The Experience with Independent Power Projects (IPPs) in Developing Countries

David G. Victor
Director, Program on Energy and Sustainable Development

Thomas C. Heller
Lewis Talbot and Nadine Hearn Shelton Professor
of International Legal Studies

Joshua House
Research Fellow, Program on Energy and Sustainable Development

Pei Yee Woo
Research Fellow, Program on Energy and Sustainable Development

Peter M. Lamb
Research Fellow, Program on Energy and Sustainable Development

Erik J. Woodhouse[1]
Post-Doctoral Scholar, Program on Energy and Sustainable Development

---

During the past two decades many nations have begun to reform their electric power markets away from state-dominated systems to those with a greater role for market forces and in which foreign direct investment ("FDI") is welcomed. In an earlier study[2] we found that, in most cases, governments begin the reform process by encouraging private investors to build independent power projects ("IPPs")—generators hooked to the main power system that supply electricity, usually backed with long-term power purchase agreements ("PPAs").

In the 1990s IPPs accounted for a large share—perhaps one-tenth—of the surge in private FDI in developing countries. Then, in the late 1990s, this market crashed. In 1999, the dollar value of all private electricity generation project financial closings fell to less than $3 billion—down from a high of $14 billion just three years earlier.[3] Despite widely reported troubles throughout the industry, the experience for investors and host countries has varied widely. According to a recent World Bank study, investors are evenly divided in their satisfaction with their experience investing in developing country power projects.[4] Anecdotal evidence also suggests that in some cases investors, builders and operators have profited handsomely and hosts have gained badly needed power,

---

[1] Comments and questions may be directed to erik.woodhouse@stanford.edu.
[2] Heller and Victor (2004). *A Political Economy of Electric Power Market Restructuring: Introduction to Issues and Expectations*, PESD Working Paper #1 (May 2004), available at http://pesd.stanford.edu/research/2120/.
[3] Sader, Frank (1999). Attracting Foreign Direct Investment Into Infrastructure: Why is it so Difficult? Foreign Investment Advisory Service Occasional Paper No. 12. Washington, D.C.: The World Bank and the International Finance Corporation.
[4] Lamech and Saeed (2003). What International Investors Look for When Investing in Developing Countries. Energy and Mining Sector Board Discussion Paper #6, May 2003.

while in other cases, most key stakeholders have withdrawn in unhappy circumstances. This study will explore the legal, institutional, political, economic and technological factors that explain the mixed outcomes in the IPP business over the last fifteen years.

We also aim to help chart a path for investors and hosts in the future. It appears that the crash of the IPP market has now reached its nadir, and we expect that the industry and hosts will be searching for new models of IPP investment.

Methodology

Earlier studies on the IPP experience have attempted to explain the relationship between investment factors and outcomes through either surveys of large numbers of stakeholders or individual case studies. Each method has their drawbacks; the former yields broad conclusions that don't offer much insight and the latter context-specific results that are difficult to generalize. The PESD IPP study seeks to strike a balance. We aim for more focus and rigor than simple polling and provide more structure and comparability than is typical of detailed individual case studies.

Our approach begins with identification of five major rival explanations—hypotheses—about the IPP experience. Those hypotheses reflect the academic literature in the area and also extensive interviews with investors, builders, operators, regulators and host country officials:

1. *The "Obsolescing Bargain"*: Much of the literature on foreign investment in infrastructure is rooted in the idea that the investor's bargaining position changes once he has poured concrete and bolted infrastructure to the ground. The original deal becomes obsolete and the host country can expropriate the benefits. There are many variants of this hypothesis; we seek to explore whether the central dismal conclusion is valid as well as the efficacy of strategies adopted by investors in an attempt to avoid the squeeze.

2. *General Investment Climate*: Perhaps IPP outcomes are merely a function of the attractiveness of the general investment climate. Examining this hypothesis will require a look at the host country legal context, the state of public finance, and other similar institutions whose performance affects all investments, and not just IPPs.

3. *The Electricity Market Context*: IPP outcomes may reflect differences in individual country electricity contexts. For example, estimated electricity demand, the adequacy of transmission infrastructure, the competency and independence of the regulator, and the existence of special mechanisms to ensure rapid paybacks are all factors that will affect the success of an IPP.

4. *Project Management*: Perhaps IPP outcomes are not related to any structural factors, but to the behavior and vision of project managers. To assess that possibility, we must survey at least two dimensions—the process of negotiating the original deal, and the process of managing the project once the basic deal is struck.

5. *Exogenous Events and Contagions*: This refers to external shocks and contagions—like the Asian Financial Crisis or the collapse of Enron—that are unrelated to the projects themselves. In general, super-macroeconomic events, non-systematic political events, terrorist attacks, and other such factors have explanatory power but cannot be systematized within an analytical framework. They should not be left out and deserve their own category to highlight the vulnerability of power projects to such events.

These five suggest very different expectations for the future, and of course this list is not fully exhaustive. Moreover, these hypotheses combine in different dynamic ways, and the full explanation for the IPP experience is more complicated than suggested by this list. Our research protocol aims to unpack the relationship between these hypotheses and project outcomes in a manner that produces robust and generalizeable insights, while remaining open to continued refinement and consideration of new factors.

Research Process.

The study has been structured in a 3-stage process:

1. *Country Selection*. The five hypotheses imply different factors at work, and we have used them to guide the selection of ten developing and reforming countries that have experience with IPPs in the 1990s. We selected these countries by first identifying the universe of all developing and reforming countries that have at least one IPP on their soil (52 countries). Then we selected countries from that universe for variation on country-level factors–for example, variation in regulatory systems, IPP financing alternatives, and the role of IPPs in the broader context of power sector reform. The resulting sample is: Argentina, Brazil, China, India, The Philippines, Thailand, Malaysia, Mexico, Poland, and Turkey.

2. *Country Studies*. Each country leads to a country study that examines the country-level factors and the history of the IPP experience in the country. The country studies also identify the universe of all IPPs within the country and propose a sample of four to six IPP projects for initial study. This initial project sample is selected for variation in project-level factors, such as types of PPA, fuel choice, financing arrangements, and investment structure (*e.g.* wholly foreign, domestic and foreign, or wholly local equity participants). The full list of relevant project-level factors will, of course, vary across countries as well.

3. *Project Case Studies*. Finally, from those initial project studies we select two to three projects in each country for in-depth analysis, with carefully structured on-the-ground interviews to test hypotheses. Through the above process, the final sample will result in detailed review and generalized conclusions from 20 to 30 projects worldwide. In order to be able to draw conclusions about factors affecting the success of IPPs, we will need to examine both successful and unsuccessful projects.

A detailed research protocol surveys the relevant literature, discusses the five principal hypotheses, outlines the method for case selection, and presents a template for each of the country and project studies.[5]

Understanding Project Outcomes.

With the results from the country studies and individual case studies we will hold meetings of key stakeholders to discuss results and begin to chart a new path for IPP investment. Initially, we will focus on how the four clusters of factors, and their interaction with each other, can create variations in outcomes of power projects. With continued discussion and analysis, we expect to address many of the thorny, multi-dimensional questions that arise when investors and host countries alike consider possible projects. Among them:

- How do new plants compete against established, usually lower-cost incumbents?

- How can host countries craft agreements that compel investors to deliver expected power and to provide the other services—such as electrification, environmental protection, and new technology—that are implied in the "social contract" that accompanies private investment in public infrastructure?

- What effect does planned market reform (such as that implied by EU accession) have on the tariffs and off-take given to IPPs by host governments?

- If costs are passed through, how does a host government determine what level of cost is appropriate?

- Under what conditions should investor and host alike believe that commitments made by the other side are credible?

Such questions are resurfacing as the world recovers from recession and the need for investment in new power grows. Answers will be needed if the IPP model is to be sustainable, and the attempts to provide answers may yield alternative models that could be useful to apply in the next wave of investment.

Products and Policy

PESD plans to publish the empirical material from the IPP case studies in two tranches. The first tranche will consist of working papers – one per country – that will report the result of the first two stages of the case selection and analysis. The second tranche will consist of the individual project studies. Our aim is to have all the country studies available in the third quarter of 2004 and many of the project studies under way at

[5] Victor, et al (2004). The Experience with Independent Power Projects (IPPs) in Developing Countries: Introduction and Case Study Methods. PESD Working Paper #23 (April 2004), available at http://pesd.stanford.edu/publications/20528/.

that time. That material will provide a basis to launch a series of stakeholder meetings on the IPP experience. Those meetings will probe the causes for the variation in IPP investments and, most importantly, they will provide a venue for developing and criticizing ideas about how to structure the private investment market in the future. As more investors and hosts ask whether the IPP model is sustainable, we aim to provide some answers and visions for the future.