

Green Japan: Managing the Intersection of National Politics and Global Environmentalism

The growing consensus about the reality of global climate change presents both national governments and global governance institutions with a formidable challenge. The task of balancing national economic development and environmental considerations has proven difficult for all countries; the need to mobilize governments and citizens to address an issue that is truly global in origin and impact has so far eluded diplomats and politicians. The Kyoto Protocol, an amendment to the United Nations Framework Convention on Climate Change signed in 1997 and in force as of 2005, became the symbol of the new era of international environmentalism. The Protocol called on signatory nations – close to 170 in total – to make significant reductions in greenhouse gas emissions and to thus reduce the trajectory of human-created climate change. But that accord has stalled, stymied by the refusal of the United States, China, and India to embrace the process and, equally, by the inability of those nations which signed the agreement to meet the targets outlined in the Kyoto Protocol. The Government of Japan, as the former host of the critical Kyoto negotiations, has, however, declared its intention to honour its commitment and continues to seek for ways to both bring Japanese practices in line with 21st century environment needs and the emerging politics of global environmentalism.

In the years after the Kyoto agreement, government leaders sought ways of reconciling national imperatives and global responsibilities. At the 2007 APEC Summit in Sydney, Asia Pacific leaders offered another attempt to move beyond the Kyoto Protocol and yet provide a manageable strategy for ecological preservation:

The APEC region has a major stake in global responses to the challenges of climate change, energy security and clean development. Economic growth and technology development are indispensable elements of our future agreed approach. The scale of these challenges demands new and innovative forms of international co-operation. We, the APEC Leaders, reaffirm our commitment to work with all members of the international community for an enduring global solution to climate change.¹

Japan was singled out for playing a crucial role in bringing APEC to a modest consensus , however, there was no action plan for implementation.²

Japan began to put itself on a self-appointed path for global leadership on national environmental strategies, but the turmoil in domestic politics shifted the government off focus fairly quickly. At an Asian leaders' meeting in May 2007 and again at the G8 Summit in June 2007, former Japanese Prime Minister Shinzo Abe³ announced a "Cool Earth 50" initiative, declaring a commitment to cut Japan's emissions in half by 2050 and proposing steps that would leverage the Japanese program into a global initiative. At a United Nations plenary session on climate change in August of the same year, Ambassador Koji Tsuruoka offered his country's plan as the foundation for a global strategy: "As a responsible member of the international community and the host country of the negotiations that led to the Kyoto Protocol, Japan is striving to take the lead in tackling global warming".⁴ Japan's promising environmental image after the 2007 meetings, however, suffered a significant public relations set-back during the December 2007 Bali Conference on global climate change. In this instance, Japan sided with the United States and Canada in favouring a more limited – supporters would say pragmatic – approach to controlling greenhouse gas emissions. In particular, the unpopular triumvirate, reviled at the Bali meeting and much criticized in Japan as well, argued that developing countries had to agree to reduce their emissions before the industrial world agreed to a scaling back in pollution. Without the active participation of China and India, they argued, major initiatives by the rest of the world would be largely without meaning.

In their 2006 book, Global Environmental Politics, Pamela Chasek, David Downie and Janet Welsh Brown make it clear that formidable barriers lie between the identification of the environmental challenge and the creation of a national consensus to address the issue. Their review makes it clear that international solutions are significantly more difficult than national programs, particularly if compliance with a specific agenda puts their country at an economic disadvantage with other nations.⁵ The authors argue that the dynamics of national politics, the challenges of maintaining public interest, and administrative responsibilities and other structural barriers can impede the implementation of a successful national environmental regime.⁶

Assessing Japan's response to the Kyoto Protocol and to the general environmental challenges of the 21st century against these well-known evaluative standards reveals the

difficulty associated with moving from the appreciation of the problem to the implementation of an effective and sustainable environmental regime. In this regard, Japan shares many characteristics with other industrial nations, with a significant gap emerging between public rhetoric, stated national positions, and practical policy implementation. As the following overview of “Green Japan” initiatives demonstrates, Japanese officials have attempted to tackle the issue in the standard manner, by stimulating a national debate, by seeking a consensus about the urgency of the issue, by identifying regulatory instruments and compliance mechanisms. In this regard, Japan follows a well-established international pattern, albeit one that has delivered unspectacular results in the years following the Kyoto Protocol.

In the case of Japan, however, one specific factor – the search for technological solutions to environmental issues – has assumed considerable primacy in terms of public policy. This issue has long been identified as a key element in global environmentalism. As Adam Jaffe and Robert Stavins argued, “the effect of public policies on the process of technological change may, in the long run, be among the most significant determinants of success and failure in environmental protection.”⁷ Japanese leaders have endeavoured to mobilize the country’s scientists to seek scientific, administrative and technological measures to offset or prevent environmental change. Following on the well-established “triple helix” approach of coordinating the work of government, the universities and the private sector, Japanese authorities have likewise tried to connect environmental change with national research and development activities and to thereby secure a significant place for the country in the growing international environmental business sector. Rene Kemp’s detailed study, Environmental Policy and Technical Change, argues “that the reason why some technologies and designs are dominant depends not just on engineering and imagination but also on the accumulated knowledge, cost efficiencies achieved in certain designs, the infrastructure around a technology, and the embedment of technologies in the economic systems and people’s way of life.”⁸ It is this connection between sociological and technological factors, between national goals and science-based solutions that describes the central approach in Japanese environmental policy. Within Japanese science and technology policy, investigating climate change and developing energy sources that do not release carbon dioxide and exploring sustainable material cycles and waste disposal systems are key priorities.⁹

Japan, therefore, faces the same political and administrative challenges as other major industrial nations search for environmental solutions in the age of global climate change. The political and civil service leadership struggle to accommodate the rhetoric and urgency of the Kyoto Protocols and the broader debate about ecological sustainability within the much more restricted framework of national policy and politics. In facing the central challenge of 21st century national and global politics, Japanese leaders are able to draw on some crucial experiences and accomplishments from earlier decades. The country's rapid economic growth after the mid-1950s created a near-environmental crisis in Japan. Stories about mercury and cadmium poisoning made cities like Yokkaichi and Minamata global icons of environmental degradation and human suffering.¹⁰ As one commentator wrote, "Probably no other country had come to feel the consequences of unrestrained industrial growth as early and as painfully as Japan. Critical observers from other countries even saw Japan as doomed to commit 'ecological hara-kiri (or seppuku, the proper Japanese word).'" A wave of local protests and the growing success of left-wing and environmentalist politicians jarred government and business leaders into action. Japan righted itself, due in part to the willingness of judges to hold companies and decision-makers accountable for egregious acts of pollution. With remarkable speed, "Japan did not only shed her image as a 'pollution nation'; in some respects she now stood out as a paragon of effective anti-pollution policy."¹¹

The country became increasingly energy conscious following the oil shocks of the 1970's which underscored its energy vulnerability. Japan's image as an innovator in environmental protection strengthened as the country's record for new approaches to environmental protection continued to attract international attention.¹² Japan's shift to greater reliance on clean energy, particularly nuclear power, cleared the skies over the major cities and was bolstered by a number of major reclamation projects and conservation measures. While the nuclear energy sector suffered numerous set-backs with the most recent being reports of radiation leakages at a power plant near Niigata in July 2007, the country has nonetheless made major strides over the past thirty years in responding to the ecological challenges of this generation.

The rhetoric and public commitment to environmental issues quieted down in the 1990s. This was due, in part, to the long-established practice of mixing partisan politics and regional

economic development, one result of which has been the largely unrestrained development of rural and coastal areas, despite mounting criticism about the aesthetic and environmental impact of such projects.¹³ Through the 1990s, the Japanese public was not extensively engaged in environmental initiatives and appeared to be less confident about the effectiveness of community-level action in protecting the environment.¹⁴ The country remained more science-friendly and preoccupied primarily by personal and community health concerns than with waging major internal battles over environmental issues.¹⁵

Japan has, in both political commentary and government policy, taken its commitments under the Kyoto Accord more seriously than many nations. Not always deeply engaged in issues of global governance and international engagement, the Japanese authorities have responded somewhat differently on the environmental front. Japan, like other nations, has wrestled with the process and structures for internalizing international agreements, such as the Kyoto Accord, and using them as a foundation for concerted government actions. International protocols, accords and treaties are the primary currency of global governance. Intense and time-consuming discussions, with political leaders often building atop of years of research, planning and strategizing by professional staff, lead to the negotiation and ratification of international agreements. Over the past decades, accords as varied as the Geneva Convention, the founding documents of the United Nations and the World Trade Organizations, new frameworks for international trade, International Covenant on Economic, Social and Cultural Rights, and the International Covenant on Civil and Political Rights have been implemented. In the process, governments have sought the political and legal means of connecting national policy and practice with international agreements, strengthening the legitimacy of international governance and providing global standards for the assessment of the practices of individual countries.

Managing environmental behaviour has presented a particularly formidable challenge for both national governments and international institutions. Slowing the use of pollutants and requiring stronger ecological protection have immediate and often significant economic and social benefits and costs. Even many among the most prosperous nations, signatories to the Kyoto Protocol and strong public defenders of global environmental management have nonetheless concluded that imposing the precise terms of a controversial international accord would have devastating economic effects and, even more, would generate a strong political

backlash against environmental regulation generally. This has clearly been the case for Canada, where the national calculus of environmental versus economic trade-offs suggested major job and business losses if the Kyoto Protocol were to be adopted, and for Australia, a heavy energy-consuming nation, which refused to ratify the Kyoto agreement until the new Prime Minister, Kevin Rudd, ratified it at the Bali conference. The challenge of responding to a global environmental accord is substantial, for governments must regulate business activity related to energy use and environmental preservation while also changing citizens' behaviours and expectations related to resource use, consumption, and personal responsibility for ecological change.

The Expansion of Japanese Environmentalism:

Japan provides a useful case of the evaluation of efforts to coordinate global ecological accords and national action. Japan made important changes to its industrial and pollution control strategies as the environmental consequences of rapid economic expansion became evident in the 1960s and 1970s. Indeed, Japan's successful rehabilitation of urban air quality, recovery of major waterways, and advanced industrial controls has often been touted as a model of contemporary developing nations.¹⁶ The assertive, often aggressive, environmental movement in the country attracted far more attention than subtle changes in industrial regulations and corporate strategies, but the latter possibly contributed as much as the former to the creation of a new environmental mindset in the country.¹⁷

Academic studies of emergent Japanese environmentalism document a lengthy struggle between grass roots movements and the "top actors in the major institutions, government, party and business—the Ruling Triad."¹⁸ Political and commercial leaders, it seems, reacted slowly to emerging threats and growing public concern:

From 1955 until the early 1990s, this pattern of elite communitarianism held. When challenged by the wave of grassroots pollution protests and local victories by opposition parties, members of the triad responded with two tactics: pre-emptive policy compromise and soft social control. Their facility at enacting preemptive pollution control policies speaks to the effectiveness of the horizontal, relatively egalitarian networks among members of the triad. The soft social control, however,

reveals the presence of “inverted V” type vertical networks between elites and ordinary citizens. The triad made substantive policy compromise in order to preserve regime stability. When the electoral threat declined, however, the triad gradually reasserted capital accumulation as its central principle. This prevented the pollution regulation principles behind Japan’s “pollution miracle” from generalizing and making all production follow environmental principles.¹⁹

Concluding his detailed study of pre-1995 environmentalism in Japan, Jeffrey Broadbent concluded that convincing government and business to adhere to environmental policies “seems to depend upon their ability to link environmentalist values to pocketbook and health-related demands. Only then can environmentalists forge a voting constituency powerful enough to threaten pro-growth elites with political defeat, and thereby jog the elites into staking steps to repair environmental degradation, contrary to their immediate economic interests.”²⁰

Over the past decade pressures have increased on Japanese leaders to respond even more aggressively on environmental issues. Like several European nations, Japan has taken the Kyoto Protocol very seriously and has endeavoured to bring its national policies and citizens’ behaviour in line with global priorities. As the Kyoto Protocol was signed on Japanese soil, the Japanese government feels a strong obligation to honour its 1997 pledge to reduce greenhouse gas emissions to six percent below 1990 levels between 2008 and 2012. “We are determined to exert all efforts by the entire nation to ensure that Japan achieves its commitment to reduce emissions by 6 percent” said former Prime Minister Abe.²¹ The Japanese government has introduced a range of initiatives designed to cut greenhouse gas emissions, encourage the production and use of low emission technologies, increase recycling, promote green products and generally encourage citizens, governments and business to adopt a more environmentally friendly lifestyle.

With pressure and incentives from the government, and with growing public awareness of environmental considerations, corporate environmental activism has also expanded. Beyond actions and processes decreed by government, many Japanese companies are competing to demonstrate their green credentials. There has been a surge of interest in environmental reporting, encouraged by a series of government guidance papers, and

company reports now proudly extol the range of environmentally friendly actions the corporation has undertaken.²² More than 80 companies offer goods or services as prizes as part of a government campaign against global warming. In September 2007, for example, McDonald's Japan offered customers a half price Big Mac if they demonstrated a commitment to global warming by signing an online form from the Ministry of Environment that outlined 39 measures individuals could take to fight global warming. The day after the McDonald's campaign started, the government website crashed from the deluge of hits.²³

The Japanese domestic commitment has also had external elements. As mentioned, at a dinner with Asian leaders in late May 2007, and reiterated two weeks later at the G8 summit in Germany, then Prime Minister Shinzo Abe invited the world to participate with Japan in "Cool Earth 50", a three pillar strategy aimed at the global reduction of greenhouse gas emissions.²⁴ Prime Minister Abe challenged the world to cut global emissions by half the current level by 2050, thus matching industrial output with the capacity of the earth to absorb carbon dioxide naturally. This would involve the development of innovative technologies, which will allow for economic growth and the reduction of greenhouse gas emissions to occur simultaneously, and by building a "low carbon" society centered on those technologies. The Prime Minister cited research on eliminating carbon dioxide emissions from coal fired power generation (which accounts for almost one-third of global carbon dioxide emissions), on the development of safe and reliable nuclear power generation technologies and on efficient solar power generation, fuel cells and low emission vehicles. Japan, he said, committed itself to making significant contributions to this research.

The second part of the Prime Minister's proposal called for the development of an international framework for addressing global warming from 2013 onward. This framework, he argued, must include all major carbon dioxide emitters, be flexible and diverse and reach a balance between economic growth and environmental protection. Japan, Prime Minister Abe announced, would financially support developing countries trying to reduce their greenhouse gas emissions. Japan would also try to get the support of other industrialized countries and international organizations, like the World Bank and the United Nations, to do the same.

The government of Japan clearly believed that its policies and initiatives could be replicated outside the country and could provide a foundation for concerted global action. To build the

low carbon society that Cool Earth 50 envisions, the Japanese plan indicated, all nations must encourage their people to reduce their carbon dioxide emissions. Prime Minister Abe said, “The amount of carbon dioxide emissions by GDP of Japan is the least among major industrialized countries in the world, and public transportation accounts for 47 percent of all movement of people in Japan – by far the highest among industrialized countries. We will demonstrate the “Japan model” in the world.”²⁵ Japan, he pledged, would redouble its efforts to achieve its Kyoto protocol commitment. Abe’s Cool Earth 50 also included an aggressive strategy for citizen mobilization. Japan’s National Campaign for Achieving the Kyoto Protocol Target said simply: “With the motto of ‘1 person, 1 day, 1 kg’ for reducing greenhouse gases, we will call upon the people to reexamine lifestyles and call for efforts and creative ideas at home and workplace.”²⁶ Unfortunately, not long after this pledge, Prime Minister Abe resigned suddenly and domestic political considerations engulfed Japan’s leadership.

Japan faces a formidable challenge in seeking to achieve its Kyoto Protocol targets. The country’s greenhouse gas emissions have grown over 8% since 1990. To achieve its newly announced goal, Japan will need to reduce its emissions 14% between 2007 and 2012. Japan plans to achieve almost nine percentage points of its reduction through domestic measures with the remainder made up by sinks (the removal of gases from the atmosphere that occurs naturally through forests, oceans and the soil) and Kyoto mechanisms.²⁷ Kyoto mechanisms include Clean Development Mechanisms (the funding of projects to reduce emissions in developing countries), Joint Implementation (the funding of projects to reduce emissions in industrialized countries which have made reduction commitments), or Emissions Trading. Achieving a 9% reduction through domestic measures alone over the next five years will be a test for Japan, particularly as compared to other industrialized nations, its emissions are already relatively low (on a per capita basis).

The success of Japan’s first steps at leadership on global warming is not assured.²⁸ Cool Earth 50 could mark Japan’s emergence as a leader on the world stage, but this will depend, among other things, on its ability to deliver on its pledges. Further, it is not clear whether Japanese initiatives will work outside the country. With a homogenous population and a deep-seated acceptance of technological innovation, Japan is atypical on the global scene. The various environmental initiatives described below have been developed, proposed and

promoted by the national government. That there has been substantial acceptance by both corporate Japan and the general public is at least partly due to a much greater acceptance of governmental leadership than is seen in much of the industrialized world. Whether that kind of leadership and/or the expectation of placing the collective ahead of individual needs and desires that some of these initiatives require will work outside Japan is debatable.

However, the urgency of the challenge of global warming that confronts the world may mean that many citizens in many countries are ready to embrace leadership from wherever and however it comes. Whether Japan or any nation is able to provide the necessary leadership remains to be seen. The next Group of Eight summit is being held in July 2008 at Lake Toya in Hokkaido, Japan. Global warming and the sharing of energy efficient technologies with developing countries will be key topics of discussion. As the host nation, Japan wants to ensure that there are convincing proposals to replace the Kyoto Protocol which expires in 2012. Perhaps Cool Earth 50 or its replacement will galvanize an international organization into action. Regardless, the domestic initiatives Japan has undertaken have had some success and may provide examples for other nations to follow.

The Policies of Combating Climate Change: In recent years, the Government of Japan has launched a complex series of initiatives designed to address the challenges and needs of environmental sustainability. A review of several of the more prominent examples demonstrates the government's determination to produce a web of public mobilization, environmental business initiatives, government regulation and scientific innovation. The Japanese strategy calls on the wide-ranging mobilization of national resources and national energy in the interests of address global climate change. The partnership of government, business, the academy and the general public replicates the Japan Inc. approach and the collaborative ethos has long characterized the Japanese strategy for rapid national change.

Team Minus 6% National Project: In April 2005, the government launched a national campaign designed to encourage every citizen and business organization to make efforts to combat global warming.²⁹ A number of Japan's domestic initiatives fall under the **Team Minus 6% National Project**. Team Minus 6% was launched in April 2005, to encourage every citizen and business organization to make efforts to combat global warming. Led by the Ministry of the Environment, and called Team Minus 6%, in reference to the amount of greenhouse gases that under the Kyoto Protocol Japan had pledged to cut³⁰, everyone in the

“team”, meaning the country, has been encouraged to take six actions:

- limit their use of air conditioners;
- reduce water consumption;
- stop idling cars;
- buy environmentally friendly products;
- refuse extra wrapping of purchases, and
- unplug unused appliances.

By May 2008, over 2.2 million individuals have signed up and over 20,200 companies were part of the rapidly expanding program.³¹ As part of Team Minus 6%, the government started a **Cool Biz** campaign in the summer of 2005 with the aim of conserving energy during the summer. With the catch phrase “No Necktie, No Jacket”, the Cool Biz campaign (which now runs from June 1st to September 30th annually) advises all offices to set their air conditioners to turn on only when the temperature reaches 28 degrees Celsius. All government offices immediately complied and, gradually, Japanese companies, large and small, began to follow suit. Many of Japan’s largest companies including Sharp, Toyota, Hitachi, Matsushita, Canon, Toshiba, Nissin, Daiei and Tokyo Gas implemented Cool Biz. In October 2006, the Ministry of the Environment announced its household “stop global warming” campaign. Entitled **Uchi-Eco** (uchi means house), its aim is to promote ways that individuals can save energy at home and in their own lives.

For much of the last decade, the government of Japan has identified scientific and technology innovation as being the key element in defining the country’s long-term economic prospects and responding to domestic and international pressures. Japan’s consistently high investments in scientific and technology research have provided the country’s universities, government research laboratories and corporations with the resources and incentives necessary to invest heavily in products, services and processes that contribute to national priorities in such areas as nanotechnology, biotechnology, and information technology. Through this period of research intensiveness, green technologies have featured prominently in Japanese high technology efforts, receiving a global showcase during the 2005 Aichi World Fair. This “Love the Earth” exposition emphasized the imperative of ecological co-existence and highlighted Japanese contributions in renewable technologies and

environmental protection.³² The development of commercially viable low emission technologies has been a central element in Japan's initiative to address ecological issues through science and technology. Japanese companies and corporate and government laboratories are particularly active in researching clean energy vehicles, inorganic light emitting diodes, residential fuel cell cogeneration systems and photovoltaic power.

A lack of landfill capacity and a densely populated urban environment combined with a desire to reach its Kyoto targets, spurred the Japanese government (primarily the Ministry of the Environment and METI) to begin enacting laws to promote recycling and resource conservation. Beginning with the **Basic Law for Establishing the Recycling-Based Society**, which went into effect in 2000, the government established a framework for both recycling generally (source reduction or waste prevention, reuse, recycling, energy recovery, appropriate disposal) and extended producer responsibility (EPR) for the recycling of the products and services they produce. The general idea of EPR is to shift responsibility for recycling, physically and/or economically, from municipalities toward the producers. This, in contrast to the polluter pays principal, is particularly suitable when the product itself is in need of recycling after a number of years of use.³³

The Container and Packaging Recycling Law, enacted in 1997 initially for PET (polyethylene terephthalate) bottles and glass, expanded to paper and plastic containers and packaging in 2000. **The Home Appliance Recycling Law** was enacted in 1998 and went into effect in April 2001. Japan's 44 million households dispose of 100 million appliances annually and landfills were running out of room. Before the law was passed, approximately 70% of scrapped home appliances were waste with the remainder exported or resold.³⁴ Japan's Home Appliance Recycling Law stipulates that manufacturers and retailers of home appliances, specifically air conditioners, refrigerators, televisions and washing machines, are obligated to take back and recycle them. The manufacturers are responsible for financing the recycling of their own products but consumers who dispose of used home appliances are charged a fee to offset those costs.³⁵ Electrical retailers are required to take back used appliances from consumers – either with a proof of purchase receipt or when a new appliance is purchased.³⁶ The goals are to create a “closed loop” economy, where used materials become new products, and to divert waste from rapidly filling up landfills.

The **Construction Material Recycling Law** (2000) requires that contractors constructing or demolishing buildings are required to have a plan for the recycling of construction and demolition waste and to recycle what it can be reused. The **Food Waste Recycling Law** (2001) sets out guidelines for all food related businesses. This sector, which includes food manufacturers, retailers, and restaurants that generate more than 100 tons of food waste had to reduce their food waste by 2006. An amendment introduced in 2007 established rules to promote food recycling in the retail and restaurant industries and provided more administrative guidance for companies seeking to comply with the regulations. The **End of Life Vehicle Recycling Law (2002)** established a national automobile recycling law.³⁷ About 5 million ELV are generated annually in Japan. Over 1 million are exported for reuse in other countries, leaving 4 million to be recycled within Japan. The law makes auto manufacturers and importers responsible for receiving and recycling automobile shredder residue (ASR), fluorocarbons and airbags which had not to this point been recycled. All of these waste products are hazardous and have significant environmental impacts. The other parts of the car are recycled by existing recyclers, including difficult to dispose of items like batteries and tires.

The **Eco Town Program** is an initiative of the Ministry of Economy, Trade and Industry (METI) to promote local economic development through the creation of environmentally oriented businesses and community recycling and waste elimination systems.³⁸ Local governments submit an EcoTown Plan to METI and the Ministry of the Environment. If approved, the local government, working with private organizations, receives support to implement the recycling projects. Since the program's inception in 1997, over 25 EcoTowns have been created.³⁹ Kitakyushu, on the northern tip of Kyushu island, one of the first EcoTowns to be approved, now has recycling facilities for PET bottles, home electric appliances, office automation equipment, automobiles, fluorescent tubes and pachinko machines. It also has a manufacturing facility for making construction material from waste timber and plastic and for producing an anti-foaming agent used in iron making.⁴⁰

Government, Business and Technological Responses: Implicit in the government's agenda for environmental sustainability has long been a belief that scientific and technological solutions are essential. Through a series of major investments in university and government research, and using a wide range of incentives, subsidies and

regulatory steps, the Government of Japan has endeavored to promote greater engagement in environmental products, services and processes.

For much of the last decade, the government of Japan has identified scientific and technology innovation as being the key element in defining the country's long-term economic prospects and responding to domestic and international pressures. Japan's consistently high investments in scientific and technology research have provided the country's universities, government research laboratories and corporations with the resources and incentives necessary to invest heavily in products, services and processes that contribute to national priorities in such areas as nanotechnology, biotechnology, and information technology. Through this period of research intensiveness, green technologies also featured prominently in Japanese high technology efforts, receiving a global showcase during the 2005 Aichi World Fair. This "Love the Earth" exposition emphasized the imperative of ecological co-existence and highlighted Japanese contributions in renewable technologies and environmental protection. The development of commercially viable low emission technologies has been a central element in Japan's initiative to address ecological issues through science and technology.

Clean Energy Vehicles: Toyota developed the Prius, the world's first practical hybrid vehicle. Under the Kyoto Protocol Target Achievement Plan, by 2010 the aim is to have introduced 2.33 million hybrid vehicles. This goal, if realized, is estimated to reduce CO₂ emissions by 3 million tons.⁴¹ Japanese auto manufacturers are researching and developing a range of clean energy vehicles including those that use liquid petroleum gas, methanol, fuel cells, compressed natural gas, electricity and solar power. Many of these have been developed to the prototype stage. Work continues to make these sources of energy less expensive and/or able to sustain a vehicle over longer distances.⁴² One example of the importance of government leadership on environmental issues comes from the fact that as early as 2004, all official government vehicles were replaced by low emission vehicles.⁴³

Inorganic Light Emitting Diodes: In 1998, the Ministry of Economy, Trade and Industry asked the New Energy and Industrial Technology Development Organization (NEDO) to begin a new research project entitled "The Light for the 21st Century" to develop low energy lighting systems. The goal was to create LED lamps with lights that last longer and are more

energy efficient than conventional fluorescent lights. Thirteen companies and two universities participated in the research program. A number of Japanese companies are now working on everything from LED lighting applications on signboards (Nippon Paint) and streetlights (Iwasaki Electric) to traffic lights, automotive instrument panels, mobile phone handset lights and others.⁴⁴

Fuel Cell Technologies: The Japanese government has been funding a national strategy to support the commercialization of fuel cells. The strategy aims to have 5 million fuel cell vehicles and be generating 10 GW of electricity from fuel cells by 2020. In early 2008, fuel cells were identified as one of 21 innovative technologies that could aid Japan in its goal to halve greenhouse gas emissions by 2050. Japan has the potential to become the first mass market for fuel cell technologies in the world.

Japan has also encouraged the development of new residential cogeneration energy systems designed to replace hot water supply heaters with much more energy efficient approaches. The systems produce electricity to run household appliances and use the heat generated by the power source to heat water for the home. The first of these systems in the world were developed and implemented by Tokyo Gas, Ebara Ballard and Matsushita. Japan hopes to have 1 million systems in residential use by 2010. The Japanese Prime Minister's official residence was one of the first homes to install a cogeneration fuel cell system.

Photovoltaics: Photovoltaic research is an area where the Japanese commitment to science-based innovation was matched with the socio-political priority of reducing dependence on imported oil. In the 1990s, the Japanese government made major efforts to convince homeowners to commit the \$20,000 needed to install a proper system. In 1993, it started the New Sunshine Project, a series of national and local subsidies, which started at 50% of the costs in 1994 and declined gradually over the next decade. The Project provided incentives to 300,000 homeowners willing to use photovoltaic electricity. By the early 21st century, Japan was recognized as an international leader in the field of domestic photovoltaic systems and had convinced thousands of consumers and, importantly, many of the leading residential construction companies in the country to use the new system. Japanese firms quickly grew to dominate the world market until an upsurge in foreign competition, particularly from Germany, in 2006.⁴⁵ Sharp accounted for almost one quarter of the

world's production, dropping to 17% in 2006; the next three largest Japanese firms, Kyocera, Sanyo and Mitsubishi Electric produced another 24%. Tokuyama dominates an important part of this sector, producing 20% of the total supply of the silicon needed for the panels. Until last year, Japanese firms controlled almost half of the world's market and produced about four times the number of photovoltaic modules as the U.S. Increased foreign competition has Japanese solar panel makers encouraging the government to consider another consumer subsidy program. Germany offers homeowners who use solar panels fifty cents for each kilowatt hour they generate through solar power for the next two decades.⁴⁶ Japanese officials are studying this program and a similar one in California.

Green Purchasing Law: The Law on Promoting Green Purchasing took effect in 2002. Its goal was to promote environmentally friendly products and services by promoting green purchasing by public organizations and increasing awareness of environmentally friendly goods and services among the general public. The law was passed to make a market for eco-friendly products so that the government would purchase the goods first, ensuring a market and thereby creating more opportunities for consumers to purchase these goods. Under this law, the national government has been promoting the procurement of eco-friendly products by designating a number of items as green products (after they meet certain criteria) and then encouraging the purchase of those items. By last year, 214 items had been designated as green products. Over 90% of office paper and over 95% of office equipment meets the green standard.⁴⁷ The government is also working not only on shifting to eco-friendly products but is also re-evaluating the necessity of its purchasing decisions.⁴⁸

The Prospects for a Green Japan: Explaining the nature and depth of contemporary Japanese environmentalism requires an appreciation of the complexity of domestic and international political economy. Environmental concerns, while prominent in Japan, have not entered the national consciousness to the same degree as they have in North America and Europe. The government's new policies do not reflect a buckling to the wishes of a strident or powerful environmental movement, although one does exist in the country. Rather, Green Japan appears to be rooted in a series of interlocking developments. The country's leaders appear intrigued with the possibility of global leadership on an issue of world-wide importance and high political profile. There are limits to this engagement, as the country's interventions in Bali demonstrate, but Japan's cautious internationalism appears to be

pushing it forward in the environmental realm. It can do so, in part, because of the Japanese track record in tackling major environmental issues on the domestic front and its willingness to take the lead through technology transfer and aid for the developing world.

There are pressures from below for political change, of course. Japan has many examples of effective political action, particularly at the local and regional level, designed to improve environmental conditions and to mobilize public support for substantial change in the approach to industrial and domestic activities. There is also widespread realization that eco-business or green business might well hold a key to Japan's continued prosperity; in this regard, Japan is being prepared and presented as a test-bed for valuable, exportable products and services that will re-enforce domestic economic strength.⁴⁹ Finally, the nation's confidence in scientific and technological solutions remains very strong. The application of research-based solutions to environmental challenges is a logical outgrowth of a nation-wide commitment to capitalizing on Japan's strengths in basic and applied science. All of these factors are underscored by a strong desire to reach the targets promised in the Kyoto Protocol, an international agreement that will always be linked to Japan.

Japan, like many other industrial nations, wishes to coordinate its international commitments with domestic policies, regulations and priorities. The country appears committed to achieving the goals in the Kyoto Protocol, perhaps more than most industrial nations. More importantly, the country's leaders, though weakened by a series of domestic political scandals and crises, hopes to assume a prominent global role on this issue. Other nations are also pursuing climate change and environmental protection initiatives; in selected areas, their policies, regulations and plans are more aggressive and effective than the Japanese activities. What does stand out in Japan is the country's desire to mobilize public support and the willingness of the government to impose tough restrictions on government and business. The central thrust of the Japanese plans appears to be the desire to make each Japanese family, company, agency, city and leader factor environmental questions and responses into their daily lives and operations. Clearly, having the nation internalize the values and principles of global environmentalism is the ultimate goal, reaching beyond the Kyoto accord and holding the potential, if not the promise, of a sustainable approach to environmental protection.

Rene Kemp's analysis of the connection between environmental policies and emerging

technologies concluded with this observation about energy regimes in the age of environmentalism:

One of the things it implies are special science and technology programs for promising energy technologies with long-term benefits. Policy makers should also engage in experimentation with new technologies to learn more about their economic costs, technical feasibility and social acceptance. One way of doing this is through the creation of niche markets through government procurement, regulation, tax policies, subsidy schemes, etc. Other policies are the creation of networks of technology suppliers, research organizations and users, and the coordination of energy technology and environmental policies with other policies: agricultural policies, transport policies, land-use policies, land-use planning, and industrial policies. This does not mean that carbon taxes or tradable quotas have no role to play in greenhouse policies; they do, but only as elements of a comprehensive energy technology policy aimed at making a transition towards a more sustainable energy system.⁵⁰

The Green Japan approach suggests that the country has taken significant, but as yet not transformative steps, along the path that Kemp and others have suggested. It is too soon to tell if individual initiatives will be maintained over time or if significant changes in lifestyle and commercial and administrative processes have actually been institutionalized. Given the global urgency currently attached to ecological matters, and given the challenges facing industrialized nations the world over in meeting Kyoto targets, the Japanese experiences merit attention if only as one set of examples of how a country has taken a broad international agreement and brought the objectives and methods of addressing the protocol's objectives into the daily lives of citizens, communities, corporations and government agencies.

Among the key developments in Japan are the following:

- The Japanese government has been a key adopter of new technologies and has tried to be something of an exemplar in responding to Kyoto and other environmental imperatives. The leadership role played by government, and something as simple as the Prime Minister not wearing a suit jacket and tie in the summer months and the regulation of heating and cooling in buildings, should not be under-estimated as a

means of encouraging collective action.

- The Japanese model has, as in other areas, encouraged product, service and processes development by the private sector, believing that the engagement and mobilization of business is crucial both to the attainment of national objectives and the creation of economic opportunities in an emerging sector.
- The government of Japan has been willing to use commercial and producers' subsidies to spark innovation, as with the photovoltaic initiatives, but with the understanding that direct support to businesses and consumers should come off quickly to avoid dependency and false economies in these key sectors.
- Scientific and technological innovation sits at the centre of Japanese attempts to meet the Kyoto targets and to become a truly "green" country. The mobilization of academic, government and commercial research scientists is deemed to be an essential element in tackling environmental challenges in a productive, cost-effective manner, with the potential side-benefit of producing a national or international business opportunity in the process.
- Sustainable environmental change, the Japanese authorities clearly believe, requires both clear national leadership and commitment to public engagement. Rather than focusing on punitive restrictions and tough and costly regulations, Japan has emphasized fundamental changes in behaviour and actions that can be taken by every person, family, company and community. In this manner, Japan has tried to make the whole country responsible for meeting the targets agreed to by the national government.

The Japan lesson works on the concept of connected action, with government policies and legislation connected to changes in basic domestic behaviour and business operations. It seeks, more generally, to create an environment where citizens watch, monitor, support and cajole each other, thus sharing the burden and mobilizing the nation in tackling a matter of great urgency and global importance. This approach, however, is likely only one piece of the necessary response to climate change. Current efforts focus on carbon emissions trading and caps, new technologies, and economic incentives. There are some who argue that the world requires a fundamentally different approach to the global economy.

If one lesson stands out from the Japanese experience – and the time involved is too short to

determine the long-term effectiveness of actions to date – it is the manner in which the government of Japan has combined directions to the country at large with self-regulation and changes in government behaviour. Most observers agree that meeting the challenge of the Kyoto Accord will require effective and collective action on an almost unprecedented scale, the ecological equivalent of a war-time footing. The building blocks of Kyoto rest within nation-states, for no global solution will be found without the mobilization and transformation of individual countries. Japan has clearly made important strides toward meeting a key international goal; it remains to be seen if the Japanese model works within the country and, even more, if it can become an effective model for other nations seeking to bring their citizen's and business community's environmental behaviour in line with the requirements for global ecological preservation.

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¹ Sydney APEC Leaders' Declaration on Climate Change, Energy Security and Clean Development, 9 September 2007, http://www.apec.org/etc/medialib/apec_media_library/downloads/news_uploads/2007aelm.Par.0001.File.tmp/07_aelm_ClimateChangeEnergySec.pdf.

² Ibid.

³ Prime Minister Abe resigned unexpectedly on September 12th and was replaced by Yasuo Fukuda on September 25th, 2007.

⁴ "Japan recommends removing ties, jackets, turning AC down at U.N." *Japan Today*, August 2, 2007 – <http://www.japantoday.com/jp/news/414010>.

⁵ Pamela Chasek, David Downie, Janet Welsh Brown, Global Environmental Politics, 4th Edition (Boulder, Westview Press, 2006), 198-199.

⁶ Ibid., pp. 230-231. In this very helpful survey of global environmental politics, Pamela Chasek, David Downie and Janet Welsh Brown identified three fundamental elements in measuring the effectiveness of an environmental regime:

- **Regime Design** – the manner in which a country or international organization identifies the environmental threat and develops systems for monitoring, reporting, assisting and compelling compliance;
- **Implementation** – the degree to which the core objectives are codified in legislation and regulations;
- **Compliance** – the extent to which participants adhere to the rules, goals and expectations laid out in the regime.

⁷ Adam Jaffe and Robert Stavins, “Evaluating the Relative Effectiveness of Economic Incentives and Direct Regulation for Environmental Protection: Impacts on the Diffusion of Technology,” paper for the WRI/OECD Symposium Towards 2000: Environment, Technology and the New Century, June 13-15, 1990. Quoted in Rene Kemp, Environmental Policy and Technical Change: A Comparison of the Technological Impact of Policy Instruments (Edward Elgar: Cheltenham, 1997, p. 19.

⁸ Rene Kemp, Environmental Policy and Technical Change: A Comparison of the Technological Impact of Policy Instruments (Edward Elgar: Cheltenham, 1997, pp. 326-327.

⁹ National Institute of Advanced Industrial Science and Technology (AIST) publications (<http://www.aist.go.jp>) and the National Institute for Environmental Studies (NIES), Outline of the Second Five Year Plan (2006-2010) – <http://www.nies.go.jp>

¹⁰ For an interesting perspective on the political response to Minamata, see H. Funabashi, “Minamata Disease and Environmental Governance,” *International Journal of Japanese Sociology*, vol. 15, Issue 1 (Nov., 2006), 7-25.

¹¹ “Preface,” in S. Tsuru and H. Weidner, eds., *Environmental Policy in Japan* (Berlin; Sigma Nohn, 1989), p. 9.

¹² This issue is reviewed in H. Weidner, “Japanese Environmental Policy in an International Perspective: Lessons for a Preventive Approach,” in Tsuru and Weidner, eds., *Environmental Policy in Japan*, pp. 479-552.

¹³ Perhaps the most impassionate critique is Alex Kerr, *Dogs and Demons: Tales from the Dark Side of Japan* (New York: Hill and Wang, 2001).

¹⁴ Robert Mason, "Whither Japan's Environmental Movement?: An Assessment of Problems and Prospects at the National Level, *Pacific Affairs*, Vol. 72 (2)(1999), 187-207.

¹⁵ On the science-friendly nature of Japan, see Carin Holroyd and Ken Coates, *Innovation Nation: Science and Technology in 21st Century Japan* (London: Plagrave Macmillan, 2007). On the priorities of the pre-1990 environmental movement, see J. Pierce et al, "Vanguards and Rearguards in Environmental Politics," *Comparative Political Studies*, vol. 18, no. 4 (1986), 419-447.

¹⁶ See T. Terao and K. Otsuka, eds., *Development of Environmental Policy in Japan and Asian Countries* (London: Palgrave Macmillan, 2007).

¹⁷ One of the best studies of grass roots environmental mobilization in Japan is Lam Peng-Er, *Green Politics in Japan* (New York: Routledge, 1999).

¹⁸ Jeffrey Broadbent, *Environmental Politics in Japan* (Cambridge: Cambridge University Press, 1998). 345.

¹⁹ Broadbent, p. 355.

²⁰ Broadbent, p. 367.

²¹ "Invitation to 'Cool Earth 50' – Three Proposals, 3 Principles," Speeches and Statements by Prime Minister – http://www.kantei.go.jp/foreign/abespeech/2007/05/24speech_e.html

²² Chris Knight and Paul Scott, "Japanese disclosure sets the pace," *Environmental Finance*, July-August 2001.

²³ "Half-price Big Mac to fight global warming proves big hit in Japan," September 5, 2007 – <http://green.yahoo.com/omdex.php?q=node/1508>

²⁴ “Invitation to ‘Cool Earth 50’ – Three Proposals, 3 Principles,” Speeches and Statements by Prime Minister – http://www.kantei.go.jp/foreign/abespeech/2007/05/24speech_e.html

²⁵ Ibid

²⁶ Ibid

²⁷ Miki Baba, “Government Purchased emission credits for 12.2 billion yen” Nikkei Business Online <http://business.nikkeibp.co.jp/article.tech> April 17, 2007; Hideki Minamikawa, Japanese Ministry of the Environment, Speech to the Air Resources Board, Sacramento, California, January 17, 2007; Team -6% Official Website <http://www.team-6.jp>

²⁸ Yasuo Fukuda replaced Shinzo Abe as prime minister in late September 2007. It is not yet clear how high the environment will be on his agenda.

²⁹ A more detailed description of the various Japanese global warming initiatives is described in CIGI Technical Paper #3, Green Japan.

³⁰ “Japan’s Eco Market Takes Root” *JETRO Japan Economic Monthly*, September 2005.

³¹ Team -6% Official Website <http://www.team-6.jp>

³² <http://www.expo2005.or.jp/en/>

³³ Mitsutsune Yamaguchi, “Extended Producer Responsibility in Japan,” ECP (Environmentally Conscious Products) Newsletter of the Japan Environmental Management Association for Industry, No. 19, 2002.

³⁴ Steve Karpel, “Recycling Japan,” *Metal Bulletin Monthly*, London, April 2006, Iss. 424, pg. 33-34.

³⁵ Kiyoshi Ueno, “Current Status of Home Appliance Recycling in Japan,” Environmentally Conscious Products (ECP) Newsletter of the Japan Environmental Management Association for Industry, No. 18. 2002.

³⁶ The consumer pays a national recycling fee plus transportation costs (4600 yen for a fridge, 3500 yen for an

air conditioner, 2700 yen for a cathode ray television and 2400 for a washing machine.) If consumers do not remember from where they bought the appliance or they don't have a receipt or the shop is too far away, then collectors will pick up the item. Televisions, for example, are picked up by the Post Office.

³⁷ For the political contest of this law, see K. Togawa, "Background of the automotive recycling law enactment in Japan," *Environmental Economics and Policy Studies*, vol. 6, N. 4 (2006), 271-284.

³⁸ For examples of community mobilization on environmental issues, see S. Shin, "East Asian Environmental Cooperation: Central Pessimism, Local Optimism," *Pacific Affairs*, vol. 80p, no. 1 (Spring 2007), 9-26.

³⁹ Ministry of Economy, Trade and Industry website –
http://www.meti.go.jp/policy/recycle/main/English/3r_policy/ecotown.html;
<http://www.env.go.jp/en/press/2005/0916a-01.html>

⁴⁰ <http://www.env.go.jp/en/press/2005/0916a-01.html>; Video made by the City of Kitakyushu, June 2006.

⁴¹ Speech by Yuriko Koike, Minister of the Environment of Japan, "Japan on the Move: Japan's Innovative Technologies for Tackling Climate Change" Montreal, Canada December 7, 2005.
http://www.env.go.jp/earth/cop/cop11/climate_c.pdf

⁴² Research and Development of Clean-Energy Vehicles: the Need for More Environment Friendly automotive Technologies: Japan Automobile Manufacturers Brochure –
http://www.njkk.com/library/bro-enviroFriendly/enviro_3.htm

⁴³ Speech by Yuriko Koike, Minister of the Environment in Japan, "Japan on the Move: Japan's Innovative Technologies for Tackling Climate Change" Montreal, Canada December 7, 2005.
http://www.env.go.jp/earth/cop/cop11/climate_c.pdf; Kazuyuki Harada, Ministry of the Environment, Japan "The Green Purchasing Law, and Promoting Green Procurement in Japan", a presentation on March 23, 2006.

⁴⁴ Paul Johnson and Tadashi Shirai, British Embassy, Tokyo and Philip White, DTI Global Watch Service, "Inorganic Light Emitting Diode (LED) Development and Applications in Japan.

⁴⁵ Jochen Legewie, “Foreign Competition Begins to Overshadow Japan’s Solar Industry”, The Japan Times, July 30, 2007.

⁴⁶ Jochen Legewie, “Foreign Competition Begins to Overshadow Japan’s Solar Industry”, The Japan Times, July 30, 2007.

⁴⁷ Kazuyuki Harada, Ministry of the Environment, Japan “The Green Purchasing Law, and Promoting Green Procurement in Japan”, a presentation on March 23, 2006.

⁴⁸ “The Law on Promoting Green Purchasing Five Years Later – Progress and Future Tasks”, Japan Sustainability Newsletter #058, June 2007.

⁴⁹ An insightful study of the commercial approach to environmental certification demonstrates that corporate interest in new standards reflects both a realization of the financial benefits attached to an eco-business approach and support for environmental considerations among leading managers. See M. Nakamura et al., “Why Japanese Firms Choose to Certify: A Study of managerial Responses to Environmental Issues,” *Journal of Environmental Economics and Management*,” Number 42 (2001), 23-52.

⁵⁰ Rene Kemp, Environmental Policy and Technical Change: A Comparison of the Technological Impact of Policy Instruments (Edward Elgar: Cheltenham, 1997, pp. 327.