logic of ecoefficiency pushes Japan as an ecologically modernized state. The case of corporate social responsibility no longer pushes the business to calculate economic success in terms of gross national product, but is increasingly calculated on the long term goals of sustainable development. To this effect, Japan has successfully explored the potential of a more participatory form of environmental governance, breaking away from the traditional model. Japan is said to have undone much of its elitist, closed and strongly bureaucratic system which provides little space to pluralistic influences. There should be no apprehensions regarding integration and meaningful internalization of environmental considerations into the administrative planning process and the Japanese Inc.

Asserting the hypotheses, *Ecological restructuring of policies depict Japan as an*

ecologically modernized State in the midst of a transitional political opportunity structure, this research aligns with the second school of thought in the existing literature.

Chapter Three

ENVIRONMENTALISM AND JAPANESE CIVIL SOCIETY

3.1 Introduction

Tracing the academic debate over Japanese civil society, in general, reflects a clear fault line between the two schools of thought, namely the *Japanese school* and the *Western school*. The Japanese school of thought argues that since 1990, 'new levels of permeability' in the 'boundaries between State and civil society' created opportunities for environmental civil activism (Barrett, 2005). There has been an erosion of developmental State which has earlier marginalized civil society and the diffusion of global norms leading to value change and greater civil activism in Japan (Keiko Hitara, 2002). Hasegawa Koichi argues that Japanese environmental movement has brought about changes in the conventional mode of bureaucratic decision making process through establishing a new public sphere that represents the growing maturity of civil society in Japan. Chika Shinohara opined that weakening of citizen's trust on State decisions has triggered the process of effective environmental activism in Japan. The Western school of thought argues that because Japanese State and business has been extricably joined since the beginning of the Meiji era, both have shaped and molded public discourse on public good in such a way that it is extremely difficult to discern the existence of a public sphere standing between the two. "The scope of public sphere in modern Japan is extremely limited" (Helen Hardacre, 2003). Sheldon Garon argues that Japanese environmental civil society has struggled to assert the level of influence found by its counterparts in Europe. Miranda A. Schreurs, one of the most vocal critics, maintains that whereas environmental movements and Green parties have been central players in the environmental policy formation in the West, in Japan environmental movements failed to become institutionalized. Environmental community's strength and effectiveness have a lot to do with institutional structures and the opportunities and barriers they present to the

environmental actors. It is believed that the civil society has been forcefully kept out of the decision making process. Andrea Revell suggests that Japan has endowed very limited counter-powers to its environmental civil society.

Situated in the broader context of this research, this chapter essentially argues that *greater environmental civil activism depicts Japan as an ecologically modernized State in the midst of a transitional political opportunity structure*. For the purpose of the research, 'greater environmental civil activism' will be treated as the independent variable while 'Japan as an ecologically modernized State' will be dependent on it. 'Transitional political opportunity structure' will serve as an intervening variable. Modest effort is to trace the historical trajectory of the Japanese environmental community and explore the extent to which it got institutionalized subject to manipulative equations between actors, interests, institutions and ideas and finally evaluate the environmental civil society in terms of its maturity to influence important policy decisions. Before further discussions, let us consider how civil society is defined?

Civil society is often referred to as an uncoerced collective action around shared interests, purpose and values.¹ Simply put, civil society is constituted by autonomous associations formed voluntarily by citizens to further common social interests (Robert Putnam, 1993). Civil society is the realm of organized social life that is voluntary, self-generating, (largely) self-supporting, autonomous from the State, and bound by a legal order or set of shared rules. It is distinct from "society" in general, in that it involves citizens acting collectively in a public sphere to express their interests, passions, preferences, and ideas to exchange information, to achieve collective goals, to make demands on the State, to improve the structure and functioning of the State, and to hold State officials accountable

1 This is drawn from the London School of Economics Center for Civil Society's working definition.

(Diamond, 1999). Robert Pekkanen defines civil society as the 'organized non-state, non-market sector'. Civil society consists of sustained, organized social activity that occurs in groups that are formed outside the State, the market and the family. Such activity creates a public sphere outside the State, a space in which groups and individuals engage in public discourse (Susan Pharr, 2003).

3.2 Contending Perspectives on Japanese civil society

Evolving a comprehensive understanding of Japanese civil society would invariably mean considering an insight into four different perspectives. Frank Schwartz and Susan Pharr, in their book *The State of Civil Society in Japan*, clarify the concept of civil society through the prism of an 'activist state'. Taking a *institutional statist view*, these scholars argue that "perhaps the most striking feature of Japan's civil society over the past century, dating from around 1900, has been the degree to which the State has taken an activist stance toward civic life, monitoring it, penetrating it, and seeking to steer it with a wide range of distinct policy tools targeted by group or sector" (p. 325). Robert Pekkanen successfully captures Tokyo's regulatory role from a political-institutional point of view, arguing that State laws and regulations have prevented many independent civic groups from gaining legal status and access to resources and tax exemptions.

The *social pluralist perspective* believes that globalization and industrial maturation have weakened State authority and sparked the growth of NGOs in Japan. In the book, *Civil Society in Japan*, Keiko Hitara 'unravels the myth of Asian civil society and democracy. Many influential writers such as Samuel Huntington (1993) argues that civil society is a western phenomenon and ill-suited to Confucianist East Asia'. Hitara continues to argue that 'it is misleading to think that East Asians remain deferential to State authority and will not develop a vibrant civil society critical of State power. On the contrary, civil society and

democracy are influenced by both globalization and industrial maturity rather than being based on supposedly unchanging civilizational values. People in the region has increasingly become defiant against State authority, despite the myth of Asian cultural deference to hierarchy. Indeed, the concept of 'Asian values' is conveniently used today by a few regional leaders who wish to hold on to power by discouraging citizen activism.....'. Tsujinaka Yutaka argues that Japanese civil society is changing and coming to resemble that of western nations. He illustrates the recent growth and pluralism of civil society organizations. Reimann reiterates the rapid expansion of international NGOs, supported in part by new State funding, supporting the argument of declining Japanese developmental State and the corresponding growth and influence of NGOs and increase in State-civil society cooperation.

Culturalists argue that Japanese values inculcate conformity and obedience to authority and this acts as a barrier to institutionalize environmental movements. They amplify harmony, conformism, collectivism, total commitment to group based on the foundation of a Confucianist culture. Traditional Japanese culture stands opposed to the value of individual efficacy. Distinctive Japanese national identity or cultural nationalism in the form of *nihonjinron*, underpins the culturalist perspective. Cultural dimension acts as a catalyst, in 'framing' a particular issue both in terms of its degree of concern and in determining the need for personal action.

Aligning much with the previous framework, the *social hegemony perspective* argues that Japanese community organizations have been embedded within external and internal vertical social relationships preventing their emergence as associations in the original sense. This perception essentially draws from the earlier works of Che Nakane, 1970; Murakami, 1984; and also from recent ethnographic works of Broadband 1998. These

works vehemently positions that Japanese communities tend to be dominated by vertical clientelistic ties to conservative patrons. Plurality and diversity in Japanese society is conditioned by the prevalent community social patterns which breeds vertical relationships.

Each of the four perspectives stand partial grounds but none of them, individually, can offer a comprehensive explanation of Japanese civil activism discourse.

3.3 Tracing the trajectory of the Japanese environmental movement

The prewar imperial Japan legacy, which provided very limited space to civil liberties (for instance, freedom of speech and assembly) continued in the post war era, that is, the first stage of Funabashi's *Environmental Control System* namely the *absence of environmental constraints in the economic system*. So the roots of Japanese civil activism is not very deep as it was manipulated by the activist-developmental State addicted to the goal of economic prosperity. The fact that the development of a modern State was promoted and guided in response to external necessity encouraged the assumption that 'the State is prior and a self justifying entity and sufficient in itself' and the external imposition of democracy after the Pacific War permitted that mentality to survive (Matsumoto,1978).

Reflecting on the growth of Japanese environmental movements, it can be observed that it followed a 'distinctly indigenous path' with the explosion of loco centric groups in the 1960s and the early 1970s followed by a lull in the institutionalization of these movements until the 1990s which is often marked as the watershed era with respect to Japanese environmental discourse. The aggressive economic policies of the Liberal Democratic Party, in the post war period is well documented in the existing academic literature. Japanese developmental State played a pivotal role in thriving an unique pattern of

industrialization, particularly during the developmental era of 1950s and 1960s, combining free enterprise and State led development. The state intervened in the economy determining the strategic industries, providing subsidies and administrative guidance to enhance their international competitive edge and controlling foreign exchange and trade. Foreign imports were a victim of protectionist policies. There was a merchantilistic export led industrialization through effective State guidance and planning. The invisible iron triangle of the political party, big business and the bureaucracy, the *amakudari* system and the organized corruption did not pave a fertile breeding ground for the civil society. Numerous bureaucratic barriers were deliberately created by the state to exert pressure on the civil society and to distance it from the decision making process. This is the reason why Japan is often referred to by its critics as a 'dysfunctional democracy'. Mapping the state policies, it is evident that very little respect was shown to the cause of environment, which failed to organize the voice it deserved through the institutionalization of movements. In the post war era, very few conservation organizations could manage to survive the organized suppression of the State mechanism. For instance, in 1949, the volunteers formed the Oze Marsh Conservation Union to protest the building of a hydroelectric dam that would destroy the marshland which was home to birds. In 1951, this culminated to Nature Conservation Society(Japan).

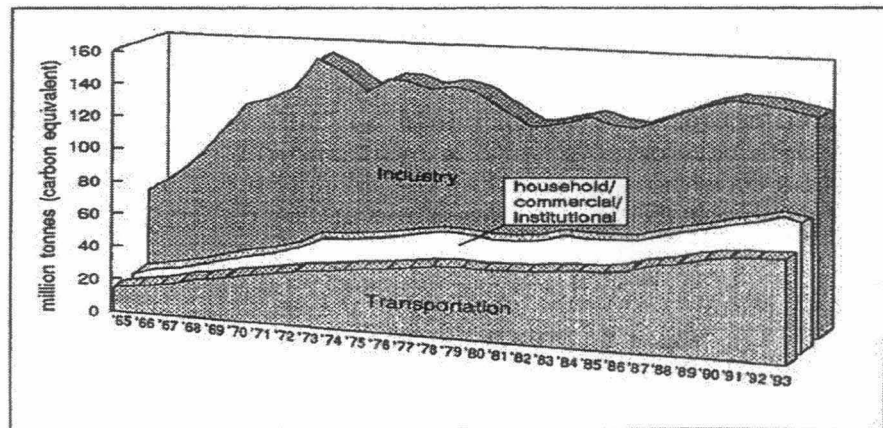
However, in the 1960s and the early 1970s, that is the second stage of the *Environmental Control System*, namely *the imposition of environmental constraints on the economic system*, increasingly deteriorating pollution status in Japan is often referred to as the 'economic miracle' - 'pollution debacle' era. There were mushrooming of local issue based citizen's movement. Unfortunately, these citizen movements were dubbed by the State as the 'left wing radicals' and 'enemies of modernization'. These loco centric movements often found their battle against the industrial giants as an unsurmountable challenge.

Nevertheless, their efforts were spurred by occasional victories. However, the big four pollution cases were monumental in the Japanese environmental activism discourse. It is critical to appreciate the role played by these four major cases - mercury poisoning in Kumamoto and Nigata Prefecture, *itai-itai* disease in Toyama Prefecture and the Yokkaichi asthma case.

The decision of the victims to challenge the government and the industries in the court of law showed the disrespect and trust deficit that citizens harbored against the unresponsive and corrupt government. These environmental groups adopted various strategies, including litigation, media campaigning, and lobbying of local governments, to bring about changes in Japan's environmental policy (Kuroda, 1972; McKean, 1981). The wave of protests that hit Japan in the 1960s signaled the transition from a traditional, hierarchical, deferential political culture to one that questions the authority. These groups succeeded in changing not only local policies but also national policies by winning litigations and making the central government responsible for the environmental problems in question (Pempel, 1982). This marked a huge shift in challenging the traditional Japanese closed political system. Local anti-pollution groups, *Jumin Undo* and the citizens groups, *Shimin Undo*, were very effective at the time of pollution crisis in the 1950s and the 1960s. But these citizen movements, although significant in their own capacities, did not last beyond their particular campaigns. Their long term impact on the environmental decision making was severely limited. The movement's major concerns were fundamentally parochial, such as pollution problems of the groups' own neighborhood, town, or city. The movement was mostly restricted to local issues and did not coalesce into a lasting national force. Once the local environmental problems were solved, the groups were disbanded, without attempting to address other environmental issues beyond their own regions. These positive impacts were temporary. The movement did not result in long-lasting environmental movements

throughout Japan (Hirata, 2002).

3.1 Trends of CO₂ emission in Japan



Source: Environmental Agency, Japan

The local governments, set a precedent for the national government to follow, as they performed much better to the crisis. For instance, in 1969, Tokyo Metropolitan government under the dynamic leadership of Mayor Ryokichi Minobe, enacted the Tokyo Metropolitan Environmental Pollution Control Ordinance, which gave pollution control priority over economic growth and set stricter emission standards as compared to the national level. However, in 1965, reacting to the growing discontent, the Japan Socialist Party and the Democratic Socialist Party submitted basic pollution control bills to the Diet. Any policy reform culminated into a tiff with then MITI (now METI). In 1967, Basic Law for Environmental Pollution Control was enacted which unfolded some superficial legislative and institutional changes. It outlined the responsibilities of the different governmental levels, industries and citizens in pollution control. It called for the creation of pollution monitoring and surveillance system and the development of science and

technology for pollution control and instructed the government to establish environmental quality standards for soil, water and air pollution. In 1968, an Air Pollution Control Law was passed by the Diet.

Fear of possible electoral loss, the national growth coalition, led by the LDP, in 1970, enacted a range of significant environmental legislations (Pollution Diet, 1970). Driven by a sense of urgency, in July 1970, the cabinet established a Special Headquarters for Pollution Control to devise new policies and a special Minister's Conference to coordinate Ministerial views. In November, the Minister's Conference drafted a proposal for the revision of the Basic Law. A month later fourteen major anti pollution bills were passed under the government of Eisaku Sato. In May, 1971, following the Swedish and United States example, Environmental Agency was institutionalized under the Prime Ministers Office. The call for stringent environmental regulations was also strengthened by the long awaited verdicts in the four big pollution trials. In September 1972, the courts decision was in favor of the Yokkaichi asthma victim. This was a significant victory of the environmental groups as against the iron triangle. The court ruled that the six companies in the Yokkachi petrochemical complex were negligent in siting and operating the complex and in failing to use the best available technology to control pollution. Under Buichi Oishi's, then Director of Environmental Agency, initiative various new environmental laws were enacted. For instance, pollution victim compensation law, chemical substance control law, nature conservation law so on and so forth. The pollution victim compensation law was a polluter -financed nation wide compensation system for the victims.

In the 1960s and early 1970s, thousands of locally based environmental citizens' movements arose to protest pollution-related problems. The movements grew in force and

number in part because of the slow response by industry and government to their complaints. Citizen protest, judicial activism, media coverage, and bad international publicity helped to push the Japanese government into introducing environmental laws and an environmental bureaucracy in the period between 1967 and the first oil shock of 1973. LDP decide it wise to respond to these upsurge of the environmental activism to prevent the opposition form amassing political gains. Critics argue that responding to the pressures exerted by these movements, unfolding policy changes were limited to incremental changes that did not challenge the status quo. Thus 'creative conservatism' consolidated the position and helped to retain conservative political forces in power in the years to come.

Moving on, the third stage of Funabashi's *Environmental Control System*, namely the *incorporation of environmental constraints into the economic system on a secondary basis*, spanned form early 1970s to the late 1980s. Unfortunately, these 'grievance-based environmental protest movements' did not survive as organizations or mature into a more stable form; they dissolved by the 1980s (Vosse, 2000 and Schreurs, 2002). The rapid growth followed by the sudden decline of these environmental activism can be traced from the following:

- **pushed into recession by the 1973 oil crisis, focus shifted into economic growth.**
With the transition to stable growth, the primary concerns of the media and the public shifted back towards maintaining economic growth. Pollution grabbed headlines from the second half of the 1960s until about 1973, but received less coverage after the oil shock. Environmental Agency's budget stagnated followed by the dilution and subordination to the powerful pro-development Ministers. This can be best demonstrated by citing the instance of the prolonged power struggle

between Ministry of International Trade and Industry and Ministry of Construction versus the Environmental Agency over the Environmental Impact Assessment Law.

- in 1970, Japan commenced building its system of pollution control laws, which began to mitigate pollution. During this period Japan was often criticized for structural changes in its economy in the form of pollution export into its backyard in the East Asian neighbors with less stringent environmental regulations. Japan's ecological footprint across Asia was highly criticized in the academic literature
- simultaneously, the growth coalition staged a quiet campaign to weaken these environmental movements. They wanted to prevent the institutionalization of these movements into permanent legitimate bodies in the political fabric. This operated at multiple levels. Through its national patron-client machine, LDP activated their local representatives to cajole and bribe their neighbors not to join, or desist from, environmental groups. Parallely, bureaucratic barriers continued to create hurdles for these movements. For instance, there were no constructive information flow, refusal to grant tax exempt status. Japan witnessed the developments of GONGOs in place of citizen groups.. These were government organized NGOs, often referred to as the 'third sector'. These were financed by the big corporates and manned by the retired ministers. These filled the space for 'civil society', giving the illusion of strong grassroots influence when in reality it did not exist (Barrett, 2005).

Hasegawa, Koichi argues that achieving rapid economic growth made Japan the world's second-ranking "affluent society" in terms of economic power. Until the end of the 1960s, it was poor young people with nothing to lose who led Japan's social and environmental movements. Guided by socialist ideals, they hoped to achieve political reform, and further dreamed of revolution. But today's young are the blessed children and the beneficiaries of

the affluent society, and the leading actors in the consumer society. For this reason the media and young people have become progressively apolitical since the second half of the 1970s, and the young are now called the "disenchanted generation." With industrial pollution damage like Minamata disease, it was easy to point out the victims and perpetrators by identifying the giant corporations as the bad guys and the innocent poor as the good guys. But starting in the mid-1970s controversy shifted to pollution from high-speed transportation facilities such as the Shinkansen and airports, and in the 1980s it further shifted to empty can litter, municipal wastes, and other problems related to daily life. Although inadequate anti-pollution measures are deserving of criticism, it is an undeniable fact that the public's need for high-speed transportation was behind the plans for building such networks. Public opinion surveys conducted by the Prime Ministers Office in 1973, reflected the erosion of public interests on the issue of pollution. Responding to queries about the most serious pollution problem, 55.3% said that they were not affected by any problems. 15.8% complained about noise pollution and 10.2% complained about air pollution. In 1979, similar queries were again put to the residents. This time 68.7% responded as experiencing no pollution problems. 12.6% complained about noise and 3.6% about air pollution.

However, records show that NIMBY (not in my backyard) style initiatives continued protesting developments that threatened environment. For instance, a citizens movement in Musashino city in western Tokyo, citizens protest in Nishikamata, group claiming compensation for minamata and other pollution disease victims. In Zushi, the citizens association for the protection of nature and children and the Ikego green operation center protested against the plans of building US military housing in Ikego forest. Citizen's groups were successful in opposing the construction of an airport on Ishigaki island that would have been a death blow to the blue coral reef. Although the Nagara dam and the

Isahaya Bay land reclamation protests failed to yield success, but they succeeded in publicly calling into question state policies that placed public works, construction projects and economic development over environmental concerns. The unsuccessful fight against the Nagara dam was followed by the successful campaign to halt the construction of a dam on the Yoshino river. The failure to save the wetlands of the Isahaya Bay led to success of similar campaigns to preserve the Fujimae wetlands in Nagoya Bay and Sanbanze tidal flats in Tokyo Bay. Citizen's movement has pushed local recycling efforts, greening of local environs, opposed the expansion of airports in Narita and in Osaka. Environmental movement in Japan was essentially a 'victims' movement'. The environmental issues which were not of immediate concern or less visible in their impacts, were not addressed by the government.

The history of the environmental movement has been most thoroughly studied and documented by Iijima Nobuko. She divides the movement into four different categories: 1) the Anti-Pollution Movement (*Han kougai, higaisha undo*), 2) the Anti-Development and Industrialization Movement (*Han kaihatsu undo*), 3) the Anti-Pollution Export Movement (*Takoku he no kougai yushutsu kougai undo*), and 4) the Environmental Protection and Creation Movement (*Kankyo hose, kankyo souzou undo*)

3.4 Institutionalization of the Japanese movements

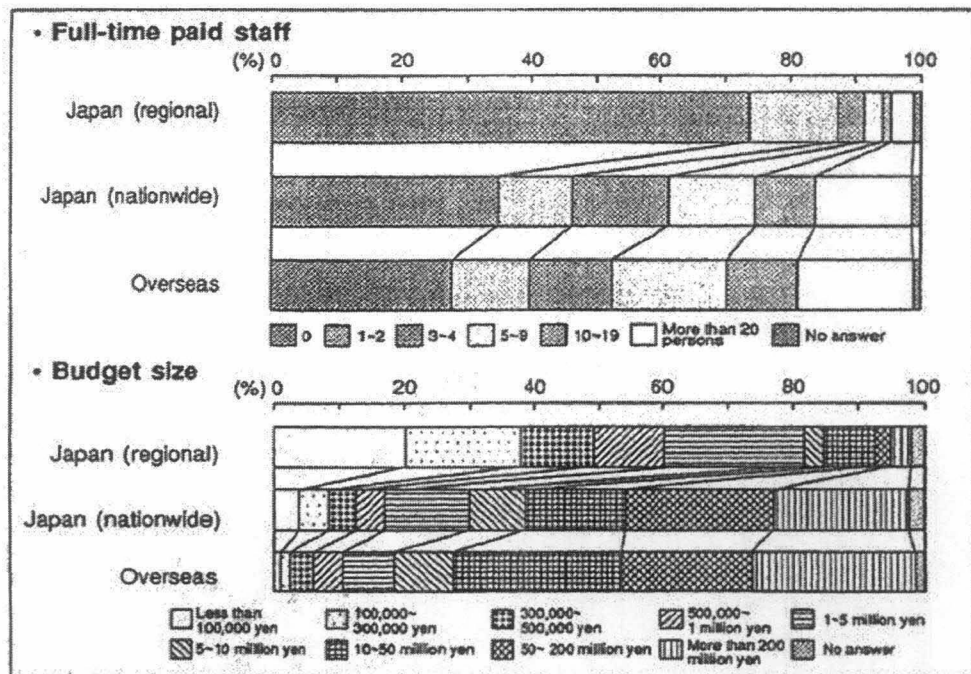
Environmental movements in Japan was 'politically' and 'economically' marginalized. One of the most asserting discoveries that Broadbent makes in his book *Environmental Politics in Japan: networks of power and protest* (1999) is of corruption within one of the environmental movements he traced. Typically, the literature dealing with Japan's early environmental movement shows sharply divided communities pitting supporters of industrial development against environmental activists. Broadbent shows just how fragile

the environmental citizen networks were in the face of constant efforts by the "Triple Control Machine" to break them with offers of compensation and bribes. Often the failure of the protest movements could be tied to the ability of the Triple Control Machine to break their networks. Despite years of protest activities, the networks Broadbent follows had but limited success in their fight against what Broadbent dubs the "Triple Control Machine"-the alliance among the pro-development Liberal Democratic Party, government, and big business-that operates all the way from the national level down through the prefectural to the town and hamlet levels. Frank Upham argued that one of the reason for LDP and the bureaucracy to enforce strict pollution laws in the early 1970s was that in doing so they could take the momentum out of these movements and dampen reliance on the courts as a forum for dispute resolution. Japan's political opportunity structure was relatively conservative and closed. The system practiced oppressive exclusion of the citizens in the decision making process. The interaction between the locally affected communities and the ruling triad tended to be characterized by social exclusion and repression of the victims (McKean, 1981; Ui, 1992; Broadband 1998; Kada, 1999). It was unresponsive of the victims demands.

In terms of resource mobilization- which includes, financial donations, information, leadership, media coverage, availability of government grants, legal provision for the formation of Non- Profit Organizations and time- the scope was limited. Japanese civil society did not have access to these basic resources which was essential for their sustenance. Margaret McKean argues that the reason why Japanese environmental activists failed to organize and institutionalize the way it happened elsewhere, for instance in Germany, was because of their local orientation and goals. In Germany, the well equipped citizen's movement, launched an extensive political campaign and institutionalize their efforts in the form of a Green Party. In 1983, the Greens received 5.6% of the votes in

the federal elections and became a force in the German politics. The electoral loss of the Christian Democratic Union in 1998 provided the Socialist Democratic Party and the Green Party an opportunity to mark a shift in their environmental discourse. Until 1998, when the Japanese Non Profit Organization law was amended, a major irritant to acquiring the tax exempt status, is widely considered as a prerequisite for the groups' survival. Article 34 of the Japan Civil Code (1896), promulgated that it was necessary to obtain approval from the 'competent authorities' before an NGO can be bestowed with the non profit status. These 'competent authorities' were problematic as it essentially referred to the bureaucracy.

3.2 Staff and Budget Sizes of Environmental NGOs



Source: Compiled by the Environment Agency from the "Survey on Administration of Environmental NGOs" by the Japan Environment Association, Quality of the Environment in Japan 1996, Ministry of Environment, Japan.

In 1979, the founder of Friends of Earth Japan, Yukio Tanaka, did not even try to get an approval from any Ministry because he was not comfortable with the kind of control that would be exerted by the authorities. Nor was he very hopeful about the possibilities of getting the approval. The group operated without non profit status. Akira Matsubara from the Research Institute of Civil Systems opines that

it is highly troublesome for an NGO to acquire the status of juridical person.....there is a problem that the minimum fund required to establish a public interest organization is not officially defined. Some thirty million yen is said to be necessary for the incorporated association to operate, and five hundred million yen is said necessary for an incorporated foundation, Zaidan hojin, to start with, but the true figures remain unclear. It sounds quite unfair, compared with the fact that a profit corporation can obtain the status of juridical person with only three million yen in capital

These campaigns revealed the need for the Japanese government to increase participation, transparency of decision making and accountability to the public. Comprehending the necessity to act urgently, Japanese government pinned its policy implementation success through administrative guidance to the industries, voluntary agreements by the industries and mix of tax incentives to perform better. Since 1960s, an extensive system of non-binding local agreements were established among industry, local government and citizens movements. The first such agreement emerged in 1964 between the city of Yokohoma and two electric power companies in relation to construction of a coal fired power plant. In 1970, there were more than 800 such agreements and in 1984, there were more than 25,000 agreements. Yamanouchi and Otsubo argues that these agreements were preferred by the local governments more than the legally binding local ordinances because of there

'flexibility' and 'speed'. National government pushed for technological innovations to combat the challenge of pollution. Takashi Inoguchi argues that both the consensus decision making culture of Japan and the close government-business nexus allowed the effective implementation of policies which yielded effective results. The government encouraged industrial efforts in research and development of heavy oil desulphurification and flu gas desulphurification with tax benefits and low interest financing from the Development Bank of Japan.

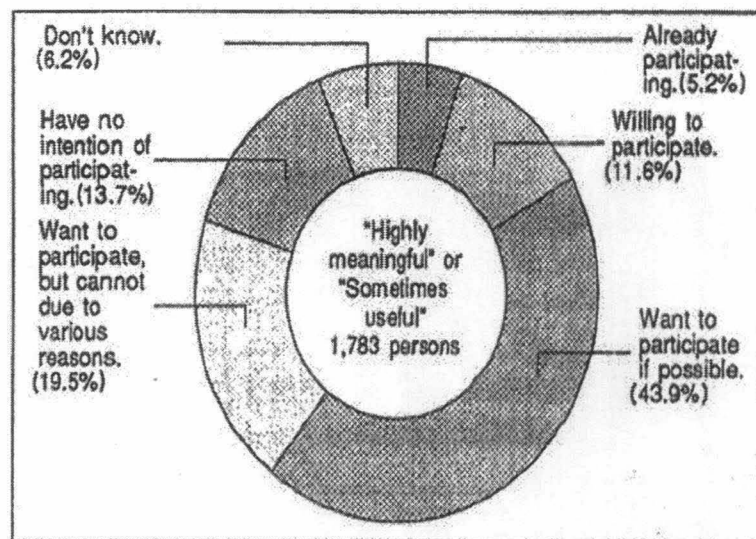
3.5 The initiation of shift since the 1990s

Unlike in the 1980s, when environmental civil society was very much on the periphery of institutional power; under-funded; under-supported, in the 1990s, they were slowly moving towards a more legitimate status within the political process akin to their counterparts in the West. In the fourth stage of *Environmental Control System*, namely the *incorporation of environmental constraints into the economic system on a primary basis* (1990s), the developmental corporatist Japanese State slowly began to transform seeking a more equitable affiliation with a wider range of civil society representatives. For instance, *Shingikai* (advisory councils) to the government, formerly the preserve of representatives from business or conservative academia, started to include more people from a variety of citizen's associations (Hirata, 2002). There has been gradual reduction in the communication barriers between the traditional elites (politicians, business leaders and bureaucrats) and the civil society. The former increasingly sees NGOs as the providers of resources, expertise and alternative perspectives regarding possible development paths. Today, the Japanese environmental movement has graduated from its loco-centric approach and embraced global challenges.

Prime Ministers Office undertakes public opinion surveys on environmental issues. In

1969, only 27.4% agreed that 'environmental pollution must not be allowed'. After the pollution debacle, by 1975, this had increased to 51%. Moreover in 1988, only 25% of the respondents indicated that global environmental issues were a serious concern. By 1990, this had risen to 42.4% and by 1993, it had risen to 55.6%. By 1998, this had risen to 80%. The 1992, Gallup Poll found that, while 64% of the Japanese public were highly aware of the local environmental problems, their concerns for the global environmental issues were lowest among the developed countries. Only 44% saw global environmental issues as a matter of serious concern compared to 57% in United States and 64% in the United Kingdom. Jeffrey Broadband conducted field work in Japan in the 1970s on a number of NIMBY style movements. In the 1970s and 1980s, Japanese were concerned with the removal of industrial pollution related threats from their immediate neighbourhood. However Broadband's more recent research, as in autumn 2002, reflected that Japan is more concerned about global warming, climate change, recycling so on and so forth.

3.3 Opinion Poll on Environmental Conservation and People's Lives



Source: Quality of the Environment in Japan 1996, MOE, Japan

The catalyst for this change can be traced from:

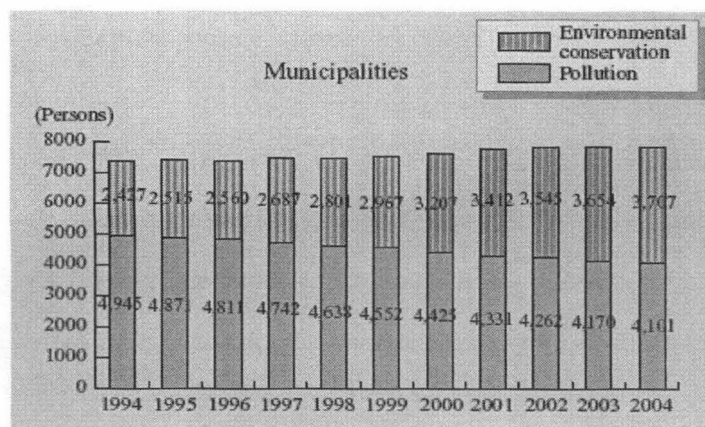
- The 1993 LDP electoral loss sent shock waves to the powerful 'ruling triad', challenging their institutionalized control of the State. Later the collapse of the 'bubble economy' followed by a decade of economic stagnation, financial crisis, corporate bankruptcies and growing unemployment further challenged the rigid political opportunity structure. There is hardly an occupation or industry left untouched by scandal and by the crumbling trust deficit. There were intense pressure to open up the decision making process to ensure greater access for the civil society.
- In November 1993, the opposition party ruling coalition led by Prime Minister, Morihiro Hosokawa passed a revised Basic Environmental Law. This was given further substance by the passage of 1994 Basic Environmental Plan. This called for a 'network style' of environmental governance, based on joint efforts of government, citizens, business and NGOs. While formerly there had been only confrontational campaigns that entailed pointing out and criticizing the wrongs of the government, but now there is an increasing number of campaigns that used means such as partnerships with critical experts in an effort to propose alternative policies, and to use collaboration with government, administrative authorities, and businesses to bring about desired policies. Many Japanese NGOs also came to seek to be "Policy Entrepreneurs".
- The 1995 Kobe earthquake was instrumental in strengthening popular support for the legitimacy of the non-governmental, non-profit volunteer organizations (Yamaoka and Yamauchi, 1998). On January 17, 1995 the most symbolic incident of shaking whole Japanese society occurred: the Kobe earthquake. One of the

political and social impacts of the Kobe earthquake is changing dramatically old attitudes to NGOs and NPOs among Japanese citizens, business and government, and opening the way for new legislation for promotion of NPOs, the NPO Law.

- The foreign policy decision to host the 1997 Kyoto Conference, made Japanese government undo much of the barriers it created to restrict environmental civil society to organize itself. With the greening of Japanese foreign policy in the post cold war era, much of the unfavorable domestic policies were restructured to align with larger goal of *kokusaika*.
- The 1998, Special Non- Profit Activities law (NPO Law), weakened much of the barriers facing civil society in Japan. Japan's NPO law was enforced only from December 1998 mainly triggered by the Kobe earthquake. It strengthened Japanese civil society to a considerable extent. The NPO Law is the first Japanese law on which the word "citizen" appears in the text. LDP politicians and government bureaucrats had disliked and avoided this word, which implies individuals with a strong sense of independence and a robust capacity for criticism.
- The 2001, Information Disclosure Law, enhanced the effectiveness of the environmental NGOs. Hasegawa Koichi rightly argues that typified by the activities of citizen ombudsmen, citizens' movements pushed through administrative and fiscal reforms in municipalities by making use of information disclosure procedures at the local levels.

A new wave of environmentalism was initiated by the irate citizens in the early 1990s. Between 1990 and 1997, 717 distinct groups conducted 944 protests against nuclear and toxic pollution (Taguchi, 1998). Plebiscites were increasingly used as an effective tool to influence local political decision having an impact on the environment. A nuclear project was rejected in August 1996, in the village of Maki (Niigata Prefecture), utilizing the first binding local referendum. With a voting rate of 88.3% and 60.9% of those voting opposed, this referendum had a huge impact on other disputes around the country concerning nuclear power plants, US military bases, and industrial waste disposal sites. The Maki Town campaign triggered movements seeking referendum throughout the country, and by the end of October 2002 municipalities had carried out 12 referendums. An industrial waste facility was rejected in the Kobayashi city (Miyazaki Prefecture) in November 1996. In 1998, referendums were used in Yoshinaga (Okayama Prefecture), Shiroishi (Miyazaki Prefecture) and Unakami (Chiba Prefecture).

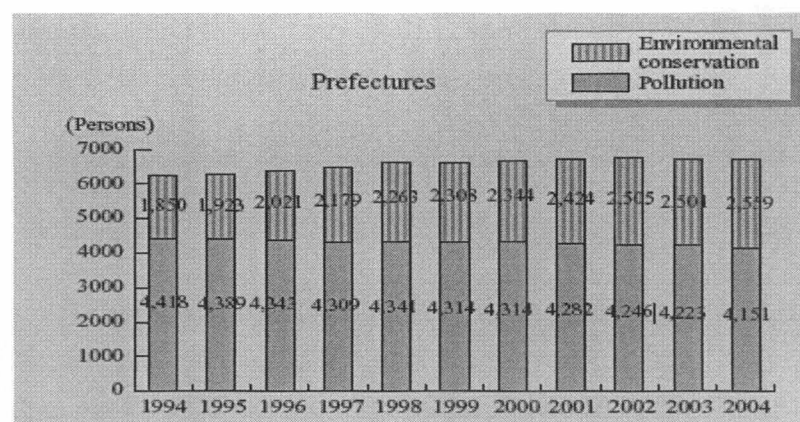
3.4 Number of Officers in the Environmental Conservation and Pollution Sections in Municipalities



Source: Compiled by the Ministry of the Environment based on the Ministry of Internal Affairs and Communications, Survey on the Total Number Management of Civil Servants in Local Governments.

However, Wilhelm Vosse, in his detailed research on environmental movements in contemporary Japan, suggested that in the 1990s there were at least 50-100 single issue protests including Nagara river dam, reclamation projects in Isahaya Bay and Shinji lake, second runway at Narite and Kansai Airports, new airports in Kobe and Okinawa and numerous landfill projects such as found in Hinode-machi (Tokyo). It is also important to recognize that the environmental groups lost far more disputes than they could manage to win in the 1990s. Nature Conservation Society of Japan (NACS-J), Vosse argues, though had considerable success in recent years in convincing government bodies to reconsider policies on biodiversity, but had failed to realize its full potential. It continues to pursue rather modest goals (Vosse, 2000). NACS-J has entered into negotiations with the House of Representatives' Legislative Bureau on a draft bill on this topic in 2003 (Japan Times, 4th May 2003). NACS-J has also critically opposed the construction of the wind farms in national parks, for instance, the Muroo Aoyama National ark in the Mie Prefecture. Effective lobbying has led Ministry of Environment to temporarily postpone its decisions on the construction of wind farms (Japan Times, 30th April, 2003).

3.5 Number of Officers in the Environmental Conservation and Pollution Sections in Prefectures and Municipalities



Source: Compiled by the Ministry of the Environment based on the Ministry of Internal Affairs and Communications, Survey on the Total Number Management of Civil Servants in Local Governments.

In the 1980s, very small proportion of Japanese environmental groups were concerned with issues pertaining to global implication, for instance, global warming, climate change, stratospheric ozone depletion, tropical rain forest destruction, desertification, biodiversity loss so on and so forth. Japanese NGO Center for International Cooperation (JANIC) conducted surveys in 1992, 1996 and 2000 suggesting that there has been some growth in the number of NGOs involved in international environmental protection. The 1992 survey identified around sixty groups having international environmental protection at least as a subset of their activities. This number rose to eighty eight groups in 1996. Changing the category of reporting in survey of the year 2000, thirty seven groups considered their activities to be partly related to global environmental protection, fifty eight to reforestation, seven to biodiversity and ten to alternative energies. In may 1990, Greenpeace Japan publicized the 'Green freeze', which was a product of the survey conducted on industries regarding their production and consumption of Chlorofluorocarbons.

3.6 MEMBERSHIP OF SELECTED ENVIRONMENTAL NGOs IN JAPAN

NAME	YEAR STARTED	MEMBERSHIP SIZE
Wild Bird Society of Japan	1934	53,798
WWF Japan	1971	50,000+1500 groups
The Nature Conservation Society of Japan	1951	15,275+939 groups
OISCA International	1961	5482+3048 groups
Japan International Volunteer Center	1980	1720
Japan Association for Greening Deserts	1991	1309+65 groups
Rain Forest Foundation Japan	1989	727
JATAN	1987	600+100 groups
Association Sahel	1987	477+3 groups
Action for Greening Sahel	1991	425+11 groups
Global Voluntary Service	1992	400+37 groups
FOE	1980	380
Institute for Himalayan Conservation	1986	350

A SEED Japan	1991	290+35 groups
Sarawak Campaign Committee	1990	180+40 groups
Japan NGO Center for International Cooperation	1987	99+141 groups

Source: Miranda. A Schreurs, 2002 (membership size data are from 1997-2000)

In Japan, there has been a consolidation of umbrella organizations, much as *Burgerinitiativen* did in Germany in the 1970s. Former President of Japan International Volunteer Center, Shunsuke Iwasaki, organized Japanese NGOs into Peoples Forum for the United Nations Conference on Environment and Development (UNCED). The aim was to present a united voice of Japanese environmental activists in the UNCED. The NGOs Peoples Forum constituted climate experts, rain forest activists, consumer groups, Minamata victims, lawyers and many more. This successfully proposed an alternative perspective. The NGO Report argued that the Japanese official development aid and corporations embarks a negative impact on the global environment and highlighted the important role that the grass root movements can play in evolving a new discourse. In November 1993, members regrouped as Peoples Forum 2001. The idea was to participate in the subsequent UNCED activities in terms of collection and dissemination of information, preparing reports to influence government policies on environmental issues. Much of the National Action Plan for Agenda 21 was modified subject to criticism from them.

The largest and oldest internationally oriented group is WWF Japan with a membership base of 50,000 in 2000. Japanese NGO Center for International Cooperation (JANIC) maintains a directory of international environmental NGOs. Out of 187 NGOs listed, only 28 has official non profit status. Limited membership of the Japanese NGOs poses a huge

challenge for funds. Miranda Schreurs studied the Climate Action Network, an international umbrella group of NGOs, set up in March 1989, to facilitate information exchange and to promote governmental and public action to mitigate climate change. Climate Action Network had a global network of some 287 NGOs. In 1998, There were seven Japanese, thirteen German and Forty-one United States environmental NGO members. The combined individual membership numbers of the Japanese NGOs was under 50,000 as compared to the German and United States NGOs which enjoyed the combined individual membership of over a million. At the end of the 1990s, WWF Japan, the richest environmental group in Japan, enjoyed a budget of only 8.4 million dollars. Friends of Earth Japan's budget stood at only some 480,000 dollars. Japan Tropical Action Network (JATAN)'s budget stood at some 150,000 dollars. Kiko Network enjoyed only a minimal amount of 240,000 dollars and SEED Japan had 120,000 dollars. However, Greenpeace Japan had a comparatively better budget standing at 1.5 million dollars.

This paints a rather bleak picture of environmental NGOs in Japan given the fact that it officially enjoys the status of being the second largest economy of the world. Japan Fund for Global Environment facilitates NGO activities pertaining to environmental protection and sustainable development. With an initial endowment of one billion yen and a five hundred million yen grant for fiscal 1993, the Fund supported forty seven Japanese NGOs working on domestic environmental issues, three overseas NGOs and fifty four Japanese NGOs working on environmental protection in developing countries. Ministry of Foreign Affairs established 'Grassroots Grant Assistance' Fund to financially support NGOs pursuing field projects in developing countries.

B-LIFE21, the Business Leaders' Inter-Forum for Environment 21, was established in January 1997. It is an environmental NGO whose members are leading figures in the

Japanese corporate world. It featured some of the prominent figures from the business world, namely, Mr. Kunio Anzai, chairman of the board of Tokyo Gas Co., Makoto Iida, Founder, Secom Co., Ltd., Keiichiro Okabe, Chairman & CEO, Cosmo Oil Co., Ltd., Mr. Yotaro Kobayashi, chairman of the board of Fuji Xerox Co., Mr. Shoichiro Toyoda, honorary chairman of the board of Toyota Motors Corporation, Shigeo Fukuchi, chairman of the board and chief executive officer of Asahi Breweries, and Mr. Masatake Matsuda, chairman of the East Japan Railway Company.

Greenpeace Japan, WWF Japan, Peoples Forum 2001, CASA and Kankyo Shimin participates actively in climate change negotiations. In December 1996, Kiko Forum (citizens forum for preventing climate change/global warming) was institutionalized by a group of around seventy NGOs and concerned citizens. Heading for the most anticipated Kyoto Conference, this group worked extensively to educate the public on climate change, fund raising and providing logistical support to environmental NGOs. Michiko Ishii, Director General of Environment Agency, highlighted the common goal of the government and the NGOs to prevent global warming. A network of 225 environmental NGOs, youth groups, local living cooperatives participated in the COP-3 Kyoto Conference. In 1998, Kiko Forum culminated into Kiko Network with the primary goal of expanding citizens' access to political decision making. Tetsunari Iida, formed the Green Energy Law Network, whose greatest success lies in forging an alliance with 256 politicians, the National Parliamentarians Association for Promoting Renewable Energy, to push for renewable energy promotion law. With the increased greening of Japanese industries, industry-NGO communication is rather facilitated which grounded these group's legitimacy in the system. The *Keidanren* Nature Conservation Fund finance NGOs initiatives in nature conservation, education, human resource capacity building projects.

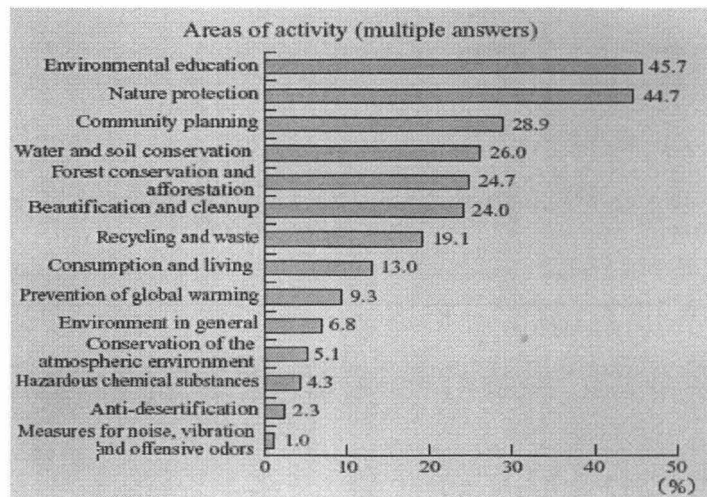
3.7 Climate Action Network member organization, Japan

CASA	Member Organizations	60
	Individual Members	500
	Volunteers	75
	Staff	2
Center for Nuclear Information	Individual Members	1600
	Volunteers	10
	Staff	10
Friends of Earth	Individual Members	600
	Volunteers	50
	Staff	8
Greenpeace	Individual Members	5000
	Volunteers	20
	Staff	17
JATAN	Individual Members	650
	Volunteers	30
	Staff	4
Kiko Network	Member Organizations	150
	Individual Members	320
	Volunteers	50
	Staff	4
WWF	Corporate Members	500
	Individual Members	41,000
	Volunteers	10
	Staff	30

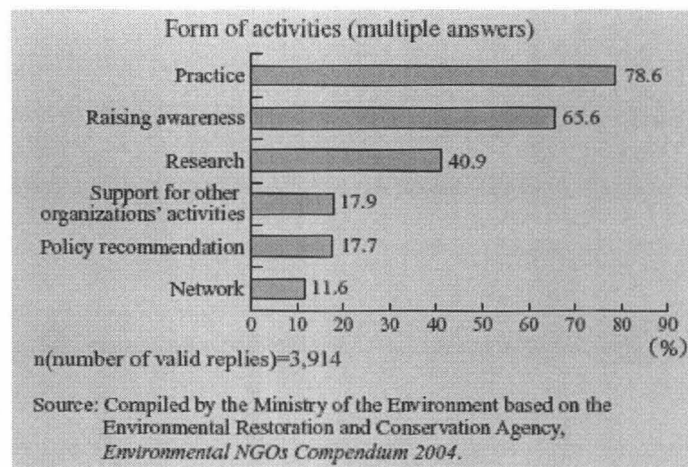
Source: Information as provided by the organizations, 1998-2000

According to *Environmental NGOs Compendium* (2004), published by the Environmental Restoration and Conservation Agency of Japan (ERCA), environmental NGOs are most active in the field of 'environmental education' (45.7%) followed by 'nature protection' (44.7%), 'community planning' (28.9%) and 'water and soil conservation' (26.0%).

3.8 Activities of Environmental NGOs



Source: Compiled by the Ministry of the Environment based on the Environmental Restoration and Conservation Agency, *Environmental NGOs Compendium 2004*.



Source: Compiled by the Ministry of the Environment based on the Environmental Restoration and Conservation Agency, *Environmental NGOs Compendium 2004*.

Many Japanese NGOs participated in the 2002 World Summit on Sustainable Development in Johannesburg, South Africa, which was a good opportunity for NGOs and citizen-led activities in Japan to take a big step towards participating in international actions. Since the level of citizen-led activities in Japan is basically smaller in scale than those in the United States and Europe (even the biggest environmental NGO in Japan only has about 50,000 members), Japanese NGOs have had fewer opportunities to work at the global level due to language barriers. The 2008 Japan G8 Summit NGO Forum, a civic coalition of Japanese NGOs, strived towards a sustainable society and worked to address diverse issues such as the environment, peace, human rights, global poverty, and development. The NGO Forum was officially established January 31, 2007, but the momentum towards creation of the coalition had already started one year earlier. The 2008 Japan G8 Summit NGO Forum held a symposium, titled "What Civil Societies Can Do toward the Group of Eight (G8) Summit in 2008," on October 14, 2007, in Tokyo, where they also released a joint position paper. In the section of the paper on climate change and biodiversity, the groups called on the Japanese government to lead the world by making climate change a major component of the G8 Summit's agenda and to strengthen domestic policies by imposing a carbon tax, introducing carbon trading, and regulating both stationary and mobile emission sources. They also proposed that Japanese government cut the country's greenhouse gas emissions by 80 percent by the year 2050 compared to the fiscal 1990 level.

To facilitate clear understanding and acceptance of its proposals, the Environment Unit has held study sessions on climate change with some members of Japanese political parties since the fall of 2007. In March 2008, it held a public session, titled the G20 Gleneagles International NGO Workshop, which was focused on climate change and the proposed framework for the future, with featured speakers from overseas NGOs, as well as director-

generals from Japan's Ministry of Foreign Affairs, Ministry of Environment, and Ministry of Economy, Trade and Industry. The Civil G8 Dialogue 2008, held on April 23 and 24, which was an attempt to have a dialogue between international civil society and the G8 countries, the same as was held before at past summits in Russia (2006) and Germany (2007). Nearly 200 representatives from Japanese and foreign NGOs gathered in Kyoto for the Dialogue, and they engaged in discussions with the G8 sherpas (the personal representatives of leaders at the G8 Summit) to seek solutions to global challenges. Expressing concern about holding the Toyako Summit, the Forum especially urged the government to release medium-term targets to reduce Japan's GHG emissions and to take an initiative to solve the poverty issues outlined by the UN Millennium Development Goals. In response to the efforts at the Forum, Prime Minister Yasuo Fukuda's Cabinet eventually said in May that the government should set long-term number targets to reduce Japan's GHG emissions. Although the result of such activism is somewhat unpredictable, simply gaining recognition of this fact was an accomplishment of the Forum.

3.6 Conclusion

To realize a 'low carbon society', it is necessary to work towards the creation of an "environmentally advanced nation"(creation of a sustainable society), in which all actors in all aspects of life care for the environment. The **2005 Annual Report on Environment** (MOE, Japan) highlights 'environmental partnership' as to working as "equals" in activities through mutual cooperation and appropriate division of roles of each actor, under the common objective of solving environmental problems in a community or society. In environmental partnerships, it is important for participating actors to form a relationship of "equals" based on appropriate division of roles, instead of providing one-way support or cooperation. To build environmental partnerships on equal terms, actors must share in advance the understanding of the objectives of working together and of its merits for each

actor. Greater synergistic effects can be attained when actors recognize each other's functions and resources, fields of expertise, and differences in know-how, and take advantage of strengths and make up for limitations of different actors. Each of these activities serves as the driving force for building an environmentally advanced nation.

Since the 1990s, there has been a fundamental shift marking a departure from the traditional approach of institutionalized State control over the public sphere in Japan. There has been a subtle evolution of an inclusive and participatory environmental space in what is otherwise referred to as the 'closed' decision making process. Japanese civil society is expanding and becoming more pluralistic, moving away from the patterns of government and business dominance typical of the developmental State (Tsujinaka, 2003). Environmental groups are increasingly being perceived and trusted as an efficient source of alternative policy plans and proposals based on their grass root expertise. They are increasingly gaining a larger role in effective environmental policy making. Aligning with the 21st century values of internationalization and globalization, there has been an erosion of the rigid political opportunity structure, which now facilitates a complimentary and accommodating approach towards the environmental NPOs/NGOs. There has been an 'gradual transformation' reflecting 'professional' and 'cosmopolitan' values. We have witnessed formal and informal networks emerging between the government, corporates, academia and the environmentalists. Internationalization of environmental protection issue has resulted in substantial changes in terms of priorities, goals, organizational strategies and their relation to other societal actors.

Compared to Germany, which is often referred to as one of the most advanced ecologically modernized states, or other sophisticated industrialized economies, Japanese environmental community is yet to fully realize its full potential. The German

environmental community got the opportunity to successfully capitalize from the Green Party's position in the national coalition with the Social Democratic Party. Unfortunately, none of the Japanese NGOs are comparable to their United States and European counterparts in terms of their large membership of several hundred thousand and robust funding, as well as their influential power. Japan's NPOs and environmental NGOs too face the problems of insufficient funding, and the lack of human resources, especially people who can staff offices full-time. As insufficient human resources is an acute problem, there is a tendency for just a few able persons to work at multiple NGOs/NPOs. Having said that, it is evident that environmental groups' are having a considerable influence and have matured in its relation with respect to the other policy actors.

Hasegawa, Koichi rightly argues that citizens' movements and NGO activities function as a non-institutionalized countervailing force that critically monitors the social rationality of the policymaking process. Two factors that existed for many years -a bureaucrat-led, centralized planning system that coordinated the interests of involved industries in advance of policy implementation, and a single-party-dominated system that made a change of government all but impossible -made outward deliberations in assemblies and other deliberative bodies mere formalities, and did not allow those bodies to adequately exercise oversight. Citizens' movements and NGO activities, which have the capacities for thinking and acting in new and flexible ways, are capable of 'exemplary practice', and they can play a major role especially in local autonomy and in responding to policy challenges at the local level.

The increasing communication among the all the stakeholders mark a radical shift from the past practices. Much of the institutional barriers are undone to effectively facilitate the development of these groups. It has been a difficult journey for the Japanese environmental

groups and the road ahead poses a complex challenge. Certainly, they have been identified, recognized and valued as indispensable in addressing the environmental issue. They have successfully fought their way to the fiercely competitive environmental space.

Chapter Four

ENVIRONMENTAL TECHNOLOGY AND JAPAN

"In order to halve greenhouse gas emissions by 2050, it will be absolutely critical that there are breakthroughs in technological innovations. This is a very challenging task, and it will require a tremendous investment in technology".

Yasuo Fukuda

"We have regarded science and technology as the keys to achieving a balance between environmental protection and economic growth. The importance of science and technology is also recognized by much of the public as well as by knowledgeable people. I would therefore like all of you to cooperate in building Japan up to be one of the world's most advanced science and technology oriented nations. I think that science and technology are of crucial importance not only in terms of achieving a balance between environmental protection and economic growth, but also in the interest of better health, in the interest of assuring our security, and in the interest of the future".

Former Prime Minister Koizumi

4.1 Introduction

United Nations Conference on Environment & Development (Agenda 21) in Rio de Janeiro in 1992 defined environmentally sound technologies as those which *protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than technologies for which they are substitutes*. These technologies include goods and services that promote sustainable development and develop processes that are environmentally beneficial or benign. The environmental technology sector consists of diverse fields, such as pollution control, waste management, site remediation, monitoring and recycling.

Japan has graduated from the end of pipe technology to Clean Production technology. Japan ranks third in the world for environmental technology sophistication after Germany and United States and captured 20% of international environmental technology

market in 2004. In Agenda 21 adopted at "United Nations Conference on Environment and Development (Earth Summit)" in 1992 in Rio de Janeiro, "Cleaner Production" (CP) was suggested as a way to progress. CP includes not only the conventional technologies for each facility and measure (Hard Technology), but the technologies for operation and management methods (Soft Technology), based on the idea of reducing the environmental burden in every process from extracting of raw materials to disposal of products and reuse.

According to International Declaration on Cleaner Production, which was adopted at the fifth International High Level Seminar held in South Korea in September, 1998, CP was defined as follows: "We understand Cleaner Production to be the continuous application of an integrated, preventive strategy applied to processes, products and services in pursuit of economic, social, health, safety and environmental benefits." In 1989, United Nations Environment Program (Division of Technology, Industry and Environment), defined the concept of cleaner production as an continuous application of an integrated preventive environmental strategy, applied to processes, products and services to increase efficiency and reduce risks for the humans and the environment. It applies to

- *production process*, for instance, conserving raw material and energy, reducing and eliminating the toxicity of all emissions and wastes;
- *products*, that is by reducing negative impacts reducing the life cycle of a product, form raw material extraction to its ultimate disposal and
- *services*, incorporating environmental concerns into designing and delivering services.

The sensible environmental option is to minimize end-of-pipe interventions and to maximize the Cleaner Production thinking that goes on upstream to save resources. If we look at the traditional approaches to managing wastes, the movement has been from dumping and dispersion, to controlling, on to recycling and management and now we are preventative at source, trying to manage and minimize consumption of resources. Cleaner production is underlined by the need for cleaner technology. Cleaner Technology

reduces effluent and other waste production, maximizes product quality, maximizes raw materials and energy and any other input use.

With respect to the purpose of this research, the chapter argues that *sophisticated technologies depict Japan as an ecologically modernized State in the midst of a transitional political opportunity structure*. “Sophisticated technologies” is the independent variable for the research. “Japan as an ecologically modernized State” is dependent on it. While “transitional political opportunity structure” is treated as the intervening variable.

The academic debate on Japanese environmental technology revolves around two schools of thought. The first are the *technonationals* who argue that Japan’s technical mastery serves as a catalyst for its ecological progress. A disparate effort is being made by the international community to achieve the ultimate aim as conceived in Article. 2 of the United Nations Framework Convention on Climate Change-

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner

With the IPCC fourth report *Climate Change 2007*, much of the debate over climate change has been put to rest when it forcefully asserted that ‘climate change is unequivocal’ and the causes has been trace to human activities. There is an urgent need of eliminating GHGs to prevent global warming. To realize this goal, there is a need to drastically change the patterns of economic behavior. Development of innovative technologies is often argued as a good alternative to combat the challenge.

Ecological modernization theory argues that science and technology are judged not only for their role in perpetrating environmental problems, but for their part in curing and preventing them. Science and technology are hence seen as central institutions for overcoming environmental problems (Mol, 1997). Aligning with the fundamental tenet of the theory, Yumi Akimoto, former chairman of Mitsubishi Material Corporation opines that “if not led by Technology, a recirculatory society can never be realized”. For realization of a decarbonised society, it is essential to intensively develop and widely disseminate the technology that is efficient enough to support such a society. He further argues that Japan needs rational and steady development of policy that develops environmental infrastructure technology.

Since it is anticipated that the world's population will continue to increase in the future, it will be hard to realize the vision of halving the GHG emission. With throughgoing energy savings, it is sought to expand the use of not only nuclear energy, but also natural energy including photovoltaic power and wind power and also renewable energy like the biomass, where drastic technological innovation is required to realize a low carbon society. Last year METI announced twenty-one technologies as Cool Earth Energy Innovative Technologies.....under existing circumstances in which approximately 80% of the world energy consumption is dependent on fossil fuels, great expectations are placed in Carbon dioxide Capture and Storage (CCS) technology , as abridge to the realization of the low carbon society.

Takashi Honjo, Senior Managing Director, RITE, Japan

Fukasaku argues that sophisticated environmental technologies has earned Japan international respect. Arthur Mol believes that Japanese have been leading the way in environmental practices by shifting from end-of-pipe technologies towards preventative technologies. Today, Japan is implementing environmental technology solutions domestically as well as internationally, emphasizing environmentally sustainable development technologies in its foreign aid programs, especially to other Asian nations whose pollution directly or indirectly impacts Japan.

While the *second school of thought* vehemently argues that technology is not a solution but a part of the problem. Allan Meiller argued that “Japan has preferred technological solutions over lifestyle changes to address the issue of environment”. The Japanese approach to environmental policy has been technological. Japan has been criticized by the environmentalist for not demanding enough from industry, even though Japan made important strides in the development of environmental technology. Critics argue that Japan has lacked in creativity and not been that innovative. Before the 1980’s Japan was lagging behind the western society; industrially, technically as well as scientifically. In the 1980’s, Japan caught up. Since the catch up, the main emphasis for science and technology has been innovation as a means to maintain a globally strong position (Stenberg 2007). Data from 2001 on traditional environmental technology such as pollution control equipment exist, revealing that especially air and water pollution control equipment are being exported to a great extent. Still the total exports for the pollution control equipment only corresponds to 2.4 percent of the total sales. More than 80 percent of the exports go to other Asian countries.

Samuels, in 1995, argued that Japan’s dash to modernize has encouraged a technocratic approach within industry and government described as ‘techno-nationalism’; the aim of dominating the world technologically. Japan’s promotion of high technology is at the core of its development model, which according to Taylor (1999) is imbued with an ideology of ‘rampant industrialisation without fear of consequences’. This reflected in the “radical transformations of nature: huge land reclamation projects, the construction of artificial islands, the flattening of mountains, the concretising of river banks and the construction of dams, underground tunnels, bridges and roadways”.

4.2 Japan’s approach

Japanese government smartly employed a double edged policy tool to expand the size of the environmental technology and service markets, that is, by applying a combination of stringent pollution regulations and standards and providing subsidies and market incentives to encourage private sector investments in green technologies. The most

crucial efforts for development of key control technologies were made by the private sector initiatives stimulated by government environmental regulations and market competition (Imura, Shinohara and Himi, 2005). Japan Development Bank (now, Development Bank of Japan) was instrumental in supporting various industrial efforts. With respect to small and medium size enterprises, Japan Environmental Cooperation played a key role. The government financial institutions created low interest rate loan system to raise investment capital (OECD, 1977).

By the early 1960's, the enormous scale of industrial investment combined with a lack of pollution control resulted in the ill-famed 'economic miracle/pollution debacle'. The problem epitomized in the "four major pollution triggered diseases cases": the Minamata disease "(a neurological disorder caused by methylmercury poisoning found in the Minamata Bay area, Kumamoto Prefecture), the second Minamata disease (found in Niigata Prefecture), the itai-itai disease (meaning "it hurts, it hurts", a chronic cadmium poisoning) and Yokkaichi asthma. Reflecting the priority placed on industrial growth, the government was not so well equipped to deal with issues of pollution. However, due to a rising salience of environment as an issue, a bureaucratic process began, leading to the enactment of the first Basic Law for Environmental Pollution control in 1967 (Schreurs, 2002). It was one of only twelve basic laws and one of the first of its kind in the world, implying important legislative and institutional changes that prepared the way for further legislative changes. For example, the first Air Pollution Control Law was enacted in 1968, and then revised in 1970 and 1996 to tighten regulations. Despite the new pollution control legislation, there was still strong demand on the grass root level in Japan of more significant actions, and the leading LDP party saw an urgent need for more new environmental regulations.

New laws and amendments to the former were adopted, and the Parliament during these years is remembered as the Pollution Diet. Furthermore, in May 1970, following the Swedish and US examples, and Environment Agency was created under the Prime Minister's Office. The two oil crises during the 1970s led to a second turning point. The following increase in oil prices led to a strengthening of Japan's international

competitiveness, since companies' energy efforts in energy saving were reflected in energy efficient and strongly competitive products (JETRO, 2006). Japan's Basic Environmental Law was enacted in 1993. The law outlines the general direction of Japan's environmental policies and sets out a vision of a society capable of sustaining development with a minimum environmental burden. In December the same year, the "National Action Plan for Agenda 21" was submitted to the United Nations. In December 1994, an action plan called "the Basic Environment Plan" was adopted. It was the most important measure introduced under the Basic Environment Law, proactively implementing supportive measures, including one measure to support the UNEP International Environment Technology Center as a core organization for appropriately transferring technology to enrich and reinforce the ODA system to realize sustainable development in developing countries (MoE, 2006). With the subsequent enactment of the Environmental Impact Assessment law in 1997 and then the recycling diet enacting nine recycling laws, Japan operationalized one of the world's most sophisticated legal framework demanding deliverance from all the stakeholders.

The environmental market in Japan has been rapidly expanding since the second half of the 1990s, partly due to the advancement of environmental laws. The World exhibition in Aichi (2005), showcased technologies designed to improve the environment. The whole exposition was dedicated to "Nature's wisdom". Aichi illustrated the possibility to change the flow of goods and capital and to revolutionize industrial activities through consumer behavior. This is in accordance with the Ministry of Environment's (MoE) "Environmental Revolution", following the footsteps of the "Industrial Revolution" and the "IT Revolution" (MoE, 2004). By demonstrating a growth model based on a virtuous circle for environment and economy, the goal is to lead the world as an environmentally advanced nation. (MoE, 2005)

The ecobusiness market size based on the OECD classifications was approximately 30 trillion yen in the year 2000 and the expected expansion is estimated to approximately 47 trillion yen in the year 2010 and approximately 58 trillion yen in the year 2020. In this calculation, the environmental business market is defined as the provision of products

and services that measure, prevent, reduce, minimize or improve negative impacts on the environment including water, air, soil and problems related to waste, noise and ecosystems. (MoE, 2003; JETRO, 2006). A forecast of the “environmentally-induced businesses”, including environmental businesses, show that the market size would increase from approximately 41 trillion yen in 2000 to 103 trillion yen in 2025 and the size of employment would increase from approximately 1,06 million people in 2000 to 2,22 million people in 2025 (MoE, 2005).

Japan’s world-class green technology, provides it an edge in the international market. Be it energy saving technologies for industry, transportation, commercial/residential sectors and renewable energy- Japan is a world leader. Japan have efficiently developed CFC Emissions Reduction Technology, for instance, HFC-23 destruction technology, refrigerant CFC chemical recycle technology, energy-saving CFC’s substitute synthesis technology, CFC and CFC’s substitute processing technology, Chlorine compound substitutes, electronic device production cleaning system using gases substituting SF₆, Air cycle refrigeration system not using HFC as refrigerant, SF₆-free, high-performance, manifest magnesium alloy structure control technology etc; Methane emissions reduction (recovery) technology, for instance, recovery of methane from coal mines, recovery of oil field associated gas, recovery of wastewater methane, etc; Dinitrogen Monoxide Decomposition Technology, for instance, CO₂ separation and recovery technology and CO₂ storage technology; Renewable Energy Utilization Technology, for instance, Solar energy like, Photovoltaic generation and Solar thermal utilization; Wind power energy; Hydro-energy; Geothermal energy; Snow ice heat; Temperature difference energy, like, Heat pumps, Seawater thermal energy conversion and Geo-heat and lake heat system; Biomass energy, like, Direct combustion of biomass and power generation, Mixed combustion of biomass and coal for electric power generation, Large-scale biomass gasification and power generation, Small-scale biomass gasification and power generation cogeneration system, High calorie gasification of biomass, Biomass gasification and methanol synthesis, Fermentation of biomass to produce methane and Fermentation of biomass to produce ethanol; Waste energy, for instance, Power generation from waste products, Technology for manufacture of biodiesel fuel and

Recovery and use of landfill gas; Ocean energy.

In order to achieve the goal of “becoming an advanced science and technology oriented nation” the Science and Technology Basic Law was promulgated in November 1995. The following year the First Science and Technology Basic Plan based on the stipulations of the above Act was established for the period from FY1996-2000. During that period government investment in research and development reached over 17 trillion yen. The Second Science and Technology Basic Plan was established for the period from FY2001-2005, with government investment in research and development of over 21 trillion yen. In addition to a focus on four priority fields (life sciences, information and telecommunications, environmental sciences, nanotechnology/materials) for prioritized investment, there was also progress on renewal and upgrades to the science and technology system.

The Third Science and Technology Basic Plan was established in March 2006. Continuing with the three basic ideas from the Second Science and Technology Basic Plan (create human wisdom, maximize national potential, protect nation’s health and security), six main targets were announced as the concrete policy goals: discovery, and creation of quantum jump in knowledge; breakthroughs in advanced science and technology; economic growth and environmental protection; innovator Japan; good health over life-time; and a nation proud of its safety. These targets are practical policy goals for the realization of the accountability to people and return of science and technology benefits to society.

In the “Promotion Strategies by Field”, which were decided in the Council for Science and Technology Policy in March 2006 under the Third Science and Technology Basic Plan, which was decided by the Cabinet in March 2006, the area of 3R technology research was selected as a high-priority research area in the next five years in the environment field. This is a research area to achieve the “effective utilization of resources and reduction of waste using 3R or resource-saving alternative technologies”, which is one of the individual policy objectives in the environment field. By promoting

such research, the strategy aims to ensure the effective and circulating use of resources and proper waste management in a way that meets people's demands for security and safety using new substance control methods. As specific research and development issues, three programs are listed: "technology for the design, evaluation and support of systems for resource-recycling production and consumption", "technology to manage the usability and hazardousness of recycling resources", and "technology for recycling and proper treatment or disposal of waste". For each program, priority issues for research and development were established.

The Central Environment Council's Report on "Promotion Strategies for Environmental Research and Environmental Technology Development" in March 2006, and the "area of building a sound material-cycle society" was established as a focus area for research and technology development also in this report. The focus issues listed include "research on systems for the proper management of waste in the Asian region on the basis of 3R technology and the social system", "research on economic techniques and other policies and techniques to promote reform towards a sound material-cycle society", "sophistication and practical application of recycling technologies and systems related to recycled resources", "research on the standardization of recycled articles and regenerated products" and "research and technology for the proper management and utilization of old final landfill sites".

The Strategic Technology Roadmap 2007, drafted by Ministry of Economy, Trade and Industry (METI) has covered five top priority domains: information and communication, life science, environment and energy, nanotechnology and material and manufacturing sector. METI called upon industry, academia, and government experts to combine their knowledge and experience to formulate the Strategic Technology Roadmap (STR) 2009 in cooperation with NEDO and other agencies. This latest STR contains updates on existing technologies and focuses on a greater range of technologies in 30 fields.

The 1997, White Paper *Quality of environment in Japan*, asserts that

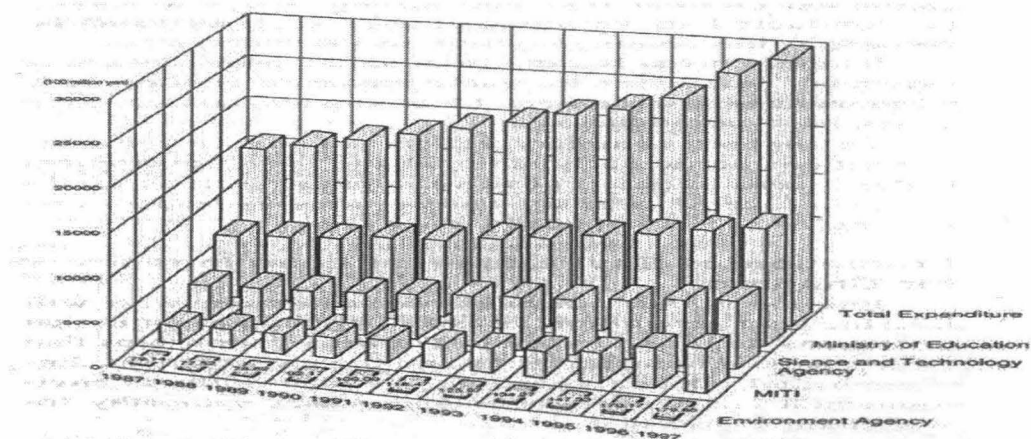
“Science and technology have played an important role in conservation, by making it possible to understand the state of the environment, by revealing the mechanisms that underlie pollution, and by improving the environment. There is no denying that science and technology are indispensable in the fight to solve the environmental problems we face. It is desired that those who are in the science and technology field should always bear the environmental impact of their activities in mind”.

4.1 Annual sale of environmental devices and equipments

YEAR	1970	1975	1980	1985	1990	1995	2000
Total (billion yen) share%	195	683	655	653	785	1418	1531
AIR	41.20	45.70	24.40	22.60	19.60	19.80	8.80
WATER	47.10	43.30	53.80	49.40	49.40	37.80	40.00
SOLID WASTE	11.40	10.70	20.80	27.40	29.60	41.70	53.00
NOISE	0.27	0.23	0.99	0.58	0.83	0.60	0.22

Source: Japan Industrial Machinery Association 2001

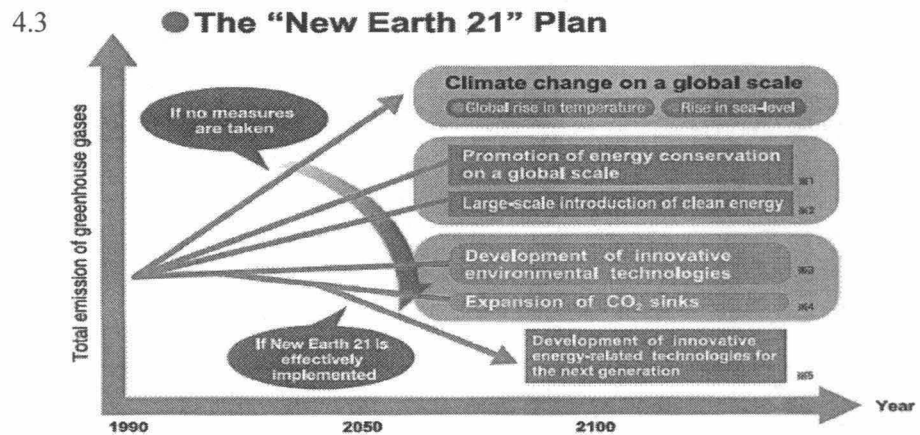
4.2 Changes in Science and Technology Related Expenditure



Source: compiled by the Environmental Agency from the data collected from the Science and Technology Agency

At the 1990 Houston Summit, Japanese government proposed *The New Earth 21 Initiative*. It is an effort to respond to climate change over the next 100 years via technology development and technology transfer. The Research Institute of Innovative Technology for the Earth (RITE), which was established in Kyoto in 1990, has

subsequently conducted research under consignment from the New Energy and Industrial Technology Development Organization (NEDO) on preparing implementation plans for New Earth 21. The overall concept is to develop a model called Dynamic New Earth 21(DNE21), to devise a long-term strategy to stabilize the concentration of CO₂ in the atmosphere, and to investigate the role of nuclear power in addressing global warming.



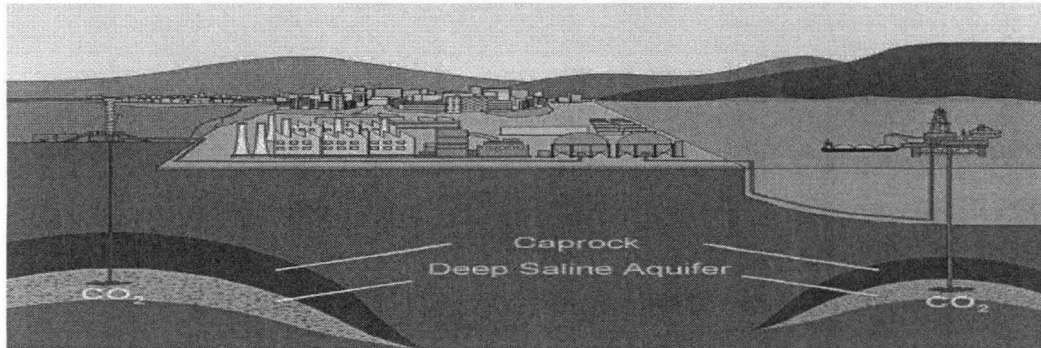
1. Energy conservation movements in society, enhancement of energy efficiencies in equipments, enhancement of electric generation efficiencies at power stations, improvement of vehicle gas mileage, etc.
2. Solar batteries, fuel cells, nuclear energy, etc.
3. CO₂ capture and storage, biodegradable plastics, bioenergy, etc.
4. Forestation and forest preservation, greening of arid land by genetically engineered plants, etc.
5. Space photovoltaic power generation, nuclear fusion, etc.

Source: RITE, Japan

Cultivating the cutting edge industrial technologies for the preservation of the global environment, RITE carries out fundamental researches on (1) scenario-making for global warming mitigation, (2) CO₂ separation, capture and storage and (3) CO₂ fixation by plants and its effective use. Under the theme of “CO₂ fixation and effective utilization”, RITE promotes national R&D cooperating with private sector companies, academia, national research organizations and research groups. Supported by subsidies from METI, RITE promotes fundamental research at the conceptual stage and technological research for the verification of feasibility on CO₂ fixation and effective utilization. The fundamental aim is to develop the technologies to store the captured CO₂ in the subsurface and oceans as key measures to mitigate the global warming. It has primarily

focused on geological storage in deep saline aquifers and ocean sequestration by CO₂ dilution technology at the mid depth ocean.

4.4 Deep Saline Aquifer

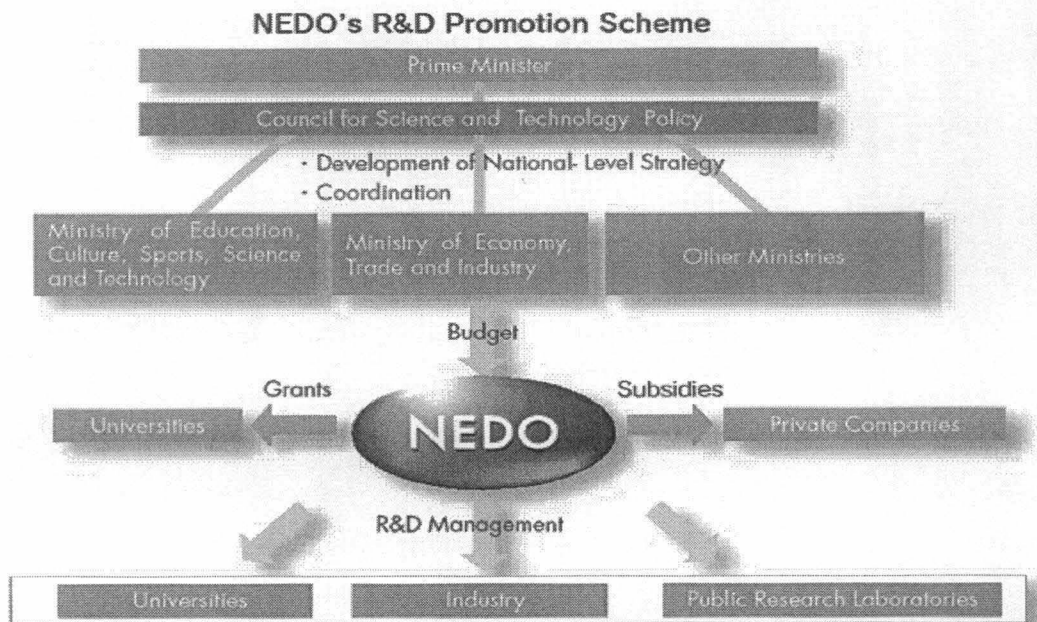


Source: Research Institute of Innovative Technology for the Earth

To build a sustainable society, Japan is making efforts to efficiently utilize resources and energy problematized by environmental constraints. The conventional production and consumption patterns are remodeled making them sustainable based on a review of past and existing environmental problems. In 1980, Japanese government institutionalized NEDO. The central aim was to develop new oil-alternative energy technologies. Eight years later, in 1988, NEDO's expanded its horizon to include industrial technology research and development. In 1990, it further roped in environmental technology research and development. Activities to promote new energy and energy conservation technology were subsequently added in 1993. Following its reorganization as an incorporated administrative agency in October 2003; NEDO is now also responsible for R&D project planning and formation, project management and post-project technology evaluation functions. In response to Japan's Kyoto Protocol Target Achievement Plan and recent crude oil market trends, NEDO carries out efficient and effective research and development activities, verification and demonstration projects, and introduction and dissemination projects for new energy and energy-conservation technologies, as well as research and development for chlorofluorocarbon (CFC) substitutes. NEDO's Environment Technology Development Department has advanced the development of new technologies to deal with environmental problems such as global warming, waste

treatment, and fossil fuel issues. In addition, it has carried out projects to disseminate world-class Japanese technologies abroad, thereby supporting solutions to environmental problems overseas.

4.5 NEDO's Research and Development Scheme



Energy conservation

- NEDO focuses on energy conservation in the consumer and transportation sectors through activities that include improving the energy efficiency of houses and buildings and by encouraging modal shifts. In the industrial sector, NEDO's research and development is focused on achieving highly efficient energy savings. NEDO flexibly promotes introduction and dissemination activities in collaboration with the Ministry of Land, Infrastructure and Transport and other ministries, as well as collaboration among businesses, such as industrial complexes, and cooperation between energy providers and local governments.

- In response to high oil prices, market instability, and the international competition for energy and resources, NEDO strategically conducts projects in Asian nations, as well as other developing countries, to introduce Japan's advanced energy and environmental technologies that are relevant to the host countries' economy, needs, and the status of business operations. These projects are carried out in close coordination with Japan's research and development activities.

New energy

- Based on the Japanese government's new energy introduction targets for 2010, NEDO focuses on verification and demonstration projects that closely relate to its research and development activities.
- NEDO continues to carry out field tests on biomass heat utilization and demonstrative activities for comprehensive, effective biomass energy systems that suit local conditions.
- Leveraging past research and development results for photo voltaic (PV) power generation, NEDO promotes full-scale production and commercialization of products that will be competitive in the marketplace in areas that have the potential for practical application in the near future.

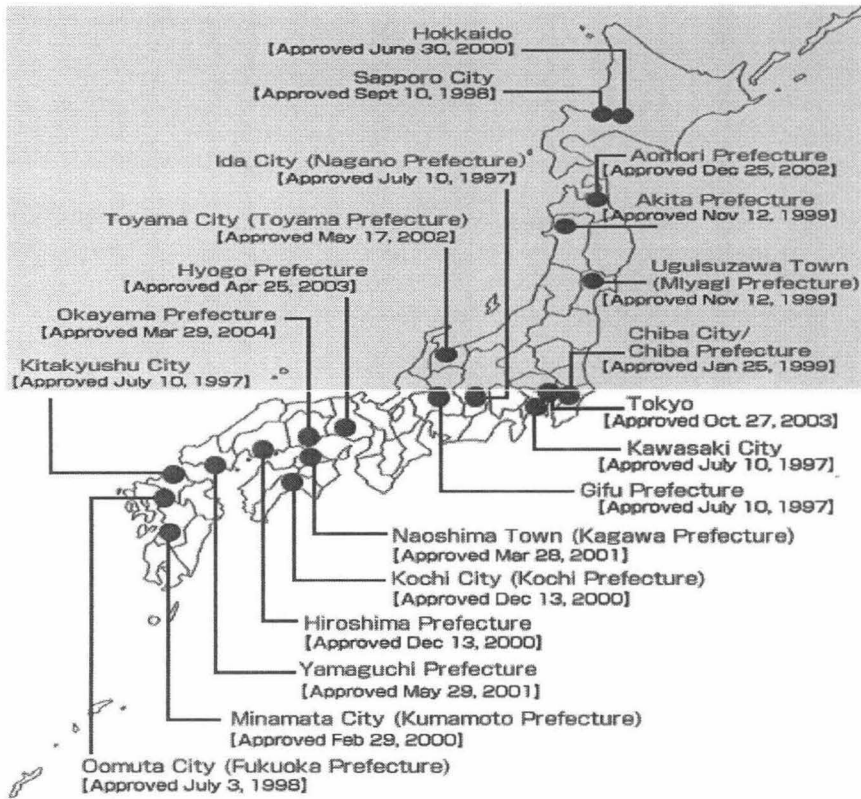
Technologies for environmental measures

- NEDO promotes research and development to reduce the emission of three fluorinated gases in order to directly contribute to meeting the objectives of Japan's Kyoto Protocol Target Achievement Plan.
- Although fossil fuels such as coal have been and continue to be vital to our lives, it is important to reduce greenhouse gas emissions from fossil fuel combustion globally. In response, NEDO coordinates the development of technologies for highly efficient energy use through innovative developments such as coal gasification technology.
- In order to achieve policy goals relating to recycling rates for the final disposal of industrial wastes, NEDO coordinates technology development based on Japan's 3R program.

Source: Report: Outline of NEDO New Energy and Industrial Technology Development Organization 2008-2009

Japan Environmental Technology Association (JETA) makes efforts at systematization of the measuring technology of environmental state of the water quality and atmosphere (environmental measuring technology), development and improvement of environmental measuring technology, and contributes to the progress of the enhancement of maintenance and control expertise. And JETA also contributes to the protection of people's health, the preservation of the living environment and the international technical cooperation concerning environmental measurement technology through activities related to the association. Its research primarily focuses on Water Quality Automatic Monitoring Technology, standardization of Dry Automatic Air Measuring Instrument, Maintenance and Control Technology of Environmental Measuring Instrument and Acid Rain Monitoring in East Asia.

4.6 Japan's Ecotown Projects



Source: METI, Japan

Eco-Town concepts have recently expanded to include the 3R (Reduce, Reuse and Recycling) concept and building an economy based on the life-cycle approach as well as accumulation of recycling facilities. Moreover, the concept of Eco-Towns were evolved in Japan by utilizing regional technologies and industries. Eco-Towns have a number of key features such as (a) strong legislation, shifting the market towards a sound material-cycle society, (b) national and local governments are spearheading the drive to bring together industry clusters to be more sustainable, (c) increasing product research and development – in both public and private sectors, including universities, (d) large and rapidly expanding eco-business market, domestically and internationally, (e) strong focus on environmental technologies and ESTs, and innovative/cutting-edge solutions to solve environmental problems, and (f) focus on energy conservation, material development and

integrated waste management are also features of Eco-Towns.

The target of the 3R concept is to achieve sustainable consumption and production by means of information access, market creation and networking, policy and strategy development, application and implementation of ESTs, regional corporation, and building sustainable commitment. In addition to the 3R, Eco-Town concepts also involve green procurement, green consumerism, industrial ecology, extended producer responsibility, socially responsible investment, integrated waste management, green labeling, global reporting initiative, corporate social responsibility, EMS and ISO 14001. “Eco-Town” therefore becomes a defined area, a laboratory, where various different eco-concepts can be developed and implemented.

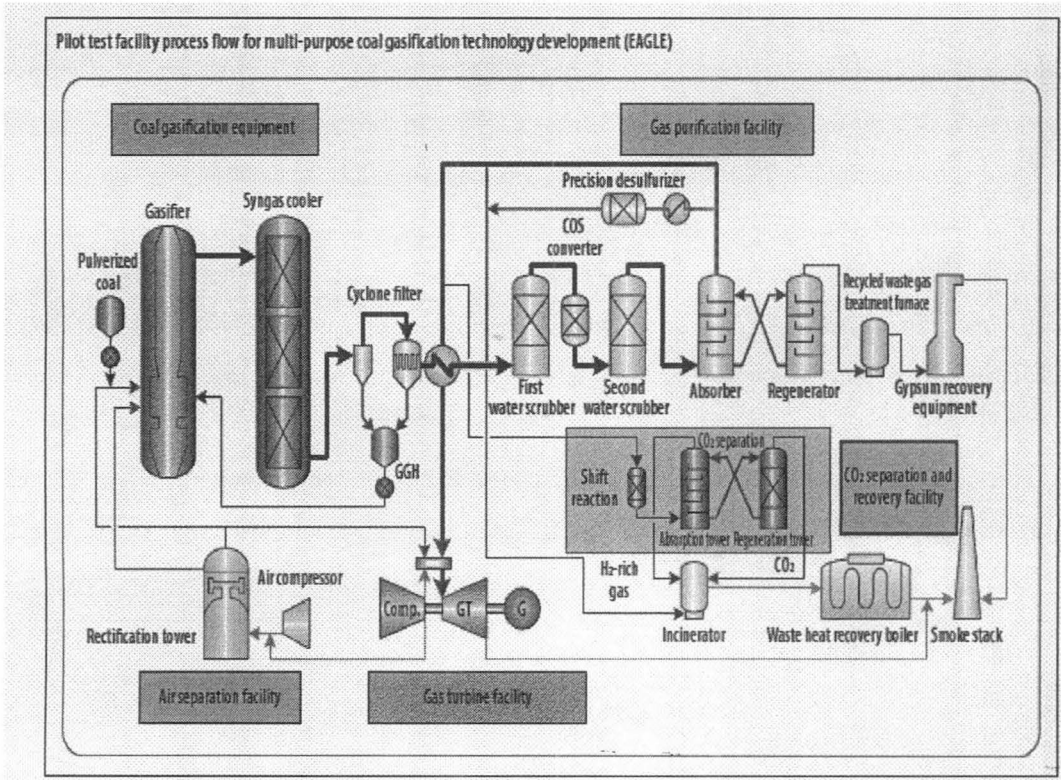
4.3 Role of Japanese technologies

To align with the Montreal Protocol to protect the ozone layer, Japan is obligated to phase out the production and use of CFC and HCFC refrigerants. Because of this, CFC/HCFC substitutes have been developed. Early on, the refrigeration and air conditioning manufacturers successfully replaced CFCs with fluorinated gas substitutes in their most common models. However, among these substitutes, there are some chemical compounds with very high global warming potential (GWP) values and the emission of those chemical compounds is limited by Japan’s Kyoto Protocol Target Achievement Plan. Air conditioners with non-fluorinated refrigerants that produce a minimal greenhouse effect have been partly commercialized, but have yet to become widespread due to safety concerns and poor energy efficiency. In general, it is extremely challenging technically to use non- fluorinated refrigerants with air conditioners, and the refrigerants have not advanced much beyond the research stage. In order to commercialize them, elemental equipment and an energy efficient, safe, and secure system must be comprehensively developed. NEDO subsidizes the introduction of equipment and the development of technologies to reduce the emission of the three fluorinated gases (HFCs, PFCs and SF₆), and promotes advanced and quick-impact efforts to mitigate global warming.

Rigid urethane foam insulation is widely utilized to insulate building structures. However, insulation and foaming agents made from fluorinated gas substitutes are almost 900 times more harmful in terms of their contribution to global warming than is CO₂. In response, non-fluorocarbon insulation and foaming agents utilizing gases with lower GWP values, such as CO₂ or cyclopentane, are being developed. However, several issues need to be addressed with these new non-fluorinated foaming agents, such as insulating efficiency, combustibility during manufacturing, and workability, before they can be introduced commercially.

To ease the burden on the environment, and in particular the emission of gases that cause climate change, the Multi-purpose Coal Gasification Technology Development (EAGLE: Coal Energy Application for Gas, Liquid & Electricity) aims to develop the most advanced oxygen-blown, two-stage, entrained-flow gasifier that can efficiently produce synthetic gas (CO+H₂), as well as technology for advanced refining (dust extraction, dehydrogen sulfide, dehalogenation, etc.) of the coal gas produced. Furthermore, this oxygen-blown gasification process has features that will facilitate the efficient capture and sequestration of CO₂ from coal gas. Research is also undertaken to develop technologies to produce synthesis gas that can be converted to clean liquid fuels, such as methanol or dimethyl ether (DME), by reforming the high-temperature COG with tar from coke ovens, thereby making use of the heat energy of the gas.

4.7 Multipurpose Coal Gasification Technology Development



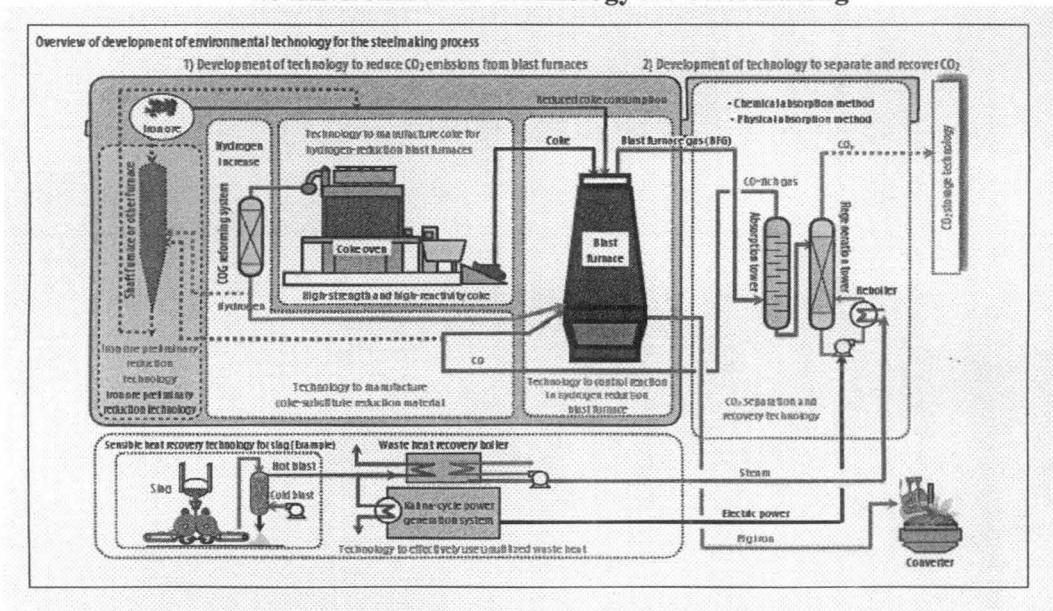
Source: NEDO, Japan

The development of clean coal technologies, which is less environmentally burdensome, innovative technologies that improve energy efficiency and contribute to energy security, is a challenge for the research and development community across the world. Japan's world-class CCT technology will be promoted through technical cooperation with other countries, especially China and Southeast Asian nations.

Japan, a world leader, in steel industry, to reduce global CO₂ emissions, has developed innovative steel making process technology. NEDO aims to drastically reduce CO₂ emissions in the steel making process by tackling the following research and development challenges: Technology to reduce CO₂ emissions from blast furnaces- to develop reaction control technology to reduce iron ore by using hydrogen or other

substances, thereby reducing coke consumption; to develop coke oven gas (COG) reforming technology that increases the amount of hydrogen produced; to develop technology to manufacture high-strength and high-reactivity coke for hydrogen-reduction blast furnaces; Technology to separate and recover CO₂; to develop a high-efficiency CO₂ absorption method and to evaluate its performance in a pilot plant; to develop technology that effectively utilizes unused waste heat in steel making plants for CO₂ separation and recovery.

4.8 Environmental Technology for Steel making



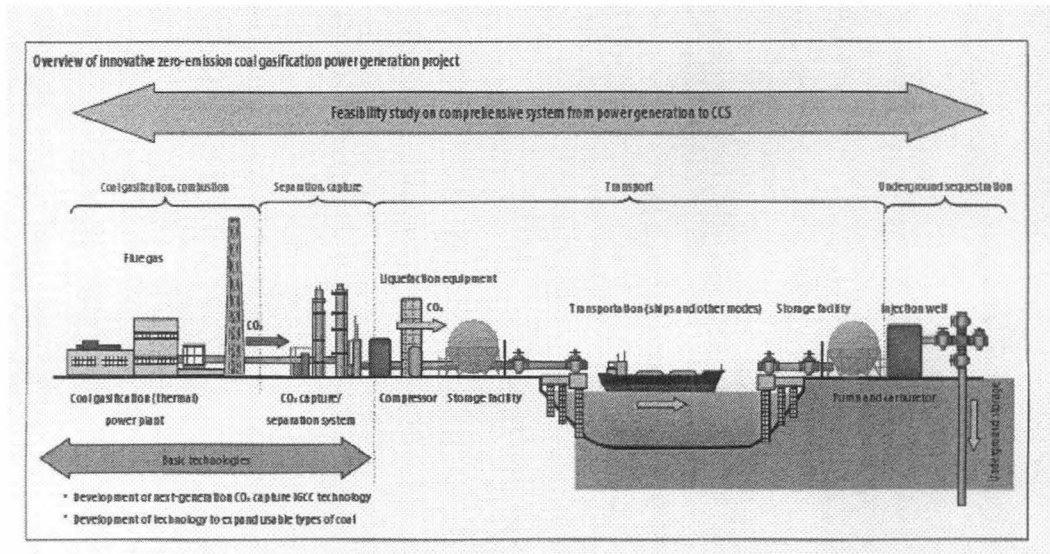
Source: NEDO, Japan

CCS technology has been increasingly recognized as important in Japan as well as abroad by organizations and countries like the Intergovernmental Panel on Climate Change (IPCC), the G8, the EU and the US. It is also necessary to reduce CO₂ emissions produced by thermal power generation plants and to earnestly study the feasibility of zero emission coal gasification power generation technologies, including CCS technology, which captures and stores CO₂ generated by coal-fired power plants.

NEDO also conducts comprehensive research on New Photo Voltaic Power Generation Technology, Next-generation PV Generation System Technologies, Innovative Solar

Cells, Next-generation Wind Power Generation Technology, offshore Wind Power Generation Technology, Development of Technology for High-efficiency Conversion of Biomass and Other Energy, Technological Development of Yttrium-based Superconducting Power Equipment, Development of Ultra High Purity Materials for Thermal Power Plants and Wind Power Stabilization Technology.

4.9 Zero Emission Coal Gasification Technology



Source: NEDO, Japan

On May 28, 2007, Japan's Ministry of Economy, Trade and Industry (METI) issued a report titled Next-generation Automobile and Fuel Initiative. In the report, METI laid out the idea of Japan pursuing the concept of the world's most environmentally-friendly motorized society as one of the measures of the initiative, and proposed building a low carbon emission society based on intelligent transport systems (ITS). Also, METI's study group on the electrification of automobiles proposed the Concept of Energy ITS as a technical development program to address ITS technologies that can contribute to energy conservation.

In comprehensive Technological Development of Innovative, Next-generation, Low-pollution Vehicles, NEDO has undertaken research on development of new combustion methods (e.g., homogeneous charge compression ignition (HCCI)) and optimization of

fuel; development of engine technology capable of using natural gas-based gas-to-liquid (GTL); research and development of innovative diesel exhaust after treatment systems; and comprehensive assessment technology development for next-generation automobiles. NEDO is also developing revolutionary technology to make exhaust gases as clean as gasoline engine exhaust while maintaining the high thermal efficiency of diesel engines.

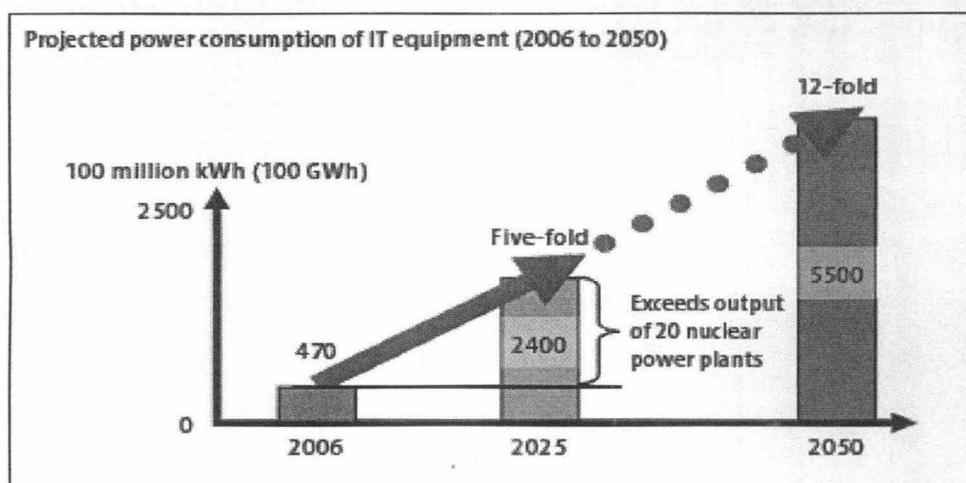
In the transport sector, alternative fuels production for transportation is expected from biomass in addition to fuel-cell-powered vehicles, plug-in hybrid vehicles, and electric vehicles. Biofuels started with a worldwide boom last year when a steep rise occurred in oil prices. Japan's lead in green-car technology. A range of next-generation green automobiles have rolled off the assembly lines of big automakers in Japan. These vehicles, whether powered by fuel cells, long-lasting batteries or renewable bio-fuels, Japanese automakers are dominating the automakers across the world. As far as Japanese car makers are concerned, gasoline is no longer where the action is. Green technologies are changing the industry in an unprecedented way. Within the environmental technology arena, Toyota has gained recognition as the first player in the world market with hybrid vehicles that combine gasoline engines and rechargeable electric batteries. The Toyota Prius went on sale in Japan in 1997, and worldwide in 2001. It was the world's first (in Latin, Prius also means "before" or "first") commercially mass-produced and marketed hybrid automobile.

Energy conservation for IT- related equipment is now considered an important issue. With mid-term (post-Kyoto Protocol, after FY2013), long-term (until FY2030) and very-long-term (until FY2050) time-frames in view, the aim is to establish fundamental technology that will lead to energy use optimization and reduce the annual power consumption of data centers by 30% or more. NEDO's objective is to establish elemental network/router technology that significantly reduces the annual energy consumption of network modules by 30%.

Environmental technologies are generally of a highly disparate nature and stems from all sections of science, research and development. The large number of environment related

patents in Japan attests to the strength of its environmental technology. Enactment of environment related legislations has further stimulated investments in environmental technology development. Japan's world class environmental technology is certain to spearhead the development of new eco-business. In 2003, MOE launched Pilot Project of Environmental Technology Verification with the purpose of verifying the performance of advanced environmental technologies.

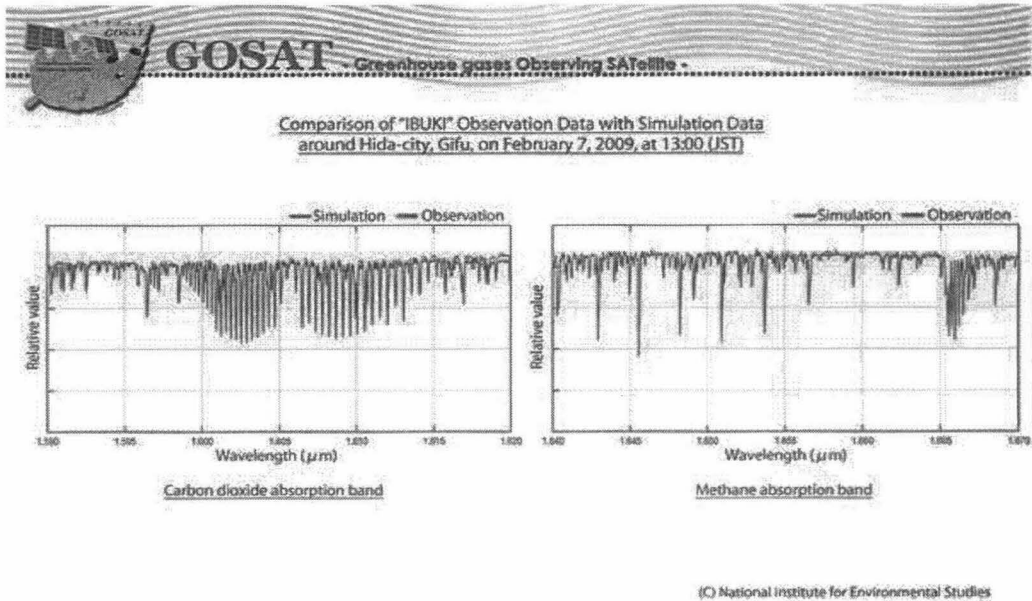
4.10 Power Consumption of IT Equipments



Source: NEDO, Japan

As one of its latest initiatives, Japan launched world's first Greenhouse Gas Observing Satellite, Ibuki, from Tanegashima Space Center, on 23rd January, 2009. Under the aegis of Japan Aerospace Exploration Agency, Ibuki is expected to monitor the density of carbon dioxide (CO₂) and methane (CH₄) over five years. According to JAXA (Japan Aerospace Exploration Agency), the Ibuki satellite is equipped with a greenhouse gas observation sensor (TANSO-FTS) and a cloud/aerosol sensor (TANSO-CAI) that supplements TANSO-FTS. The greenhouse gas observation sensor of Ibuki observes a wide range of wavelengths within the infrared band to enhance observation accuracy. The satellite uses a spectrometer to measure different elements and compounds based on their response to certain types of light. This technology allows the satellite to measure “the concentration of greenhouse gases in the atmosphere at a super-high resolution”.

4.11 GOSAT GHG Observing Satellite



Source: Japan Aerospace Exploration Agency

4.12 Major technologies to support a SMC Society

TECHNOLOGY		DESCRIPTION
Improvement in hygiene	Johkasoh	A purification tank for treating night soil and domestic waste water to discharge treated water
	Mechanical collection vehicle	Packer trucks to efficiently collect and transport wastes without any spillage
	Incinerator	Incineration technology, suitable for use under Japanese conditions, to reduce the volume of waste and kill bacteria
	Gasification and melting furnaces	Melting technology reduce dioxin generation, ensuring complete high temperature combustion, rendering incineration ash harmless by melting and solidification and allowing effective use of molten slag

	Final disposal	Technologies for the final disposal of the waste residue remaining after intermediate treatment
	Manifest control	A manifest control system that will improve transparency and accuracy when monitoring and managing waste flows, and the adoption of electronic manifest control technology
Measures against hazardous substances	Measures to reduce waste mercury levels	Recycling technologies for waste batteries and fluorescent bulbs
	Measures to reduce waste dioxins levels	Systems and technologies to reduce the amount of dioxins generated during waste incineration
	Measures to reduce waste PCBs levels	Methods and programs to ensure the responsible disposal of polychlorinated biphenyls (PCBs)
	Measures to reduce waste asbestos levels	Systems, final disposal methods, and studies concerning the responsible management of asbestos
	Measures to reduce infectious waste	Incineration for infectious waste from medical facilities
Technologies to support 3R	Container and packaging reductions	Measures to reduce waste through the use of thinner PET bottles, the development of refillable bottled products, and the adoption of replacements for bottled products (e.g., liquid soap, detergent)
	Home appliance -related reductions	Technologies to reduce the number of component parts, produce smaller parts, reduce weight by means of modularization, and extend the useful life of PCs
	Vehicle-related reductions	Technologies to reduce vehicle body weight through the increased use of aluminum, and extend the useful life of engine oil by increasing designated replacement intervals
	Reuse of copiers	Initiatives to reuse exterior components through the development of improved cleaning technologies, in addition to the drive unit and other interior components, which have already been used.
	Reuse of slot machines	Initiatives to reduce the amount of resources needed to manufacture new models of "pachislo" slot machines by encouraging their reuse
	Reuse of vehicles	initiatives to restore and recondition vehicles by replacing worn or broken components with new ones based on parts removed from end-of-life vehicles

Eco-design home appliances	Designs incorporating "ease of decomposition," using product assessment projects
Eco-design vehicles	Adoption of recycling-conscious resources, such as recycled materials and recyclable resources, and the use of the "Easy Disassembly Mark" labeling system
Recycling of waste containers and packaging	Material recycling and chemical recycling for waste plastic and PET bottles
Recycling of end-of-life vehicles	Recycling for aluminum wheels, shredder dust, and waste tires
Recycling of end-of-life home appliances	An end-of-life home appliance recycling flow, and the utilization of recycling to provide more added value (closed recycling)
Recycling of construction waste	Technologies to sort mixed construction waste and recycle construction sludge
Recycling of food waste	Technologies to produce compost and eco-feed and to recycle food waste for other uses, such as fuel
Paper recycling	Technologies to manufacture pulp from used paper in order to produce recycled paper
Recycling technology for non-burnable waste and large discarded articles	Technologies to crush/shred and sort non-burnable waste and large discarded articles in order to effectively recycle valuable waste
Recycling of incineration ash	"Eco-cement," manufactured mainly (50%) from wastes such as urban waste incineration ash and sewage sludge
Waste power generation	Waste power generation systems utilizing the waste heat from waste incineration facilities
Biomass power generation	Power generation systems using biomass materials such as wood chips and bagasse (sugarcane chaff)
RDF	Refuse-Derived Fuel (RDF), produced by shredding and drying burnable waste and removing any impurities
RPF	Refuse-derived paper and plastic Fuel (RPF), produced mainly from the used paper and waste plastic (difficult to recycle) included in industrial waste
Biodiesel fuel	Biodiesel fuel (BDF) as a substitute for light oil in automotive diesel engines
Bioethanol	Bioethanol, produced mainly from waste construction wood with other wastes such as waste paper and food residues added

Metallic resource circulation technology	Iron, copper, aluminum	Technologies and material flows to recycle iron, copper and aluminum scrap
	Rare metals, heavy metals	Technologies to recover and recycle rare metals and heavy metals from waste

Source: Ministry of Environment, Japan

4.4 Promotion of technological support

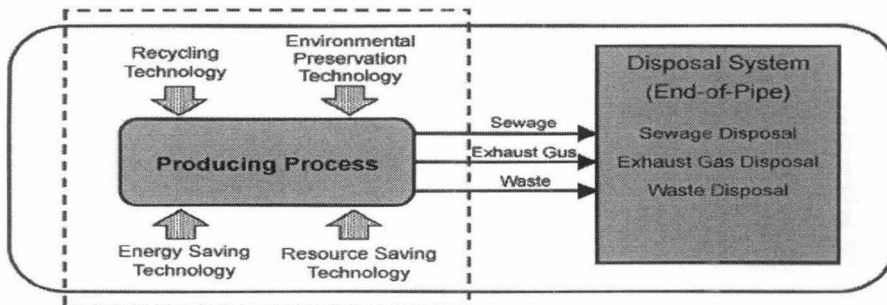
Through cooperation among peoples, enterprises and government, Japan has gained valuable experience in overcoming oil crises and the aggravated pollution problems that followed the economic boom of the late 1960s, and has amassed a wealth of experience and technology. In hopes of extending Japanese experience beyond its borders, the Osaka City Government has been working to help alleviate environmental problems in developing countries. In August 1989, Mr. Masaya Nishio, Mayor of Osaka, announced a plan to attract an international environmental organization to the city in order to disseminate and apply Osaka's successful experience with urban environmental management. Following the mayor's announcement and with the support of the national Japanese government, the Osaka Prefectural Government, and business organizations in the region, Osaka Mayor Nishio officially handed a request to Dr. Mostafa K. Tolba, then Executive Director of the United Nations Environment Program (UNEP), while he was visiting Japan. In July 1990, at a summit of developed nations in Houston, Prime Minister Toshiki Kaifu announced the plan of setting the UNEP facilities up in Japan. In August of the same year, Mr. Naohiro Kumagai, then Japan's ambassador to Kenya, proposed to the 2nd Special Meeting of the UNEP Governing Council that a center be set up in Japan in view of the increasing importance of environmental technology transfer to achievement of sustainable development. In May of the following year, a resolution to establish the UNEP/DTIE/International Environmental Technology Centre (IETC) whose mandate is the adoption, application and operation of Environmentally Sound Technologies (ESTs) in developing countries and countries with economies in transition, was unanimously approved at the 16th Session of the UNEP Governing Council. Official establishment of IETC was completed in October 1992 in Osaka when UNEP Executive Director Tolba and Parliamentary Vice-Minister for Foreign Affairs Kakizawa signed an

official agreement marking the founding of IETC.

The Global Environment Centre Foundation (GEC) was institutionalized on January 28, 1992 with the expressed purpose of supporting IETC. GEC, a nonprofit organization, obtains support from the local business sector. GEC provides logistical support to IETC Osaka and collaborates with IETC on joint projects. It also acts as a liaison between environmental organizations in Japan and the IETC. In this way, it helps to ensure the IETC's smooth and efficient operation. In addition, GEC promotes environmental conservation through original projects such as the collection and dissemination of environmental technological information, training programs, seminars and symposia, as well as research. "New Environmental Technology Transfer in the 21st Century", GEC Environmental Technology Database, shows GEC's resolution to promote environmental technology transfer in the 21st century. However, since there are great differences among countries in terms of environmental conditions, economic and technological progress, and public morals and practices, it is necessary to transfer technology appropriate to the actual situation in a developing country after accurately evaluating the needs of the country and taking into account the existing level of technological development. Sometimes the technologies developed when Japan first addressed environmental issues could actually be more useful to a developing country than the latest technologies. In addition, there are many cases in which the traditional technologies or knowledge of other developing countries are highly beneficial. In this context, the Committee for Studying Transfer of Environmental Technology was established in October of 1994 in the Global Environment Center Foundation, supporting the UNEP International Environmental Technology Centre (UNEP/IETC) was invited to Osaka. The UNEP/IETC was established for the purpose of transferring environmentally-sound technologies to developing countries, as well as countries with economies in transition. "Air Pollution Control Technology in Japan", which was published by the Committee for Studying Transfer of Environmental Technology in May 1996. It outlined the various technological measures to prevent and control air pollution which are available in Japan. Waste Management Technology in Japan database mainly outlays the most advanced environmental technologies in Japan, and is developed as a user-friendly tool. The data is

categorized by “waste-type”, therefore users can easily access to appropriate data/measures for waste treatment technology, and it is also designed to be able to search a data by “treatment method”. The UNEP/DTIE is conducting national cleaner production centers (NCPCs) program, in which UNEP and United Nations Industrial Development Organization have joined forces to help introduce Cleaner Production in developing countries and countries in transition by establishing NCPCs. The purpose of NCPCs programme is to promote capacity development to help achieve adoption and further development of the Cleaner Production concept at the national level through disseminate technical information and other activities.

“Introduction of Japanese Advanced Environmental Equipment” published by the Japan Society of Industrial Machinery Manufacturers (JSIM) in 2001 introduces the advanced environmental equipment made by Japanese leading manufacturers. With the kind cooperation of the Society and fund raised by Ministry of the Environment of Japan, Global Environment Center Foundation, incorporates it on its database.



Source: Global Environment Center Foundation

International Center for Environmental Technology Transfer ICETT, established in 1990 by Mie prefecture and Yokkaichi City with the active support of the national government, industries and academic circles, is contributing to international environmental conservation effort by transferring Japan's accumulated technological and administrative know-how and experiences to developing countries, with an emphasis on meeting specific needs in each country. To this end, ICETT carries out training and technical guidance, research and development, surveys and provision of information, and activities intending to promote information exchange and raise public awareness. By collaborating closely with enterprises, universities, and research institutes in Japan and

abroad, ICETT is promoting development of appropriate technology for conservation of the global environment that perfectly meets the needs of various other countries, as well as promoting development of cutting-edge technology that is conducive to conservation of the global environment.

4.13 Research and Development on Global Warming Mitigation Technologies (Commissioned by the Ministry of Economy, Trade and Industry)

Subject	Research Period	Participating Institute
Development of the on-site type RPF energy system	2003-2004	Imuraya Confectionery Co., Ltd. and KUBOTA Corporation
Development of high-efficiency with low NOX emission burner for the cement kiln	2003-2004	TAIHEIYO CEMENT CORPORATION
Development of environmentally-benign thermoelectric power generation materials	2003-2003	Toyota Central R&D Labs., Inc
Development of phosphate sludge recycling technology	2003-2004	Toyota Motor Corporation
Development of bio-treatment system for dioxins using functional complex microorganism	2003-2004	Mitsui Engineering & Shipbuilding Co., Ltd.
Development of recycling system of polyolefin compound resin	2003-2004	RHOMBIC CORPORATION
Development of direct methanol fuel cell system	2003-2004	Yuasa Corporation
Development of new biodegradable resin by compounding chemosynthesis biodegradable plastics	2003-2004	DAITO ME CO., LTD
Development of air refrigerant-type quick freezing equipment at ultralow temperature (-60℃ or lower) for reducing greenhouse gas emission	2003-2005	Mitsubishi Heavy Industries, Ltd., Yokohama Dockyard & Machinery Works
Development of system to reuse and recycle vending machines	2003-2005	Fuji Electric Systems Co., Ltd.
Research and development of high power output technology for nickel hydride battery for HEV	2004-2006	GS Yuasa Corporation
CO2 reduction technology by foam material production from waste paper	2005-2006	Kankyo Keiei Sougou Kenkyusho Co., Ltd.
Development of biodegradable plastic sheet utilizing construction waste	2005-2007	Mitsubishi Chemical Corporation Mitsubishi Plastics, Inc. (Former Mitsubishi Chemical MKV Company)

Development of decoke technology from fly ash and its utilization technology by surface reforming method	2005-2007	Taiheiyo Cement Corporation Mitsui Engineering & Shipbuilding Co., Ltd.
Development on hydrogen storage as recyclable energy carrier	2006-2007	Hrein Energy, Inc.
Research and development of a high-reliability storage device that can be used in ubiquitous society	2006-2007	GS Yuasa Corporation
Development of supporting system for optimization of total production planning to reduce CO2 emission	2006-2007	Information and Mathematical Science Laboratory, Inc. Shindo Company, Ltd.
Development of bulb-type LED illumination	2007	Lighthouse Technologies Co., Ltd.
Development of eco-friendly high-performance precision washing system using CO2	2007	YP System Co., Ltd.
Development of weather-resistant auxiliary wind power generation to reduce CO2 emission	2007	Loopwing Co., Ltd.

Source: ICETT

ICETT aims at fostering human resources capable of dealing with environmental issues. ICETT conducts training and technical guidance regarding the technical aspects, administrative measures, and other facets of Japan's pollution-control technology to government administrators, business leaders, technical experts, researchers, academic staff and others.

4.14 OVERSEAS TRAINING, FISCAL YEAR 2008

Country	No. of Training days	No. of Participants	Title of the Training Course	Profession of Participants	Invited by
Philippines	1	44	Green Framework of Innovative Strategy on Sustainable Consumption and Productivity (GFIS) EE/CP Workshop	Government Officials, Private Company Engineers	METI
Philippines	1	28	Green Framework of Innovative Strategy on	Government Officials,	METI

			Sustainable Consumption and Productivity (GFIS) CP Workshop	Private Company Engineers	
China (Tianjin)	3	54	Seminar on Environmental Protection in Tianjin city, People's Republic of China –The Environmental Management Policy toward the Reduction SO2	Government Officials, Private Company Engineers	Yokkaichi Municipal Government
Cambodia	1	76	Dissemination Seminar for Environmental Cooperation Program for Asia (ECPA) in 2008	Government Officials, Private Company Engineers Local Communities	Mie Prefectural Government
Indonesia	3	197	International Cooperation Network Information Project	Government Officials, Professors, Private Company Engineers, Local Communities	Mie Prefectural Government
Cambodia	1	50	Evaluation Seminar on for Environmental Cooperation Program for Asia (ECPA) in 2008	Government Officials, Private Company Engineers Local Communities	Mie Prefectural Government

4.15 FISCAL YEAR 2007

China	10	34	Capacity Building for Environmental Conservation toward Material –Cycle Society for TEDA	Government Officials	TEDA
China	3	50	Seminar on Environmental Protection Water Quality Control on Closed Water Area – Total Water Pollutant Load Control	Government Officials, Private Company Engineers	Yokkaichi Municipal Government

Mongolia	1	80	Environmental Improvement for Local Government in Mongolia Bayanzurkh district	Government Officials Local Communities	Mie Prefectural Government
Mongolia	1	71	Seminar on Environmental Improvement for Local Government in Mongolia Bayanzurkh district	Government Officials Local Communities	Mie Prefectural Government

In 2006, Osaka Prefectural Government established the Osaka-Asia 3R Technology Support Consortium, and commenced a project to help provide technological support and human resource development to promote recycling-oriented societies among Asia's developing countries. In 2007, the "Osaka Prefecture 3R Technology Seminar and Eco-Industry Forum" was held on 1 August in Jiangsu Province, China, aiming at the introduction of 3R technologies, as well as the promotion of exchanges between waste-related enterprises in Osaka and Jiangsu Province. Also, the "Viet Nam-Osaka 3R Technology Seminar" was held on 22 January 2008, in Law. Hanoi, Viet Nam with the aim of introducing public and private initiatives for sound waste treatment in both Japan and Viet Nam. This seminar was co-hosted by Osaka Prefectural Government and the Ministry of Natural Resources and Environment of Viet Nam with the cooperation of GEC.

4.5 Conclusion

Japan's sophisticated green technologies provide it an edge in the international Environmentally Sound Technology (EST) market. Progressive research and development facilitated innovative technological solutions to Japan's own domestic challenges which later established its potential beyond its national boundaries. As developing economies walk down the similar path, Japanese experience proved to be of enormous value. Technology should be appreciated as a pillar of sustainable development erasing inefficiencies at every stage of economic activity. The booming Japanese eco-business sector has graduated from the 20th century eco-business model

focused on disposal facilities to a 21st century model that aims to build a recycling based society.

Japanese technology policy can be considered an extraordinary success. The success is, however, the outcome of many different strategies, rather than a single model, agency or ministry. The mechanisms of integrating environmental and industrial policy incorporating a goal-oriented approach, long-term in outlook and cooperative in nature; governmental agencies and programs being organized to obtain cooperation within government as well as with the industry; an emphasis on public/private cooperation with government guidance, but with industry responsible for action and commercialization, and promotion of technological solutions including “critical” technologies.

Pursuing the goals of 3R (reduce, reuse and recycle) and 3E (energy saving, environmental protection and economic development), Japan has successfully innovated cutting edge technologies to achieve the goals of sustainable development. Japan proactively conveys more interest in assisting the developing economies with its technologies in the form of aids. Though presently Japanese aid do comprise of environmental technologies, but it would do good if the aid compose of high end technology which will equip these economies do deal with the challenge better.



Chapter Five

CONCLUSION

Ecological modernization has become the most important theory of practical attempts to deal with environmental problems. Whether it be efforts by the environmentally leading countries of northern Europe, or by the Obama administration in the United States, or by Japan and China, the endeavors all consist of ecological modernization in one form or another.....The success or failure of ecological modernization remains nevertheless an open question, as indicated by global warming caused by human activities. Hence this perspective has its critics, particularly neo-Marxist and neo-Malthusian ones.....

Raymond Murphy

5.1 Introduction

Since the 1990s, in the industrialized economies, Ecological Modernization theory increasingly dominated the way of approaching environmental policy. It represented a new 'consensus on how to conceptualize the environmental problems, its roots and its solutions' (Hajer, 1995). Arthur Mol has identified three ways in which ecological modernization has been interpreted: firstly, it is used in the context of overreaching debates about social theory discussing about evolving relationship between institutions and environment in environmental sociology, through a broader theorizing of modernity and post modernity (Giddens, 1990); secondly, it has been interpreted as a new paradigm by social scientists by analyzing the changing nature of environmental politics and policy; and thirdly, it is adopted as a prescriptive way to refer to a program of environmental and economic policies designed to tackle a range of ecological problems facing governments in the industrialized economies at the end of the 20th century.

Sustainable development is increasingly being nurtured by the international community as the fundamental goal irrespective of the North-South divide. It is evident that implementation of sustainable development is likely to confront many deep seated problems with respect to the development agenda. Ecological modernization has evolved as a variation of sustainable development that has emerged in the industrialized economies that have the best records of environmental protection. Ecological modernization has much to offer as a positive sum game. It seems to offer a practical set

of principles and techniques for dealing with the challenge of environment. It is a flexible model and an enabling state reflects recent developments in the idea of 'governance' as involving 'steering' rather than 'rowing', whereby governmental organizations set strategic objectives but leave day-to-day implementation to other actors (Rhodes, 1997). Perhaps the most distinctive feature of ecological modernization is that it directly addresses the business sector whose support is vital for any transition towards a more sustainable society. It helps us to understand contemporary development in several industrialized countries where policy making elites have adopted a more holistic and strategic approach to environmental issues.

5.2 Japan and Ecological Modernization

Contextualizing Ecological Modernization Theory on Japan and navigating through the academic debates while undertaking an in-depth analytical approach to comprehend Japanese environmentalism in the course of this research, reinforces the hypotheses: ***Ecological restructuring of policies, sophisticated technologies and greater environmental civil activism depicts Japan as an ecologically modernized state in the midst of a transitional political opportunity structure.*** The first of the three independent variables, ecological ***restructuring of policies***, has been extensively treated in chapter two: JAPANESE ENVIRONMENTAL POLICY DISCOURSE. The hypotheses, that has been treated in this chapter holds that ***Ecological restructuring of policies depict Japan as an ecologically modernized state in the midst of a transitional political opportunity structure.*** “Ecological restructuring of policies” is the independent variable for this chapter. “Japan as an ecologically modernized state” is dependent on it. While “transitional political opportunity structure” is treated as the intervening variable. Asserting the hypotheses, the research results align with the second school of thought, namely the *modernizers*, in the existing literature. The second independent variable of this research, ***greater environmental civil activism***, was treated in the third chapter: ENVIRONMENTALISM AND JAPANESE CIVIL SOCIETY. Situated in the broader context of this research, this chapter essentially argues that ***greater environmental civil activism depicts Japan as an ecologically modernized state in the midst of a transitional political opportunity structure.*** For the purpose of the research, ‘greater

environmental civil activism' is treated as the independent variable while 'Japan as an ecologically modernized State' is dependent on it. 'Transitional political opportunity structure' served as an intervening variable. The fourth chapter: ENVIRONMENTAL TECHNOLOGY AND JAPAN argues that *sophisticated technologies depict Japan as an ecologically modernized state in the midst of a transitional political opportunity structure*. "Sophisticated technologies" is the independent variable for the research. "Japan as an ecologically modernized state" is dependent on it while "transitional political opportunity structure" is treated as the intervening variable.

International environmental literature rightly categorizes Japan as an ecologically modernized State aligning with Germany, Sweden, Netherlands and Norway. However, it needs to be clarified that each of these countries has evolved their own distinct model of ecological modernization. For instance, the German model is distinctly different from the Japanese model with respect to institutionalization of the environmental movements. In Japan, there is a tradition of close governmental consultation in the form of administrative guidance to industries, *gyosei shido*, but a weaker social market tradition than is found in Germany. Japanese do not accept environmental taxes as easily as the Germans.

Since the 1990s, there has been a fundamental shift in the Japanese environmental discourse. Japan has successfully devised a matured approach to environmental concerns and thus demonstrated its initiative beyond symbolic politics. Environmental policy making has diversified and has become "increasingly pluralist". It has become more participatory and inclusive. The success of Japanese comprehensive approach lies in addressing the challenge equally at three levels: outlining effective policy reform measures, facilitating increasing space to the environmental communities in the decision making process and cementing a sophisticated technological solution to environmental management problems. It is important to note that much of these dramatic changes were facilitated by deconstructing the closed opportunity structure. Much of this progressive environmentalism depends on the institutional structures, including the formal and informal rules and procedures, and the opportunities and the barriers that they present to

the various actors and the stakeholders.

Japan has rightfully graduated to the fourth stage of Harutoshi Funabashi's *Environmental Control System*, that is the *incorporation of the environmental concern as a primary administrative task*. Green concerns have been internalized on a primary basis at the sustainable economic model evolved by the Japanese leadership. A Report titled *Creation of Recycling Oriented Economic System (Vision of a Recycling Economy)* was prepared in July 1999, by the fundamental problem joint sub-committee, of the Waste and Recycling Committee and the Earth Environment Committee of the Industrial Structure Council, which proposed the promotion of Reduce, Reuse and Recycle, the so-called 3R approach, by extending conventional recycling procedures to become the basic policy for constructing a recycling oriented economic system.

it highlights the necessity not only to set rules requiring entrepreneurs, Japanese citizens, local authorities, etc., to adopt the 3R approach, but also to promote the creation and development of new recycling-oriented, environmentally-friendly businesses by utilizing market forces in which private-sector vigor is utilized, to invest in concentrated research and development of 3R technologies, and to utilize environment and resource protective restrictions as new growth factors when building the recycling-oriented economic system.

Towards Advancement of a Recycling Oriented Economic System,
Environment Committee, METI, February 2002

In light of the current situation, there is an urgent need to step up efforts towards a sustainable society and to integrate these activities with efforts towards a low-carbon society and a society in harmony with nature so that a sound material-cycle (SMC) society based on lower natural resource consumption and lower environmental burdens can be successfully established in Japan, as well as in the rest of the world.

Annual Report on Environment and
Sound Material Cycle Society in Japan, MOE, 2008

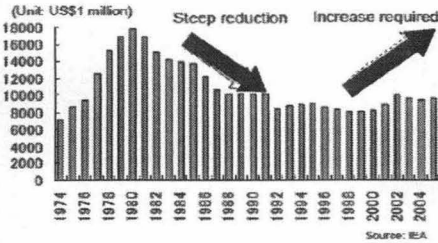
The MOE inculcates a vision that aims to establish a "Healthy, Rich and Beautiful Environmentally Advanced Country" by realizing "virtuous circle for environment and economy", based on the concept that actions for environmental issues will boost the economic growth while the resultant economic growth will further improve the environment. "The market that fully recognizes the value of the environment" provides the groundwork for "building a virtuous circle for environment and economy." Such a market is created by the following actors:

- Consumers who care for the environment and consider the environmental impact when purchasing goods and services.
- Investors who provide funds to environmentally conscious businesses.
- Businesses who supply the market with eco-friendly goods and services, and make efforts to reduce the environmental load resulting from their business activities.
- Educational institutions that conduct research on environmental technologies and develop human resources.
- Civil groups such as non-profit organizations (NPOs) that play a role as liaisons for community, linking citizens with businesses and government agencies. Government agencies that incorporate environmental perspectives in all policies and support citizens and businesses.

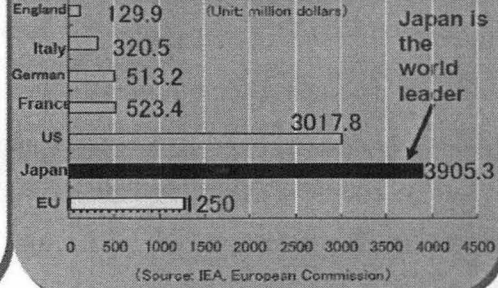
5.1 R&D Investments

Japan Also Leads in Investment on R&D

Global Trend in Public Investment in Research and Development in the Energy Sector

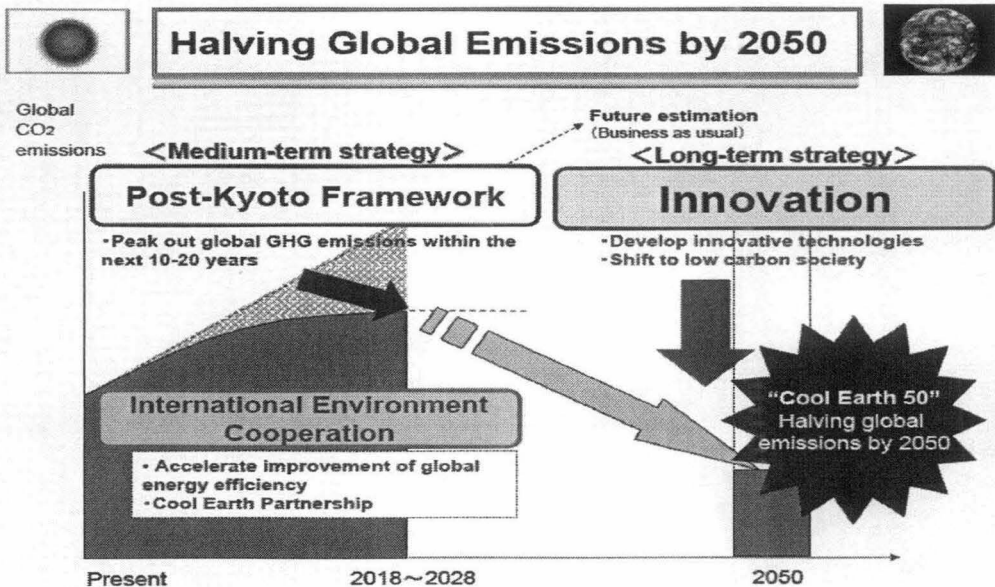


Government R & D Investment in the Energy Sector in Various Countries (2005)

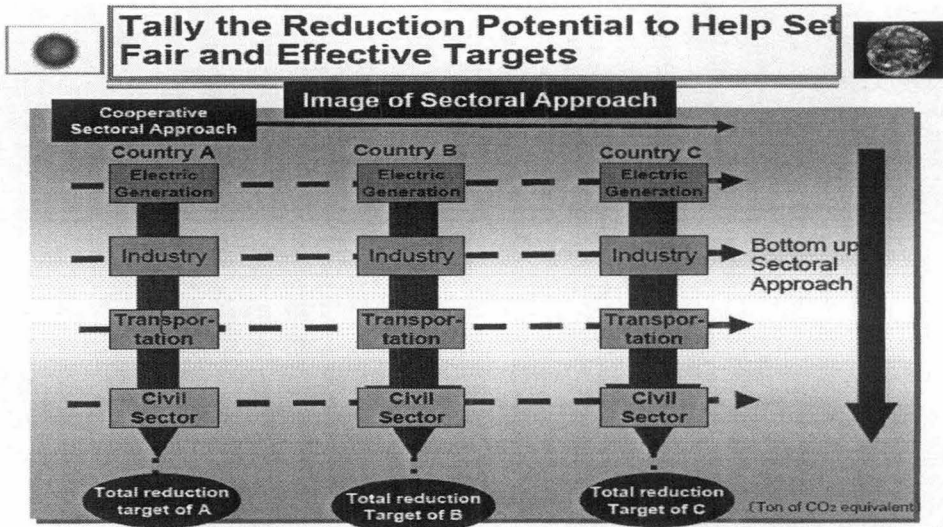


● Prime Minister Fukuda made a commitment at the Davos forum in January 2008: "We will invest US\$30 billion over the next five years in R&D in the environment and energy sector."

To realize a low carbon society, Japan is working towards the creation of an "environmentally advanced nation" (creation of a sustainable society), in which all actors in all aspects of life care for the environment. To ensure continued reduction of CO₂ emissions resulting from energy use, the main cause of global warming, Japan promote measures that efficiently and effectively combine the following three elements: "energy consumption efficiency," "CO₂ emission intensity per energy consumption (carbon intensity)," and "volume of activities." To improve "energy consumption efficiency" and reduce "carbon intensity," technology developments are indispensable. At the same time, from the standpoint of "volume of activities," Japan reconsiders lifestyles and socio-economic activities that are dependent on mass production, mass consumption, and mass disposal, and practice more environmentally conscious daily life and business activities. Japanese efforts seeking to reduce GHG emissions while actualizing sound development of the economy with a low environmental load and a high quality of life, it has developed and diffused energy-saving equipment, enhance energy use efficiency, and accelerate technology development. The spirit of environmental 'partnership' is increasingly cultivated by the environmental administration.

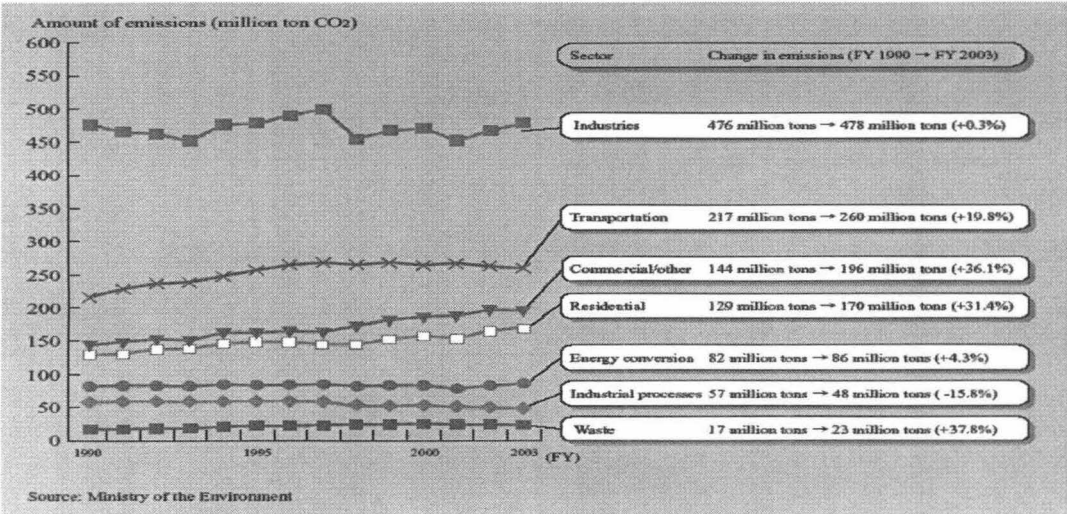


International community is gearing up for the United Nations Framework Convention on Climate Change Conference scheduled in Copenhagen from November 30 to December 11, 2009. A Copenhagen Protocol is expected to evolve as the Kyoto Protocol will run out beyond 2012. Being at the center stage of the Kyoto framework, Japan continues to aspire for a leadership position in the post Kyoto regime. Japan's vision is to establish a fair and equitable framework by evolving a mechanism which enables each country to take measures according to its capacity to combat climate change beyond 2012. In keeping with its green leadership aspirations, at the annual World Economic Forum held in Davos in January 2008, Prime Minister Fukuda outlined his new proposal aimed at ensuring equity in the target setting for the post-Kyoto framework. Japan has set itself the long term target of 60-80% emission reduction by 2050 from its current level. Japan vociferously argues for a sectoral approach in the post Kyoto framework: a tool to make developing countries to participate in mitigation by setting emission factor targets for specific industrial sectors; a tool to solve competitiveness issue of the industries in developed countries by setting emission factor targets for specific industrial sectors. The target could be set based on a bottom-up approach by compiling on sectoral basis energy efficiency as a scientific and transparent measurement and tallying up the reduction volume that would be achieved based on the technology to be in use in subsequent years.



However, critics often are skeptical about Japan's sincerity and potential substantiating statistics which argue that Japan produces approximately 5% of the total world CO₂ emissions, which is the 4th largest in the world after the U.S.A. (about 23%), China (about 16%) and Russia (about 6%). Developed nations produce larger CO₂ emissions per capita than developing nations. Japan emitted 1,355 million tonnes of greenhouse gases in FY2004, which was 8.0% higher than the total emissions of the base year (1,255 million tonnes) as stipulated in the Kyoto Protocol. Japan's greenhouse gas emissions were 0.2% lower than the preceding year. Compared to the base year level (1990 in principle), a breakdown by sectors shows that the emissions of greenhouse gases for the industrial sector had decreased by 3.4%, while that of the transport sector had increased by 20.3%, the commercial and other sectors had increased by 37.9%, and the residential sector had increased by 31.5%.

5.2 Emission trends



Having said that, it needs to be noted that much of the Kyoto targets were unrealistic. It is well documented that these targets were laid without careful planning and a practical road map to achieve the same. So the shortfall is often interpreted as unwillingness and incapacity of the member states to restructure their developmental profile. On the contrary, during the course of this research, it has been well observed that fundamental restructuring of the development model has unfolded in Japan. The leadership has laid down a comprehensive vision to deal with the challenge of environment. This has been facilitated by progressive reforms, underpinning the economics of ecology. These are soon expected to mature and yield desired results. The analysis undertaken strongly asserts Japan as an “ecological frontrunner” nation.

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