



Accelerating energy access with aggregation

Insights

1. Decentralised energy is a huge investment opportunity. Billions must be funnelled into smaller energy service companies and programmes, including through more accessible and flexible financing, to achieve universal energy access by 2030.
2. Aggregators can help target and guide more efficient public spending by focusing on blended finance instruments that attract more private money, grants to jumpstart markets and subsidies targeting people unlikely to be reached by other approaches.
3. Investors should look for aggregators that offer support beyond financing — such as technical assistance, policy influencing and quality assurance — which helps energy markets to grow sustainably and protects household and business customers, including those in poor or hard to reach communities.
4. Better measurement of decentralised systems' impact — determining who exactly is being reached, who is not, and how electricity assets are used — can better calibrate finance and policy instruments that are responsive to people not being reached and changing market conditions.

Energy; Sustainable markets

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Sustainable Development Goals:



Electricity products as small as solar lanterns or as large as mini-grids connecting many households play a significant role in electricity access across Africa and Asia. These 'decentralised energy systems' complement grid extension, but need public and private investment of over US\$20 billion annually to meet the ambition of the SDGs.¹ It has taken a decade to reach about US\$2 billion worth of investments into private companies.² Looking to 2030, IIED has identified aggregation as a promising accelerant to energy access, one that should interest impact investors, institutional financiers, foundations and others. As well as 'crowding in' more investment, aggregation can nurture sustainable markets with further support, including technical assistance and quality assurance. Importantly, aggregation can focus resources on those people most at risk of being left behind by established approaches.

Aggregation: why now?

Although grid extension continues to dominate electricity access, decentralised electricity systems are playing a strong complementary role. Offering varying levels of access for households and businesses, from single lighting to mini-grids, decentralised systems are often cheaper than grid expansion, especially for remote communities. Energy companies and NGOs have already delivered several million decentralised electricity systems to communities in low- and middle-income countries. Indeed, estimates suggest about half the people gaining electricity access between 2016 and 2030 will be using decentralised systems.¹

The opportunity is huge, but we must finance and deliver millions more assets to reach everyone.

Since 2010, private investors and governments have made large financial and technical investments in energy access, helping establish multimillion-dollar companies. So far, investment has been concentrated in a handful of companies. For example, just ten energy companies soaked up 84% of investments for solar home systems (SHS); and another ten secured 77% of all funding available for mini-grids.² Hundreds more companies must be established to reach universal access. For example, estimates on delivering electricity throughout sub-Saharan Africa approximate that 298 first-, second- and third-generation SHS energy companies will be required with a total of US\$26 billion in capital, including almost one billion in grants, in addition to almost 40,000 mini-grids.³ Building this pipeline remains decisive in delivering energy for all, while growing the pipeline ensures competitive marketplaces.

Yet fledgling energy companies struggle to secure start-up grants and capital. To grow, they must access different mixes and types of affordable and flexible equity and debt capital, as well as business support and market stimulation. Funds, financial intermediaries, public programmes and other structures (who we generically refer to together as 'aggregators') use functions of aggregation along the value chain. Our research⁴ shows that different functions of aggregation can nurture company growth by providing appropriate mixes of financing alongside support in the form of business development, links to policymakers and generating demand.

Financial aggregation and off-grid energy

Energy access funds and financial intermediaries are attracting investors with structured funds. For example, in early 2019, financial intermediary SunFunder achieved a first close of US\$42.5 million on a structured energy fund — its largest single raise yet. By offering different levels of return for comparable risk, structured funds can bring together investors with different risk appetites. The underlying assets for these funds are the bundles of smaller decentralised systems and companies, which spreads risk, lowers transactions costs, hones expertise and standardises processes.

Impact investors, private and public funds, government programmes and financial intermediaries have been crucial in testing business models and supporting rapid sector growth. Recent high-profile bankruptcies highlight the risks caused by increasing investor expectations on returns by companies that may have expanded too quickly or are still searching for best 'channel-product fit' for various energy offerings.^{5,6} Financial aggregation has particular potential in building the pipeline by offering more flexible and patient capital as well as quicker deployments and tailored instruments.

Similarly, public aggregators have successfully pooled government and donor money to stimulate energy access

in their respective markets. Bangladesh's Infrastructure Development Company Limited (IDCOL) and Nepal's Alternative Energy Promotion Centre (AEPIC), both government initiatives, offer mixes of subsidies, grants and concessional finance tailored to the needs of different energy companies. This has been highly successful: their programmes have brought electricity to some of the poorest and most remote communities. But neither has managed to shift or phase out subsidies in their programmes quickly enough. Subsidies leave markets vulnerable to budget cuts, shifting donor interest and politics. To be even more successful, these programmes must better target subsidies, and clearly advertise the subsidy phases to the markets so companies can better adapt. For rapid and equitable development, programmes must be more flexible and responsive to changing market conditions.

Non-financial support is vital for growth

Affordable and flexible financing alone cannot support market growth; business support is crucial. Although second- and third-generation companies benefit from observing the first generation (learning from missteps and leveraging the demand already generated), they still require skills development, advice and mentorship to navigate particularly dynamic markets.

For-profit financial intermediaries can offer limited assistance to their clients: SunFunder's referral network can provide mentorship or investment;⁴ financial technology company Lendable offers data analytics tools so clients can reduce transaction costs and better analyse customer data. But more significant technical assistance and business support requires long-term donor or government support and funding. Financial aggregators or government programmes are well placed to direct this kind of funding to qualified companies.

In the many developing markets for decentralised energy systems, companies need ongoing market activation support including demand generation and quality assurance. Aggregators can support these activities. IDCOL financing is dependent on companies meeting technology and service specifications; the Beyond the Grid Fund for Zambia (BGFZ) also sets service specifications and additionally requires three-year warranties from qualified energy companies. AEPIC aggregates community demand for mini-grids and links them to companies. But some technologies, like mini-grids, are still struggling to identify sustainable business models (see Box 1).

Aggregators must also have strong government links to support coordination, advocacy and influence. In Bangladesh, IDCOL's solar home system programme floundered after the government pursued competing energy programmes. Funds such as the recently announced VentureBuilder hold promise in coupling early-stage finance and business development, but sector coordination and policy links will be crucial to establishing sustainable markets. Aggregators with formal coordination mandates, especially between grid extension programmes and off-grid energy companies, could help boost governments' efforts to reach energy access targets more quickly and equitably.

Box 1. Buttressing finance with supporting services

Financing for commercial mini-grids has mostly lagged behind 'pay as you go' systems. But recently, investors have aggregated mini-grids into portfolios of assets in Tanzania and Sierra Leone,^{7,8} using special purpose entities. This proven infrastructure financing method is being newly applied to mini-grids and presents a promising avenue to unlock long-term project financing.

These deals aim to align performance-based incentives and an equity share in the portfolio to ensure a good energy delivery service for the end-users. It remains to be seen whether these incentives will inspire the meaningful engagement with communities that is necessary to set up mini-grids in areas that have never had electricity.

Financing is crucial, but if the mini-grid model is to be sustainable, community engagement, knowledge, skills, end-user financing, as well as appliance supply chains and so on, must also be in place.^{9,10,11} This supports the larger point of closely linking financing with other important elements such as technical assistance and engagement, which could be provided by an appropriately structured aggregator.

Better impact measurement for better outcomes

Current metrics generally use unit sales and multipliers to estimate the impact of decentralised systems. However, multipliers vary between countries and within market segments, meaning these metrics struggle to accurately capture who is being reached and where, and how systems are used, or not. For example, AEPC sold 45% of SHS to women, but without usage patterns, we don't know whether women are benefiting, or how. The sector must look to disaggregate usage and needs — including for women and men, different socioeconomic backgrounds, regions, and so on.

In many decentralised systems, energy companies can access usage analytics and/or collect data from customers. There is little incentive to share this valuable information unless it unlocks finance. BGFZ requires companies to share usage statistics to qualify for funds; it then aggregates and publishes the data. This is an important move towards generating information for sector consumption, helping us to understand who is being reached. A step further will be more detailed metrics that can be used to direct targeted subsidies to the communities that need them most.

IIED is seeking effective ways to measure the impact of energy finance and delivery models, able to reveal who is — or who is not — being reached. This will support governments, donors, companies and practitioners to

channel additional resources and to structure appropriate financial instruments to make energy access more equitable. For example, there may be an opportunity for impact investors to choose companies that are verified to have reached disadvantaged communities, trading financial returns for greater human impact returns. It is important that recognition of this different or deeper type of impact is present within the investor space.

More public money, well targeted

While corporate-level investments in energy access are largely private, four of the top ten corporate-level dedicated energy access funds are development finance institutes (DFIs): FMO, Norfund, CDC Group and OPIC.² But the purpose and efficiency of public investments, and whether this money is attracting or discouraging private investment at this stage of market development, remains unclear. DFIs have been investing concessional finance into aggregators through pooled funds and financial intermediaries. This use of public money has allowed crucial financing to reach smaller and earlier-stage companies, while in some cases also providing critical support beyond financing. At the same time DFIs have been ushering money directly into larger, later-stage energy companies, which may allow these companies to reach profitability more quickly. However, this may inadvertently compete with the very aggregators they already support. At this stage of market growth, the impacts of this are unclear and need further analysis and discussion with sector stockholders.

Indeed, many investors believe that public money should be leveraged in blended instruments that de-risk and amplify private investment, especially where public budgets are tight or earmarked for grid extension. For example, SunFunder claims to have used grants in structured investment funds to attract 11 times the amount of private money.¹² This could be one role for public funds to play. As grids are heavily subsidised around the world, applying or shifting subsidies into off-grid energy systems is a logical role for public funds; a move IDCOL has already made.

The sector continues to explore financial instruments that can stimulate energy access. For example, the Kenya Off-Grid Solar Access Project (KOSAP) is pairing debt and results-based financing (RBF) facilities in an effort to activate energy market expansion (see Box 2). BGFZ releases funds to energy companies based on measuring and delivering on impacts rather than just selling systems. This demonstrates that an impact-focused approach is practical and could potentially be standardised across the sector.

In pooling donor and government money, AEPC and IDCOL have used a mix of grants and consumer price subsidies to reach some of the poorest people. An impact study convinced IDCOL to maintain subsidies on systems below 30 watts, to continue reaching the poorest, while removing subsidies for larger, more expensive systems. Identifying the most effective financial instruments to reach different market segments will be crucial to catalysing energy access.

Box 2. Results-based financing: a recipe for universal energy access?

The Energising Development Program (EnDev), KOSAP and the World Bank's new Clean Cooking Fund are using results-based financing (RBF) to try to reach more people with clean cooking solutions.

RBF offers incentive payments for specified results in the delivery of energy products and services. For example, if a company sells a stove in a target market (verified by a third party), that company would receive a payment. In theory, this would subsidise the investment costs of expanding to target markets without affecting the price for consumers. It remains to be seen whether RBF stimulates sustainable energy access delivery to target markets, as opposed to delivering short-term access to the wealthiest citizens.

Find out more

IIED is exploring practical, deep impact metrics, financial models and instruments to ensure equality in energy access with the right make-up of non-financial support so vital to achieving SDG 7.

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References

1. IEA (2017) World Energy Outlook.
2. Wood Mackenzie Power & Renewables and Energy4Impact (2019) Strategic investments in off-grid energy access.
3. Catalyst and Shell Foundation (2018) Achieving SDG 7: the need to disrupt off-grid electricity financing in Africa.
4. Garside, B, Johnstone, K and Perera, N (2019) Moving More Money: Can aggregation catalyse off-grid financing? IIED, London. pubs.iied.org/16651IIED
5. Dizard, J (3 May 2019) Mobisol: a cautionary tale for impact investors. *Financial Times*.
6. Solarkiosk AG (1 April 2019) Solarkiosk AG wants to secure a sustainable position through restructuring process. Press release.
7. InfraCo Africa, Transforming energy access in rural Sierra Leone. www.infracoafrica.com/transforming-energy-access-in-rural-sierra-leone
8. Rockefeller Foundation (2019) CrossBoundary Energy Access and PowerGen Pioneer Long-Term Mini-Grid Project Financing at Scale. www.rockefellerfoundation.org/about-us/news-media/crossboundary-energy-access-powergen-pioneer-long-term-mini-grid-project-financing-scale
9. Best, S and Garside, B (2016) Remote but productive: Using energy access investments to catalyse enterprises and income in Tanzania's rural communities. IIED, London. pubs.iied.org/16627IIED
10. CrossBoundary and Energy4Impact (2019) Innovation Insight: The Price Elasticity of Power.
11. Johnstone, K, Rai, K and Mushi, F (2019) Remote but productive: Practical lessons from productive uses of energy in Tanzania. IIED, Hivos. pubs.iied.org/16652IIED
12. Tyabji, N, de Cointet, I and Levinson, R (2018) Scaling Energy Access with Blended Finance: SunFunder and the Role of Catalytic Capital. SunFunder.



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