

## Output-Based Aid in Armenia Connecting Poor Urban Households to Gas Service

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**G**as-based heating offers a clean, efficient, low-cost heating solution for poor urban households in Armenia, a country with severe winters. But many low-income households cannot afford the cost of connecting to gas networks and heating facilities or the cost of heating equipment. To help these families benefit from gas-based heating, GPOBA and the World Bank are funding a scheme that provides grants to eligible poor households for individual heating solutions, based on a gas heater, or local heating solutions, based on a boiler. Disbursement of the funds is tied to the delivery of preagreed outputs, creating incentives for the service providers to ensure timely completion of the installation work and early delivery of gas or heat supply. Up to 10,000 poor urban households (4,600 through the GPOBA funds) are expected to benefit.

Armenia has undertaken a series of structural reforms in its energy sector since 1995. It established an independent regulatory agency and revised tariffs to cost-recovery levels for both power and gas supply. It privatized most power sector assets and sold a large stake in the state-owned monopoly gas company. And it restored gas supply and connected more than 100,000 new gas customers in recent years, mostly in urban areas.

Yet relatively little progress was made in sustainable provision of heating. Most of the district heating systems, which used to supply most of the space and water heating in urban residential and public buildings, stopped service after 1992. The few that continued to supply winter space heating finally collapsed in 2003, when the government stopped subsidizing them.

After the government adopted an urban heating strategy in 2002, however, access to clean, efficient, gas-based heating started to pick up. The World Bank and several other donors stepped in with support, structuring heating and energy efficiency projects around the strategy, which provides a framework for developing the urban heating sector.

Although the urban heating strategy estimated that gas-based heating is the least-cost heating solution, access to gas-based heating services is low among poor households. These households are unable to afford the



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cost of connecting to gas networks and heating facilities or the cost of heating equipment. As a result, many either use no space heating of any kind (the share of poor households without heating exceeds 15 percent in some regions) or rely on costly electricity or polluting solid fuels for heating solutions.

Armenia has severe winters, with a heating season of up to 180 days in some areas, and heating claims a large share of the household budget for low-income families. According to several surveys, low-income families devote up to 50 percent of their expenditures to heating during the winter (Alliance to Save Energy 2007). This contributes to poverty—particularly in urban areas, where housing was designed primarily for the centralized heating systems no longer in service.

### The project

To help families adopt safe, affordable, gas-based heating solutions, the government of Armenia requested US\$3.1 million in GPOBA support. This funding is complemented by US\$3 million in funding from the World Bank-financed Urban Heating Project and govern-

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ment cofinancing of US\$530,000. Funding from all three sources is disbursed through an output-based aid (OBA) scheme that provides capital grants to eligible poor households toward one of two types of heating solutions:

- *Individual heating solutions*, based on a gas heater, that involve the connection of an apartment to the gas network, the purchase of a safe gas heater, or both.
- *Local heating solutions*, based on a boiler, that include the connection of apartments to a boiler scheme at the building or block level.

An average connection subsidy of US\$420 (90 percent of unit costs) was determined on the basis of the retail market price for gas heaters and gas connections at the time of project preparation, the expectation that the unit cost would be lower than the retail price as a result of bulk purchases, and evidence from pilot projects that this subsidy would be sufficient for a least-cost local boiler scheme ensuring a basic level of comfort for poor households.

### Determining eligibility

The GPOBA subsidy is designed to benefit the poorest segments of the population. The main criterion for targeting the GPOBA capital grants is the vulnerability score under the Poverty Family Benefit Program, the main social protection program for low-income households in Armenia. The higher the score for a household, the more socially vulnerable it is. The eligibility score for the individual heating solutions was initially 38.01 (US\$1 a day per capita) and above. After all applications in this range were accepted, the eligibility score was revised to 36.00 (US\$1.10 a day per capita) and above. For the local heating solutions, eligible households need only to be enrolled in the Poverty Family Benefit Program.

For the individual heating solutions, eligibility for a capital grant also requires satisfying several other conditions: The family must live in an urban building with multiple apartments. The building must be connected to a functioning gas network that is permitted to use gas for heating purposes. And the family must provide a cash contribution of around US\$25–50, with the amount depending on whether it wants a gas connection, a gas heater, or both. For the local heating solutions, eligibility requires evidence that more than 50 percent of the apartment owners in the building have agreed to the solution. And these families too must provide a US\$25–50 cash contribution.

### Implementing the solutions

The scheme is administered by the Renewable Resources and Energy Efficiency (R2E2) Fund, which promotes the development of energy efficiency and renewable energy in Armenia. The privatized gas company, HaiRusGasArd, is the operator for the individual heating solutions,<sup>1</sup> and private heat supply companies are the operators for the local heating solutions. These companies bear the prefinancing risk for the connections and are mostly reimbursed only after verification that a connection has been made and reliable service is being delivered.

For the individual heating solutions, the project follows several key steps (figure 1):

- The R2E2 Fund presents the list of households enrolled in the Poverty Family Benefit Program to the gas company, which identifies and excludes those already connected to the gas network.
- The R2E2 Fund widely publicizes the scheme to encourage the urban poor to submit applications.
- The R2E2 Fund screens the applications to determine eligibility, and the eligible applicants are asked to provide the cofinancing (this can be provided by municipalities and other cofinancing partners).
- The R2E2 Fund, together with the gas company, organizes tenders for the installation of the gas connections and heaters.
- The gas company verifies that connections have been made and notifies the companies selected to supply gas heaters to initiate installation.
- Once this work is done, the R2E2 Fund independently verifies the delivery of gas service and refunds to the gas company the payments it has made to contractors for connecting eligible households to the gas network and installing gas heaters.

Implementing the local heating solutions involves the following key steps:

- The R2E2 Fund widely publicizes the scheme.
- A homeowners association (or any other group) that represents an apartment complex—and has secured commitments from at least 50 percent of its households—submits an application to the R2E2 Fund.
- The households confirmed as meeting the eligibility criteria are asked to contribute the mandatory cofinancing to the R2E2 Fund account.

<sup>1</sup> HaiRusGasArd is owned 90 percent by the Russian company Gazprom and 10 percent by the Armenian government.

- Once receipt of the contributions has been confirmed, the R2E2 Fund sends acceptance notifications to the households and the heat supplier.
- The R2E2 Fund organizes tenders for energy service companies. If the heat supplier has already been selected, the heat supplier selects the contractors to connect the eligible apartments to the local heating system or, if there is no local system, to install one following established commercial practices.
- Once the local heating system has been installed and heat supply is being delivered, the energy service company or the heat supplier (if already selected) notifies the R2E2 Fund.
- The R2E2 Fund verifies the delivery of heat supply and reviews the service contract between the households and the service company to ensure that the tariff does not include the connection costs.
- Once the R2E2 Fund has independently verified the delivery of gas service, it refunds to the heat supplier eligible payments made to contractors.

### Ensuring performance

The disbursements of OBA subsidies are tied to outputs in a way that creates incentives for the service providers to ensure timely completion of the installation of heaters and gas connections and early delivery of gas or heat supply. For the individual heating solutions, 20 percent is paid in advance when the gas company signs

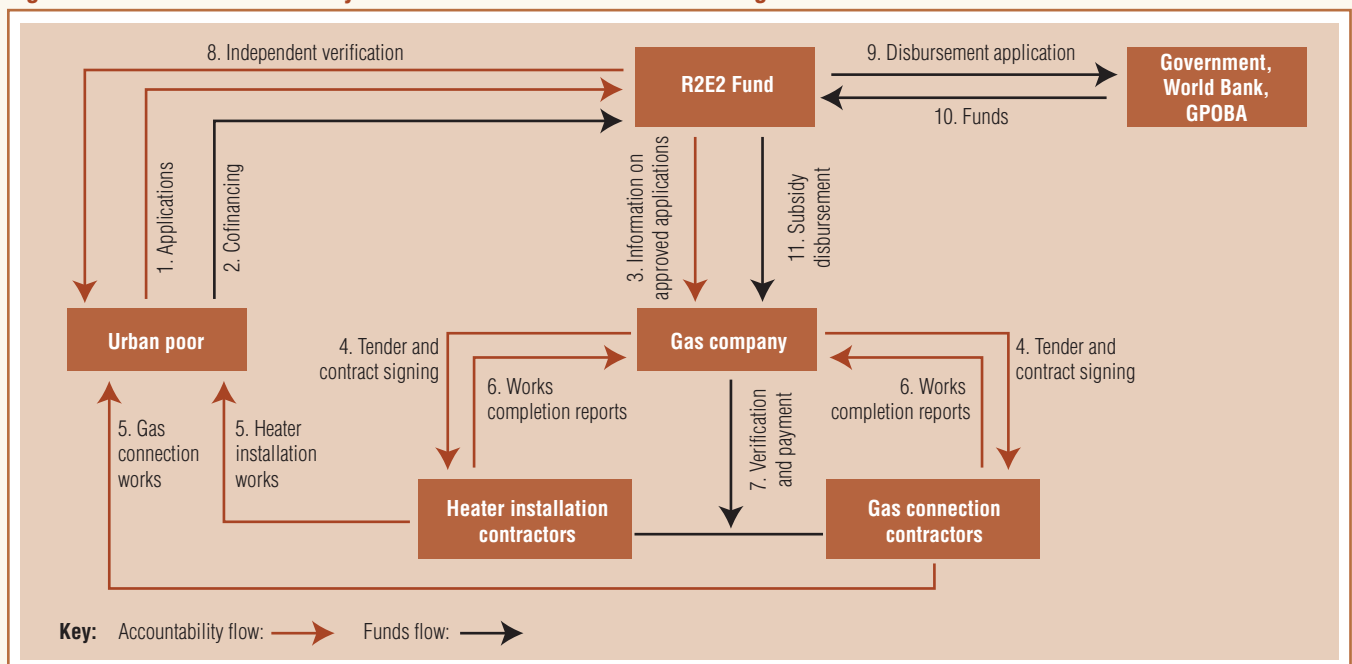
a contract with the service contractors, 70 percent upon independent verification of service delivery by the gas company, and 10 percent upon independent verification of 12 months of satisfactory service delivery. For the local heating solutions, 90 percent is paid upon independent verification of service delivery by the heat supplier and 10 percent upon independent verification of 12 months of satisfactory service delivery. The OBA approach transfers performance risk to the service provider.

### What has been achieved?

By August 31, 2008, the R2E2 Fund had verified the delivery of gas service to 2,589 poor households in 36 cities. By the time the project closes at the end of December 2009, 10,000 poor urban households (4,600 through the GPOBA funds) are expected to have gas or heat supply.

As a result of an increase in the unit subsidy requirement, the number of project beneficiaries will be lower than agreed to during project preparation. In a typical OBA scheme the subsidy per unit of output is determined up front and fixed. In this scheme the unit cost of service provision was estimated from market testing during the design phase. These estimates were seen at the time as a sound basis for determining the likely unit subsidy and likely number of outputs, and it was thought that competitive tendering could reduce

**Figure 1 Flow of accountability and funds for the individual heating solutions**



the unit costs below these estimates. Consequently, it was decided to use the actual tender prices achieved by the incumbent gas company as the basis for determining the unit subsidies to be reimbursed. Unfortunately, following grant signature, there was a 40 percent depreciation of the U.S. dollar relative to the local currency. The unit subsidy requirement escalated and as a result fewer beneficiaries could be served.

## Lessons learned

The OBA approach is still novel in Armenia. Even so, the experience in designing and implementing the project suggests several lessons for similar projects.

- Early preparation for implementing the project is needed, especially if the OBA approach is relatively new to the country. In particular, the reporting and monitoring software of the scheme administrator needs to be adjusted to the project's requirements. And sufficient time should be allowed for service providers and their contractors to become familiar with output-linked payments.
- The scheme's demand-based approach is justified: requiring that beneficiary households apply for capital grants and provide cofinancing bolsters their sense of ownership and commitment.
- Adequate planning of procurement is essential for smooth and timely implementation. The demand-based approach means that there is often a need to install additional heaters or gas connections in the urban areas covered by the grant program. Since the number of additional installations in a

region is typically small, extending the contract with the winning bidder for the region is more cost-effective than awarding a new one. So the procurement method should allow contract extensions as needed. This also means that extra work is needed in contacting potential bidders to ensure adequate competition.

- Early and active involvement of central and local governments is essential to lay the groundwork for scaling up the project in the future. The governments should be encouraged to cofinance the scheme, and their contributions recognized and publicized.
- Well-designed public outreach activities are important to adequately communicate the benefits of the OBA approach.
- It is important to fix the unit cost per subsidy up front or, where unit subsidies are determined by tender prices, to place a cap on the unit subsidy up front, so that an OBA scheme can reach the number of beneficiaries originally intended. In addition, an OBA scheme should have a sufficiently flexible design to allow a contractual amendment to the unit subsidy where unit costs increase significantly for reasons beyond the control of the recipient. Another possibility is to consider the use of an exchange risk hedging tool to protect against a unit cost increase due to exchange rate depreciation.

## Reference

Alliance to Save Energy. 2007. "Addressing Affordability of Utility Services in Urban Housing: Energy Efficiency Solutions." <http://www.ase.org/content/article/detail/4082>.

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