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Southeast Asia's Looming Nuclear Power Industry

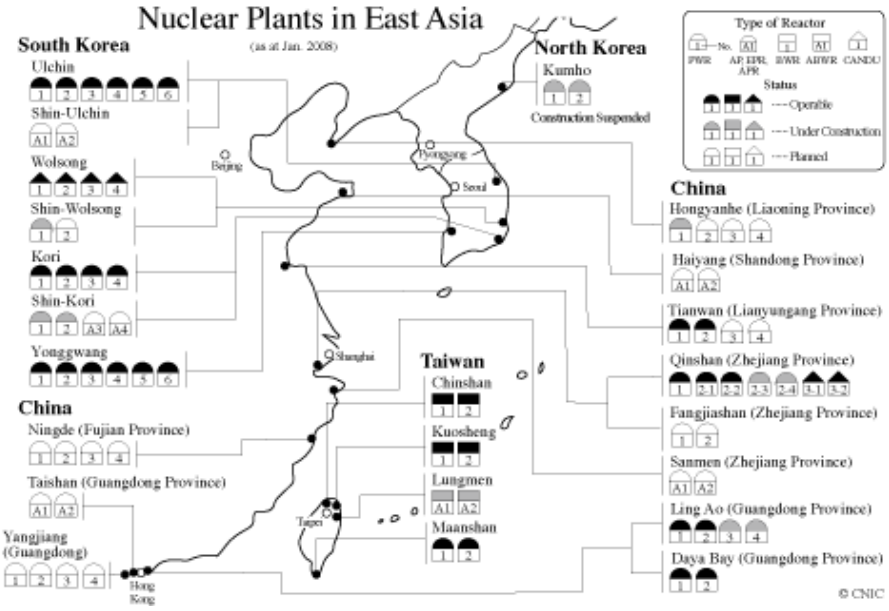
Geoffrey Gunn

The 2005-07 spike in petroleum prices topping out at $100 a barrel has prodded economic planners across the globe to reconsider their energy options in an age of growing concern over global warming and carbon emissions. The Southeast Asian economies, themselves beneficiaries of an oil and gas export bonanza through the 1970s-1990s, also find themselves in an energy crunch as once ample reserves run down and the search is on for new and cleaner energy supplies. Notably, regional leaders at the 13th ASEAN Summit meeting held in Singapore in November 2007 issued a statement promoting civilian nuclear power, alongside renewable and alternative energy sources. ASEAN--which in 1971 endorsed a nuclear-free zone concept--also sought to ensure that plutonium did not fall into the wrong hands through the creation of a "regional nuclear safety regime." In response, environmental activists across the region cited concerns over nuclear power, citing safety and unstable regional geologies concerns. [1] Undoubtedly they were taking a cue from Japan's recent nuclear disaster. [2] Singapore, host of the ASEAN summit meeting, made known its concerns.

The 13th ASEAN Summit meeting held in Singapore in November 2007

Enlarge this image

East and Southeast Asia is the only region of the globe where nuclear power generation is presently growing significantly. According to the *Nuclear Issues Briefing Paper*, the region boasts 109 operational nuclear power plants, with 18 more under construction and around 110 in the planning stage. In addition, there are 56 research rectors in 14 countries. Among major Pacific Rim countries, only New Zealand and Singapore are without research reactors. Much of the startling growth is in China (10 units), Taiwan (6 units), India (15 units), Pakistan (2 units), Japan (55 units) and South Korea (20 units).. [3]



Nuclear power plants in East Asia according to the Citizens' Nuclear Information Center (as of

January 2008)

Japan, which generates 29 percent of its power from nuclear energy, has two plants under construction with 10 more planned. More than that, as Gavan McCormack observes, Japan positions itself as a "plutonium superpower," not only as the world's most committed nuclear country but, even as one "nuclear obsessed." By this it is meant that, alone among non-nuclear weapon states, Japan pursues the full nuclear cycle in which plutonium is used as fuel after the reprocessing of spent reactor waste, just as Japan has accumulated more than 45 tonnes of plutonium or almost one fifth of the global stock of civil plutonium. [4]

The high risks and vulnerability of nuclear power plants in geologically unstable zones was dramatically highlighted by the impact of an earthquake upon the Kashiwazaki-Kariwa nuclear power plant in Niigata Prefecture on 16 July 2007. Fortified to withstand earthquakes as strong as 6.5 on the Richter scale, the plant nevertheless suffered a fire and leakage. In the 40 years since Japan initiated its nuclear power industry no major quake-linked damage to plants occurred. But in the past two years, three incidents occurred--at the Onagawa Plant (August 2005); the Shika Plant (March 2007); and the Kashiwazaki Plant, respectively. In each case the maximum ground motion was greater than seismic design criteria of the plants. Of great public concern and a matter of high scandal, as Japanese scientist Ishibashi Katsuhiko explains, enforcement policy is also in "shambles." [5]

Fossil Fuel Depletion and the Energy Race

As Laos Vice Prime Minister, Bounhang Vorachith reportedly told Iran's Ambassador to the land-locked Southeast Asia nation, in words undoubtedly designed to defend national sovereignty from outside interference, "Every country should be allowed to take advantage of peaceful nuclear energy." Due to the depletion of oil reserves as well as to the sharp increase in oil prices, the developing countries have no alternative but to make use of nuclear energy, he added. [6]

In the Southeast Asian region, country after country appears to be getting that message, although hydro-electric-rich Laos is a major exception. With the help of the World Bank and the ADB, Laos seeks to position itself as the "battery" of mainland Southeast Asia, a reference to lucrative cross-border electricity sales with, respectively, Thailand and Vietnam. Even setting aside serious environmental questions raised by big dam construction on the Mekong and its tributaries in Laos, [7] the limits to hydro-power generation are obvious. In any case, few nations are as blessed in this regard as Laos, although river systems in Yunnan in southwest China along with the Salween River flowing through Burma are also being dammed and harnessed for this purpose. [8]

While impoverished Laos is not a candidate for the development of civilian nuclear power, neighboring Burma has declared its intention to build at least a research reactor and has dispatched technicians to Russia for training. International Atomic Energy Agency (IAEA) inspectors who visited Burma in 2001 were not exactly impressed with the country's regulatory framework to develop nuclear energy. But the notion that Burma is experimenting with nuclear weapons is undoubtedly over-hyped as it lacks the capacity to enrich uranium. In fact, of the mainland Southeast Asian countries, Thailand and Vietnam alone, are considering nuclear power options with Vietnam undoubtedly further down the road to the realization of such a dream.

Thailand, which has long served as Laos' major purchaser of hydropower, especially for the energy-deficient northeast--including periods in the late 1970s and early 1980s when the two countries were virtually at war--has now declared its nuclear power ambitions. Under the so-called Power Development Plan, four 1,000-megawat nuclear power plants will be built and are expected to start generating electricity around 2020-2021. Possible coastal sites are still being identified in the southern provinces of Ranong, Chumpon, and Surat Thani. The country was visited in September 2007 by IAEA officials to advise a preparatory committee on the feasibility of nuclear power. The Governor of the Electricity Generating Authority of Thailand (EGAT) asserts that nuclear power is necessary in light of a deficit of natural gas seen as occurring within the next three to four years. He also admitted the prospect of future protests, [9] although the space for civil society actions in Thailand has considerably diminished since the military coup of September 2006.

Since 1984 Vietnam has operated a 500KW capacity reactor for medical research located in the central highlands. But economic reforms kicked off by Vietnam in the late 1980s have also been accompanied by steadily rising growth rates along with a surge in demand for power. Vietnam's population base of 76 million is also expected to grow to over 100 million by 2020. Figures for 1997 reveal that 62 percent of electricity output in Vietnam is sourced from hydropower, 17 percent coal-fired thermopower, and 20 percent oil or gas-fired thermopower. Few Southeast Asian economies have this mix of energy sources. Even so, hydropower is mostly sourced in the northern part of the country and is subject to inconsistent supply during summer or drought. As a result, Vietnam remains a net importer of hydropower from Laos, Cambodia, and China, respectively. But the need to diversify energy sources and to meet energy security is also pushing Vietnam towards a nuclear power option. Assisted by the IAEA, Vietnam has produced a "Pre-Feasibility Study on the Introduction of Nuclear Power," (1996-1999). In 2005 Vietnam announced it would begin construction of a nuclear power plant in Ninh Thuan in central Vietnam--a province known for its Cham civilization and fine white sand beaches--scheduled to come into operation by 2017-2020. [10] All power utilities in Vietnam are operated by the state. It remains to be seen if local or other opposition to nuclear power plant construction emerges in a nation without a history of open challenge to state power.

Malaysia is also a nation hell-bent on industrialization, and over the past several decades, has secured significant revenues from PETRONAS, the state-controlled oil company. Until recently, Malaysian officials stated that the country does not need civilian nuclear power given its abundant supplies of energy. Yet Deputy Prime Minister, Najib Tun Razak, has also stated that limits on fossil fuel reserves make nuclear power a possible option, allowing a 15-year lag in planning and development. In fact, Malaysia hosts an Institute for Nuclear Technology Research, which supports a one megawatt research and training plant at Bangi in Selangor. Malaysia has also asserted the right of fellow Non-Aligned Nation (NAM)-member countries to develop nuclear power. More than that, the Malaysia Nuclear Agency (MOSTI) declaims on its website that "Nuclear Malaysia is responsible in (sic) preparing the nation for a resurgence of nuclear industry." [11]

Alone among the core countries of the ASEAN region, Singapore stands apart on civilian nuclear power, at least ostensibly. Notably, in early 2007 Singapore's Prime Minister Lee Hsien Loong went on record as expressing caution over safety and security in relation to the region's nuclear power ambitions. "We have to understand what the risks are," and "make sure that there are very clear stringent rules." [12] Such a stand might be accounted for by the island state's small size and exposure to trans-boundary threats, its location athwart tanker routes from the Middle East as much as its local oil refining capacity, making gas-fired thermopower the established option. Even so, at the 2007 ASEAN Summit, Singapore also touted the use of solar power as a clean option just as the need for options are obvious given the vulnerabilities of oil and gas supplies, not to mention upward pressure on price, and mounting environmental concerns.

Indonesia: Top Down versus Bottom Up

In 2005 Indonesia, the world's largest producer of natural gas and long an oil exporter, announced that it was proceeding with the construction of the country's first nuclear power plant. This is to be sited on the Miura peninsula, actually the slopes of a dormant volcano, on the northeast coast of central Java. Originally announced in 1995 under the Suharto regime (and the hobby horse of

future President then Minister of Technology B.J. Habibie), but shelved owing to public opposition as much as the effects of the Asian financial crisis, the project involves the construction of four 1000 megawatt plants, down from the 12 originally planned. Construction is to begin in 2010 with completion slated for 2017. A site on Madura island has also been identified for a separate reactor. Reportedly, a new constellation of business and political figures are behind the enthusiasm for Madura, including vice president Yusuf Kalla.

Nevertheless, criticism of the project has emerged from legislators, academics, a broad section of public opinion, and vocal local residents. Not only are unstable geology and environmental concerns stated as reasons for objection, but critics also contend that Indonesia is blessed with many alterative untapped sources of power including thermal. Such vocal environmental groups as WALHI, or the Indonesian Forum for Environment, argue that even a small radioactive leak could potentially affect tens of millions of people in one of the most densely populated places in the world. [13]

In June 2007, some 4,000 demonstrators against the project rallied at the central Javanese site, including a local chapter of Greenpeace. In October, 100 clerics and scholars from the largest Muslim organization in Indonesia, Nahdatul Ulama, descended on the site and, after deliberations, issued a *fatwa* declaring the Muria site *haram* or forbidden, albeit more on pragmatic than strictly religious grounds. [14]

Rally followed the Ulama *fatwa* declaring the Muria site *haram*.

According to a Stockholm International Peace Research Institute SIPRI report, Indonesia has largely succeeded in creating an "indigenous fuel cycle." Although only conducted at the laboratory level, evidence indicates that Indonesia is active in uranium milling, processing and conversion. Its nuclear research program spans five decades. Three research reactors are in operation with a fourth planned. Indonesia hosts at least two uranium mines capable of supplying sufficient yellowcake to service domestic needs for planned reactors. While Indonesia operates under IAEA safeguards, SIPRI's stated concern is that given the questionable security of the management of nuclear waste, "it is conceivable that terrorist organizations could utilize its spent waste in a radiological device ("dirty bomb"). [15] Perhaps of greater concern is the combination of unstable geological conditions and dubious safeguards to control the technology.

Indonesia plans to expand its fledgling nuclear industry

While Indonesia appears to be committed to the peaceful development of nuclear energy, an indigenous route to power plant construction is not in the cards. In August 2003, Indonesia signed a ten-year nuclear cooperation agreement with Russia, which includes the construction of a research reactor and a power reactor. Besides Russia, General Electric, Mitsubishi Heavy Industries, Areva of France, and Toshiba are all lining up as potential contractors. Back in 1994 Japanese consultants conducting a feasibility study cleared the way. The Indonesian firm Medco Energi Internasional, with links to Vice President Kalla, has signed a preliminary contract with Korea Hydro and Nuclear Power Co. Ltd. to build the plant. But as Australian journalist Tom Hyland reports, "Details of the deal are secret, adding to unease in a country where corruption remains endemic." He adds that even though power generation has devolved to the province level, nuclear power remains the last of the Suharto-era big projects imposed from above. [16]

Back in 1994 major criticism of the project came from Australian experts in the field (although not the Australian government) owing to concerns of a potential accident, especially as monsoon winds would expose northern Australia to radioactive fallout. On the other hand, it would not be surprising if Indonesia had concerns that Australia would acquire or produce nuclear weapons, especially as successive conservative governments held to that option through until the early 1970s, a debate revisited in recent

years. [17] As Richard Tanter has summarized, "The consequences of Indonesia and Australia pursuing their somewhat non-rational approaches to the nuclear fuel cycle could have very negative consequences for people who are already suspicious of each other." [18]

Japan, Southeast Asia, and the International Nuclear Lobby

According to the Tokyo-based Citizen's Nuclear Information Center (CNIC), Japan and Korea are two countries eager to secure contracts for the construction of nuclear power plants in Southeast Asia with Indonesia looming large in the sights of both players. For example, Japan assists Indonesia's nuclear program in such areas as training in technical and regulatory skills and through high level participation in the Forum for Nuclear Cooperation in Asia (FCNA), inaugurated in Bangkok in 2000 by the Tokyo government with support of the Atomic Energy Commission. South Korea in December 2005 signed a memorandum of understanding with Indonesia concerning the introduction of nuclear power. Japan's Nuclear Power National Plan, as released by the Ministry of Economy, Trade and Industry (METI) in August 2006, seeks to "actively support the global development of the Japanese nuclear industry." As CNIC interprets it, Tokyo is motivated by the fact that domestic power plants alone will not provide sufficient profits to sustain the industry through 2030. To remain competitive and to maintain its domestic capacity, the Japanese nuclear power industry will need to win overseas contracts. According to a METI-commissioned report of 2006 conducted by JETRO on the potential for introducing nuclear power to Indonesia (and Vietnam), obtained by CNIC under a freedom of information request, Indonesia presented a number of obstacles. Foremost among concerns was the lack of trained personnel, the lack of an appropriate entity to implement the nuclear power program, and failure to address problems raised by an IAEA study of 1997-2002. Other caveats entered were that Indonesia had large unexploited reserves of geothermal power, that infrastructure was lacking, and that power usage was highly inefficient. [19]

Lessons Learned?

The region has thus far failed to grasp the implications of the negative experience of the Philippines with nuclear power. The mothballed Bataan nuclear power project just north of Manila should send a strong message to potential nuclear power plant clients. Initiated in the early 1970s by the Marcos dictatorship as a response to the energy crisis, the all-but-completed-albeit-never-fuelled Westinghouse light water reactor stands today as a stark white elephant, victim of inadequate planning, corruption, and flawed cost-benefit calculation. In early 1986 international inspectors concluded the site was unsafe and inoperable owing to proximity to major earthquake fault lines and the then dormant Pinatubo volcano. Heeding public opinion, the incoming Aquino government (1986-92) sealed the fate of the nuclear plant for good when it banned the use of nuclear power and enshrined the principle in the constitution. Undoubtedly, Marcos-era corruption added to cost overruns in the plant's construction, just as the Philippines mounted an unsuccessful suit against Westinghouse to redeem alleged kickbacks paid to Marcos. For over 30 years, until meeting obligations in April 2007, Filipino taxpayers paid 155,000 dollars a day in interest on the plant that never produced a kilowatt of power. [20] Still, the nuclear power option in the Philippines was revisited under the Ramos administration, and in 2007, the Arroyo administration's Energy Secretary raised the Bataan nuclear option once again with interest expressed by the Korean Electric Power Corporation (KEPCO). The lesson of the Philippines' experience for Southeast Asia should be clear: when scientists and engineers get it wrong in the world's most advanced economies, the potential for error or mishap in less advanced is magnified. A Javanese or Vietnamese Chernobyl or even Kashiwazaki is, or should be, unthinkable.

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