Integrated Resource Planning for Asia?

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Integrated Resource Planning for Asia?

Whether in Japan, where the growth in electricity consumption is relatively slow, in Korea, where growth in power demand has been slowing as the economy matures, or in the faster-growing economies elsewhere in the region—from China to Vietnam to Thailand—the planning for development of future electricity supplies is dominated by power companies. In some nations, these companies are at least nominally private. In most of Asia, however, state-owned power companies dominate. The typical power planning process followed by power companies in most nations, as noted in a recent publication prepared for International Rivers, An Introduction to Integrated Resources Planning, typically uses relatively simple trending and econometric methods to forecast electricity demand, then prepares an electricity supply plan, usually featuring conventional fossil-fueled, hydroelectric, and nuclear generation technologies that are familiar to the engineers and other planners working in the ministries, and to the consultants, engineering companies, and equipment vendors that support them. Often left out of such planning processes, at least for the most part, is serious consideration of the environmental impacts of power systems, consideration of supply-side options based on renewable energy (with large hydro power plants an exception), and programs to reduce energy and power demand ("demand-side management").

In the United States in the late 1980s, a pattern of utilities with planning processes very much like the above, and operating with limited or ineffective regulatory oversight, resulted in the utilities entering into investments in large, expensive power plants that, in hindsight, were not all needed, but burdened their ratepayers with assets requiring many years to pay for. In some cases, nothing more complicated than an exponential extrapolation of recent trends was used to forecast electricity generation and provide the basis for power plants initially priced at hundreds of millions of dollars—and eventually costing much more. At some point, however, even with economic growth continuing, natural improvements in energy efficiency, plus saturation in the ownership of electricity-using appliance and other devices—a household only needs so many refrigerators and air conditioners, for example—trending forecasts proved ill-founded, and the result was often electricity generation overcapacity, and years of regulatory proceedings to determine which parties should be held financially responsible (and for how much).

Against this backdrop, in the late 1980s and early 1990s, requirements for integrated resource planning, or IRP, were put into place in many US States, and, in time, in other nations as well. IRP processes differ between jurisdictions, but generally include as key elements 1) a clear statement of planning goals and processes; 2) preparation of a long-term load forecast, ideally based consideration of trends in energy end-uses and energy intensities (for example, the amount of electricity used by type of appliance, or per tonne of cement produced); 3) a comprehensive review of the supply-side (power generation, transmission, and distribution) options for serving the utility's customers; with 4) similar consideration of the options to reduce energy and power demand through DSM programs; 5) preparation of alternative integrated resource plans (including both supply and demand-side options, and including under different scenarios of demand growth); 6) systematic and

evenhanded analysis of candidate plans, including the costs, environmental performance, social impacts, reliability, energy security, and other quantitative and qualitative aspects of the plans, and selection of several final candidate plans; 7) selection of a preferred plan, and, often, alternative plans for implementation if underlying economic or other conditions--for example, key technologies--change markedly; 8) detailed planning, and then implementation of the chosen integrated resource plan, followed by monitoring and evaluation of the outcomes of implementation. An additional key component of most or all phases of IRP is review of both the planning process and its results by not only independent regulatory authorities, but also, typically, key stakeholders likely to be affected by or have an interest in utility plans for serving consumers. Stakeholders participating in the IRP process thus often include representatives of industrial, residential and commercial consumers, environmental groups and other non-governmental organizations, representatives of governmental organizations, and sometimes others.

Thailand is an example of an Asian nation where power planning has been and is carried out by the state utility with limited input from other stakeholders. Thailand's Power Development Plan (PDP), prepared periodically by the state-owned Electricity Generating Authority of Thailand (EGAT), is the master investment plan for power system development. It determines what kind and what quantity of power plants get built, where and when. The PDP has wide-reaching implications, shaping not just the future of Thailand's electricity sector and its social and environmental landscape, but also that of Thailand's neighboring countries. As local opposition to large-scale power plants grows stronger, Thailand increasingly relies on electricity imports from Laos, Myanmar and Cambodia to meet its growing demand.

Thailand's PDP process is in large part politically determined. There is no regulatory body or requirement to hold the outcome of the planning process accountable to the planning objectives. For example, coal- or gas-fired power plants are often chosen as sources of power supply of choice due to their "cheapest cost" or "fuel diversification" or "security of supply". Yet, the decisions to include these resources are not based on demonstrated, well-supported analysis, and rationales such as "least cost" or "risk diversification" or "security" remain ill-defined.

What appears to be driving the planning process in Thailand is not systematic analysis, but rather political considerations. There is a lack of independence between the power sector and its vendors, as several high-level government officials with responsibility in power sector planning also serve on the board of directors of many energy corporations that stand to receive business as the power plants and other infrastructure investments associated with implementing PDPs are developed. Because of lack of transparency, accountability and meaningful participation in the planning process, various PDPs issued by the government have been criticized as bloated and inefficient—that is, including a too-large, too-expensive, and suboptimal mix of power resources.

Specifically, the demand forecasts on which Thai PDPs were based often over-projected actual demand, leading to cycles of over-investments. Because of the monopoly structure of the Thai power system, Thai utilities are able to pass on costs of inefficient investments (surplus generation capacity) to captive consumers, without suffering much in the way of repercussions from the public or other stakeholders, which has led to repeated cycles of over-investment in power generation facilities. In addition, the PDP limits choices of power plants to large-scale coal, natural gas, oil, and nuclear power, with special provision for imports from hydropower projects from neighboring Laos and Myanmar. Although it has proven to be cheaper than all supply-side technologies, energy efficiency is not allowed to compete as a candidate to provide energy services on an equal basis with these large-scale power plants. Similarly, renewable sources of electricity have typically received only minor consideration, at best, in the PDP process. Any cost considerations in the planning process are still from the utility's perspective, instead of from the perspective of society. As a result,

cost comparison between, say, nuclear and solar options only consider generation costs, while the costs of transmission, distribution, and environmental and social externalities are not taken adequately into consideration.

Clearly, adopting a well-run, comprehensive integrated resource planning (IRP) process would improve the Thai power sector planning process. IRP has been discussed as a tool, but has yet to receive serious interest from policy makers, partly due to lack of capacity and familiarity with IRP, but primarily due to resistance to change in the status quo. One key problem is that individuals in government sometimes stand to benefit personally from investments made in carrying out PDPs. As in other nations, existing utility incentive structures are a large part of the problem as well. Utilities in Thailand earn a fixed return on invested capital. Put simply, the more they spend, the more money they collect in tariffs, and the higher their profitability. This incentivizes utilities to over invest in supply-side facilities. On the other hand, Thai utilities have a negative incentive to invest in energy efficiency, because energy efficiency measures (even those implemented by EGAT) are not counted as capital expenses, and because they reduce electricity sales and therefore reduce utility revenues.

These issues could, in principle, be addressed by an energy regulatory commission. The Energy Regulatory Commission (ERC) in Thailand, however, has no jurisdiction over the planning process, and has to date been ineffective in safeguarding consumers' interests.

Many other Asian nations are also currently in the process of choosing and developing power systems for their long-term future, and, concurrently, preparing action plans for reducing greenhouse gas emissions (including plans for "green growth" as in Korea, Vietnam, and elsewhere), and for adapting to climate change. In many cases, these plans are (or are to be) prepared and implemented by different agencies, with often inadequate interplay between these key and heavily interrelated planning processes. Implementing IRP in many Asian nations would help not only to improve coordination in energy and environmental planning generally, but to improve the inclusiveness of the planning process and, thus, the long-term effectiveness and ability to more smoothly implement utility (and climate action) plans.

References and Further Reading

International Rivers (2013), An Introduction to Integrated Resources Planning, dated October, 2013, and available as http://www.internationalrivers.org/files/attached-files/intlrivers_irp.pdf

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