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Japan's New Energy Strategy

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[Hisane Masaki provides an excellent survey of the energy challenges confronting Japan while suggesting some of the problems with the new energy policy regime about to be officially adopted by the Koizumi Administration. The issues are pertinent not only to Japan but throughout the Asia Pacific and globally.

First the challenges: Japan, like all other nations, now faces the strong possibility that fossil fuel supplies and energy politics will be fraught in the coming years, resulting in upward pressure on prices. In Tokyo and other parts of Japan, for example, unseasonably cold weather has boosted the demand for fuel, and sharply driven up the cost of heating oil along with winter vegetables and other products. The country's heavy dependence on imported fossil fuels is thus keenly felt by consumers. But it is systemic problems at the regional and global levels that pose the largest problems. Robust economic growth elsewhere, notably in China and India, presents a seemingly insatiable global appetite for more oil and gas. At the same time, the major oil producers have at best minimal margins of spare production capacity. While producers are investing in new sources of supply, the cost of exploration is skyrocketing due to the demand for rigs and other equipment as well as the risks, remoteness and other challenges attendant on new finds.

All indicators suggest that the very tight squeeze between demand and supply will be protracted. Power and wealth are thus flowing into the hands of the big exporting countries. Like everyone else, policymakers in Tokyo saw this in early January, when Russia's Putin Administration felt confident enough to publicly declare itself a petropower, through briefly kinking the hose on its gas exports to the Ukraine and thus to Europe.

That is not the only set of problems. As Hisane points out, the global community may in fact be facing a peak in oil production even as demand appears unabated by high prices. Though often scoffed at in the press, notably the Japanese press, concern about peak oil is now solidly mainstream. Virtually all fossil-fuel importing countries are therefore scrambling to devise policies to cope in the short-term and reduce dependence over the long haul. Sweden's Prime Minister openly announced late last year that the country is facing the challenge of peak oil and committed Sweden to zeroing its dependence on oil by 2020. And at about the same time, in the US, the DOE Secretary Samuel Bodman officially requested the US National Petroleum Council to investigate the supply problem as well as peak oil per se. Since even optimists judge conventional oil supplies to be sufficient for only a couple of decades or so, Tokyo too is evidently aware that it is imperative to start acting is now.

Indeed, in Japan's case a little more haste and clear thinking might be in order. As this piece points out, Japan's energy efficiency is world class when measured in terms of energy consumed per unit of GDP produced. On the downside, however, Japan has few conventional energy resources and relies on the Middle East for over four-fifths of its oil imports. Largely for these reasons, the Koizumi regime's New National Energy Strategy, slated for official unveiling perhaps as early as next month, appears to be centred on nuclear power and building up national champions in the oil industry.

Is nuclear power the answer? Aside from the risks, costs, and waste problems associated with nuclear power, Japan's nuclear industry has such a poor safety and compliance record that finding sites for new plants will surely present a challenge. As Leuren Moret has documented (http://japanfocus.org/article.asp?id=460), opposing a proposed reactor in the political equivalent of one's own backyard seems no mere NIMBY issue in a country with so many earthquakes. Japan, moreover, may have to rethink its deregulation of the energy sector as the nuclear firms themselves may not have the financial capacity to muster the investment capital for a big expansion. Indeed, committing enormous amounts of capital to more nuclear power may turn out to be a bad bet. A wiser strategy might be to combine diversifying Japan's investment in energy R&D, investing seriously in renewable energy resources, and finding bolder ways to reduce energy use.

Japan's plan to fuel many of its reactors with plutonium ("pluthermal," also know as plutonium uranium mixed oxide fuel) brings with it a host of safety and proliferation concerns. It is not especially encouraging, given the already strained foreign relations between Japan and much of the rest of Asia, that the Japanese government is unwilling to work with the International Atomic Energy Agency on policing the new reprocessing facilities.

As to building national oil champions to rival British Petroleum and Exxon-Mobil, the Japanese government convinced the domestic firms Inpex and Teikoku Oil to merge as of April this year. This is part of an overall "Hinomaru oil" strategy that seeks to raise the ratio of oil developed and imported through domestic producers from the current 15% to 40% by 2030. Japanese oil and energy-related firms have had some successes on various fronts, but even after the merger Japan's new champion is still relatively puny and faces much more powerful competitors in a fiercely competitive environment. Not only are the majors from America, China, India and elsewhere also roaming the globe in search of supplies, but most of the big oil firms are not finding new reserves in sufficient quantities to replace their current production.

Hence, it seems safe to conclude that Japan's new energy policy is likely to be a first - and possibly faltering - step in a new and long march from crisis to sustainability. AD]

TOKYO - Resource-poor Japan is barreling ahead to rev up its energy security, driven by the specter of another oil crisis, the global rush for energy resources and a simmering gas dispute with China.

Japan's Ministry of Economy, Trade and Industry (METI) plans to release publicly the outline of the nation's new energy strategy as early as next month and will ask an advisory panel to Minister Nikai Toshihiro to flesh out the details before formalizing it by June.

The New National Energy Strategy, the draft outline of which was made known recently, is expected to call for, among other things, reduction in the oil-dependency rate to 40% or less by 2030 from the current 50%, promotion of nuclear energy, and securing of energy resources abroad through the fostering of more powerful energy companies.

Apparently in tandem with the new government energy-security policy being drawn up, the nation's controversial nuclear-fuel-cycle policy has entered a new phase. Recently, the government unveiled a plan to construct a new 1 trillion yen (US$8.7 billion) fast-breeder reactor, and domestic power firms also announced their plutonium utilization plans ahead of the start of a key test operation next month to extract plutonium at a spent-nuclear-fuel reprocessing facility. In another important development, Inpex Corp and Teikoku Oil Co, Japan's No 1 and No 3 oil developers, will integrate their operations under a joint holding company in April in a bid to survive cutthroat competition on the global scene.

These Japanese moves toward greater energy security come amid growing concerns about whether the nation will be able to ensure stable oil and other energy supplies to fuel its economy, the world's second-largest. Crude-oil prices are stuck at about $60 per barrel in world markets, although they remain well below the historic peak of $70 reached in late August.

Amid the stubbornly high oil prices, the global competition for oil reserves is intensifying. This rush for oil reserves is being driven by China and India, which both desperately need stable oil and energy supplies to power their booming economies. New sources of energy have turned into new sources of potential tension and conflict, as being exemplified in East Asia by the gas dispute between Tokyo and Beijing in disputed waters in the East China Sea.

Japan relies on imports for almost all of its oil, of which nearly 90% now comes from the politically volatile Middle East. Inevitably, last year's spike in oil prices posed a threat to the country's economy. Another oil crisis similar to the two of the 1970s - in 1973 and 1979 - would be a nightmare scenario for the energy-strapped country. After the first oil crisis, panicked Japanese consumers rushed to stock up on toilet tissue and detergent, among other goods. As a result of that crisis, the Japanese economy experienced its first negative growth since the end of World War II in 1974 after years of high-flying growth from the early 1960s. Japan survived the two oil crises through strenuous energy-saving efforts and technological innovations. The oil crises are commonly remembered as "oil shocks" by Japanese people.

Today, Japan's economy is among the world's most energy-efficient. According to one estimate, the nation now needs 55 kiloliters of crude oil - nearly half the 106 kiloliters it did in 1980 - to generate 100 million yen in gross domestic product (GDP). Japan now has sufficient oil reserves, 170 days of supply. A stronger yen, which makes imports cheaper, also plays a significant role in fending off the negative impact of a sharp surge in oil prices. In 1980, when oil prices broke through $40 per barrel, the yen traded in the 202-264 yen range against the US dollar. But the yen is now quoted at about 106 against the greenback.

To be sure, Japan's economy is much more resilient to high oil prices than it was during the two oil crises of the 1970s. But Japan cannot feel safe and secure in the medium and long term. In addition to speculative trading and harsh weather conditions, world oil prices have stayed high - and are expected to do so throughout the year and beyond - because of structural factors that will not change overnight. Among those structural factors are sharply rising demand in Asia, led by China and India, the world's two most populous countries, as well as limited spare production capacity of the Organization of Petroleum Exporting Countries (OPEC). The International Energy Agency (IEA) estimates that global demand for energy will rise by 60% in 2030 from this year. World petroleum production is predicted to peak in approximately 2010 according to some analysts, with more optimistic forecasts placing the peak at around 1040.

The New National Energy Strategy calls for stepped-up energy-saving efforts and the development of energy-saving technologies to cut the ratio of energy consumption to GDP by 30% by 2030 to ensure the nation will have a stable energy supply amid intensifying competition for energy resources. This goal is far from a cakewalk, however. Japan's ratio of primary energy consumption to GDP is already the world's lowest after improving 30% over the past three decades because of conservation measures spurred by the oil crises of the 1970s. The new strategy is also expected to call for lowering Japan's dependence on oil as a primary energy source from the current 50% to 40% or less by 2030 through promotion of alternative energy sources including solar and wind power. However, the largest source of new energy is likely to be nuclear power.

Going more nuclear

The strategy is expected to call for raising the percentage of nuclear power in the total national electricity supply from the current 30% to between 30% and 40% or more in 2030 and also establishing a nuclear fuel cycle. In late October, the Atomic Energy Commission of Japan, the highest nuclear decision-making body affiliated with the cabinet, also adopted a long-term nuclear plan maintaining the nation's nuclear fuel cycle program, which reprocesses all the spent nuclear fuel to extract plutonium for future use as nuclear fuel. A fast-breeder reactor (FBR), which produces more fissile material than it consumes, is central to the nuclear-fuel cycle.

The prototype Monju FBR in Tsuruga, in the central prefecture of Fukui, has remained shut down since a sodium leak and subsequent fire in December 1995. The operator, the Power Reactor and Nuclear Fuel Development Corp (Donen), had tried to cover up the extent of the accident.

The semi-governmental Japan Atomic Energy Agency, which was created in October through the merger of Donen's successor body, the

Japan Nuclear Cycle Development Institute (JNC), and the Japan Atomic Energy Research Institute, has recently started preparing Monju with an eye toward resuming full operations, although local residents remain concerned about safety. Fukui Governor Nishikawa Issei has said local citizens must be convinced of the safety at Monju before he gives the go-ahead.

Furthermore, the METI-affiliated Agency for Natural Resources and Energy unveiled a plan late last month to build a new, far more technologically advanced and efficient FBR by about 2030 at a cost of 1 trillion yen to replace Monju. The new FBR would also be used as a model reactor for about a decade and then commercialized to replace light-water reactors from about 2050.

At the same time the agency also disclosed a plan to work toward the development and construction of a second spent-nuclear-fuel reprocessing facility by about 2045 to produce uranium-plutonium mixed oxide fuel (MOX) for use at the new FBR. The current one in the village of Rokkasho, in the northeastern prefecture of Aomori, is slated to end operations by about 2045.

Also, the so-called pluthermal (using plutonium in commercial, or thermal, nuclear power plants) power-generation project will next month enter a new phase toward its realization when Japan Nuclear Fuel Ltd, which runs the Rokkasho facility, will start a test operation to extract plutonium so that element can be produced as early as this spring. The project will burn MOX fuel at light-water reactors. The Rokkasho plant is scheduled to come into commercial operation next year.

According to plans released this month by 11 Japanese power companies, as much as 6.5 tons of plutonium will be consumed annually at nuclear plants after the pluthermal power-generation project gets under way. The Federation of Electric Power Companies of Japan plans to get pluthermal power generation under way at 16 or 18 power plants by the end of fiscal 2010. The companies said they plan first to use plutonium produced overseas, such as in Britain and France, at the pluthermal plants and start using domestically produced plutonium in 2012 or later.

The companies' plans fall short of providing concrete figures to convince critics that the nation will consume all the plutonium it keeps and produces for peaceful purposes. Moreover, none of the companies have received final consent yet from local communities expected to host the pluthermal plants about their plans because of lingering uncertainties over details. The companies plan to obtain a combined 1.6 tons of plutonium to be reprocessed from spent nuclear fuel at the Rokkasho plant by the end of fiscal 2006. Japan Nuclear Fuel envisages the plant producing more than 4 tons of plutonium at full operation annually in the future. The Japanese power companies currently keep a total of about 30 tons of plutonium reprocessed in Britain and France, an amount they say can be burned at the pluthermal plants within about 15 years.

Pluthermal burning was devised to consume surplus plutonium that resulted from the reprocessing of spent nuclear fuel. Because of the stoppage of the Monju fast-breeder reactor and the slow progress in the pluthermal project, Japan's stockpile of plutonium has been increasing. With nuclear non-proliferation emerging as a grave global issue, Japan could be viewed with suspicion by other countries. While being the only country to have suffered the scourge of atomic bombs - during World War II at the hands of the US - and also being a non-nuclear-weapon state, Japan is the only member of the nuclear Non-Proliferation Treaty (NPT) that is permitted both to enrich uranium and reprocess spent nuclear fuel for peaceful civilian purposes.

International Atomic Energy Agency (IAEA) director general Mohamed ElBaradei has proposed that new reprocessing facilities be placed under international control to ease proliferation concerns. But the Japanese government's position is that even though the Rokkasho facility has yet to go into operation, it is an existing facility and therefore outside the scope of ElBaradei's proposals.

US President George W Bush has advocated a similar international nuclear-management initiative of his own, and Japan is leaning toward joining it.

Japan also sees promotion of nuclear energy as crucial if it is to slash carbon dioxide and other greenhouse gases widely blamed for global warming. Japan is obliged by the 1997 Kyoto protocol to reduce such gases by 6% from 1990 levels by 2012. Many of the nation's 54 nuclear power plants are now 20-30 years old but won't be replaced by new ones until about 2030. Increasing the share of electricity produced by nuclear reactors to 40%, for example, will place great strain on older reactors. To increase the operation rate of such reactors while ensuring their safe operation will be a great challenge.

It also remains to be seen whether Japanese power companies, facing tougher competition as well as damaged public confidence in nuclear-plant safety in the wake of a spate of accidents and other problems - and their cover-ups - will be able to build new plants to replace the aging ones in the future.

When crude-oil prices remained low in the 1990s, the government went ahead with deregulation, such as liberalization of the electricity market, which resulted in lower electricity prices. But this deregulation weakened the financial strength of power companies, raising concerns about whether they have sufficient funds to invest in nuclear-power development. It may even be possible that the government will be forced to

reverse its deregulation policy.

More 'Hinomaru oil'

The New National Energy Strategy is expected to call for increasing the ratio of "Hinomaru oil", or oil developed and imported through domestic producers, from the current 15% to 40% by 2030. To achieve that goal, the new strategy emphasizes the need to foster Japanese oil majors that can compete with foreign rivals.

The planned operational integration of Inpex and Teikoku Oil under a joint holding company in April is in line with the new national strategy. There is no doubt that METI, which owns 36% of Inpex, has played a key role in the marriage of the two oil developers in the hope of fostering a more powerful entity to compete better with foreign rivals. Inpex had merged with another government-affiliated firm, Japan Oil Development Co, in 2004. Teikoku Oil was also originally established by the government.

As the global resource boom continues, increasing competition among oil and gas developers worldwide shows no sign of abating. Energy-hungry China and India are fueling the rush for the world's oil and other energy reserves. China became a net importer of crude oil in 1993 and superseded Japan as the world's second-largest oil consumer after the United States in 2003. China now depends on imports for more than 40% of its oil, while India imports about 70% of its oil. The ratio of the two countries' dependence on imported oil is expected to keep rising. This prospect has prompted Japan to begin to help other Asian countries build oil reserves through technical assistance.

China's aggressiveness in the global oil market drew particularly widespread attention last summer when China National Offshore Oil Corp (CNOOC) launched a takeover bid for US oil and gas firm Unocal. CNOOC eventually gave up the bid in the face of strong opposition from American politicians, and another US firm, Chevron, took over the smaller rival.

Still, China has secured many foreign oil deposits in the past year or two.

Chinese oil firms took over Canada-based companies PetroKazakhstan, whose operations are based in Kazakhstan, and Encana Corp's oil and pipeline interests in Ecuador. China also won oil interests off the coast of Angola after wooing the African country with an extension of a $2 billion credit line. China outbid India in all three cases. China and Kazakhstan also inaugurated a 1,000-kilometer oil pipeline last month to supply Kazakh oil to western China.

CNOOC announced this week the $2.27 billion purchase of a 45% stake in the Akpo offshore oil-and-gas field in Nigeria. India's largest oil and gas company, Oil & Natural Gas Corp (ONGC)'s international-exploration subsidiary, ONGC Videsh Ltd, won the bidding for the field in December. But the purchase was blocked by the Indian government, which contended that the bid of more than $2 billion wasn't commercially viable (see Curses, oiled again!, January 11).

Late last month, a joint venture between ONGC and China National Petroleum Corp (CNPC) emerged as the winning bidder for Alberta-based Petro-Canada's oil-producing assets in Syria, acquiring a 38% stake in the Al Furat oilfield, in what is seen by analysts as heralding the beginning of cooperation between Beijing and New Delhi in securing energy supplies to fuel their booming economies.

China does not seem to be fussy about where its oil comes from. It gets oil in Sudan despite the international uproar over the Darfur crisis. In moves that have raised eyebrows in Washington, China has strengthened ties in the past few years with staunchly anti-US countries such as Cuba, Venezuela, Iran and Myanmar. Cuba agreed to let China explore its coastal oilfields. Venezuelan President Hugo Chavez offered Chinese firms operating rights to mature oilfields. China signed an agreement to buy oil and gas from Iran and to develop that country's Yadavaran oilfield. India also plans to receive gas from Iran under a proposed $6 billion pipeline project via Pakistan.

China has also strengthened political and military as well as economic relations with Myanmar in defiance of US and European sanctions against the military-ruled Southeast Asian country. China seeks to secure stable oil and other energy supplies by land, as well as by sea. Speculation is rife about the idea of building an oil pipeline running across Myanmar to Kunming, the capital of Yunnan province, western China, at an estimated cost of $2 billion. In late December, China also signed an agreement with North Korea jointly to develop offshore oil reserves, although no other details have been announced.

Meanwhile, competition for energy sources has also increased tensions between China and Japan. Tokyo and Beijing are locked in a simmering fracas over Chinese gas projects in the disputed waters in the East China Sea near the so-called median line, which was drawn by Japan but has not been recognized by China. The line is meant to separate the two countries' 200-nautical-mile exclusive economic zones (EEZs). The disputed Senkaku (Diaoyutai) Islands are on the Japanese side of the median.

Last year, the Japanese government decided to build the country's first ship designed to survey offshore oil deposits. The government also earmarked 8.2 billion yen in its fiscal 2006 defense budget to increase the nation's ability to cope with submarines and armed spy ships in seas close to Japan.

Also, the Liberal Democratic Party-led coalition plans to introduce a bill this month in the diet, or parliament, to create off-limits zones near structures set up for resource exploration and development in the Japanese EEZ. Trespassers would be punished with prison terms of up to one year and fines worth 500,000 yen. The bill, already drafted, is aimed at supporting Teikoku Oil, which was granted concessions last summer to start experimental drilling in the East China Sea, in an apparent bid to counter natural-gas exploration conducted nearby by China.

Japan and China have each lobbied hard for alternative routes for a pipeline from eastern Siberia's oilfields to Pacific Rim nations. When Russian President Vladimir Putin visited Tokyo in November, Japan failed to gain a guarantee that Russia will give priority to building a "Pacific route" from Taishet near Lake Baikal to Nakhodka on the Sea of Japan coast via the halfway point at Skovorodino, near the Russia-China border, rather than to building a "China route" heading to Daqing, northeastern China, from Skovorodino. Putin and Japanese Prime Minister Koizumi Junichiro signed an agreement only to accelerate talks on the Pacific route. Russian state pipeline monopoly Transneft is building the pipeline in two stages. It expects to finish the first stage in 2008 at Skovorodino, far from the coast but close to China. No date has been set for the second stage.

Japan's oil diplomacy suffered a serious setback when Arabian Oil Co, which has strong backing of the government, lost its right to operate in the Khafji oilfield in the Persian Gulf - in the Saudi-controlled portion of the field in early 2000 and the Kuwaiti-controlled portion in early 2003. But Japan has since regained lost ground, securing oilfields elsewhere in the Middle East.

In early 2004, Japan and Iran signed a $3 billion deal to develop Iran's massive Azadegan oilfield. The project is expected to pump 700,000 barrels of oil per day by 2010.

In October, Japan scored another coup in its oil diplomacy. Five Japanese enterprises won international tenders to acquire the rights to develop a combined six oilfields in Libya. The deals mark the first oil-exploration concession ever given to Japanese firms in Libya.

Through their marriage, Inpex and Teikoku Oil hope to become bigger players on the global stage. The two oil developers have combined annual sales of more than $4.7 billion. But the new entity is nowhere close to becoming a powerful oil major that can match huge US - and even Chinese - rivals. The new entity produces 370,000 barrels of oil per day, slightly smaller than the 380,000 barrels per day pumped by China's CNOOC. Japan still has a long way to go before making "Hinomaru oil" rise and shine on the horizon.

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