

AN ‘ENERGY MARKET ACCELERATOR’

Summary

Achieving the Sustainable Development Goals in International Development will require a mix of public and private actions. In some places and in some sectors, harnessing the power of the private sector may be the best route to deliver sustainable social impact at scale. This is particularly true for those SDGs that involve the provision of essential services to households, such as water, energy and sanitation. The ability to respond to customer needs and to supply services in a cost-efficient way is often best done by private providers, particularly where there has never been any prior provision by the state.¹ The prospect of competition between private sector providers enhances the likelihood of better outcomes for households.

In practice – and for obvious commercial reasons – private sector players will often target higher-income households to establish the financial viability for a new service. They are – equally understandably – slow to reach into underserved communities where the service may be in demand, but where ability-to-pay is constrained.

A case in point is the market for modern off-grid solar photovoltaic (‘solar PV’) energy products & services. This is growing quickly in peri-urban and urban areas in sub-Saharan Africa and India. But this growth is highly uneven. For example, over 97% of off-grid households in sub-Saharan Africa remain without access to modern energy services. This is a market failure. There is significant social value in allowing rural households to access solar PV devices, but the market is not yet functioning in low-income rural areas. To address this failure, we have begun the conceptual design of a new, commercially-oriented mechanism to accelerate the market: a **competitive auction of grants to enterprises**.

Background

How can we accelerate the development of rural markets for off-grid energy products in low-income countries? This is not a new question. Significant efforts have been made by the donor community over the past fifteen years to help mature the market for affordable, high-quality solar home systems. They range from technical assistance and quality assurance that builds customer trust and awareness, such as Lighting Africa / Global, to financing programmes that directly incentivise energy distributors via results-based approaches, such as EnDev. Significant effort continues to go into improving the regulatory and enabling environment for off-grid, including via USAID’s ‘Beyond the Grid’ initiative and DFID’s ACE programme. And other initiatives, such as Energy4Impact, provide technical, business and operational support to fledgling energy enterprises.

Over the same period, the price of solar PV inputs has reduced dramatically² and technological innovations are tackling long-standing constraints to market expansion – such as pay-as-you-go solar systems that remove the capital constraint for poorer households. As a result, the market for modern household energy products has grown exponentially, attracting significant amounts of private³ and public⁴ investment. In some countries – particularly in East Africa – the commercial market for solar devices in urban and peri-urban areas is now well-established and

¹ For clarity, we are not talking here about privatisation or concessioning of network monopoly companies – such as on-grid electricity utilities – to private sector companies.

² IRENA estimated an 80% fall in the cost of solar panels between 2010 and 2016.

³ Recent capital-raising rounds by the largest solar device distributors in East Africa have been in the multiple hundreds of millions of dollars. ZOLA Energy (formerly Off-Grid Electric) raised \$70 million in 2015, including \$25 million in equity and a \$40 million debt facility, and another \$75 million in 2018. M-KOPA raised \$20 million in 2015, \$80 million in 2017, and \$10 million in 2018. Since 2016, D-Light and BBOX have raised \$138 million and \$69 million, respectively.

⁴ The \$36 million USAID, DFID & Shell Foundation “Scaling Off-Grid Energy (SOGE) Grand Challenge” is a good case in point.

sizeable, with high levels of consumer awareness and with multiple distributors competing for business. Very rough estimates suggest that nearly two million households in East Africa now benefit from modern energy access via household solar PV systems.

But the market remains highly fragmented. We estimate that over 97% of off-grid households in sub-Saharan Africa remain without any form of modern energy services. In remote rural areas, the market is far-less established and – in some cases – distorted by previous donor-led efforts to introduce solar systems. So the question remains: how can we accelerate the footprint of the market for modern solar PV products in rural areas via interventions that leverage the power of the private sector – but which avoid creating market distortions that can undermine markets' long-term commercial viability?

Rural vs Urban: the Commercial Viability Divide

Rural markets for modern energy services face a difficult route to commercial viability. Some of the barriers to enterprises' plans for rural market expansion include:

- Significant up-front and recurring costs required to build and operate product distribution channels in remote and sparsely-populated areas, which can reduce or eliminate operating margins
- Lower average household incomes in rural areas provide less pricing flexibility relative to established urban markets with higher household incomes
- Building product awareness in new areas may not translate into immediate product sales revenues, given different risk appetites and technology adoption rates

While these rural markets could become financially viable in the longer term, the commercial and operational barriers tend to result in low or negative risk-adjusted returns on investment in the near-term. The small- and medium-sized companies operating in these markets lack the balance sheet needed to absorb these near-term losses.

Unsurprisingly, private enterprises have been deterred from investing in rural markets, concentrating instead in urban and peri-urban markets that benefit from high population density, higher average income levels and well-established supply chains. This uneven coverage is a classic market failure. There is broad consensus that there is significant social value from rural households accessing modern energy services, but the market is not yet delivering.

A Market-Oriented Allocation of Donor & Philanthropic Capital

Targeted supply-side subsidies can tackle this market failure by closing the commercial viability gap enterprises face in rural areas. Incentive payments can, in effect, boost operating margins and allow enterprises to absorb the additional costs of expansion.

This is not a new concept.⁵ Programmes such as EnDev have extensive experience over the past decade in allocating subsidies on a results or outcomes basis. This approach results in an efficient use of grant money – as resources are only disbursed against verified sales of energy products to households – and creates a strong incentive for enterprise to expand their customer base. RBF can also be used to target specific geographical areas to tackle rural energy poverty.

But the challenge – to put it frankly – is that aid bureaucrats do not know which enterprises to back, or how much subsidy is needed. Well-meaning but poorly-designed 'one size fits all' efforts in the past have damaged efforts to build a market. Given the commercial market that has emerged in higher-income areas in the past few years, it is vital that donors work with the grain of the market, using a commercially-oriented mechanism that makes product sales in new rural markets by existing enterprises as attractive as sales in their current markets.

⁵ A similar auction approach is being piloted in the World Bank-funded KOSAP programme in Kenya to encourage SHS operators to expand operations in underserved counties.

The challenge is to find a way to package donor and philanthropic support so that it is as 'lean' as possible to minimise market distortion. It is also crucial that financial support (i) tapers out as quickly as possible so that the market becomes self-sustaining, and (ii) is enterprise-specific. **Our view is that the best means to achieve this is a 'sealed bid' (i.e. anonymous) reverse auction that allows enterprises themselves to determine the level of support they get, tailored to each enterprise's circumstances.**

To ensure the most efficient distribution of available funding, incentive payments would be priced in practice through a competitive auction as follows:

- Enterprises first undertake their own financial analysis to assess the subsidy needed to support the scaling of their sales networks. This will be highly-specific (and proprietary) to each company, reflecting their existing product cost, operating costs and estimates of customer willingness-to-pay.⁶
- Enterprises then bid for a given pool of funding on the basis of \$ per Watt-peak subsidy they calculate they need to operate profitably in the target rural areas
- The fund manager allocates available funding sequentially to companies in order of least subsidy per Watt-peak required.⁷

Compared to current interventions, this mechanism would deliver various benefits:

- It is competitive: it ensures that available funding is allocated in the most efficient manner to companies closest to serving target markets profitably and eliminates the need for a bureaucratic allocation of grants.
- To facilitate competition and aggregate demand, this application process could be repeated in rounds every 1-2 years. A downward trend in the level of subsidy per Watt-peak required by enterprises, as a result of the competitive bidding process (and ongoing declining technology costs), would signal the improving economics of rural market sales. Over time, subsidies would taper down to zero. In other words, the mechanism would only be transitional, until sufficient market penetration and sales volumes are achieved.
- The 'lean-subsidy' selection process will generate valuable insights into the operational and financial constraints of rural markets and help to build a picture of the commercial viability gap that faces service providers.
- And, as noted above, incentive payments would be made on an outcomes-basis, contingent on verified sales of eligible products to the target rural markets.

This mechanism is radical but not entirely unproven. It is already used in other contexts, including a recent IFC/DevCo 'Scaling Solar' solar subsidy auction in Zambia.⁸

Looking forward

While the concept is compelling, further work is required to answer key implementation questions. For example, should the auction be on a 'pay-as-bid' or 'pay-as-clear' basis? (In other words, should all enterprises get the same subsidy per Watt-peak below a cut-off point, or should the subsidy vary in line with bids, with the lowest bids getting the least support per Watt-peak). How would geographical delimitation work in practice? And what would be the specific role of the fund manager operating the mechanism? The answers to these questions will be unique to the context and dynamics of the targeted market.

⁶ As with previous initiatives such as Lighting Africa, donor assistance could usefully de-risk the market by generating data on willingness-to-pay in specific areas through, for example, household surveys. This data would be shared with all bidders. As a general point, it is vital to link this initiative to existing TA and market-development efforts, rather than develop it in isolation.

⁷ To avoid market distortion, we suggest that at least three enterprises would need to be allocated support.

⁸ See <http://www.scalingsolar.org/>. Auction-based approaches have been used in other initiatives (e.g. The World Bank's 'Pilot Auction Facility for Methane and Climate Change Mitigation'). It is also how renewable energy subsidies are allocated in the UK's 'contracts for difference' market.



Moreover, this mechanism tackles a *distributional* issue: the market failure that deters solar device distributors from extending their distribution networks to deep rural areas. It does so on an outcomes basis: in other words, it does not provide pre-financing and hence does not directly tackle the *additionality* issue of tackling the working capital constraint that slows the growth of solar distributors. It is likely that this mechanism will indirectly ease working capital constraints: the visibility of future revenues will be increased (because there will be guaranteed outcomes payments for verified sales), which will make them more bankable. Nonetheless, enterprises will still require working capital to manufacture, ship and distribute solar devices, whether those devices go to established markets or new rural markets. We are currently thinking how the same auction-based mechanism could be brought to the operations of an impact investment fund.