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Small-Scale Generation

Issues in Standardizing Power Purchase Agreements

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Programs to attract investment in small-scale electricity generation, often powered by renewable energy sources, have become increasingly common in the developing world as governments seek to both expand access to electricity and improve sustainability. A valuable tool for such programs is a well-crafted, standardized power purchase agreement, which can reduce transaction costs for generators and government agencies alike and substantially improve the economics of small generation facilities. This Note discusses key considerations in designing a standardized agreement for a small power producer program.

Nearly 20 percent of the world's people have little or no access to modern energy services, a share that rises to 40 percent in South Asia and to more than 70 percent in Sub-Saharan Africa (World Bank 2010, p. 8). Almost half rely on coal, wood, or waste for cooking and heating.[1] Led by a booming electricity sector,[2] global energy demand is expected to increase by 80 percent by 2050. But energy is still distributed unequally, and the lack of access to affordable, reliable power today remains an important barrier to economic development in many parts of the world.

Addressing the lack of access to energy is a key policy priority, and many developing countries have begun to implement policies and programs to expand the development of their energy resources, including by attracting investment to small-scale or renewable power generation projects. Small-scale projects are often the only option for providing power to remote sites or in areas with low or diffuse demand, but they are often more expensive than larger projects (per unit of energy generated) and are not necessarily the most effective use of resources for a national utility company. Government-backed small power producer programs can provide the opportunities and incentives for private power producers to fill this gap.

In addition, small projects are often developed using renewable resources, which eliminate the need to transport and store fuel in remote locations. As governments around the world recognize the effects of climate change, small power producer programs are often combined with renewable energy programs and incentives.

The power sector of every country operates under a legal framework usually implemented through a number of core legal documents, but the cornerstone of any long-term power sales

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agreement with a private power generator is the power purchase agreement (PPA). A PPA is the primary legal contract between the seller and buyer of power, specifying prices, obligations, and all associated terms and conditions of the transaction.

Designing a standardized PPA is a particularly critical (and complex) element of a small power producer program. This Note discusses the options and considerations that go into the development of a PPA between a small power producer and the national grid, including the benefits of standardization. Because the development of PPAs requires legal and regulatory assistance, multilateral and regional development banks have often played a pivotal role and are likely to continue to do so.

Why standardize?

A standardized PPA treats all small power producers and the utility similarly through its legal arrangements. While this inflexibility may be viewed by some as a disadvantage, it also provides important advantages. If the standardized PPA is developed by unbiased legal advisers and carefully crafted through a consultative process with all relevant stakeholders, it can achieve several things:

- Because all parties are treated similarly, there is no perception of advantage or unfairness and all stakeholders can trust and are invested in the integrity of the small power producer contract and program.
- The up-front transparency and visibility of the agreement minimize regulatory risk.
- The PPA is internationally acceptable for the financing of small power producer projects, protecting lenders, project owners, the utility, and utility ratepayers.
- The standardization eliminates the layers of transaction costs that come with negotiating a PPA for every small power producer, saving time and case-by-case regulatory approvals.

While standardized PPAs are of particular value for small power producer programs where each project is relatively small and the transaction cost of negotiating each PPA is therefore proportionally higher, some countries have begun to employ versions of standardized PPAs even for larger independent power producer (IPP) projects.

Key clauses and considerations

For standardized PPAs, the key issues addressed by traditional project-specific PPAs must be determined up front and apply to the entire targeted sector. Such considerations include the term of the PPA, control of generation and operations, the structure of the tariff, and the allocation of risks between the buyer and seller of power. Table 1 shows how five small power producer programs in East and South Asia addressed such issues.

Length of the term

The length of the PPA term is a critical element in realizing project leverage and financing. In the capital-intensive power generation industry, lenders often will provide loans only to project developers that have already signed a long-term PPA providing a sufficient revenue stream to repay the loan amount plus a debt coverage contingency. Entry into standardized PPAs can be managed through either controlled competitions or ongoing general offers.

Most PPAs allow the small power producer to elect a term for supplying firm power (a commitment to dedicate and sell power output to the utility) of up to 15 years or longer. Long PPA terms, however, expose both parties to the risk of economic change; as discussed below, the PPA must determine which party will assume each of the myriad risks relating to specific changes in law and in taxes and fees as well as those relating to economic events. Developing countries in the process of moving toward retail competition in the power sector need to work with advisers to adapt long-term PPAs to this changing regulatory environment.

Control of operations

Another key role of a PPA is to allocate control of generation and operations. Common considerations include whether the off-taker utility has the obligation to always purchase the power output, whether the project is dispatchable (that is, whether the project can and must adjust its generation at the request of the utility or grid operator), and whether there is a firm power supply or "capacity" obligation imposed on the small power producer.

If the utility controls the dispatch and operation of power, this gives it, as the power

Table 1 **Practices in power purchase agreements for selected small power producer programs in East and South Asia, 1992–2012**

	Thailand	Indonesia[a]	Sri Lanka	Andhra Pradesh, India	Tamil Nadu, India
Year begun	1992	1993	1998	1995	1995
Maximum size (megawatts)	60 or <90	<30 in Java; <15 in other grids	<10	<20; previously <50	<50
Primary fuel	Gas	Renewable energy	Hydro	Wind	Wind
Standard PPA?	Yes	Yes	Yes	Not formally, but a standard form	In development
Long-term firm PPAs?	Yes	Yes	Yes	Yes	Yes
Capacity payment for long-term power?	Yes	Yes	No	No	No
Approach to allocating performance risk between seller and buyer?	Alteration of capacity payment; utility can refuse delivery	Neutral; originally mutual best efforts	Neutral; mutual best efforts	Nonfirm, but utility must accept all power	Nonfirm, but utility can refuse delivery
Capacity payment adjusted if seller does not deliver?	Yes	No, capacity payments in peak rate	n.a.	n.a.	n.a.
Small power producer dispatchable?	Yes, if firm capacity PPA; 80% minimum annual output purchase obligation	No, with original PPA; freely dispatchable after change	No	No	No

n.a. Not applicable.
a. After initial success, this small power producer program was abandoned during the 2008–09 financial crisis.
Sources: Ferrey 2004; Ferrey with Cabraal 2006, updated to reflect changes since 2006.

purchaser, control over when and how much power it must buy. While having centralized, coordinated control over power dispatch and operation is important, some countries have found that this creates a visible conflict of interest, because the utility may be tempted to prefer dispatch from its own plant to that from private producers. In such cases this conflict has been addressed by imposing regulated standards and review on the utility; by delegating grid operation to an independent system operator different from the utility; or by developing regulations that designate renewable energy small power producers as "must run" facilities that the utility "must take" for purchase, without dispatch.

Similarly, PPAs should be designed to carefully structure grid operation and repair obligations and *force majeure* provisions, which excuse either the small power producer's owner or the utility from its contractual obligations under unanticipated circumstances.

Tariff structure

Where the utility controls decisions on the dispatch and operations of small power producers, this creates a risk of projects not being allowed to operate or sell power. To address this risk, tariff payments can be "split" into separate payments: a payment for capacity, reflecting the marginal cost of project construction and financing, and a payment for energy actually supplied. Even if the project is not allowed to operate during certain times of the day or season, the project is paid the capacity payment (sometimes called "deemed" energy) as compensation for simply being ready to operate. PPAs for nonfirm power (with no contractual minimum supply obligation for the small power producer, and payment only for the "energy" value reflecting the utility system's marginal operating costs) do not include capacity payments.

Allocation of project risks

To be effective, a PPA should allocate project risks in ways carefully tailored to the country's goals and markets. Because small power producers are subject to a range of project risks, how a standardized PPA treats these risks can have a substantial effect on the level of private investment in power generation. Commercial risk is the possibility that project economics will not unfold as planned. PPAs typically allocate this risk to the project developer. Sovereign

risk is the risk of the project being nationalized or of the country vacating the utility's PPA obligations after the PPA is signed. This risk is addressed through change-of-law clauses and waivers of sovereign immunity. Regulatory risk is the risk of new laws, new regulations, and new interpretations of the obligations of the utility or small power producer—a risk that becomes particularly salient when the country is restructuring roles and obligations in its electricity sector. Different countries regulate this risk in different ways, but should maintain a balance between allowing new laws and regulations and providing sufficient certainty to attract private investment.

Currency risk includes both the risk of the local currency changing in value relative to "hard" international currencies and the risk of being unable to repatriate currency to out-of-country international lenders and project owners. To address this risk, some countries index PPA payments to international currencies to stabilize their value, index the payments to particular inflation indices to maintain their local value over time, or do both.

Conclusion

The technologies exist to mobilize small-scale and renewable power generation in developing countries, where power demand is increasing most rapidly. Well-designed small power producer programs, with balanced and standardized PPAs, can leverage financing and support efficient, cost-effective private investment in small-scale power generation. But in every country the government faces a variety of key strategic choices to tailor the small power producer program and the associated PPA to its own situation and policy objectives.

Notes

This Note provides an introduction to the issues surrounding the design of PPAs. For more detail as well as options for implementing both PPAs and small power producer programs more generally, see Ferrey with Cabraal (2006) and Ferrey (2004).

1. United Nations, Sustainable Energy for All, "About Us," http://www.sustainableenergyforall.org/about-us.
2. The International Energy Agency projects that 45 percent of new investment in energy infrastructure between now and 2035 will be in electric power, dwarfing investment in all other energy sectors (IEA 2011, executive summary, p. 5).

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