58599

OBA Approaches | November 2010 | Note Number 39

Output-Based Aid and Energy:
What Have We Learned So Far?

Geeta Kumar and Yogita Mumssen

Worldwide, nearly 1.4 billion people live without access to electricity and nearly 2.7 billion people use traditional biomass fuels for cooking (IEA/UNDP/UNIDO, 2010). One challenge to increasing reliable energy access for the poor is their limited ability to pay the up-front connection fees for electricity and natural gas. Output-based aid (OBA) approaches—in which subsidy payments are linked to predefined outputs, such as installation of a working household connection or solar home system—offer a potential solution that has increased energy access for more than 6.8 million poor beneficiaries. A recent World Bank review of OBA concludes that there is a case to adopt OBA more widely, where there is an enabling environment (Mumssen, Johannes, and Kumar, 2010). This note discusses lessons learned and best practices in implementing OBA in the energy sector.

Low access in the energy sector stems from both demand and supply side issues. On the demand side, high up-front connection charges are a barrier to connecting the poor. Even though energy expenditures are typically less for electrified households, the connection fee prevents the poorest from switching to this lower cost source (World Bank, 2008). On the supply side, low cost recovery and the resulting inability of utilities to spend on capital investments contribute to low access. Most electricity utilities charge tariffs substantially below full cost recovery and many charge tariffs that do not even cover operating and maintenance costs (Foster and others, 2005). Thus subsidies are pervasive in the energy sector, but often are not targeted to the poor, resulting in unnecessary leakage of scarce public funding. A common attempt to target utility subsidies is to use quantity-based tariff subsidies that charge lower tariffs for lower quantities of electricity. However, such subsidies usually lead to regressive targeting, as many poor households are often not connected to the network in the first place.

The International Energy Agency (IEA/UNDP/UNIDO, 2010) estimates that US$36 billion a year in investment is needed to ensure universal access to modern energy services by 2030. This figure is far above the current levels of investment. Neither developing country governments nor donors have sufficient resources to close the financing gap. Hence there is an urgent need to encourage private sector investment and to use existing public resources effectively.

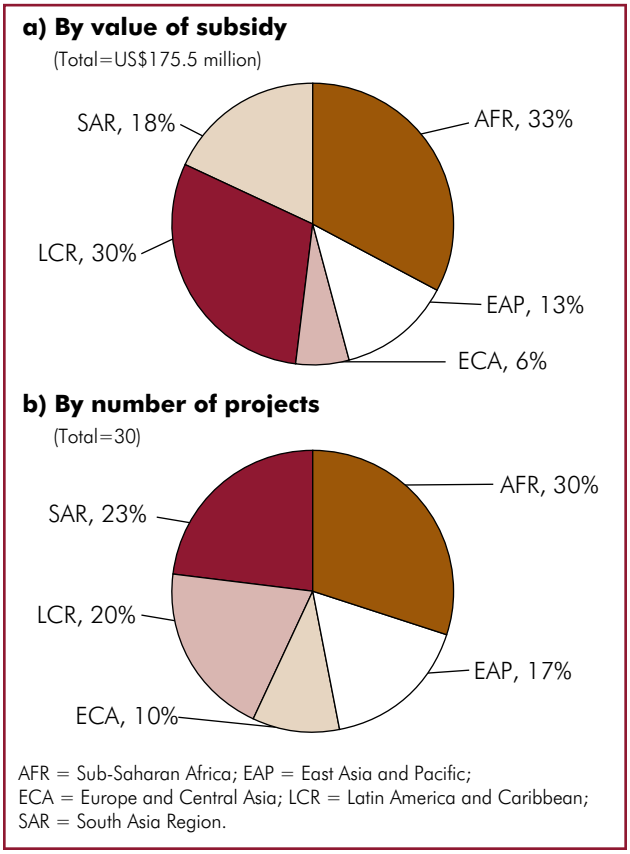
Photo by Richard Hosier (World Bank)

Output-based aid in the energy sector

OBA approaches are currently being implemented in the energy sector to help improve access and targeting for the poor. A recent World Bank review of OBA (Mumssen, Johannes, and Kumar, 2010) identified 30 OBA energy schemes in the World Bank Group (WBG), including three GPOBA projects under design (see Figure 1). Several additional schemes have been identified outside the WBG, including projects funded by the Dutch Directorate-General for International Cooperation through the Energizing Africa Initiative.

Geeta Kumar is a consultant in the Global Partnership on Output-Based Aid. **Yogita Mumssen** is a Senior Infrastructure Economist in the World Bank's Finance, Economics, and Urban Development Department.

Figure 1. Regional Distribution of World Bank Group OBA Energy Projects



Source: Mumssen, Johannes, and Kumar (2010).

The use of OBA is most widespread in individual off-grid systems for rural electrification. Public funding is often needed as grid expansion costs are typically high in rural areas, as demand tends to be small and widely dispersed. The "output" in an off-grid project is usually the installation of a functioning off-grid unit, such as a solar home system (SHS). Fifteen of the WBG projects use SHS and one uses household-sized biogas plants. Most OBA projects use the "dealer model" whereby private dealers sell systems in the open market. A third-party financial institution, such as a microfinance institution, may provide household credit for the initial down payment. Consumers own the stand-alone systems and are responsible for maintenance, following the warranty period.

OBA for grid-based extensions is also being used in a few projects (including a couple of GPOBA projects under design) to expand access to the urban and peri-urban poor. The "outputs" in grid-based systems typically are verified working connections to the network, but could also include a specified period of service delivery, demonstrated through billing or collection records. The OBA subsidy is generally used to buy down the capital cost to make access affordable and is paid once installation is verified. In addition to one-off capital subsidies for access, transitional and ongoing output-based subsidies have been used in grid-based schemes, such as the Pamir Private Power Project in Tajikistan.

Explicitly targeting subsidies to the poor

The World Bank review concludes that OBA provides a strong platform from which to target subsidies.

- Nearly all the energy projects (28 out of 30) involve one-off capital subsidies enabling initial access, which is inherently more pro-poor since the poor are usually not connected in the first place.
- Most OBA energy projects use a blend of geographic targeting (selecting poorer locations where subsidies should be channeled) and self-selection targeting (subsidizing outputs that the non-poor are less likely to use, such as smaller SHS) (see Box 1).
- The most precise way of targeting involves assessing household income (means testing) or using indicators to estimate household wealth (proxy means testing). Means-tested targeting is more common in projects located in middle-income countries, as it requires more advanced administrative systems.
- Output verification helps check the accurate targeting of subsidies and is providing early evidence that OBA schemes are reaching the poor. In the Armenia Heating and Gas project, for example, output verification involves checking whether the beneficiaries of the subsidy are registered in the country's official social protection program for low-income households.

Shifting performance risk to providers

Compared to input-based schemes, OBA shifts performance risk to service providers, since payments to them are made only after verified delivery of access and service. How much performance risk is borne by the OBA service provider depends on the definition of outputs and the extent of phasing-in of subsidy payments, as well as the service provider's ability to prefinance the investments and services until subsidy payments are made. In the Colombia natural gas

Box 1. Nepal's Biogas Support Program: Geographic Targeting plus Self-Selection Targeting

The Biogas Support Program successfully combines carbon finance with output-based subsidies to provide affordable household-size biogas plants to rural families in Nepal. The subsidies vary according to the plant's size and location. Smaller plants, used by poorer families, receive relatively higher subsidies than larger plants. Biogas plants in remote mountainous regions, where the population is poorer, receive a higher subsidy than biogas plants in the Terai lowlands, where the population is better off. As of July 2010, 10,868 biogas plants had been installed and verified under a GPOBA-funded component. The World Bank's Community Development Carbon Fund is purchasing emission reductions generated by substituting biogas for traditional fuels such as wood and kerosene.

project, the entire output-based subsidy was paid after the households had obtained (and paid for) service for at least three months. This was possible because the service provider, Promigas, is a large private company and has the financial muscle to take on increased performance risk.

In the case of mini-grids, up-front capital expenditures as a percentage of total costs are high and service providers are typically small. Thus a larger fraction of the subsidy must be paid up front to avoid increasing the financing costs and hence the subsidy levels. For instance, Nicaragua's off-grid rural electrification project (PERZA) disburses 70 to 80 percent of the subsidies against construction milestones and the remaining 20 to 30 percent against final outputs such as new connections and service quality. In recent SHS projects, maintenance services are included in the output to shift greater risk to the provider. For example, in Bolivia's SHS project, the service provider is responsible for maintenance of the SHS during a three-year service contract.

Mobilizing private sector capital and expertise

OBA has been successful in mobilizing expertise and funding from the private sector to poor areas they would not otherwise serve. All the energy OBA projects involve private service providers (or public-private partnerships), except one (the Ethiopia rural electricity access project).

Grid-based OBA schemes leverage private capital mainly by working with private concessionaires. Such investments are viable only if tariffs for OBA beneficiaries cover ongoing costs and pay back investments. Thus private capital leveraging is wholly related to tariff reform. In Senegal the Government, with support from the Public-Private Infrastructure Advisory Facility (PPIAF) and other donors, developed a rural electrification program that combines privately operated concessions with output-based subsidies[1]. Under this program, the rural concession of Dagana-Podor was awarded to the Office National de l'Electricité (ONE), Morocco's electricity utility, in 2007. ONE has committed to make long-term investments of approximately US$10 million that it plans to recover through customers' monthly payments.

In cases where the OBA subsidy recipients benefit from social tariffs—which do not fully cover investment and/or running costs—the provider will need to cross-subsidize these new poor users with higher tariffs for industrial customers and wealthier households. For example, in Colombia, under a government cross-subsidy initiative, poor residential customers receive a 40 to 50 percent discounted tariff for the first 20m^3 of natural gas consumed. Gas distribution companies recover these subsidies from a surtax charged to high-income residential and industrial users.

In the case of off-grid energy schemes, dealers are typically small- and medium-size service providers. There are identified cases where dealers could not scale up business volumes rapidly because of difficulty in accessing finance. However, there is some evidence that larger dealers are taking risks in OBA schemes. In Sri Lanka's RERED project, three SHS dealers have each made investments of up to US$1.5 million to develop a commercial distribution network (World Bank, 2002). Although the amounts are small in absolute terms, the relative risks are substantial from the dealers' perspective.

Key to enhancing private sector finance and expertise, especially when working with smaller providers, will be tackling the access-to-finance constraints for medium- to long-term financing. An IDA line of credit is being used in Bangladesh, Ghana, Sri Lanka, and Uganda to provide long-term liquidity to participating private rural banks and microfinance institutions. But in the Ghana case, the line of credit focuses on household affordability; it is clear that dealer access to finance will also need to be addressed. Carbon finance may generate incremental revenues for renewable energy projects and can thus alleviate some of the funding constraints (see Box 1). However, for OBA

to grow to scale, the access-to-finance constraint will need to be addressed more systematically.

Conclusion

OBA is not a panacea. OBA schemes are only as sustainable as the environment in which they operate and cannot bypass the need for a strong regulatory regime. Ultimately, an output-based capital investment program is only part of a larger service delivery arrangement: in order to provide sustainable service over time, tariffs need to be at appropriate levels and subsidies need to be minimized.

There are also additional costs associated with implementing OBA. Monitoring and verification requires capacity and resources. Capacity can be an issue in OBA schemes, especially with small and local private providers. Successful projects, such as the Rural Electrification and Renewable Energy Development Project in Bangladesh, tend to include extensive capacity-building elements for the private sector.

Access to medium- and long-term financing is critical to enhancing private finance and expertise, and determines how much performance risk can be reasonably shifted to the service provider. To date, experience is limited on how best to mitigate the access-to-finance constraint with instruments such as guarantees.

Despite these challenges, OBA has demonstrated advantages over traditional approaches in efficiently targeting subsidies and mobilizing the private sector to serve poor households that would otherwise go without improved service. In the energy sector, OBA is becoming one of the more commonly used approaches for expanding rural off-grid access, and it is also being used in grid and mini-grid schemes. Further lessons are being learned and will inform OBA as it goes to scale.

References

Foster, Vivien, Quentin Wooden, Kristin Komives, and Jonathan Halpern. 2005. "Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?" Washington, DC: World Bank.

IEA/UNDP/UNIDO. 2010. "Energy Poverty: How to Make Modern Energy Access Universal?" Special early excerpt of the *World Energy Outlook 2010* for the UN General Assembly on the Millennium Development Goals. Paris: OECD/IEA.

Mumssen, Yogita, Lars Johannes, and Geeta Kumar. 2010. *Output-Based Aid: Lessons Learned and Best Practices*. Washington, DC: World Bank.

World Bank. 2002. "Renewable Energy for Rural Economic Development." Project appraisal document for the Rural Electrification and Renewable Energy Development Project, Sri Lanka. Washington, DC: World Bank.

_____. 2008. *The Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits. An IEG Impact Evaluation*. Washington, DC: Independent Evaluation Group, the World Bank.

[1] PPIAF has provided technical assistance to the Government of Senegal since 2000 to foster private participation in infrastructure. PPIAF also funded the market survey and pre-feasibility study of the Matam-Bakel-Kanel-Ranérou concession in 2008.

About OBApproaches

OBApproaches is a forum for discussing and disseminating recent experiences and innovations in supporting the delivery of basic services to the poor. The series focuses on the provision of water, energy, telecommunications, transport, health, and education in developing countries, in particular through output- or performance-based approaches.

The case studies have been chosen and presented by the authors in agreement with the GPOBA management team and are not to be attributed to GPOBA's donors, the World Bank, or any other affiliated organizations. Nor do any of the conclusions represent official policy of GPOBA, the World Bank, or the countries they represent.

To find out more, visit
www.gpoba.org

GPOBA

The Global Partnership on Output-Based Aid