The Centre for International Governance Innovation

TECHNICAL PAPER

Environment

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

Carin Holroyd

Technical Paper No. 4
March 2008

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Addressing International Governance Challenges

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Thank you for your interest,

John English

Author Biography

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Abstract

Signed on Japanese soil, Japan has taken the Kyoto Protocol seriously and has endeavoured to bring its national policies and citizens' behaviour in line with global priorities. The past decade has seen Japan beginning to make a significant effort towards decreasing the country's impact on the environment, partially in response to the Kyoto Protocol.

The author presents a review of the Japanese government's environment initiatives including:

- Initiatives to Combat Global Warming
- Low Emission Technologies
- Recycling Laws
- Eco Towns

With the combined pressure of the sense of global urgency that ecological matters are commanding and the challenges that industrialized nations face to meet the Kyoto targets, the Japanese experience provides an example of how one nation interpreted and applied the principles of an international agreement and brought the objectives and principles into the daily lives of citizens, communities, corporations and government agencies.

Only time will determine the long-term effectiveness of Japan's actions to date. One lesson stands out in the Japanese experience: the way in which the government of Japan has led by example with changes in government behaviour and self-regulation and combined it with directions to the country at large. The Green Japan approach provides examples of key options available to national governments seeking to abide by a strict and high profile international protocol.

The Japanese authorities led by example, demonstrating a belief that a sustainable environment requires both clear national leadership and a 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. Put simply, Japan is trying to bring everyone on board.

1. Introduction

At the 2007 Asia-Pacific Economic Cooperation (APEC) Summit in Sydney, Australia, Asia Pacific leaders offered another attempt to move beyond the controversial Kyoto Protocol to the United Nations Framework Convention on Climate Change[1] 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 (Sydney APEC Leaders' Declaration, 2007).

The final communiqué singled out two countries for their efforts in leading APEC to an agreement on this issue: "We agree to work to achieve a common understanding on a long-term aspirational global emissions reduction goal to pave the way for an effective post-2012 international arrangement. We appreciate the efforts of Japan and Canada in proposing a long-term global goal." (Ibid). That Japan and Canada would be partnered on this high-profile ecological initiative surprised some observers. While through the first half of 2007 Japan had been demonstrating a growing desire to lead the campaign against global warming, the Canadian government had previously not been in a leadership position on emissions controls.

At an Asian leaders' dinner in May and again at the G8 Summit in June, former Japanese Prime Minister Shinzo Abe[2] announced his "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

[1] The Kyoto Protocol, an amendment to the United Nations Framework Convention on Climate Change signed in 1997 and in force as of 2005, has become the symbol of the new era of international environmentalism. The Protocol calls 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.

[2] Prime Minister Abe resigned unexpectedly on 12 September 2007, and was replaced by Yasuo Fukuda on 25 September 2007. As of January 2008, it was not clear which direction the new administration would take on these issues.

Nations plenary session on climate change in August, 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." (Japan Today, 2 August 2007).

Environmental activism is not a radical departure for Japan, although earlier efforts focused largely on domestic rather than international objectives. The country has been energy-conscious since the oil shocks of the 1970s underscored its energy vulnerability. But Japan's emerging self image as a global leader in environmental protection is a long way from the post-World War II years dominated by heavy industry, and serious problems with air and water pollution and environmental degradation. Japan's shift to reliance on clean energy, particularly nuclear power, cleared the skies over the major cities and resulted in a number of major reclamation projects and conservation measures. While the nuclear energy sector suffered a setback with 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. Through most of this period, the national government made relatively few forays into global environmentalism in part because of sensitivity about Japan's environment record in other areas, such as commercial whaling. The emphasis on mainly domestic initiatives appears to be ending as the national government is placing increased emphasis on Japanese engagement with global climate change and environmental issues, even to the point of a surprising policy shift on the long controversial Japanese whaling activity.

The timing of Japan's shift into international ecological matters is not surprising. The global debate on climate change, pollution and the urgent need for environmental reform has reached a crescendo. There is now widespread agreement that major initiatives are required to stop the despoliation of the global ecology and prevent further and massive environmental changes. While a great deal of public attention is currently focused on China's abysmal record of ecological management, pollution and inefficient energy use, all but the most reluctant and cynical analysts concede that the key problems and the solutions are global in nature.

Scientists, economists and political commentators the world over continue to debate the utility and practicality of the Kyoto Protocol, and of international envi-

ronmental agreements generally. The discussion now focuses on scientific questions, including such fundamental matters as whether global warming is taking place and, if it is, if the changes are attributable to human actions. The most salient controversy now focuses on the means of reaching national targets. The Protocol established firm guidelines for greenhouse gas emissions, and signatories recognized the need to change national policies and regulations in line with these targets in a relatively short time-frame. Many countries, including Canada, have treated the Protocol as an aspirational document, providing a guideline and target to be balanced against national economic and social realities. Heated debates, focusing on the trade-off between environmental protection and negative economic effects of heeding the agreements, have become commonplace, leading to questions about the ability of international agreements to shape and direct national policies.

International protocols, accords and treaties are the primary currency of global governance. Intense and time-consuming discussions with political leaders often building on years of research, planning and strategizing by professional staff, lead to the negotiation and ratification of international agreements. Many times over the past decades, accords as varied as the Geneva Convention, the founding documents of the United Nations and the World Trade Organization, new frameworks for international trade, the International Covenant on Economic, Social and Cultural Rights, and the International Covenant on Civil and Political Rights have been developed, signed and implemented. In the process, governments have found 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. The conjunction of global governance accords and national policy has worked most clearly in matters relating to international trade, although not without major challenges in both areas, with agricultural policy providing perhaps the best example of the inability of national governments to align domestic policy with what is clearly in the best interests of the world as a whole.

Managing environmental behaviour on a global basis presents a 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. China, for one, has sternly rejected global appeals to reduce the use of coal-burning plants, to protect natural systems

more effectively, or to bring national practices in line with global expectations. Even many signatories to the Kyoto Protocol among the most prosperous nations and strong public defenders of global environmental management have concluded that imposing the precise terms of a controversial international accord would have devastating economic effects and would generate a strong political backlash against environmental regulation. 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 was adopted, and for Australia, a heavy energy consuming nation, which refused to ratify the Kyoto agreement until the election of Kevin Rudd in November 2007. Rudd ratified the Kyoto agreement at the Bali conference in December. The challenge of responding to a global environmental accord is substantial, for governments must regulate business activity, particularly energy consumption and emissions standards, while also changing citizens' behaviour and expectations related to resource use, consumption, and personal responsibility for ecological change.

Environmental considerations will become an increasingly important element in international politics and global governance. National governments, the primary agents for the implementation, oversight and management of these international agreements, will face a formidable challenge in bringing policies, regulations and standards in line with what will inevitably be hotly debated environmental priorities and expectations. The years of discussion and controversy surrounding the Kyoto Protocol demonstrated that there are no certainties and no consensus on the nature, causes and solutions to environmental change and even less on personal and national responsibility for addressing the ecological challenges facing the globe. As a consequence of these realities, the intersection between the instruments of global governance in this area – like the Kyoto Protocol – and national political and regulatory responses will be the determining factor in the value and sustainability of international initiatives on climate change and international ecological management. While there have been significant successes in the past, through agreements on protected and endangered species and the protection of the ozone layer, for example, it remains to be seen if broader and more intrusive efforts to regulate the global environment, like the Kyoto Protocol, can be married successfully with domestic politics and national regulations. If, as most analysts agree, the future will see further and urgent need for coordinated and global ecological action, the means of coordinating international agreements and national policies will likely be the determining factor in the success of international environmental agreements.

Japan provides a useful test case of the coordination of global ecological accords and national action. 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. The past decade has seen Japan begin to make a significant effort toward decreasing the country's impact on the environment, partially as a response to Kyoto. As the Kyoto Protocol was signed on Japanese soil, the Japanese government felt a strong obligation to honour its 1997 pledge to reduce greenhouse gas emissions to 6% 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%", said Prime Minister Abe (Abe, 2007). 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 encourage citizens, governments and business to adopt a more environmentally friendly lifestyle.

As a result, corporate environmentalism is also rapidly rising. Beyond what government is requiring firms to undertake, 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 (Knight and Scott, 2001). More than 80 companies offer goods or services as prizes as part of the government's campaign against global warming. In September 2007, McDonalds 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 McDonalds campaign started, the government website crashed from the deluge of hits (Terra Daily, 2007).

The Japanese government's environmental initiatives have been focused domestically until recently. As noted earlier, Prime Minister Abe at a dinner with Asian leaders in late May 2007, and again two weeks later at the G8 Summit in Germany, invited the world to participate with Japan in "Cool Earth 50," a three-pillar strategy aimed at the global reduction of greenhouse gas emissions (Abe, 2007). He challenged the world to cut global emissions to 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, would pledge to make significant contributions to this research (Ibid).

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, he 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 (Ibid).

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, 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% of all movement of people in Japan – by far the highest among industrialized countries. We will demonstrate the "Japan model" in the world" (Abe, 2007). Japan, he pledged, would redouble its efforts to achieve its Kyoto protocol commitment. Abe's Cool Earth 50 also includes 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." (Abe, 2007).

Achieving its Kyoto Protocol targets will not be easy for Japan. The country's greenhouse gas emissions have grown over 8% since 1990. To achieve its 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 (Masaki, 2007). 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 that have made reduction commitments), or Emissions Trading. Achieving a 9% reduction through domestic measures alone over the next five years will be a significant challenge for Japan, particularly since, on a per capita basis, compared to other industrialized nations, Japan's emissions are already relatively low.

Japan is positioning itself to take a leadership role in the fight against global warming. The prime minister's Cool Earth 50 pledged support for research on low emission technologies, announced financing for developing countries in their efforts to reduce carbon dioxide emissions, and, most importantly, promised that Japan would lead by example. The announcement came after Japan had been actively working on a variety of environmental initiatives for the past decade.

Japan's approach to environmental protection and awareness is worthy of study, for it demonstrates an interesting web of government regulation, citizen mobilization and corporate engagement. Japan's experience demonstrates the effort of a single government to bring the imperatives of an international environmental agreement to bear on the national scene and thus may provide a measure of guidance to other nations seeking to tackle the same challenge. Japan is not the only country making a national commitment to fighting global warming, but as one of the world's most wealthy, most high profile and most scientifically innovative nations, its actions are well worth understanding in some detail.

The success of Japan's first steps at global warming leadership is not assured. 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 following environmental initiatives 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. It is debatable 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. 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. Perhaps Cool Earth 50 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.

2. Initiatives to Combat Global Warming

The public cornerstone of Japan's green campaign rests on the Kyoto Protocol and the government's desire to assume a global leadership position in this area. The following represent several of the key Japanese global warming initiatives.

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. 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 cut (JETRO Japan Economic Monthly, 2005), everyone in the "team", meaning the country, is 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 September 2007, over 1.3 million individuals signed up and over 14,600 companies were part of the rapidly expanding program (Team -6%).

Cool Biz/Warm Biz: As part of Team Minus 6%, the government launched its Cool Biz campaign in 2005 with the aim of conserving energy during the summer. Japanese summers are notoriously hot and humid, so air conditioning systems are in high use. With the catch phrase "No Necktie, No Jacket", the Cool Biz campaign (which now runs from 1 June to 30 September annually) advises all offices to set their air conditioners to turn on only when the temperature reaches 28 ºC. Workers are encouraged to wear cool but stylish clothing to be more comfortable in the warmer work environment. 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. A June 2007 survey of almost 10,000 Japanese companies conducted by Teikoku Databank surveyed corporate attitudes toward Cool Biz and showed that 42% of all companies had implemented Cool Biz and another 16% were thinking about doing so (Teikoku Databank, 2007). The reduction in CO_2 (carbon dioxide) emissions from Cool Biz in 2006 was estimated to amount to 1.15 million metric tons, equivalent to the amount of pollution produced by 2.5 million households in a month.

Cool Biz has been decidedly government-designed and -led. When the campaign began, it featured many photos of then Prime Minister Junichiro Koizumi in a short-sleeved shirt and without a tie. Later, Prime Minister Abe and his Minister of Environment were shown in advertisements promoting both Cool Biz and Warm Biz. Warm Biz, announced by the Ministry of the Environment in August 2005 after the success of the first Cool Biz campaign, called on people to reduce heating-related energy consumption by wearing more clothes, particularly turtlenecks and long underwear, rather than using heaters and by setting heating systems to a maximum of 20 ºC during the winter. As Japan's energy demand for heating is 2.5 times higher than the demand for air conditioning, the government hoped to have an even larger impact on CO_2 emissions through Warm Biz (Koike, 2005), although, so far, Warm Biz has not been so successful as Cool Biz. Clothing manufacturers have responded to both campaigns, working quickly to design clothing that is cooler or warmer while remaining fashionable.

Uchi-Eco: Uchi-Eco (uchi means house) is the Ministry of the Environment's household campaign to stop global warming. Launched in October 2006, its aim is to promote ways that individuals can save energy at home and in their own lives.

The Uchi-Eco philosophy states that many small actions can make a big difference. Individuals are encouraged to play their part in the fight against global warming by following the Team Minus 6% proposals in their daily lives. Suggestions include everything from using energy-efficient electrical appliances, choosing eco-friendly products, encouraging the whole family to sit and eat nabe (a warming Japanese stew), saving on room heating and putting down the lids on heated toilet seats (Japan for Sustainability Information Centre, 2007).

The city of Sapporo in northern Japan has built on this idea. Reasoning that most CO_2 emissions in the Sapporo area come from citizen lifestyles as opposed to factories, Sapporo decided to support its citizens to live environmentally friendly lives. In February 2005, Sapporo introduced a program encouraging citizens to make ecolife declarations. Those who make ecolife declarations agree to take five energy-saving actions – from turning down the heat or turning off the lights. Sapporo aimed to have 100,000 of its citizens make the ecolife declaration and to achieve a reduction in CO_2 emissions of 10% of 1990 levels per person by 2017. The city achieved its 100,000 citizen objective in approximately 16 months and the number of participants has continued to grow since then (Yagi, 2007).

3. Low Emission Technologies

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 in responding to domestic and international economic pressures (Holroyd, 2007). 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 "Love the Earth" exposition at the 2005 Aichi World Fair. This exposition emphasized the imperative of ecological coexistence 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. The goal of the Kyoto Protocol Target Achievement Plan is to have introduced 2.33 million hybrid vehicles by 2010. This goal, if realized, is estimated to reduce CO_2 emissions by 3 million tons (Koike, 2007). 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 which have been developed to the prototype stage. Work is continuing to make these sources of energy less expensive and/or able to sustain a vehicle over longer distances (Japan Automobile Manufacturers, undated). As early as 2004, all official government vehicles were replaced by low-emission vehicles, demonstrating the government's willingness to lead by example on environmental issues (Koike, 2005).

Inorganic Light Emitting Diodes (LED): In 1998, the Ministry of Economy, Trade and Industry (METI) 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 bulbs that last longer and are more energy-efficient than conventional fluorescent bulbs. Thirteen companies and two universities participated in the research. Projects that Japanese companies are now working on include 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 (Johnson, Shirai and White, 2004).

Residential Fuel Cell Cogeneration Systems: Japan has encouraged the development of new domestic energy systems designed to replace hot water supply heaters with much more energy efficient approaches. The system produces electricity to run household appliances and uses the heat generated by the power source to heat water for the home. The first of these systems in the world was developed and implemented by Tokyo Gas, Ebara Ballard and Matsushita. Japan hopes to have 1 million systems in residential use by 2010. (McEntee, 2005).

Photovoltaics: Photovoltaic (converting sunshine to energy using solar cells) 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 1993, the Japanese government launched the New Sunshine Project in a bid

to convince homeowners to invest $20,000 to install a proper photovoltaic system in their homes. The New Sunshine Project offered 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 (Holroyd and Coates 2007, 149-150, and Ristau, 2001).

By the early twenty-first century, Japan was recognized as an international leader in the field of domestic photovoltaic systems and had convinced thousands of consumers and 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 (Legewie, 2007). 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 did the United States. Increased foreign competition has Japanese solar panel makers encouraging the government to consider another consumer subsidy program. Germany pays homeowners who use solar panels fifty cents for each kilowatt hour they generate through solar power for the next two decades (Legewie, 2007). Japanese officials are studying this program and a similar one in California.

4. Recycling Laws

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 principle, is particularly suitable when the product itself is in need of recycling after a number of years of use (Yamaguchi, 2002).

The Law for the Effective Utilization of Resources (2001) was designed to create a complete recycling economic system from product design to collection and recycling. The law was designed to encourage the development of production systems that make the best use of resources by using recycled materials, reducing by-products and incorporating more easily recyclable structures and materials into products, setting up recycling and collection systems and taking back end-of-life products. Business entities in certain sectors are required to reduce their generation of by-products or ensure the wisest use of materials.[3]

Container and Packaging Recycling Law, The first law to reflect the EPR, the Container and Packaging Recycling Law was enacted in 1997, and was intended initially for polyethylene terephtalate (PET) bottles and glass, and then expanded to paper and plastic containers and packaging in 2000. Municipalities voluntarily collect the containers and packaging and transport them to storage sites. Then the companies, or an organization formed to represent all producers of a certain product, choose a recycling company that is paid only upon proof that the waste has been recycled. Consumers and municipalities, which must collect and sort all the materials, also have responsibilities but the onus is on the company to ensure that the waste is recycled. Two Japanese academics looked at the impact of the law on Nagoya, as an example of a large city that collects all kinds of containers and packaging. They compared the 1998 and 2001 (the law was enacted in 2000) discharge levels of CO_2 and Nitrogen Oxide (NOx) and discovered that the amount discharged in Nagoya had dropped 34% (Okayama and Yagashita, 2004).

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 ended up in landfills with the remainder exported or resold (Karpel 2006, 33-34). Japan's Home Appliance Recycling Law is a formidable law that stipulates that manufacturers and retailers of home appliances are obligated to take back and recycle home appliances such as air conditioners, refrigerators, televisions and washing machines. The manufacturers are responsible for financing the recycling of their own products, but consumers who retire used home appliances are charged a fee to offset those costs (Ueno, 2002). Electrical

[3] There is a more detailed description of the law at: <http://www.env.go.jp/en/laws/recycle/06.pdf>

appliance retailers are required to take back used appliances from consumers – either with a proof of purchase receipt or when a new appliance is purchased.[4]

When consumers pay their fee and drop off their used appliance, they must also buy a recycling ticket to show that the recycling fee (set by individual manufacturers) has been paid. This is part of a voucher system that allows for tracking of the scrapped appliance from consumer to recycler (and actually followed on the web.) There are five tickets per appliance. One is given to the consumer upon delivery of the item to the shop to be recycled. The shop keeps a ticket and three tickets go along with the appliance. One stays at the collection site and two go to the recycling plant. The recycling plant sends one back to the shop to start the payment of the recycling fee. The recycling fees (currently uniform but set by individual manufacturers), are sent back to the manufacturers monthly to cover the costs of recycling. The fees cover some but not all of the recycling costs and manufacturers are responsible for the rest of the expenses (INFORM, 2003).

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 law was developed over a number of years in consultation with industry so the major electrical and electronic manufacturers had time to prepare. The appliances were redesigned to be easier to dismantle. The manufacturers split into two groups (Group A and Group B) to establish recycling plants throughout the country. Group A is made up of 21 firms, with Matsushita and Toshiba as key members. Group B is made up of 53 companies including Sony, Sharp, Sanyo, Mitsubishi and Fujitsu. Group A has built 25 recycling plants while Group B has built 15. Each plant takes back only products made by their group's member companies (Karpel 2006, 33-34).

The law stipulates material recycling target rates (the percentage of the total waste that should be recycled) as 50% for refrigerators and washing machines, 55% for televisions and 60% for air conditioners. These percentages apply only when recyclers take the materials for free, not if the manufacturer has to pay the recycler to take the materials.

[4] 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.

The Construction Material Recycling Law (2000) requires contractors erecting or demolishing buildings to have a plan for the recycling of construction and demolition waste and to recycle what can be reused (Japan's Approach to the 3Rs, undated).

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 tonnes of food waste, had to reduce its 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.

End of Life Vehicle (ELV) Recycling Law (2002) established a national automobile recycling law. About five million ELVs are generated annually in Japan. Over one million are exported for reuse in other countries, leaving four 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 items that are difficult to dispose like batteries and tires.

5. Eco Towns

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. Local governments submit an Eco Town 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 Eco Towns have been created (Ministry of Economy, Trade and Industry, undated). Kitakyushu, on the northern tip of Kyushu island, one of the first Eco Towns to be approved, now has recycling facilities for PET bottles, home electric appliances, office automation equipment, automobiles, fluorescent tubes and pachinko (Japanese form of pinball) 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 (Ministry of the

Environment, 2005). Kawasaki, located between Tokyo and Yokohama, is another one of the first Eco Towns. It has been working to eradicate coastal pollution, and environmental technology companies have been setting up operations. Resource recycling plants have been set up to produce products from waste materials. These include a PET bottle recycling facility, a plant to convert waste plastic into ammonia and a facility to reprocess non-recyclable paper (JETRO, 2005).

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 sought to create a market for eco-friendly products. 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 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 (Harada, 2006). The government is working not only on shifting to eco-friendly products and is also re-evaluating the necessity of its purchasing decisions (Edahiro, 2007).

Top Runner Program – Developing Energy-Efficient Appliances: The Top Runner program, launched in 1999, sets industry standards based on the most efficient model of commercial appliance available rather than setting minimum efficiency standards. The level of efficiency of the most efficient commercially available model then becomes the industry standard that is expected to be achieved within a specified time period. As of 2007, there were 21 target products ranging from passenger cars and microwave ovens to electric toilet seats and vending machines.[5] As the goal is to have the more efficient products in widespread use by 2010, the energy efficiency targets are revised every four to eight years. Manufacturers must make the weighted average of the efficiency of all its products of

[5] The complete list comprises passenger vehicles, freight vehicles, air conditioners, electric refrigerators, electric freezers, electric rice cookers, microwave ovens, fluorescent lights, electric toilet seats, television sets, Video Cassette Recorders, DVD recorders, computers, magnetic disk units, copying machines, space heaters, gas cooking appliances, gas water heaters, oil water heaters, vending machines and transformers. Susumu Okamoto, "Energy and Technology Policies; Japan's Perspectives and Experiences," Chair's Air Pollution Seminar, Sacramento, California, 17 January 2007.

that particular type equal to the top runner model by the target year. Top Runner standards are set by committees composed of representatives from industry, universities, labour and consumer organizations. There are well-defined procedures and variations for products depending on size, power, and weight. Each product is divided into several groups and energy efficiency targets are decided upon for each group, to ensure that consumers still have enough selection in the products they buy.

In contrast to energy consumption efficiency standards in the United States, the European Union and Australia, Japanese regulations require that manufacturers' appliances meet the standard as a per category weighted average. This means that manufacturers can still sell appliances that do not meet the standard but the company's other appliances in that category would have to be of a much higher standard. The overriding objective of the Top Runner Program is to retain product diversification while leading the market to improving energy efficiency of all products (Energy Conservation Centre Japan, undated). Although the government is limited in its ability to enforce these standards, its public profile is the real strength of the Top Runner Program. A company's corporate brand will be badly damaged if it does not achieve top runner status or never even tries to do so (de Wachter, 2006). Manufacturers are also obligated to label their products. A green sticker indicates that the product met Energy Conservation Standards while an orange sticker indicates the appliance failed to reach the standard. In fact, companies have done very well at achieving the targets. As seen in Table 1 some product categories demonstrated an improved efficiency ratio beyond the original goal.[6]

Table 1.

Products	Improved Efficiency Ratio (Planned)	Improved Efficiency Ratio (Actual)
TV Sets	16.4%	25.7% (FY1997-2003)
VCRs	58.7%	73.6% (FY1997-2003)
Air Conditioners	66.1%	67.85 (FY1997-2004)
Refrigerators	30.5%	55.2% (FY1998-2004)
Freezers	22.9%	29.6% (FY1998-2004)
Passenger Vehicles	23% (FY1995-2010)	22% (FY 1998-2004)

Source: Susumu Okamoto, "Energy and Technology Policies; Japan's Perspectives and Experiences", Chair's Air Pollution Seminar, Sacramento, California, January 17, 2007.

[6] For information on the results in other categories, see "What is the top runner Program?" Energy Conservation Centre Japan – <http://www.eccj.or.jp/top_runner>

6. Conclusion

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 of 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, seem determined to assume a global leadership 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 stands 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. The ultimate goal is having the nation internalize the values and principles of global environmentalism thereby reaching beyond the Kyoto Protocol and holding the potential, if not the promise, of a sustainable approach to environmental protection.

The Green Japan approach provides important illustrations of key options available to national governments seeking to abide by a strict and high-profile international protocol. 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, should not be underestimated as a means of encouraging collective action.

- The Japanese model has encouraged private sector product, service and process development, in the belief that the engagement and mobilization of business is crucial to both the attainment of national objectives and the creation of economic opportunities in an emerging sector.
- The government of Japan has been willing to use subsidies to spark innovation, as with the photovoltaic initiatives, but with the understanding that direct support to businesses and consumers should terminate 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.
- The Japanese authorities clearly believe that meeting the sustainable energy challenge requires both strong 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. Put simply, Japan is trying to bring everyone on board.

Japan's green efforts represent an important manifestation of a critical question in global public affairs. The Kyoto Protocol is an international accord that requires national engagement and changes in individual behaviour to be effective. Changing behaviour on a national scale is a formidable challenge and yet such transformations are essential if international accords on environmental questions and other issues are to be meaningful or to have an impact. 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 in which 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 Protocol will require effective and collective action on an almost unprecedented scale. 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 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 a beacon of optimism and opportunity for other nations seeking to bring their citizens and business community's environmental behaviour in line with the requirements for global ecological preservation.

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