論　文

Mediating Externalities:

Energy and Environmental Risks in Japan

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All countries confront mounting risks, or negative externalities[1], on energy and the environment. These externalities include geopolitical risks, as the most desirable fossil-fuel reserves (ie, oil and natural gas) are increasingly concentrated among unfriendly or potentially unstable regimes in OPEC, Russia, Nigeria and elsewhere. The environmental consequences of fossil-fuel use also pose a multifaceted and global threat that requires a commensurate level of policy coordination and technological innovation. This paper centres on the latter aspect, and describes the accelerating alternative energy revolution (especially in wind, solar, and marine technologies) that is in large measure a response to these negative externalities[2].

This paper focuses on Japan because the country is generally depicted as emphasizing energy efficiency, alternative energy, global cooperation (eg, the Kyoto Treaty), and other forms of activism in confronting energy and environmental risks. Japan earned this reputation in its smart response to the oil shocks of the 1970s. And we should expect Japan to take a powerful leadership role in countering such risks.

1) I shall define here what I mean by externalities. In political economy terms, an externality can be said to exist whenever the utility of one or more actors (meaning an individual, a firm, a country) is significantly affected by the activity of one or more other actors. Positive externalities arise when what actors do brings unintended benefits to others. Negative externalities arise when these unintended consequences are detrimental.

2) I shall deal with this issue again below. But for the present, note that in a June 20, 2007 report, the UN Environmental Programme and the Sustainable Energy Finance Initiative survey USD 70.9 billion of new, private sector investment in renewables in 2006, an increase of 43% over the previous year. This broad-based boom continues, driven by state support as well as fears of global warming and insecurity of fossil fuels. See “Global Trends in Sustainable Energy Investment”: http://www.sefi.unep.org/

It would also make sense for Japan to be a front-runner in maximizing the economic opportunities from the ongoing energy revolution. This is because Japan has a high level of oil dependence, a relative lack of extractive industries, considerable vulnerability to damage from climate change, and a modern history of using the state to deal with externalities. To take one example, ordinary geopolitical risks are magnified in the Japanese case by extreme dependence on the Middle East oil producers even as the region becomes increasingly unstable.

But in this paper I argue that Japan's level of effort is well behind the Scandinavian countries, the UK, and others. Perhaps most surprisingly, Japan's performance in pursuing alternatives even lags behind many American states, such as California. The main reason for this gap between Japan's incentives to act and its actual performance appears to be the dominance of neoliberal interests, institutions and ideas in Japanese politics. Market-conforming reformism under the Koizumi and Abe regimes is often lauded as the modernization of Japanese politics and policymaking. This seems particularly true in putting political and economic reform squarely on the policy agenda (Katz and Ennis 2007). But the neoliberal definition of reform has also fostered a profound unwillingness to use the state productively. Contemporary Japan's approach to energy and environmental challenges reflects this overall stance. The primary concern in Japanese environmental and energy policy is to avoid impositions on business, and allow the corporate sector virtually unrestricted freedom to mediate risks as it sees fit. Hence at present, rather than deal with externalities through the agency of the state, Japanese politics is foregoing benefits and shifting the bulk of energy and environmental risks to individuals.

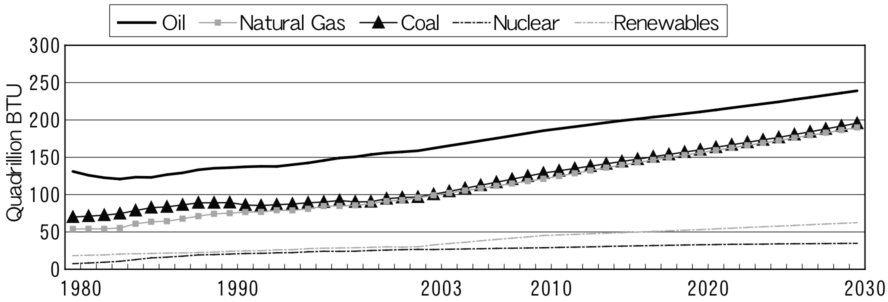
The Oil Age

This paper does not cover all sources of primary energy, which include fossil fuels, nuclear power, hydroelectric, solar, geothermal, and so on. I shall focus instead on oil, because oil remains the world's primary source of energy. Oil provided about 26% of the world's primary energy in 2003. As is evident from Figure 1, the International Energy Agency and other authorities expect oil's dominance in the global energy mix is to continue. The world remains very much in the oil age.

The oil age is quintessentially American, of course. The cheap, plentiful and convenient fossil-fuel energy that defines the oil age transformed the global political

Figure 1 World Primary Energy Demand, 1980–2030

Source: EIA, International Energy Outlook 2006



economy (Yergin 1991). In particular, it brought America into prominence. In the years between the First and Second world wars, American national power - fuelled through the positive externalities of oil - eclipsed that of the UK and all other contenders. Oil is so central to the rise of America that it is routinely depicted as the basis of the modern American imperium (Phillips, 2007). In these accounts, energy sources are viewed as the main pillar of all modern empires. With the Dutch in the 17th century it was wind, and we see traces of that role in the vast numbers of windmills that still dot the Dutch countryside. After the Dutch came the British, and the basis of the latters' empire became coal. The centrality of oil to America is seen in the fact that of 830,000 oil wells in the entire world in 2003, fully 520,000 of them were in America (SPE, 2005).

America also remains the world's third largest oil producer. But perhaps the most telling evidence that oil is virtually imprinted in the DNA of American capitalism is seen in the fact that, with only 4.6 percent of the global population, it consumes fully one-quarter of the world's oil output (BP, 2007).

But America is only the most obvious case. The continuing oil age is also strikingly evident in Japan. We can see the evidence in Tables 1 and 2. Table 1 shows us that Japan is not the global leader in energy efficiency. Nor is it especially notable for low per-capita energy consumption, carbon emissions and the other indices of sustainability.. Moreover, Table 2 shows us that among the major industrialized countries, Japan has the highest rate of dependence on oil, on imported oil, and on imports from the Middle East. Though Japan has been described as having "confronted the reality of limited oil" (Loth, 2007), this is clearly an exaggeration. Japan's performance looks good compared with America, but seen from a broader perspective

Table 1 Energy Intensity, Consumption, CO2 Emissions Indicators 2004

	Japan	US	UK	Germany	France	Italy
Energy Intensity	6535	9336	6205	7175	7209	6044
Ton Oil Equiv/Capita	4.18	7.91	3.91	4.22	4.43	3.17
TPES/GDP (PPP)	0.16	0.22	0.14	0.16	0.19	0.17
Tonnes CO2/TPES	2.28	2.49	2.30	2.44	1.42	2.51
Tonnes CO2/Capita	9.52	19.73	8.98	10.29	6.22	7.95
CO2/GDP (PPP)	0.35	0.54	0.32	0.39	0.23	0.31

Source: International Energy Agency (IEA Statistics). Note: all data 2004, PPP＝Purchasing Power Parity, TPES＝Total Primary Energy Supply

Table 2 Dependence on Oil, Imported Oil, and Imports from the Middle East, 2003

	Japan	US	UK	Germany	France	Italy
Oil Dependence	50	40	35	36	34	48
Import Dependence	100	62	–36	97	98	93
Dependence on ME	89	24	6	10	25	32

Source: METI, 2006 Energy White Paper, Section 5
http://www.enecho.meti.go.jp/topics/hakusho/2006EnergyHTML/html/i1250000.html

Japan is firmly enmeshed in the oil age.

On the surface, the oil age is defined by dependence on oil. But the oil age is a story of externalities. The most potent effect of oil's positive externalities is seen in the cheap and abundant energy that has literally fuelled the rise of industrial civilization[3]. The positive externalities of oil, as a resource, derive from its high energy density, the fact that it is a fluid, its low cost of production, and all the other amazing features that made it the essential element of the industrial era. The energy density of crude oil, for example, is about 42 million joules/kg, much higher than the various grades of coal, of wood, and the other once dominant sources of energy. Oil and the fuels refined from it are also easily stored, readily delivered through pipelines, tankers and trucks, and can be used with a minimum of fuss. Oil has also been incredibly cheap to extract. In some regions, including Iraq (if one ignores the unpleasant externalities), remains only about $1 to $2 per barrel. Oil is also used in an enormous range of products, including chemicals, plastics, fertilizers, and

3) Economic theory ignores the role of energy in growth, but recent critiques have persuasively argued that energy is as much a factor of production as labour and capital: Alam, 2006.

medicines.

Thus the modern economy is simply unthinkable without oil. Cheap and abundant energy has been the prerequisite of growth, and one can confirm that fact by matching any well-performing and developing country's rate of economic growth with its oil consumption statistics. Indeed, the postwar years saw Japan wholeheartedly join in on oil-fuelled growth and industrialization. Between 1948 and 1972 oil consumption in the US tripled, and in Western Europe it rose by 15 times. But in Japan it went up no less than 137 times, from 32,000 barrels per day to 4.4 million (Yergin 1991, 541). In the early 1950s in Japan, oil provided only 7% of primary energy (less than firewood) whereas coal supplied well over half. But by the end of the 60s oil was providing 70 percent of total energy for the so-called economic miracle. The speed and scale of this energy revolution in Japan is testament to oil's positive externalities, bolstered by secure supplies brought in over sea lanes patrolled by its former enemy.

Oil stands alongside, perhaps even slightly ahead of, the technological advances and innovations that we might ordinary regard as the basis of contemporary civilization. All the drawbacks - or negative externalities - of the oil age, including war, colonialism, corruption, pollution and so on, were evident nearly a century ago. But the economic efficiencies and other positive externalities deriving from cheap and plentiful energy outweighed them all.

Climate Change

The negative externalities of the oil age are increasingly evident in sobering geopolitical challenges. I have dealt with these externalities elsewhere (DeWit and Kaneko 2007) and do not intend to treat them in detail here. They include the fact that the world has run out of cheap oil just as demand is booming in developing Asia and elsewhere[4], the concentration of reserves in the increasingly unstable Middle East as well as the rise of "petro-authoritarianism" in Russia, Venezuela and elsewhere. Energy - and especially oil - was viewed as merely one more commodity in the market-fundamentalist 1990s. But since then escalating prices, political instability, the

4) The International Energy Agency's July 2007 "Medium-Term Oil Market Report" warns that supply constraints are almost certainly to tighten over the next several years. It is difficult to overstate the gravity of the report http://omrpublic.iea.org/

apparent rise of a new, energy-based Cold War, and other implications of the unfolding energy crisis suggest that energy is far more fundamental a factor of production. At the very least, we have learned that the negative externalities of the oil age are almost limitless.

I want to deal here with the largest negative externality of the oil age, climate change. As we saw from the 2007 reports of the Intergovernmental Panel on Climate Change (IPCC)[5], the scientific evidence is conclusive on the role of fossil fuels in driving up levels of greenhouse gases well beyond levels recorded from samples dating back to 650.000 years ago. Even so, many climatologists regard the IPCC report as rather optimistic[6]. Not only does the IPCC reporting process reflect the caution of scientists, it is subject to intervention by member-government appointed observers who okay the final drafts of reports. Moroever, the IPCC 2007 reports do not include recent evidence of accelerated melting of the icecaps, the tundra and so on.

Yet we have barely begun to confront this crisis. Al Gore may have won an Oscar for his work in "An Inconvenient Truth,"[7] and the evidence indicates that the concentration of greenhouse gasses now exceeds the dangerous threshold of 450 parts per million (Lamb 2007)[8]. But there is not yet a serious international effort to reduce emissions (Ponting 2007, 398–408). Indeed, though outright denial of climate change is becoming a fringe phenomenon, there is in its stead a concerted effort to spin the IPCC's report in a favourable light and label warnings as the fantasies of "cataclysm-ists."[9] The politics of the problem are clear: Fully 80% of present energy investment

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5) The IPCC was set up in 1988 by the World Meteorological Agency and the UN Environmental Programme to study climate change. The IPCC's reports and other information are available at: http://www.ipcc.ch/

6) The most compelling arguments come from James Hansen (2007), head of NASA's Goddard Institute and among the world's best-informed climate specialists. He and his colleagues warn that we confront "tipping points" and a sea-level rise of several metres if we do not reduce our emissions drastically in the next decade. Hansen's work can be accessed at: http://www.columbia.edu/~jeh1/

7) On this documentary, see: http://www.climatecrisis.net/

8) This level was thought to be a decade from about 2005. But accelerated rates of CO2 and other greenhouse gas emissions (plus recalculation of the latters' potency) have led to the new figure. The stark implications are that the world will see greater than 2°C in warming, leading to potentially catastrophic effects. Note that the IPCC 2007 reports projects a 2°C increase puts one-third of species at risk of extinction.

9) One example is seen in the work of environmental economist Bjorn Lomborg (2007), who suggests we do little about CO2 emissions and instead focus on economic growth, leaving a

goes to fossil fuels, and all the allied interests will not back down no matter how persuasive the evidence.

Japan's exposure to the fallout from climate change is ranked among the highest in the world[10]. In cooperation with Munich Re (the world's second largest reinsurance firm), the climate NPO German Watch rated Japan as 8th in the world for losses from extreme weather events in 2004[11]. Japan also has the industrialized world's lowest self-sufficiency level in food supplies (40%). If the optimistic visions of abundant harvests in a CO2-rich atmosphere do not pan out (McKenna 2007), Japan will be in trouble on that front as well[12]. The United Nations, the World Bank, and other institutions estimate that warn that humanity faces increasingly difficult water shortages, so the potential agricultural problem is compounded[13].

To the enormous mix of risks from climate change, one can add climate-related diseases, worsening natural disasters, regional political destabilization from environmental refugees (especially in Bangladesh), and a host of others[14].

Over the past few years, expanding research efforts on the terrestrial environment have led to accumulating evidence of climate change. Many of these research results, such as those showing the retreat of glaciers, the collapse of ice shelves, the bleaching of coral, the limits of oceanic carbon sinks, the melting of the tundra, and so on, have been disturbing. But perhaps the most troubling event so far has been the stunningly rapid shrinkage of Arctic ice in the 2007 summer melt. Precise measurements of the ice field have been possible since 1979, when satellite measurement began. The previous low in the extent of Artic sea ice was seen in 2005,

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richer next generation to deal with the climate problem. But Lomborg's work has previously been criticized as "marred by invalidating errors that include a narrow, biased reading of the literature, an inadequate understanding of the science, and quotations taken out of co ntext" (Scientific American 2002). A more recent critique can be found in McKibben (2007).

10) In Japanese, projected climate change effects on Japan are outlined in the Japanese Environment Ministry's site: http://www.env.go.jp/earth/cop3/ondan/ondan.html

11) http://www.germanwatch.org/ccpi.htm

12) Note, for example, that climate experts warn that Africa's agricultural output is likely to fall by half by 2020 (Africa News 2007).

13) On this issue, see the statistical information at the UN's "Water for Life" page: http://www.un.org/waterforlifedecade/factsheet.html

14) The threat to the Asia region was studied in depth in the 2006 report "Heating up the Planet: Climate Change and Security," by Australia's Lowy Institute for International Policy: http://www.lowyinstitute.org/PublicationGet.asp?i=391

when the sea ice extent dropped to about 5.57 million square kilometers. The figure for 2007 was 4.13 million square kilometres, and contrasts starkly with the long-term average of 7.7 million square kilometres of minimum sea ice extent. The dramatic rate of shrinkage seen in 2007 was not expected (for example, by the IPCC reports) to occur for at least several decades. Moreover, the melt season itself has been lengthening. The implications for global climate are worrisome in the extreme[15].

The Perfect Negative Externality

Climate change is the perfect negative externality because it is global and generational. The free-rider problem is enormous, as cuts in greenhouse gases by any given nation or region will mean little if there are equivalent or even greater levels of emissions elsewhere. The solution must, in other words, be global. Yet as we see with band-aid solutions like the Kyoto agreement, there is the profound risk of doing far too little since the worst consequences will accrue to future generations.

Perhaps because the Kyoto Treaty is named after a Japanese city, many observers regard Japan as pro-active on this problem, in the same way they regard Japan as particularly activist in conserving energy and getting away from oil. But in fact, Japan's performance here looks good only in comparison with the North Americans. Japan will not meet its Kyoto commitments, its use of environmental taxes is well below the OECD average (OECD), and it is only marginally involved in international efforts to move beyond Kyoto into a stronger regime of controls on carbon and incentives for alternatives[16].

Japan's efforts are a sharp contrast to the proactive role of Sweden, which has committed itself to ending the use of oil by 2020 and is a global leader in the use of renewable energy (26% versus a 6% average for the EU), in district heating, and microgeneration. Sweden already gets only about 30% of its primary energy from oil, having been at the same 77% level of oil dependence that Japan was at in 1973. In

15) See the US National Snow and Ice Data Center site on the phenomena: http://nsidc.org/news/press/2007_seaiceminimum/20070810_index.htm

16) In 2001, the Koizumi regime was, for example, prepared to abandon Kyoto in order to curry favour with the new Bush regime (DeWit and Kaneko: 2007). More recently, the Abe regime's "utsukushi hoshi 50" proposal at the June 2007 G8 summit included no reference year for CO2 reductions.

addition, the UK has emerged as perhaps the global leader in cutting its CO2 emissions, in studying the economics of fighting climate change (the Stern Review), in orchestrating alternatives. Hence the German Watch NPO, in its Climate Change Performance Index for 2007[17], ranked Sweden as number 1 and the UK as number 2 based on a calculation of their trend in cutting greenhouse gases, their absolute levels of emissions, and their policy regime for dealing with the problem. Japan was ranked 26th.

Learning From America

"Right now, in California, the brightest scientists from around the world and the smartest venture capitalists are racing to find new energy technologies and the solutions to global warming."

Arnold Schwarzenegger, Governor of California, United Nations, September 24, 2007

Moreover, though America ranks a shameful 53rd on the German Watch index (just ahead of China), it holds important lessons for Japan. Let us recall Japan's nearly 50% level of dependence on oil and the fact that nearly 90 percent of it is imported from the Middle East. The Americans are less dependent on oil in their energy mix and rely on the unstable Middle East for only 22 percent of their imports. And yet the American establishment looks at the Middle East and other producer areas' instability and want to cut their reliance as much as possible. Thus, alongside global warming, the dominant issue in American politics is energy independence[18]. The volume of capital flowing into alternative energy is therefore expanding apace. And much of it is paying off by fostering local economic development as a side benefit.

The Japanese elite tends, even now, to see the Bush regime as representative of the US. Yet most of us know - or should know - how isolated the Bush regime are on energy and environmental issues. They are no longer representative of their own country, as environmental awareness and activism are increasingly generalized throughout America. The April 16, 2007 edition of *Newsweek* notes, for instance, that

17) http://www.germanwatch.org/klima/ccpi.htm

18) The US military also recognizes climate change as "a serious national security threat": http://securityandclimate.cna.org/

the absence of constructive action by the Bush regime obscures a great deal of policymaking at the state and urban level. Fully 592 US mayors have already committed their cities to achieving the Kyoto rules that the Bush regime opted out of and then sought to undermine[19]. On June 1, 2005 (World Environment Day), California Governor Arnold Schwarzenegger signed Executive Order Number S-3-05, committing the state to a series of long-term goals culminating with an 80% reduction by 2050 of the its 1990 CO2 emissions levels. And among American cities San Francisco is so activist that even European countries send representatives to study its policies. San Francisco's director of its Department of the Environment noted that environment ministers from Denmark, Ireland and France had visited in early 2007. Apparently, the Europeans go to San Francisco to learn how to complement their robust national systems of energy and climate policies with strong local programmes.

This activism is not driven solely by the desire to battle negative externalities; it also has a local developmental focus. The initiatives taken in California by Governor Schwarzenegger are expected to increase state income by US$ 4 billion and create about 83,000 new jobs by 2020[20]. Also, the January-February 2007 edition of *The American Prospect* points to a November 2001 study by America's "Renewable Energy Policy Project"[21] that showed nearly 400,000 jobs would result from producing 10% of US electricity with renewables. The study showed that even then biomass, solar, wind, and geothermal energy projects in America already employed "more than 115,000 people directly. These new jobs more than compensate for ongoing job loss in the coal and oil industries as clean forms of energy replace polluting ones." Moreover, the article highlighted the role of renewable energy "portfolio standards." These standards "require a specified percentage of energy be from renewable sources by a given year." The US federal government, under the Bush Administration, has not adopted such standards, of course. But 23 US states have already, and these rules are already working to guarantee future demand for renewables and thus drive down costs.

The May 2007 *Electricity Journal* devoted a special to the potential payoffs from these standards if implemented at the national level in the US (and this is almost certain to happen once Bush is out of office in January 2009). One article, "The Projected Impacts of a National Renewable Portfolio Standard," related the results of

19) http://www.ci.seattle.wa.us/mayor/climate/quotes.htm#mayors

20) See http://www.nrdc.org/media/pressreleases/060404.asp

21) The relevant study can be found at: http://www.crest.org/index.html

a detailed study of the impact. It found that a 20% renewables target would reduce costs by 1.8 percent per year through opening up dominant power sources to more competition. The same study also found a net increase in employment of just under 160,000 jobs (nearly twice as many as fossil fuels) as well as an additional US$ 10.2 billion in GDP for 2020. The article also stressed that “renewable energy facilities avoid the need to export cash to import fuel from other states, regions, or countries - keeping money circulating in the local economy, and creating more local jobs.” It also emphasizes that climate, geopolitical, and a host of other risks would be correspondingly reduced.

Note that a 20% target is hardly too ambitious. Germany has already set itself a target of 26% renewables by 2020. Moreover, the American Council on Renewable Energy’s 2007 Outlook pointed out that stronger, and particularly federal, support for renewables could see them supply half of US electricity and 40% of its transportation fuels by 2025. Wind would be 40% of this mix of renewables, followed by solar at 26%, geothermal at 16%, biomass at 16%, hydro, tidal and wave power (or “water power” collectively) at 3.6% (ACORE 2007).

By contrast, the US federal government and the oil firms claim that renewables can at best provide only 5–10% of US energy use by 2030. Their claim rests on the assumption that current federal policies will not change. But virtually everyone in America knows that current federal energy and environmental policies are simply unsustainable and thus set for a thorough overhaul after January 2009. The US Government Accountability Office (GAO) sketched what is likely to become the outline of a renewable-energy reform agenda in a December 20, 2006 report (GAO 2006). The GAO warned that US federal “energy R & D dropped by over 85 percent (in real terms) from 1978 to 2005.” Increasing funding for basic research will clearly be essential to maximize the development and adoption of renewables. America’s increasingly influential Apollo Alliance[22] of business, environmental, and labour organizations argues, for example, that a US$ 30 billion per year, ten-year commitment of federal funding will generate 3 million new jobs.

The GAO report argues that new rules will be needed to maximize the payoffs from this funding of research. It points out that “Many states have successfully stimulated the deployment of renewable energy technologies by using standards,

22) The Alliance’s URL is: http://www.apolloalliance.org/

mandates, and financial incentives that require, for example, power companies to provide small producers with access to the power transmission grid and purchase their excess energy.” The GAO also notes it examined programmes Brazil, Denmark, Germany, Japan, Spain, and France where mandates and/or financial incentives have been used, and found that “advanced energy technologies that are providing, or are expected in the future to provide, significant amounts of energy” (GAO, 2006).

To the extent that most political, business and media circles in Japan see any of this US reaction to energy and environmental issues, they see only the biofuels boom and Bush’s emphasis on voluntarism instead of rules. The biofuels frenzy is an unsustainable approach to sustainable energy, however. American farmers have close relations with politicians in Washington, so subsidies for corn-based ethanol are plentiful. In January of 2007, for example, the Bush regime announced US$2 billion in loan guarantees for ethanol production. The flood of subsidies is having a profound effect. US Department of Agriculture statistics indicate that 2007 will see the largest corn crop since the Second World War, with 19% more planted area than 2006 (USDA 2007). But the US corn crop is already 40 percent of the global harvest, 70 percent of corn exports, and fully one-quarter of total global grain exports. There is no way to expand agricultural output enough to satisfy demand, as even converting the entire US grain harvest (ie, all grains, not just corn) would only produce enough ethanol to replace 16% of current US gasoline consumption.

This trend is worrisome, because escalating demand for corn as a biofuel is driving up food prices. Between March of 2005 and March 2007, the price of US wheat rose 34 per cent, corn by 47.4 per cent, barley by 59.4 per cent and cattle by 41 per cent. In its January 2007 *World Economic Outlook,* the International Monetary Fund (2007) warns that “rising demand for biofuels will likely cause the prices of corn and soybean oil to rise further, and to move more closely with the price of crude oil.” Further, these price increases will drive food prices in general up because corn and soymeal are feedstocks (indeed, 95% of feed for livestock in the US). The IMF argues that the trends are unsustainable and, among other reforms, suggests rapid development and use of second-generation substitutes

This speculative frenzy is clearly becoming a negative externality of the oil age and something to be very wary of. At the same time, it is a highly visible indicator of the underlying fact that the US is gearing up to get out of oil, or at least out of imported oil as much as possible. When even the Americans are abandoning laissezfaire rhetoric and policy concerning the oil age, then it is time for Japan to take notice. Moreover, the Japanese elite clearly need to look beyond the Bush regime in order to see how Americans are using the pursuit of energy conservation and alternatives as tools of local economic development.

Europe Leads the World

"Europe must lead the world into a new, or maybe one should say post-industrial revolution - the development of a low-carbon economy."

European Commission chief Jose Manuel Barroso, January 10, 2007

With the US case, we have seen that much is being done even with the Bush regime holding the reins of federal power. Japan should expect American competitiveness in environmental and energy technology to boom in reaction once the stifling and distracting effect of the Bush regime has passed. The German case is thus equally instructive for Japan, as it is an example of what can be done when the national government is eager to combat the negative externalities of the oil age. We have already seen that Germany has set itself the goal of getting 26 percent of its energy from renewables by 2020. Germany has harnessed these goals to local economic development. Employment in Germany's renewable energy sector expanded to 214,000 workers in 2006 compared to 190,000 in 2005, a 12.6% rate of growth[23]. Studies by the German Ministry of the Environment and other agencies project this employment to expand to as many as 500,000 workers by 2020 (Erneuerbare-Energien 2006).

One key to Germany's success is its Renewable Energy Sources Act of 1990, through which Germany has deliberated fostered its solar and other renewable industries. The Act required utility firms to buy electricity produced by solar and other renewable plants, even though the power costs more than fossil-fuel generated electricity. For solar energy, the Act gave it a reliable and lucrative market, but one with incentives to cut production costs and increase technical efficiency because the guaranteed tariff paid by the utilities declines every year. A system of subsidized loans has also fostered purchases of solar installations for individuals' homes. Aided by these supports, solar power in Germany has grown to an industry with

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23) http://allafrica.com/stories/200705140715.html

employment of over 50,000 people in 2007. Also, in 2006, Germany had about one third of the EU's total installed solar capacity of 3.4 gigawatts. The German capacity was about 4 times the capacity in Japan.

Like the US, Germany has important local development lessons for Japan, with its struggling local areas. The German government used its solar-development policies specifically to foster growth in the former East German states, which had been left with high unemployment and other serious economic problems in the wake of unification. In turn, local governments have capitalized on the opportunities. The German city of Freiberg, with only 214,000 citizens, has made the most of it. Through strong local support for the industry, Freiberg has become the centre of the German solar business. The city is rapidly becoming Europe's "eco-city," and hosts the European office of Local Governments for Sustainability, the headquarters of the 30,000-member International Solar Energy Society, extensive solar and related research institutions, and so on. Other regional and local governments in the former East Germany are also benefiting immensely from promoting local clusters and networking in the industry (Platts, 2006).

Wind energy is an even greater success story in Germany. The sector directly provides over 70,000 jobs as of 2007 and - even by conservative estimates - is expected to provide 112,000 jobs in 2020[24]. The "World Market Update 2006" (released March 26, 2007) annual market report by the Danish consulting firm BTM Consult records 30% growth in the wind energy business over the previous year. Moreover, much of the growth is driven by an "international political agenda that has given top priority to security of supply and the climate change issue." Along with climate risks, the Europeans are concerned about their reliance on Russia for gas (a concern that ought to send a strong signal to Japan). Further, the growth centres are the USA, China, India, Europe, and growth projections to 2016 remain in the double-digits, with the only concern being the capacity to meet mushrooming demand. And Germany, the world's largest exporting country, ships about 70 percent of its production of wind-energy technology overseas.

There is thus a global boom in renewables. But there is also a global race to lead the market. The February 2007 edition of *New Energy*, the "magazine for renew-

24) See (in German) the calculations at the German WindEnergy Association: http://www.wind-energie.de/de/themen/wirtschaftsfaktor/arbeitsplaetze/

able energy," notes that even as the market for wind power "has exploded," the dominance of Germany and Denmark in the industry is being challenged. A surge is evident in the US, but especially in China. The magazine points out that in China, "clusters of several manufacturers and suppliers in their immediate neighbourhood are growing in various regions and cities. In addition to the known players, new ones will emerge which will produce machines developed in Europe with the lower domestic labour costs and export to the entire world from China" (May and Weinhold 2007). The Europeans' challenge will be to maintain and expand a technological lead, so as not to fall into the "global labour arbitrage" trap and lose momentum in this key sector.

The May 7, 2007 *Business Times of Singapore* also comments on the outlook in Asia. The chair of Singapore's National Research Foundation argues that clean energy, especially solar power, could be a major engine of the country's growth. The thinking is that "Singapore can play the middle-man: the technology is in Europe, but the demand will come from Asia." This is because there are about one billion people in Asia without electricity (and globally, a total of 1.6 billion lack electricity). Singapore's elite see this as a huge market opportunity. Bringing solar power to them seems increasingly a realistic option as its production costs fall and the market costs as well as the negative externalities of fossil fuels rise. Moreover, solar can be a lot more portable than the large generating stations and complex grids characteristic of fossil-fuel and nuclear- generated electricity.

Singapore envisions itself as a site to test European energy technologies to make them more applicable to climatic and other conditions characteristic of Asia. It too is spurred on by growing competition on this front from China and Korea. It comes as a shock that the Singaporeans have nothing to say about Japan, either as a competitor or source of technology.

So let us have a closer look at China. It is clear from the above that the Chinese are getting into the business as well. The May 12 2007 *Business Times Singapore* relates that China has committed itself to developing renewable energy as fast and as plentifully as possible. In 2005 US$38 billion was invested in renewable energy development worldwide, and China was the largest investor with US$6 billion. Moreover, America's National Renewable Energy Laboratory (NREL) points out that "China has long been a world leader in renewable energy development and utilization, especially decentralized small-scale renewable energy technologies such as small hydro power, solar water heaters, bio-gas digesters and small wind turbines.” The NREL adds that “China is becoming a leader in sophisticated, high-technology renewables, such as photovoltaics (PV, which converts sunlight directly to electricity), and is positioning itself for significant growth in other sectors, such as utility-scale wind power, bio-power and bio-fuels.”[25)]

Catch the Wave

To get an appreciation of the sea-change we are seeing, consider that the wave and tidal energy market is in on the edge of becoming the next clearly sustainable boom (in contrast to unsustainable corn and biofuels) in renewable energy. The energy potential from waves and tides is enormous, but exploitation has remained marginal throughout the oil age. Over the past few years, however, great strides have been made in technologies to turn the quite reliable motion of waves and tides into electricity and other useful output. As a result, the May 20 2007 Independent notes that the UK cabinet is pressing for a 5% percent marine energy target. The UK is the world leader in marine energy technology. But it has strong competition. The May 17 2007 edition of Australia’s ABC news cites the country’s Industry Minister that Australia’s marine technology, which uses wave motion to produce highly pressurized streams of water, could be the “holy grail” for supplying electricity and drinking water to its major cities[26)]. Australia has especially powerful incentives in this respect. In the past year, the country has woken up to the fact that it is among the worst hit by global warming. Among other dire problems, prolonged drought is threatening to force it to choose between drinking water or irrigation for 40% of its agriculture (Marks, 2007).

Such are the negative externalities of the oil age.

And What of Japan?

“Every country has a [renewable energy] huge potential. I have not heard of any country in the world where the wind doesn’t blow or the sun doesn’t shine”

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25) www.nrel.gov/international/china/

26) See the article at: http://www.abc.net.au/news/newsitems/200705/s1925888.htm

Mechtild Rothe, Vice-President, EU Parliament, May 8 2007 (European Wind Energy Conference)

The startling incompetence and obstinacy of the Bush regime appears to have kept the spotlight off Japan's almost politically autistic approach to energy and environmental issues. We have seen that some observers even think Japan is at the head of the race in getting out of oil and into renewables. But in spite of all its incentives, Japan's performance in getting out of the oil age as well as exploiting the gains from doing so is poor. Look at the incentives implied by the market cost of oil alone. Data from Japan's 0il Cooperative (*sekiyu renmei*)[27] show that Japan's oil imports in 2006 cost YEN 68,414 billion and comprised 21.3 percent of total import costs. Imagine cutting just 10% of that cost. Add in the costs of other fossil-fuels and their associated environmental, geopolitical and other risks, and the amounts are staggering. Surely getting out of the oil age would be at least as valuable to Japan as to the America that is rapidly greening behind Bush. With all the spinoffs, including bolstered regional economic competitiveness and employment, it seems an obvious strategy. So it comes as a shock that the Japanese government only mandates that 1.63% of power be supplied via renewables by 2014. This is a stark contrast with the EU's binding target of 20% by 2020 for all European countries. And note that the US state of California has even more stringent requirement of 20% by 2017[28]. And Germany has recently proposed to increase its target to 45% by 2030.

The problem in Japan appears to be political. The old-economy forces are strongly represented in Keidanren and the other citadels of the business establishment, and they reject anything but voluntary measures. Hence when it comes to electricity, the power producers do not want to be forced to buy the output from renewables. They have their eyes fixed on their own interests, and there appears to be little political leadership pushing them towards a broader perspective. So Japan's elite view power from renewables as too expensive and not reliable, compared to fossil-fuel and nuclear power[29].

A striking example of this thinking was described in the April 16 2007 *Nikkei*. It noted that Japan's *sogo shosha* (overseas trading firms) are investing overseas in

27) http://www.paj.gr.jp/statis/data.html

28) http://www.wapa.gov/es/pubs/esb/2005/apr/apr058.htm

29) http://www.wwf.or.jp/activity/climate/lib/greenenergy/tsudoi.htm

renewables rather than in projects in Japan. Spokesmen for the *sogo shosha* argue that there are not enough windy areas in Japan as well as too few regions with geothermal potential. This kind of uncritical thinking boggles the mind. Japan's use of renewables is extremely low, Japan is far larger than most European countries (including the UK and Germany), there are abundant thermal energy resources, and there certainly appears to be plenty of wind. If consistency of supply from renewables is truly such an enormous problem, one wonders how the Europeans and others have managed to reach the levels of renewable energy reliance they have already. And why is it that they plan to expand that reliance so much in the coming years? It would appear that Japanese business and political circles are in a state of denial because getting seriously involved in the energy revolution and climate change would require pro-active use of the public sector.

A further example of Japan's failure of political will: Though Japan has not required electricity producers to buy power generated by renewable, it did have a very successful subsidy programme for solar energy up to 2005. The GAO report noted earlier pointed to this programme as a success. Largely because of the subsidy, Japan became the world's leader in solar energy technology in the early 2000s. But with the end of the subsidy, Japan has lost market share to the Germans and the Chinese. That national subsidy was not renewed, but the wasteful system of subsidies for road finance (which total about YEN 5 trillion) is being protected. The May 21 2007 *Nikkei* in fact tells us that the road-building plan has been extended by 10 years. Clearly some rethinking of fiscal priorities is in order[30].

Along with the solar market are potential projects in wind energy, where Japan is only 10th in the world. It should not be. One bright example is Iwate Prefecture's Kuzumaki-cho, where fully 80% of the town's energy is from renewables[31]. Indeed, Kyoto University Professor Ueta Kazuhiro, a specialist in environmental economics and public finance pointed out in the May 20 2007 *Nikkei*[32] that Japan has a poor supply of natural resources, but is rich in solar, biomass, wind, small-scale hydro, geothermal, snow and other local energy resources. Hence, in spite of Japan's old-

30) In September of 2006, shortly after becoming Minister of Transport, Fuyushiba Tetsuzo, suggested that a portion of the road-finance revenues be used for CO2 reduction projects. The idea went nowhere.

31) http://www.town.kuzumaki.iwate.jp/

32) See "saisei kanouna enerugi-kyakkou."

economy elite's conviction that fossil fuels and nuclear energy are the only realistic options, much more output is possible from geothermal, wave, tidal, biomass, and a host of related projects.

Moreover, though Japanese media carry plenty of news on aggressive research and development in biomass, Japan is only even with the US and Europe. This is clear from a 2006 comparative report on 3rd Generation Biomass technology by the Japan Science and Technology Agency Centre for Research and Development Policy[33). Insufficiently supportive policies threaten to cost opportunities here as well. Keep in mind that fostering these alternative energy sources reduces the fuel-import bill and the associated negative externalities of the oil age. It also generates a host of spinoffs. These spinoffs include enhanced local employment, bigger incomes, gains from bringing overseas researchers into Japan, and so on. Japan's failure to take or maintain the lead in these critical technologies of the new economy is a failure of policy, not the consequences of geography or any such inevitability.

Japan does have large R & D subsidies for energy, of course. There is a good deal of financing, for example, directed towards getting coal sequestration technology in place. In theory, this technology would take the carbon dioxide from burning coal and dispose of it underground or in some other fashion. There are already small-scale projects in Yubari City and Nagaoka City[34). Yet even the relatively optimistic executive leadership of the IPCC regard these technologies as a long way from any feasible application. And the great risk of betting on them is that hundreds of coal-fired plants will be built in anticipation of using these technologies, pouring enormous volumes of CO2 into the atmosphere. The US Energy Administration's May 21 2007 "International Energy Outlook 2007" reports that coal's share of world energy is set to increase from 26 percent of total world energy in 2004 to 28 percent by 2030. By 2010, carbon dioxide from coal is expected to exceed that from the consumption of oil age. So instead of moving forward out of the oil age, we risk going backwards[35).

Moreover, the bulk of Japan's energy R & D spending goes to nuclear energy research. According to the International Energy Association's 2006 publication "Energy Policies of IEA Countries 2004 Review," fully 64 percent of Japan's budget for energy R & D went to nuclear energy. Japan's national government and the old guard appear

33) http://crds.jst.go.jp/output/pdf/06gr01.pdf
34) http://www.nhk.or.jp/zero/contents/dsp64.html
35) http://www.eia.doe.gov/oiaf/ieo/index.html

to see nuclear as the only realistic option for reducing dependence on fossil fuels and cutting emissions. They are also keen on making nuclear power a major export business.

Yet even the IPCC sees at best a small role for nuclear, increasing from the current 16% of electrical generation to about 18% by 2030. For the IPCC, this limited role stems in large part from the fact that "safety, weapons proliferation and waste remain as constraints." The highly respected US Council on Foreign Relations concurs with the IPCC. In an April 2007 report (Ferguson 2007), the Council reports that "Nuclear energy is unlikely to play a major role in the coming decades in countering the harmful effects of climate change or in strengthening energy security." The report argues that the only way for nuclear to play a significant role would be to opt for very rapid deployment of reactors. But such would present unacceptable risks. The "nuclear industry would have to expand at such a rapid rate as to pose serious concerns for how the industry would ensure an adequate supply of reasonably inexpensive reactor-grade construction materials, well-trained technicians, and rigorous safety and security measures."

In addition, however, the enormous costs and long lead times of building nuclear power plants seem serious hurdles as well. Japan's nuclear industry has a poor safety record and is already encountering opposition on that front. Siting any new reactors is almost certainly to be a serious political problem.

Hence, these appear to be areas where Japan's investment priorities need to be reconsidered. The interests counting on nuclear and coal are strongly represented in Nagatacho and Kasumigaseki[36] politics, but their monopolization of fiscal and other support clearly has to be curtailed.

Time for a Carbon Tax

"What's needed is a carbon tax - a tax on all fossil-based fuels that reflects their true social, political, and environmental costs." February 7, 2007

Robert Reich, Professor of Public Policy, University of California at Berkeley, and former US Secretary of Labor.

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36) These are, respectively, Japan's political and bureaucratic centres, within the Tokyo Metropolis.

http://www.carbontax.org/who-supports/

Japan clearly needs to increase its renewable portfolio standards target from the paltry 1.63% (by 2014). An additional spur for shifting Japan out of the oil age and into the new energy economy could come from carbon taxation. Japanese leadership is indeed critical in this area and has the potential for enormous payoffs. Moreover, Japan needs perhaps just a modicum of extra incentive, especially political incentive, to adopt this tax. It has been on the agenda for years. In early 2000, at about the same time as Tokyo Governor Ishihara was giving up on the congestion tax, the Japanese government tax commission was preparing to study environmental taxation. The commission was concerned that Japan's environmental taxes are very low relative to those of Europe. In September of 2000, then government tax commission head Kato Hiroshi suggested that a carbon tax might be introduced in 2002 in order to assist Japan in meeting its Kyoto targets. That never happened. There have been repeated efforts by Tax Commission and the Ministry of the Environment to get an environmental tax adopted, but the introduction of the tax keeps getting put off. Present plans would see the revenues be used for environmental projects, including forestation (to absorb atmospheric carbon) as well as to facilitate the purchase of green technologies.

The issue of carbon taxation is in fact inseparable from global warming. This is because carbon taxation is the most efficient means for attaching a price to carbon dioxide emissions. That price is essential in order to - as specialists would describe it - internalize the negative externalities of carbon dioxide emissions. In non-specialist language, the problem is that without a price the emission of carbon dioxide is virtually cost-free. Immense damage is clearly being done to the environment, but it is not being calculated and assessed on the firms, consumers and other actors who emit greenhouse gases. With the imposition of a carbon tax, each ton of carbon dioxide would have a cost that more fully reflects its real cost in damages. This price would boost the incentives to use alternative energy or least remove much or all of the carbon dioxide from the effluent stream.

Carbon taxation is not a new, untested approach. Such a tax was first implemented in Sweden in 1991, where the carbon in oil, coal, natural gas, liquefied petroleum gas, petrol and aviation fuel was priced at about US$ 100 per ton. The tax had a marked impact in bringing down Swedish carbon dioxide emissions as well as inducing a shift towards biomass for local heating and energy use. Higher carbon prices led to numerous innovations in home heating technologies. The shift to biomass also resulted in a continuing stream of innovations in efficient production of biomass. Moreover, the Swedish economy did not fall apart or lose its competitive edge. As we saw earlier, Sweden is in fact one of the world's most competitive economies.

For these reasons, the Commission of the European Communities has recently all but officially declared itself fully in support of carbon taxes. On March 28, 2007 it released a green paper on market-based instruments for environment and related policy purposes (Commission of the European Communities, 2007). The paper stresses that taxation is easier to administer and otherwise generally more effective than such alternatives as carbon trading. It also argues that opting for taxation among the alternatives should not be blocked by the EU's voting rules (which generally require unanimity for taxes), but should be decided by an objective assessment of the options. The Commission goes on to stress that a carbon tax "can be a win-win option to address both environmental and employment issues" because it is levied on negative externalities rather than income. It argues that "reductions in labour taxation or social-security contributions which tend to benefit lower-income households, can counterbalance any possible regressive effect from environmental taxes." It notes as well that "with an ageing population, which increases pressure on public expenditure, and globalisation that makes taxation of capital and labour less viable, the shift of tax burden from direct taxation towards consumption and, in particular, environmentally damaging consumption, may provide considerable benefits from a fiscal perspective." All of these conditions apply just as strongly to Japan, especially the fiscal and political constraints arising from ageing and globalization.

Moreover, the IPCC's 3rd report, released on May 4, 2007, also suggests that a carbon tax in the range instituted by Sweden would be very effective. The report sketches 3 basic scenarios, wherein carbon is priced at 20$, 50$ and 100$ per ton. These scenarios lead to very different cuts in emissions. A carbon price of US$ 20 per ton leads to a reduction of between 9 and 17 billion tones of carbon per year by 2030, whereas the US50$ per ton price leads to cuts of 13 to 26 billion tones per year. The most robust scenario, of 100$ per ton, leads to a cut of up to 16–31 billion tones in emissions per year. These cuts compare to total global emissions of 43 billion tones in 2000, and a projected increase of between 25% to 90% by 2030 if we do nothing. The upper range of the emissions reduction achieved by the US$ 100 carbon price is enough to cut emissions by 50% and avoid the worst catastrophes outlined in the IPCC 2007 reports. Moreover, the US$100 per tonne scenario has been assessed to be about the equivalent of adding YEN 32 to the price of a litre of gasoline over the next two decades. That compares with the costs of the catastrophes noted earlier. The IPCC projected the total cost in global output would be about 0.12 percent of GDP per year, which is virtually unnoticeable.

On top of that, the world would appear to need at the very least the robust scenario. As noted earlier, the IPCC report is probably too optimistic in its assessment of risks. This is not only because the reports go through a very politicized process. Even if there were no interference, the reports do not reflect the most recent research results on the pace of warming and related melting and the threat of running into "tipping points." That is why James Hansen calls for a more frequent process. One example of this was seen in the May 18 2007 announcement by the journal "Science" that the Southern Ocean around Antarctica is losing its capacity to absorb carbon dioxide. The Southern Ocean has absorbed about 15% of the carbon emitted since the industrial revolution. But new evidence suggests that global warming and the ozone hole have combined to create stronger winds that churn the waters deeply and impair CO_2 absorption. This feedback effect of global warming was not predicted to occur for about another 4 decades. That it has already started has sent a strong shock wave through the global scientific and political community (Clover 2007).

The opportunity for leadership on this tax is also clear. The Swedish example has been generalized throughout the Nordic countries, but has not made significant progress since then. The reason is not economic feasibility but rather political feasibility. In its 2006 study of "The political economy of Environmentally Related Taxes," the OECD found that the taxes "have not been identified as causing significant reductions in the competitiveness of any sector." This is in part because there are exemptions for very vulnerable sectors, such as resource extraction[37]. But Japan's industrial profile largely lacks such sensitive sectors. Japan's steel industry would find itself compelled to adopt even more efficient processes as well as use cleaner energy, but that would further enhance its competitiveness.

Because talk of taxes is anathema in most countries' politics, proposals for

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37) http://www.oecd.org/dataoecd/27/23/36966499.pdf

costing carbon have settled on carbon trading. Carbon trading is an effort to accomplish the same end of internalizing the externalities. Carbon trading sees the public sector (at the local, regional, national or supra-regional level) determine the allowable level of emissions and then auction the rights to emit it to businesses. Trading of the emissions permits then determines the price of carbon. This means of pricing carbon has been used by the EU and is being introduced by various groupings of state governments in the US (with Canadian participation as well). It is, however, considered a poor second-best to taxation, because trading requires a number of regulatory steps that the carbon tax can achieve directly. The carbon tax is far more efficient, and hence a better tool for economic development.

This fact about the limits of carbon trading is increasingly recognized in American politics. Hence in spite of the depth of political disdain that modern American politics has for taxes, carbon taxes are on the agenda. In the April 27, 2007 *Boston Globe* US Senator Christopher Dodd (a Democratic candidate for President) called for a “corporate carbon tax” in conjunction with carbon trading. He suggested the tax revenues could be used to finance a major effort in “renewable energy research and development and deployment of clean energy and energy efficient technologies.”[38)] He would also support this by mandating that electric utilities use renewables to generate at least 20% of their power, which we have seen is already happening in California. The list of political heavyweights who support carbon taxes includes Paul Volcker, for chairman of the US Federal Reserve and Thomas Freidman of the New York Times. As is evident especially in his April 17 2007 *New York Times Magazine* article “The Power of Green,” Friedman’s arguments reflect the thinking of interests who champion a neoliberal, national-security-centred approach[39)]. Indeed, so mainstream is carbon taxation becoming in American that the February 9, 2007 *Wall Street Journal* reported its own survey of economists revealed 40 out of 47 favour carbon taxes to spur the development of alternative fuels.

Japan’s environmental tax burden is below the OECD average[40)]. Even so, a day

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38) http://www.boston.com/news/globe/editorial_opinion/oped/articles/2007/04/27/a_corporate_carbon_tax/

39) The article can be accessed at: http://www.iht.com/articles/2007/04/13/opinion/edfried.php

40) See page 8 of the OECD presentation on “the political economy of environmental taxes”: http://www.oecdtokyo2.org/pdf/theme_pdf/enviroment_pdf/20060707environment_taxes.pdf

after the May 4 2007 release of the 3rd tranche of the IPCC 2007 report, the *Asahi* newspaper reported that Japanese industry was largely against carbon taxes and even carbon trading. The standard refrain from these groups, especially the Keidanren, is that Japan's technology is the world's "top runner" and so no further effort is needed nor possible without sacrificing competitiveness. The May 22 2007 *Nikkei* also tells us that Japanese industry essentially dismisses proposals for a carbon tax with the claim that such would be contrary to the trend of shifting power from the public to the private sector ("*kan kara min e no jidai no nagare ni gyakkou shi rongai*").

The Japanese business community's arguments about technology and costs are gross exaggerations of the facts. Japan has some very good technology in many areas of energy conservation as well as alternative energy. This is to be expected, given Japan's lack of natural resources, its geographical isolation from suppliers and its historical experience (and virtually certain future) of being squeezed through energy dependence. What is surprising is that Japan is conceding leadership, or the opportunity for leadership, in so many areas, and particularly in renewables. Moreover, the taxation argument is completely misinformed. Carbon taxes are the most efficient, least interventionist means of effectively controlling emissions and spurring the innovation needed to carry Japan, its cities and its countryside, out of the oil age and into the new economy.

The reasons for Japan's poor performance compared to its evidently strong incentives to act are not immediately obvious. One can, by contrast, understand why the Australian and Canadian governments have hitherto been opposed to credible climate change policies[41]. Australia is the world's largest coal exporter and Canada hopes to become an energy superpower by exploiting its huge reserves of enormously polluting oil sands. Japan has no such serious domestic vested interests to overcome. It would appear that reliance on the American security guarantee as well as excessively close ties to the Bush Republicans has dulled Japan's sense of how risky are the mounting negative externalities of the oil age. A further reason for the lag would appear to be that acting forthrightly involves the creative use of the public sector. The Koizumi regime was loath to do this, it seems, when the thrust of its policy was in cutting regulations, subsidies, personnel and all the other arms of the state. So

41) Yet even these countries' hitherto obstructionist federal governments are pushed by popular pressure and subnational government activism into becoming increasingly strong proponents of the development of alternative energy (Kanellos 2007, Warren 2007).

reluctant were they to use the state productively that it took them until May of 2006 to come out with a new energy policy.

The Japanese central government's policy of market mediation of climate and energy risks (as well as the opportunities inherent in confronting those risks) has a further glaring fault. Japan does not have the federal system of the US (and other countries such as Canada and Australia), where subnational governments have taken the lead from their lackluster federal counterparts. Many American states have instituted their own tough regimes for CO2 emissions caps and for promoting the development and diffusion of renewables (driven by local politics). As we saw earlier from tables 1 and 2 (the data on energy efficiency, consumption and CO2 emissions), America as a whole has a lamentable record on dealing with climate risks. The Bush regime and its allies are acting on behalf of the least competitive, most energy intensive (and wasteful) states[42]. But the US is still performing remarkably in the regions where technological breakthroughs can be expected (esp California and the Northeast, but also in Bush's home state of Texas). The Japanese elite need to recognize that the neoliberal era is over and that the public sector has a critical role to play in confronting externalities. Business as usual in the Japanese political economy risks forfeiting opportunities for sustainable economic growth and employment as well as being sidelined in global politics.

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