

# The rise and fall of EGAT: From monopoly to marketplace?

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Mekong governments have pinned their national economic futures on multimillion dollar exports of hydroelectricity to serve Thailand's surging demand for electricity. But electricity demand and supply has never been more uncertain as EGAT, the Electricity Generating Authority of Thailand, opens its national electricity grid to private power producers in Thailand. This article reviews the rise of EGAT, the fears and forces surrounding its transition from a state-owned monopoly to one of many players in Thailand's electricity marketplace, and the implications for hydropower development in the six-country Mekong region.

## The Rise of EGAT

With an installed electricity generating capacity of approximately 14,600 megawatts (MW) revenues in the order of US\$4 billion a year, and a workforce of nearly 34,000 people, the Electricity Generating Authority of Thailand is unquestionably a financial and political powerhouse in the region today.

EGAT was created in 1968 following the World Bank's recommendations to the Thai government that a national, state-owned power utility be formed by merging the existing power utilities. EGAT's mandate was to supply and distribute low-cost electricity to the growing numbers of urban and industrial customers, as well as provide electricity to rural areas.

Together with another World Bank-recommended state agency, the National Economic and Social Development Board (NESDB), EGAT has played a key role in Thailand's centrally-planned economic development over the last three decades. Following the first national economic and social development plan in 1961, EGAT has prepared an infrastructure investment plan every five years for approval by the Ministry of Finance and the NESDB, based on the assumption that power supply expansion was both a cause and effect of economic growth.

Throughout the country, EGAT has traditionally been responsible for electricity generation as well as the electricity transmission system (or grid), and all sale of electricity. EGAT distributes power through two agencies, the Municipal Electrical Authority, serving the Bangkok area, and the Provincial Electrical Authority, serving the provinces. To minimize dependence on any one type of fuel source or generating technology, EGAT has built a mix of generating stations including hydropower, thermal (oil, lignite, gas) and combined cycle plants. EGAT's largest power plants are the 2,625 MW Mae Moh lignite-fired plant in the northern region and two large thermal plants near Bangkok. EGAT also owns two mines which produce lignite for its generating stations. In terms of hydropower, Thailand has 17 large dams and reservoirs with an installed capacity of 2,690 MW, which is about one fifth of EGAT's total installed capacity.

Much of EGAT's expansion since the 1960s has been financed by international finance institutions such as the World Bank, Japan's Overseas Economic Cooperation Fund, and more than a dozen bilateral aid agencies. By 1991, EGAT had borrowed an estimated US\$700 million from the World Bank for dams and power plants.

## Central Planning

Throughout its expansion of the electricity grid, EGAT's planning and decision making process has been technically-oriented and highly centralized, similar to most state-owned power utilities around the world. EGAT staff would conduct site visits and engineering surveys upcountry but all planning, design work, and decision making was centred in Bangkok, relatively autonomous from regular political decision making channels. By the time project proposals were presented to the government's Cabinet for approval, EGAT had often designed the

power plants already and negotiated financing with the World Bank or other aid agencies. Wherever expropriation or re-zoning of land and resources was required to make way for power plants or transmission lines, EGAT would simply request the Cabinet to issue the necessary legal amendments and decrees. Where EGAT identified communities living in the proposed project area, the Ministry of Interior was usually called in to execute resettlement in coordination with provincial, district, and village authorities.

### **The Boom Years**

Over the last decade, Thailand's economy has boomed and the demand for electricity grew by 10 to 12 per cent a year. To keep ahead of demand, EGAT more than doubled its annual investments in new plants from an annual US\$600 million to US\$1.4 billion between 1989 and 1992. Since then, EGAT has added about 5,000 MW of new capacity to the system, including the giant 2,300 MW Bang Pakong thermal plant and five natural gas combined cycle plants.

EGAT's power supply and transmission system dwarfs those found in neighbouring countries. Vietnam and China's Yunnan, with populations of 72 and 40 million people respectively, (compared to Thailand's 60 million) have about one third of EGAT's installed capacity. Burma, with its population of 43 million people, has less than six per cent. Lao PDR and Cambodia, with populations of 4.5 and 9.5 million, both have less than two per cent of EGAT's installed capacity.

### **Gas Supply Expansion**

Most of EGAT's supply expansion in the 1990s has been large-scale, natural gas, combined cycle generating units. Gas-fired plants now constitute 45 per cent of the total energy mix in Thailand and their contribution is expected to rise significantly over the next decade with the participation of private producers in the electricity supply market, according to EGAT.

To fuel its plants, EGAT buys natural gas from its sister monopoly, the Petroleum Authority of Thailand (PTT) which owns several large gas fields in the Gulf of Thailand in partnership with multinational oil and gas companies. One of the largest is the Bongkot field, owned by the PTT (40 per cent), Total of France (30 per cent), British Gas (20 per cent) and Statoil of Norway (10 per cent), has been supplying gas to the PTT since 1993. The second field, Pailin, is owned by PTT (45 per cent), Unocal (35 per cent), Amerada Hess International (25 per cent) and Thai Oil (5 per cent), and is expected to come on-line by 1999.

To boost its gas supplies, the PTT is negotiating the extension of pipelines from neighbouring countries where multinational oil and gas companies have identified abundant off-shore gas reserves. Despite international condemnation for dealing with the Burmese junta, Thailand signed a 30-year agreement with Burma to buy natural gas from the Yadana gas field in the Gulf of Martaban, starting in mid-1997, and began negotiations for a second deal from the Yetagun field, which could start delivery as early as mid-1998.

### **Expansion Woes**

EGAT's expansion has encountered a number of difficulties not unlike the experience of power utilities world-wide. First of all, the technical and financial demands of operating a highly-centralized grid and maintaining adequate power reserves in times of rapidly increasing demand have proved formidable. Secondly, while the expansion of gas plants has met with little resistance, EGAT's dam building program has been all but cancelled due to public opposition. And as the number of citizens who have been forcibly displaced, or who have had their health and livelihoods damaged by hydro dams and thermal plants has grown, so too have the demands on government for fair compensation.

Thai academics, citizens' groups and the media have long criticized EGAT for imposing environmentally destructive (and economically dubious) projects on rural communities to provide cheap power to distant industrial and urban elites. In the late 1980s, citizens successfully campaigned to stop the 580 MW Nam Choan dam, which would have flooded the heart of the Thung Yai-Naresuan and Huai Kha Khaeng Wildlife Sanctuaries along the Thai-Burma border. In hindsight, many Thai environmentalists regard Nam Choan as the campaign that galvanized

the fledgling environmental movement into a national force in Thai society.

The cancellation of Nam Choan, and several other large dams thereafter did not happen because EGAT had a change of heart. Rather, EGAT was publicly disgraced for falsifying environmental data and exaggerating benefits, and then government leaders responsible for EGAT had to be worn down by a combination of protests, criticism from prominent Thai citizens and relentlessly critical reports in the media.

After Nam Choan, EGAT succeeded in pushing ahead with one more large dam in the furthest corner of northeast Thailand. The 136 MW Pak Mun dam, situated on a large Mekong tributary, was completed in 1994 with financing from the World Bank. The dam provoked six years of protests by farming and fishing communities, dependent upon the Mun River, who had seen how communities had suffered at the nearby Sirindhorn dam, which was built in the 1970s. The ongoing struggle for fair compensation by affected communities, and the globally-publicized devastation of the Mun River fishery, has prompted widespread speculation that EGAT's dam building programme in Thailand is over.

By 1994, even the hydropower industry journal, *Water Power and Dam Construction*, wrote that public opposition and drought in Thailand was fuelling "doubts about the future viability of domestic hydro generation." Consecutive years of drought have crippled the performance of many of EGAT's largest dams designed to store water for both electricity generation and irrigation. In 1991, reservoir water levels were so low behind Thailand's largest dams, Bhumibol and Sirikit, that hydroelectric output had dropped below 30 per cent of their installed generating capacity.

The official response from EGAT, government, military and many politicians, to both the drought and environmental opposition, has been to promote the idea of diverting water from the Salween or the Mekong into Thailand's existing and planned reservoirs, as well as building hydropower dams in neighbouring countries to serve Thailand's electricity needs. This policy shift from dam building at home, to importing electricity and water from neighbouring countries, coincided with Thailand's new "battlefield to marketplace" policy, ushered in by then Prime Minister Chatichai Choonhavan in 1988. Choonhavan, a soldier-cum-businessman, envisioned Thailand as the world's gateway to newly-opening Indochina. Choonhavan made several trips to neighbouring countries to secure logging concessions for Thai businessmen and to promote cooperation in hydropower development. On such a visit to Vientiane in 1990, Choonhavan's foreign minister told *The Nation*, "The dams in Laos are like sleeping beauties, waiting for their Prince Charming."

The Thai environmental movement, on the other hand, has argued that diversion and damming of neighbouring rivers will not solve Thailand's water crisis. Environmentalists point to EGAT's existing dams as an important contributor to deforestation and drought, and the centralized management of rivers as the root cause of wasteful water consumption and degradation of inland water resources.

Because EGAT and other government agencies favouring dams have monopolized the public policy agenda for so long, alternative approaches to Thailand's electricity supply crisis have been slow to emerge. In Bangkok, the Thai government, universities and the private sector have just begun to respond to what dam opposition should have made obvious to policy-makers a decade ago: better approaches to providing electricity and water services - approaches which do not victimize communities and destroy the environment - are needed.

### **Electricity Demand Management**

EGAT is the first power utility in Asia to adopt an electricity demand side management programme (DSM). Modelled on the experience of North American utilities, EGAT's DSM programme aims to reduce electricity consumption and boost efficient use of electricity, particularly by large power consumers such as factories and hotels. Since 1991, the programme has promoted energy-saving lighting, refrigeration and air-conditioning, and expects to reduce peak demand for electricity by 1,400 MW, or about 10 per cent of the existing system's capacity by 1998. Already, EGAT reports that some hotels and large buildings have cut their energy consumption by as much as 40 per cent.

EGAT's commitment to DSM has been largely externally driven, financed and assisted by international agencies such as the Global Environment Facility and the US-based International Institute for Energy Conservation. EGAT does not regard demand side management as an alternative to supply expansion, but rather as a means of reducing the load on the central system, especially during peak periods. In 1991, when environmental groups urged EGAT and its financier, the World Bank, to consider alternatives to the environmentally destructive Pak Mun dam, both institutions dismissed the available option of saving 2,000 MW of electricity and US\$2 billion over 10 years by investing in energy efficiency measures.

In Bangkok, which accounts for over half of Thailand's total consumption, the programme has gathered momentum. There are 1,300 large electricity users (peak demand exceeds two MW or monthly electricity consumption exceeds 355,000 kilowatt-hours), in refineries, textiles, food processing, cement, iron and steel, and commercial buildings, which can achieve significant savings on their electricity bills if they improve their end use of electricity. Because conservation and efficiency makes good business sense, demand side management programmes have local industry sponsors, including Banpu and Volvo (Thailand), and about 20 air-conditioner manufacturers have joined EGAT's promotion of energy-saving appliances.

According to the Thai Environment Institute, EGAT could save 5,000 MW, and potentially much more, through demand side management measures over the next few years for the cost of US\$680 million, which is equivalent to the cost of building 1,000 MW of new power plants. Whether EGAT is prepared to re-orient itself, to become an agency providing least-cost electricity services, when doing so conflicts with its long-time business of building new power plants is debatable.

One incentive for EGAT's shift in policy away from dam construction, towards energy imports, demand side management and, finally, privatization of its generation facilities - has not been concern for electricity consumers' needs but the government's squeeze on its investment budget, which began in 1991. At that time, EGAT was proposing massive expansion - a total of US\$8.3 billion in new power plants - and wanted to pay for it by increasing electricity rates and borrowing externally. The NESDB rejected its plan, and advised EGAT to turn instead to the private sector for capital investment in new power plants.

### **EGAT's Privatization**

To reduce the amount of public borrowing while still allowing for rapid expansion of the power supply system, the World Bank has recommended the privatization of EGAT, beginning with the participation of private companies in new power plant investment and operation. In 1992, Prime Minister Anand Panyarachun passed a law approving the participation of the private sector in power production. Anand is also chairman of Saha Union, the parent company of Union Energy, which is poised to become one of EGAT's private power producers, and is planning to build three large coal-fired plants in China.

Since 1992, the central government agency responsible for privatizing EGAT has been the National Energy Planning Council within the Prime Minister's Office. This year, its Secretariat, the National Energy Planning Office (NEPO), announced that within the next five to ten years, Thailand would have a competitive market in which power plants can sell directly to customers, and customers will be able to choose their suppliers. Over the next ten years, NEPO has instructed EGAT to sell all of its generating units except for the hydroelectric dams and retain responsibility for the transmission system. To regulate power producers and ensure fair competition among producers, NEPO announced it would establish an independent regulatory body by the end of 1996. No such regulatory body has been established but NEPO nevertheless continues to promote the concepts of competition, customer choice and independent regulation as essential components of a financially viable and efficient electricity industry.

### **The Rebel Monopoly**

EGAT's response to NEPO's vision of a competitive electricity sector has been less than cooperative. Instead of promoting more private investment in the system, EGAT has borrowed enormous amounts of capital to build new plants and refurbish old ones thereby defeating a tenet of privatization: shifting the burden of capital investment

and risk away from the state to the private sector. Between 1992 and 1996, EGAT borrowed about US\$5 billion for new power plants and had amassed a debt of US\$4 billion - more than 10 per cent of the total long-term foreign debt. In 1997, two-thirds of EGAT's revenues were earmarked for generation expansion rather than paying down its foreign debts. EGAT's plans include building the world's largest natural gas-fired power plant in Ratchaburi province using gas from Burma. At a cost of nearly US\$5 billion, the first phase is to be a 1,800 MW cogeneration plant followed by a 2,800 MW thermal plant. EGAT also plans to spend US\$680 million to refurbish the aging Krabi power plant with a 600 MW oil-fired unit.

In preparation for a privatized electricity market, EGAT has set up its own commercial subsidiary and reserved half the expected new business in plant construction for it. EGCO now owns and operates two of EGAT's generating plants, the 1,232 MW Rayong plant and the 824 MW Khanom plant. In 1995, its first year of operating the Rayong plant EGCO earned a profit of US\$37.3 million. According to Power in Asia, EGCO has raised over US\$1 billion on the stock market since 1995.

The World Bank and NEPO have criticized EGAT's partial privatization and its efforts to thwart competition. The new structure will lead to 'unnatural' competition, according to the World Bank, because other companies will inevitably join forces with EGCO to get the inside track on EGAT's business. EGAT subsequently barred EGCO from participating in the IPP bidding process but EGCO went on to win an SPP contract to build a 100 MW cogen plant in partnership with Union Energy and British Gas. Dr. Piyasvasti Amranand, secretary-general of NEPO, also criticized EGAT's move to capture half of the supply expansion business for EGCO saying that it violated the ground rules for competition and will not benefit consumers.

### **Electricity Rate Reform**

To identify costs in the electricity system, which is an essential part of privatization and preparing producers and consumers for a competitive market structure, EGAT's financial advisors, Coopers and Lybrand, have recommended EGAT begin with a new billing structure which would itemize the cost of connecting the power plant to the grid, the cost per customer connection to the grid, the cost of transmission distance, transformers, distribution costs, and so on. Electricity prices have to be adjusted, say industry analysts, so that private investors can recover their costs, earn an acceptable return for their shareholders, and generate enough surplus to allow for further investments in the system. More accurate pricing would also encourage more efficient use of electricity, by as much as 20 percent, and discourage wasteful consumption which, in turn, drives rapid expansion. In Thailand, increasing electricity efficiency by 20 percent could eliminate the need for about 19 Pak Mun hydro dams. EGAT has resisted reforms, however, because its traditional rate structure has given discount rates to large, politically-connected consumers.

### **Private Power Producers**

After setting up EGCO, EGAT announced the Independent Power Producers (IPP) Programme. Companies were invited to submit bids to become either small power producers (SPP) or large power producers (IPP), to finance, build and operate electricity generating stations in Thailand and sell their electricity output to EGAT. Since 1994, when EGAT first announced the programme, giant public utilities such as Electricité de France, Imatran Voima of Finland and Vattenfall of Sweden, and transnational companies including Bechtel (US), PowerGen (UK), Westinghouse (US), Siemens (Germany) and Mitsubishi (Japan), have submitted bids. In total, EGAT has received over 30 bids from international consortia to supply 32,000 MW, which exceeds EGAT's projected expansion needs for the next 15 years.

By 2001, EGAT plans to purchase up to 5,000 MW worth of power from IPPs and an equivalent amount from its own commercial subsidiaries. EGAT closed its first IPP deal in October 1996 with a consortium led by Thai Oil (56 percent) in partnership with Unocal Asia-Pacific (24 per cent) and Westinghouse Electric Corporation (20 per cent). Under contract with EGAT, the consortium will build and operate a 700 MW combined cycle plant in Chonburi province, which will be fuelled with natural gas from the Gulf of Thailand.

Under the SPP programme, EGAT has received 84 bids for a total of about 4,500 MW SPPs range from companies

ready to generate one or two megawatts using organic waste, to up to 100 MW using cogeneration systems that generate electricity and use the waste steam for industrial purposes. Any surplus electricity is to be sold to EGAT. Over the next five years, EGAT plans to buy electricity from up to 2,000 MW from 55 SPPs.

Thailand's first SPP is a subsidiary of the Hemaraj Group, one of Thailand's largest industrial estate developers, which has just diversified into the power generation business. Its subsidiary, Industrial Power Company, signed a 23-year contract with EGAT and then sub-contracted the ABB Power Generation Company of Switzerland to build a 55 MW co-generation plant which will supply electricity and steam to the Mab Ta Phut Eastern Industrial Estate.

The initial aim of both SPP and IPP programmes was to reduce EGAT's debt and attract private investment needed to expand and modernize the electricity system. Yet EGAT has restricted the amount of electricity it will buy from private producers in order to protect its monopoly.

EGAT is also favouring plants larger than 600 MW despite World Bank recommendations to avoid power plants larger than 300 MW because they limit competition to a few bidders, which is counter-productive, and because technological changes have eliminated their traditional cost advantages.

### **Rebel Consumers and Producers**

Consumers and smaller-scale power producers excluded by EGAT are likely to raise objections to EGAT's import commitments because, to cover the cost of the more expensive supply, EGAT will eventually try and impose higher electricity rates on consumers in Thailand. EGAT's largest customers, whose monthly electricity bills are worth millions of dollars, would be the first to balk at rate increases particularly now that private producers are poised to provide less expensive electricity. So threatened by EGAT, more and more electricity consumers could decide they would rather generate their own power on-site or seek out cheaper, private power producers. If consumers do decide to bypass EGAT, the utility stands to lose substantial revenues and yet would still be obliged, under the long term power purchase agreements signed with producers in Laos, to pay for the electricity imports whether consumers in Thailand are willing to purchase that electricity or not.

### **The Uncertainty of Demand**

Even if EGAT were to abandon its commitment to expensive electricity imports, EGAT's expansion at home still poses an excessive financial risk. EGAT's domestic expansion and IPP commitments rest on the assumption that the past trend of steadily rising demand for electricity would continue uninterrupted into the future. For more than 30 years, EGAT has expanded the supply of electricity and, indeed, electricity demand has grown steadily. Unlike many utilities around the world, EGAT has not yet experienced a significant de demand and it continues to make investments based on long-term forecasts of demand growth.

Meanwhile, utilities around the world are abandoning the practice of demand forecasts as private investors and producers take over the task of figuring out where the demand for electricity is, in much the same way private companies would do for any other goods and services. As well, with the boom in energy efficiency and renewable energy technologies, and the widespread availability of combined cycle technology, some industry analysts believe that investments in centralized, large-scale power stations, which often require expensive, long-distance transmission lines, are obsolete.

For EGAT, the risk that its demand figures are wrong is already looming large. Last fiscal year, Thailand's electricity demand fell short of EGAT's projections by 3.5 per cent or 478 NM. As a result, EGAT's revenues were US\$84 million below target. EGAT forecasters are now scrambling to revise their expansion plans and long-term demand forecasts.

Over the past year, EGAT has displayed a growing uncertainty about the demand for new capacity, announcing revisions every few months. In July 1995, for example, EGAT announced it had overestimated demand by 7,000 MW and would have to cut back on its purchases from Lao PDR, as well as reconsider other proposed agreements with neighbouring countries. A few months later, the government announced demand figures were up and it was now ready to consider buying up to 6,000 NM of power from Lao PDR.

By mid-1996, however, EGAT had to revise its plans yet again. Citing a glut in electricity supply, EGAT announced it would cutback on the amount of power it would buy from SPPs in Thailand. According to EGAT governor, Preecha Chungwatana, the industrial eastern region of Thailand had an installed generating capacity more than double the actual electricity demand of 1,500 MW.

### **Hydro Developers At Risk**

A study conducted by the Asian Development Bank (ADB) reports that two-thirds of power development in the Mekong region over the next 25 years - equivalent to anywhere from five to eight times the scale of EGAT's existing system - could be geared towards Thailand's market. Burma, Laos, Cambodia, Vietnam and Yunnan all have vast potential hydropower but do not have sufficiently large electricity demand, with the possible exception of Yunnan, to justify development of large hydro dams, the study noted. Vietnam, with roughly 50 per cent more installed hydropower capacity than EGAT, has had considerable excess capacity since it completed the giant 1,920 MW Hoa Binh dam in 1994 (financed with Soviet aid). The Vietnamese authorities now plan to build an even larger dam upstream of Hoa Binh, with twice the capacity (3,600 MW), mainly for electricity exports. Similarly, Yunnan's state-owned Electricity Bureau, which has about 15 per cent more installed hydropower capacity than EGAT, is now planning to develop about 10,000 MW of hydropower on the upper Mekong for export to Thailand.

Dr. Prathes Sutabutr, a prominent member of the Mekong River Commission and longtime proponent of Mekong hydroelectric development, has reassured hydropower proponents in the region that imports from hydro dams will remain a priority for the Thai government despite the IPP and SPP competition. But with the uncertainty of demand, and the overwhelming interest in the IPP and SPP programmes, EGAT's commitment to power purchases from hydro dams in neighbouring countries could be short-lived.

In Lao PDR, hydropower proponents have had difficulty attracting investors because hydro dams are notoriously high-risk, low-return investments and would need to sell their output for 6 to 8 cents per kilowatt-hour in order to generate the minimum 20 per cent rate of return on investment required by private investors. Leuane Sombounkhanh of the Vientiane-based Committee for Planning and Cooperation, the central agency responsible for approving hydropower concessions, reports that prices negotiated to date have been less than hoped for - 4.22, 4.3, and 4.55 US cents per kilowatt-hour for electricity from the Houay Ho, Nam Theun-Hinboun and Nam Theun 2 dams respectively. The Electricité du Laos and its would-be dam building partners have complained that the export price is too low to be commercially viable.

At current prices, hydro dams in Lao PDR are not competitive with IPPs selling electricity to EGAT for 5 to 6 US cents per kilowatt-hour. To entice commercial lenders to invest in uneconomic hydro dams in Lao PDR, proponents are counting on bilateral and multilateral aid plus export credits and government guarantees. Indeed, without continued aid and guarantees from governments and institutions such as the World Bank, most large hydro dams the Mekong region will not be able to compete with other suppliers in the Thai market.

No doubt unsettled by the IPP and SPP competition in Thailand, Mekong government leaders are counting on political commitments from Thailand to keep their hydro projects alive. In 1996, Yunnan authorities paid a visit to the Thai Prime Minister's Office to reiterate their plans to sell power from the 1,500 MW Jinghong dam once it is completed. So far, the ADB has agreed to fund studies of possible transmission line connections from Jinghong but unless Yunnan can secure a power sales agreement with Thailand, they will have trouble finding commercial investors.

### **Meeting Demands in a Marketplace: Citizens' Rights**

For resource-dependent communities in Thailand and the Mekong region it matters little whether developers sell electricity to a monopoly or a market across the Mekong, or whether dams are financed with aid or private capital. Communities are threatened with the loss or destruction of their resources in any case, because Mekong governments are not prepared to uphold and protect local rights to the resources upon which they depend for their livelihoods. With commercialization of the Thai electricity market, and the lineup of hydropower concessions in neighbouring countries, Mekong governments are moving to protect the legal rights of hydro dam investors and

their claims to resources while denying formal recognition of local claims.

A fairer system would include, as the starting point for negotiations with hydro developers, recognition of citizens' claims to resources. Without such recognition, Thailand's electricity market could well be shaped to provide greater choice for electricity consumers in Bangkok while resource-dependent communities in Thailand and neighbouring countries are condemned to impoverishment.

In the rush for electricity export revenues, Mekong governments need to be reminded that it is the legitimacy, values and demands of ordinary citizens that must guide governments and shape new marketplaces, not just those closest to capital. Without the temperance of citizens, from electricity consumers to farmers and fishers, decision makers appear headed for some costly mistakes in energy expansion and an electricity market that reflects, not the interests of citizens, but that of a couple of coal barons and the world's wealthiest engineering and construction companies.

**SIDEBAR:** The surge of interest in Thailand's electricity industry has been spurred by technological, economic and political change in industrialized countries where utilities are reducing their expansion of large-scale power plants, particularly nuclear and coal. A combination of slow economic growth, a decline in energy-intensive industries, environmental opposition, over-expansion during the 1980s, and technological change has left many of the world's giant electric utilities severely indebted and in need of new employment and investment opportunities to keep afloat. As well, deregulation of the electricity markets in North America and Europe has increased competition from private producers and allowed state-owned utilities to buy and sell electricity beyond state borders. As utilities world-wide undergo privatization and open their grids to private producers, they are seeking out markets beyond national borders, either to sell their electricity surplus or to make new commercial investments. European utilities, such as Vattenfall of Sweden and Electricité de France, have been developing their presence in the Mekong region for several years now whereas Japan's state utilities were barred from investing overseas until 1996.

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