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Addressing Energy-efficiency with Virtual Power Plants

By Jeffrey Liang, Siew Fing Wong, and Hongliang Yang

- **Improved incentives and regulatory measures can promote widespread investments in virtual efficiency power plant initiatives**
- **Energy-efficiency champions can fill the information gap on new energy-efficient technologies**
- **Lending and credit can help small and medium-sized enterprises fund energy-efficient initiatives**

Background

Halfway through the implementation of the People's Republic of China's 11th Five-Year Plan (2006-2010), the government of Guangdong and other provinces such as Hebei, Jiangsu, and Shandong are building virtual "efficiency power plants" (EPPs). This is to deliver energy-efficiency targets and at the same time satisfy growing energy demand and promote stable economic growth.

EPP is a concept that allows aggregated savings in energy on a par with the productivity of a physical power plant. An EPP is a bundle of investments in energy-savings technologies such that the magnitude of the energy saved obviates the need to install new power generation of equivalent capacity. It is virtual because it does not exist physically. It exists instead in the guise of the energy saved. Unlike conventional coal-fired power plants, an EPP burns no fuel, emits no pollution, involves no land acquisition, and costs much less.

Virtual Power Capabilities and Development Needs

The government of Guangdong, for example, helps local electricity end-users and energy service companies retrofit industrial equipment. This saves energy equivalent to a 100 MW coal-fired power plant, halves investment costs, and provides significant environmental benefits.

While virtual power plants work to achieve the energy efficiency goal of the 11th Five-Year Plan, their development is, however, more complex than the financing of coal-fired power plants. Continuous successful development of virtual power plants requires government intervention and the willingness of energy consumers to consider initiatives to improve energy efficiency as profitable investments.

Overcoming Barriers

Learning from Guangdong's experience, incentives are necessary to encourage investments and participation in energy saving practices. By adjusting electricity tariffs, households and enterprises can be encouraged to invest in retrofits and new technologies in return for profits and lower electricity bills. In practice, energy consumers do not usually become collective investors in virtual power plants if electricity tariffs are very low or heavily subsidized. In the absence of tariff adjustments, tax incentives, subsidies, or rebates may be used to reward energy-saving practices. One example is the People's Republic of China's subsidies to encourage the production and use of fluorescent lights instead of cheaper incandescent light bulbs. Incentive mechanisms are best institutionalized if performance and accountability measures are allied.

A high-efficiency transformer

Operators of physical power plants will participate more actively in EPP initiatives if laws and regulations regarding energy efficiency are integrated into power sector reforms. This would enable virtual power plants to compete with conventional power plants, particularly where tariffs and additional costs are low. The profits of power companies should be decoupled from the volume of energy sold. Tax rebates can encourage power companies to invest in efficient, clean coal technologies.

Energy-efficiency champions can intensify awareness of energy-saving practices and their long-term benefits. Senior government officials can champion energy saving. They can campaign for tariff reforms, promote energy-saving services, and nurture development of EPPs. They can wage awareness campaigns about available energy-saving practices, and disseminate information about potential benefits against upfront transaction costs.

Lending and credit can support energy-efficient initiatives. Funding to support energy efficiency initiatives is often scarce. High transaction costs are also associated with small loans, and assessing the creditworthiness of large numbers of small investors can be problematic. Judicious use of lending and credit instruments enables small and medium-sized enterprises to access finance that supports energy-efficiency initiatives.

For further information
Contact Jeffrey Liang, Principal Country Economist, Asian Development Bank (jliang@adb.org)
A detailed project description is at: http://www.adb.org/Documents/RRPs/PRC/39653-PRC-RRP.pdf