

# Digital Aggregation Platforms



→ Part of the report: **Energy Access, Data and Digital Solutions**



## DISCLAIMER

© 2020 TFE Energy GmbH

This report is supported by the German Federal Ministry of Economic Affairs and Energy on the basis of a decision of the German Bundestag.

All rights reserved.  
February 2020, Munich, Germany.

No part of this report may be used or reproduced in any manner or in any form or by any means without mentioning its original source.

## Authors from TFE Energy

Tobias Engelmeier  
William Duren (lead researcher)  
André Troost  
Sam Duby  
Philippe Raisin

## Supported by:



On the basis of a decision of the German Bundestag

## CONTENTS

1 The development of project aggregation platforms	05
2 How project aggregation platforms work	05
3 The development of crowdfunding platforms	06
4 How crowdfunding platforms work	08
5 How digital aggregation platforms address the main challenges of energy access	10
5.1 Impact on scale	10
5.2 Impact on cost	10
5.3 Impact on risk	10
6 Challenges to deployment	11
7 Looking ahead	11
Further reading	12

## THIS DOCUMENT IS PART OF THE REPORT “ENERGY ACCESS, DATA AND DIGITAL SOLUTIONS”.

*The report shows that the large-scale and often realtime collection, analysis and use of all kinds of datasets, enabled by the rapid, global technology shift called “digitalization,” is in the process of transforming the energy access industry. Companies across the energy access spectrum use digital solutions to enable their businesses and as the industry matures, there is a growing number of specialized digital solution providers.*

*The full report can be downloaded here ([link](#)).*

# DIGITAL AGGREGATION PLATFORMS

## KEY POINTS

- Aggregation of projects helps the electrification sector transition from softer to more commercial financing by meeting minimum transaction requirements of commercial investors.
- Project aggregation platforms can offer a sufficient level of transparency and standardization of reporting without creating undue reporting burdens on operators.
- Crowdfunding is a growing funding stream, offering mostly debt solutions to OGS companies.

The primary purpose of digital aggregation platforms is to facilitate investment into the off-grid space. In order to achieve this, projects are standardized, aggregated and made accessible to different stakeholders. This can significantly reduce transaction and operating costs and unlock new investment sources. Digital aggregation platforms come in two main forms. The first are platforms that aggregate projects and link them to professional investors, regulators or subsidy providers (project aggregation platforms). The second are platforms that aggregate private investors and link them to companies or projects (crowdfunding platforms). The former are used mainly by mini-grid companies. For them, reducing transaction costs for infrastructure investors is key to scaling. The second kind are sometimes used by mini-grid developers for project financing. More often, they are used by OGS companies to access debt.



*Photo by Ruthson Zimmerman on Unsplash*

# 1 THE DEVELOPMENT OF PROJECT AGGREGATION PLATFORMS

Project aggregation platforms make the management of a portfolio of mini-grid projects easier. They help users make informed decisions based on standardized, comparable project data. This is relevant and valuable at a number of stages in the development, operation and financing of a mini-grid. Standardization of technical designs and documentation, for example, can assist first-time developers and reassure potential investors. Standardization of technical and financial performance reporting<sup>131</sup> of operating projects allows easy comparison between projects, reducing due diligence costs and creating portfolios large enough to meet minimum transaction sizes of commercial investors. Project aggregation platforms can also serve as an oversight mechanism for national regulators and can help mini-grid operators monitor a portfolio of their own projects. Here they can integrate with remote monitoring solutions.

» *Odyssey offers investors a single place to manage their portfolio of investments across operators.* « EMILY MCATEER, Odyssey Energy Solutions

While there are several generic platforms for monitoring infrastructure projects, Odyssey Energy Solutions is currently the only one specializing in the mini-grid sector. Hence, our analysis of their potential value for the sector is based on their experience in a number of mini-grid program designs in Africa.

## 2 HOW PROJECT AGGREGATION PLATFORMS WORK

In the case of Odyssey Energy Solutions, developers can upload technical and financial project information onto the online platform. This information is then made available to a selected audience, such as prospective investors or regulators. Information can either be imported automatically (if remote monitoring equipment is in place) via an API or through scanned documents and CSV uploads. The platform is structured in such a way that the asset owner, often the mini-grid operating company, has full control of data sharing.

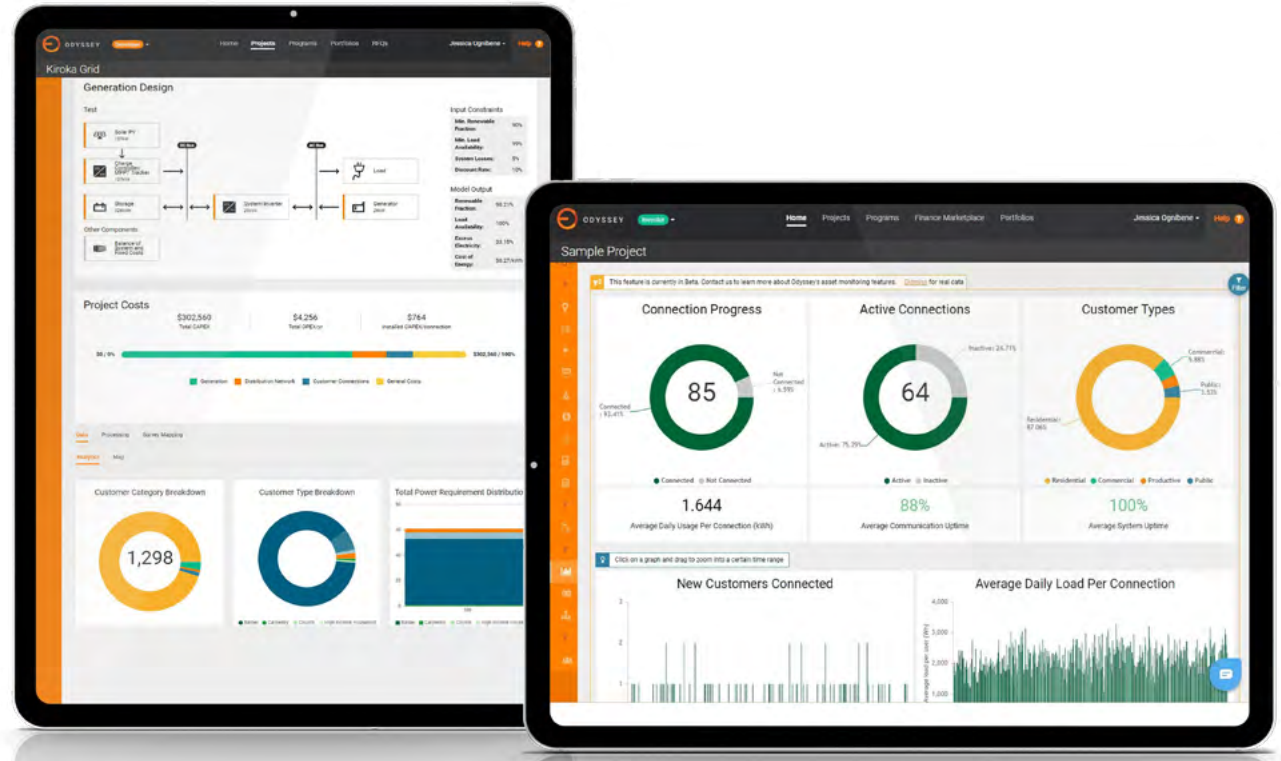
Table 1 – Example of information provided by developers on the Odyssey platform

COMPANY WIDE INFORMATION:	INFORMATION ON PROJECTS:
<ul style="list-style-type: none"> <li>• Organization profile</li> <li>• Business plan</li> </ul>	<ul style="list-style-type: none"> <li>• Location(s)</li> <li>• Load profile</li> <li>• Cost of distribution</li> <li>• Cost per connection</li> <li>• OPEX &amp; CAPEX</li> <li>• Customer classification</li> <li>• Projected revenues</li> <li>• Financial metrics</li> </ul>
<p>PORTFOLIO-WIDE INFORMATION:</p> <ul style="list-style-type: none"> <li>• Procurement plans</li> <li>• Billing strategy</li> </ul>	

131 – Examples of technical metrics include power quality, availability, distribution planning and installed capacity per generation source, while financial metrics include CAPEX, OPEX and revenues.

Figure 21 – Example of project information presented on Odyssey

Mini-grid sites are often located in areas without GSM coverage, which makes near real time data transfer from sites hard to achieve. A satellite link could be used but is typically too expensive. In cases where GSM coverage is not available, mini-grid operators upload performance data manually. This can reasonably only be done at longer intervals (e.g. monthly). Project aggregation platforms deal with this challenge in two ways: The first is to implement mechanisms to make it easier for operators to upload information manually. Odyssey does this by providing downloadable CSV templates for developers to populate and re-upload. The second is to make sure that expectations of what data can reasonably be gathered from small, rural sites are kept realistic. What is “realistic”, depends on the mini-grid and operator. As part of a project for the AfDB, TFE Energy is currently introducing a tier-based approach to performance reporting to include the full spectrum of operator maturity and size. This minimizes the reporting burden on operators as far as possible (based on factors such as the equipment they have installed on site and mobile coverage), while harvesting a sufficient volume of data for due diligence and regulatory oversight.



Screenshots provided by Odyssey Energy Solutions

*Project aggregation platforms can provide a combination of technical and financial data.*

### 3 THE DEVELOPMENT OF CROWDFUNDING PLATFORMS

While crowdfunding still only contributes a small fraction to the overall funding requirements of the energy access market, it is nevertheless becoming more important as a source, having grown from \$3.4 million in 2015 to \$31 million in 2018.<sup>132</sup> This is an annual growth rate of 76%. By the end of 2018, crowdfunding platforms have raised a cumulative total of \$54 million.

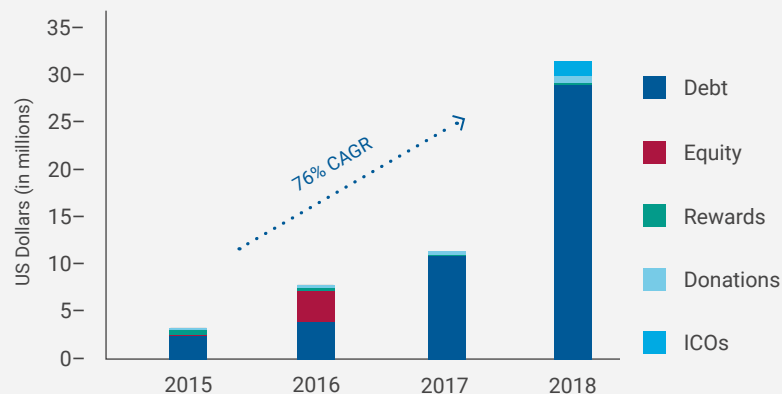
132 – Energy 4 Impact, Crowd Power – Crowdfunding & P2P Lending for Energy Access, 2019, ([link](#))



Figure 22 – Annual energy access investments raised by crowdfunding platforms (2015-2018)<sup>133</sup>

The amount of capital provided through crowdfunding platforms has grown rapidly since 2015.

The 2016 spike in equity crowdfunding is due to three deals. Since then, no energy access company successfully raised equity through crowdfunding. Equity crowdfunding deals tend to be large, but uncommon (due to regulatory hurdles).

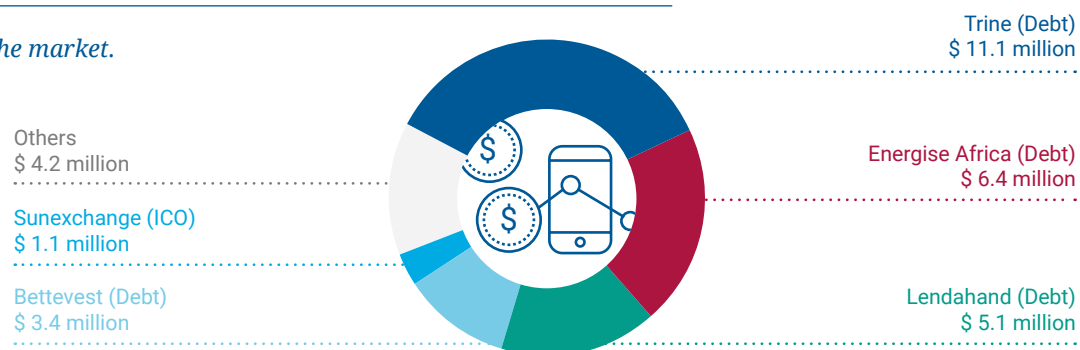


Initially, crowdfunding platforms were focused on seed investments to early-stage energy access companies. However, now they also include larger deals for OGS companies with track records, as well as project finance for mini-grids. The largest debt campaign, closed in 2019, amounted to \$7 million for the OGS company Bboxx.<sup>134</sup> Since their fees are typically a percentage of the deal value, crowdfunding platforms have sought to increase campaign sizes to become more viable themselves.

Investor aggregation in the energy access sector is also done by fund managers, such as SunFunder. These differ from crowdfunding platforms in that they aggregate capital from a combination of institutional and accredited individual investors (including high net worth individuals, DFIs, and impact investors) into tailored debt funds. Since they do not operate on digital platforms, they are not included in this analysis.

Figure 23 – Top crowdfunding platforms in terms of energy access investment raised in 2018<sup>135</sup>

Debt platforms dominate the market.



133 – Adapted from Energy4Impact, Crowd Power – Crowdfunding & P2P Lending for Energy Access, 2019, (link)

134 – Bboxx, Bboxx receives largest crowd-funded debt raise in the history of solar in Africa, 2019 (link)

135 – Energy4Impact, Crowd Power – Crowdfunding & P2P Lending for Energy Access, 2019, (link)

Table 2 – Energy access companies that have attracted the most crowdsourced finance (2018)<sup>136</sup>

NAME OF COMPANY	ENERGY ACCESS OFFERING	CROWDFUNDING APPROACH	CROWDSOURCED FINANCE RAISED
Bboxx	OGS products	Debt	\$7.3 million
Azuri	OGS products	Debt	\$1.9 million
Sollatek	OGS products	Debt	\$1.7 million
SolarWorks!	OGS products	Debt	\$1.5 million
Powerhive	Mini-grids	Initial Coin Offering (ICO)	\$1.1 million

## 4 HOW CROWDFUNDING PLATFORMS WORK

Like project aggregation platforms, crowdfunding platforms require a standardized approach to quality verification. Crowd investors want reassurance that they are investing in products and projects that meet certain targets and standards. Low quality, unverified products and projects are less likely to satisfy the end customer (the person benefitting from the energy service), which in turn jeopardizes return on investment and social impact.<sup>137</sup> When conducting technical due diligence, crowdfunding platforms can benefit from industry-wide quality standards.<sup>138</sup>

Energy access crowdfunding platforms can be classified as debt, equity, donation, ICO or reward-based platforms. So far, the most successful are debt platforms. They offer debt to companies with sufficient collateral (usually in assets) to service loans.<sup>139</sup> Returns to crowd investors are typically 5-6% in USD or EUR, per year.<sup>140</sup> Borrowers pay interest rates up to 15%. Loan terms range from 6 to 60 months, depending on the platform and type of project.<sup>141</sup>

In their technical due diligence, debt crowdfunding platforms often review technology choices and performance reports, as well as energy resource assessments. They also assess location-specific risks. This is followed by a legal and financial due diligence, which includes reviews of compliance and creditworthiness of the company and the project. The financial due diligence also includes reviewing the company's business model, cash-flow, budget statements and financial models.

» It is very important to make sure that we bring quality projects to our crowd.«

ROHIT SEN,  
Former Strategic Cooperation and  
Business Development Manager at  
Bettervest GmbH<sup>142</sup>

Equity crowdfunding platforms are most suited to companies with proven track records.<sup>143</sup> Equity campaigns, however, remain limited due to regulatory barriers. Often fundraising companies are required to be registered in the same country as the crowdfunding platform. At the time of writing, less than 10 equity crowdfunded investments have been completed in the energy access sector.

136 – Energy4Impact, Crowd Power – Crowdfunding & P2P Lending for Energy Access, 2019, [\(link\)](#)

137 – TFE Energy research shows that customers indeed experience increased satisfaction with quality verified products as compared to non-verified products. For more, see: International Finance Corporation, Papua New Guinea: Off-Grid Lighting Market Dynamics, 2019 [\(link\)](#)

138 – Quality standard initiatives in the OGS product sector in use today include the Lighting Global QAF, the GOGLA Consumer Protection Code and the GOGLA Standardized Impact Metrics for the Off-Grid Solar Energy Sector.

139 – Examples of debt platforms include Trine, Bettervest, and Energise Africa

140 – See for example the following cases: Energise Africa [\(link\)](#) and Lendahand [\(link\)](#)

141 – TFE Energy, Case study interview, Rohit Sen, Bettervest

142 – TFE Energy, Case study interview, Rohit Sen, Bettervest

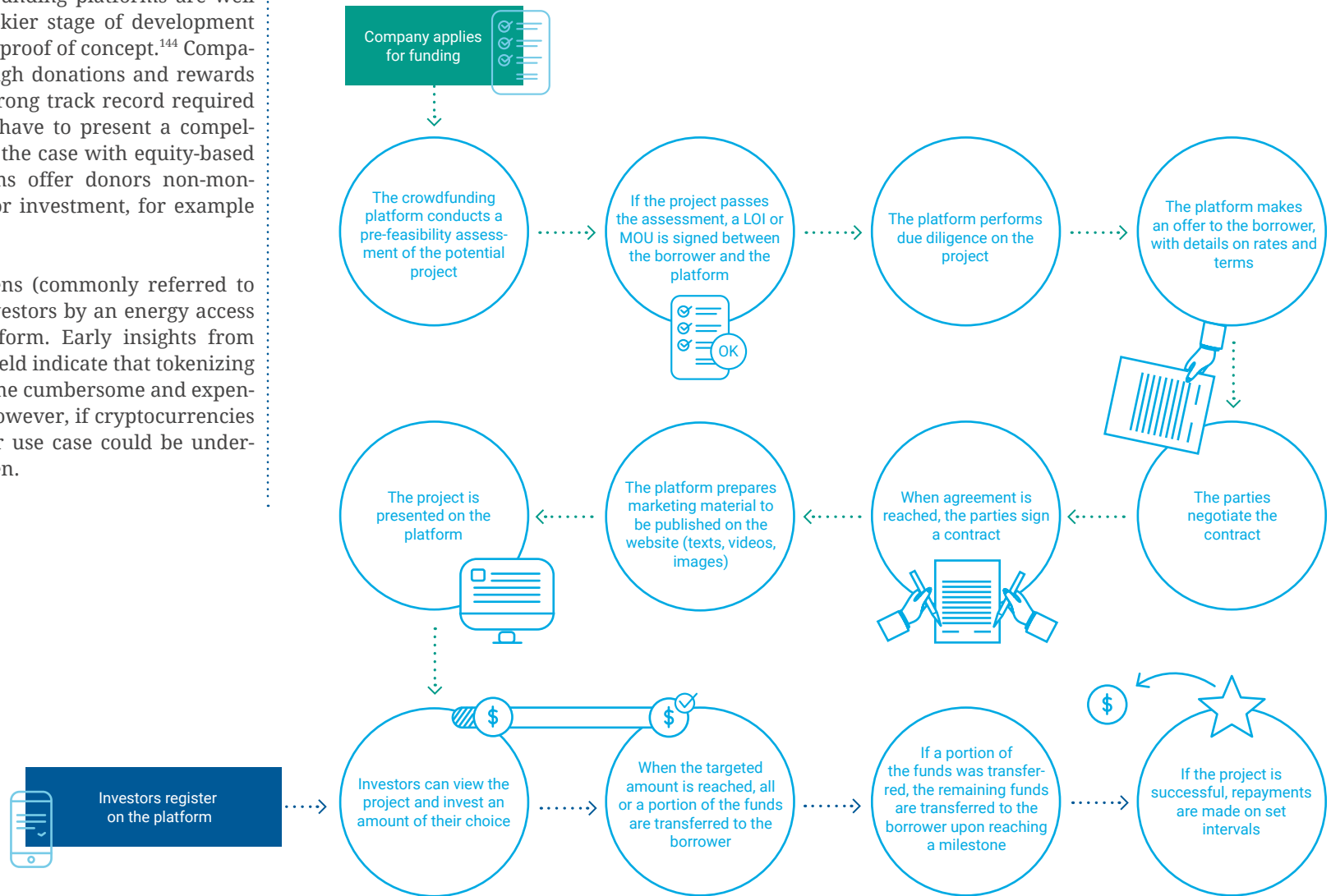
143 – Examples of platforms that offer equity deals include Crowdcube [\(link\)](#), Oneplanetcrowd [\(link\)](#) and Symbid [\(link\)](#)



Figure 24 – Overview of the crowdfunding process<sup>146</sup>

Donation and reward crowdfunding platforms are well suited for companies at a riskier stage of development and require seed capital for a proof of concept.<sup>144</sup> Companies raising investment through donations and rewards are not forced to show the strong track record required to service debt, nor do they have to present a compelling, long term storyline as is the case with equity-based investment. Reward platforms offer donors non-monetary rewards in exchange for investment, for example free products or publicity.

ICOs involve the sale of tokens (commonly referred to as crypto assets) to crowd investors by an energy access company via an online platform. Early insights from pioneering platforms in this field indicate that tokenizing investments can eliminate some cumbersome and expensive banking procedures.<sup>145</sup> However, if cryptocurrencies become more regulated, their use case could be undermined before it is really proven.



144 – Examples of donation platforms include StartSomeGood ([link](#)) and M-Changa ([link](#)), while reward platforms include Indiegogo ([link](#)) and Kickstarter ([link](#)).

145 – For an energy access-related example, see Sunexchange ([link](#)). For other renewable energy examples, see WePower ([link](#)) and Cryptoleaf ([link](#)).

146 – TFE Energy analysis

## 5 HOW DIGITAL AGGREGATION PLATFORMS ADDRESS THE MAIN CHALLENGES OF ENERGY ACCESS

### 5.1 IMPACT ON SCALE

Digital aggregation platforms can provide a window into the data and insights coming from digital operations tools and via data sharing protocols. This allows rapid and widespread dissemination of data to investors and policy makers, and increases transparency and accessibility, which is essential for mini-grid and OGS companies to scale.

Crowdfunding platforms also support scalability of the market by connecting projects to a broader investor group and leveraging social media tools such as dedicated marketing campaigns.

### 5.2 IMPACT ON COST

Through project aggregation platforms, the transaction costs of identifying and evaluating electrification investment opportunities can be reduced because investors are not forced to search for and evaluate individual projects on a case-by-case basis. Instead, they can have access to all the required due diligence data of a portfolio of projects at a single point of interface.

### 5.3 IMPACT ON RISK

Standardized performance data of mini-grid projects and OGS products presented on aggregation platforms encourage all energy access companies to meet quality criteria, which ultimately reduces investment risk.

As part of the due diligence they perform on behalf of investors, crowdfunding platforms leverage data to assess systemic risks related to countries, technologies and

» People who are registered on our platform receive newsletters and we do digital marketing through social networking sites such as Facebook and LinkedIn. That is how potential investors are informed about upcoming projects. This is the basic difference between getting a loan from bettervest and from a bank. The bank will not do any marketing or PR for you. They will just do the due diligence and then give you the money.«

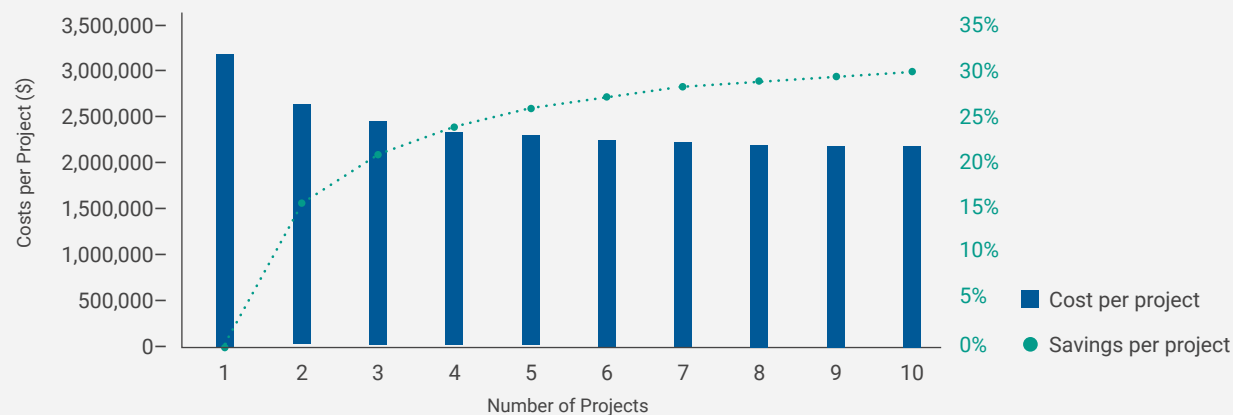
ROHIT SEN,  
Former Strategic Cooperation and  
Business Development Manager at  
Bettervest GmbH<sup>147</sup>

currencies. In some cases, the platforms themselves guarantee loans, which mitigates the risk of non-payment.<sup>149</sup> Aggregation platforms limit investors' exposure to unsystematic risk via portfolio diversification.<sup>150</sup> A recent analysis of mini-grid project aggregation in India found that by aggregating 10 projects into a portfolio, the transaction cost was reduced substantially.<sup>151</sup>

Figure 25 – Transaction cost savings per aggregated mini-grid project (data from 2015)<sup>148</sup>

Transaction costs can be significantly reduced through scale.

Project costs presented on the vertical axis are 2015 numbers.



147 – TFE Energy, Case study interview, Rohit Sen, bettervest

148 – UNEP, Crossboundary, Stanford University & UC Berkeley, Increasing Private Capital Investment into Energy Access: The Case for Mini-Grid Pooling Facilities, 2015 ([link](#))

149 – For example: SIDA, Crowdfunding Guarantee, 2017 ([link](#))

150 – Conversely, systemic risks cannot be mitigated through aggregation.

151 – Malhotra, A. et al. Scaling up finance for off-grid renewable energy: The role of aggregation and spatial diversification in derisking investments in mini-grids for rural electrification in India, 2017 ([link](#))

## 6 CHALLENGES TO DEPLOYMENT

The success of project aggregation platforms is dependent on the quality of incoming project data from mini-grid sites. However, projects are sometimes located at sites without internet availability, which makes data transfer at short intervals difficult. Smaller operators also rarely use sophisticated monitoring infrastructure. Moreover, reaching consensus on the metrics to be included in standardized reporting frameworks is a challenge due to the large number of diverse stakeholders involved. This delays the adoption of reporting frameworks and the impact of project aggregation platforms.

Another challenge is economic. Currently, the margins of most energy access companies are thin. As a result, digital aggregation platforms struggle to generate revenues from them.

For crowdfunding, the main challenge is unfavorable financial regulation that limits the flow of funds in and out of energy access markets and increases transaction costs.

*For crowdfunding the main challenge is unfavorable financial regulation.*

## 7 LOOKING AHEAD

Project aggregation platforms could in the future be driven by new government policy and subsidy schemes. Often, analyses of the various energy access routes unfairly compare unsubsidized mini-grid tariffs and OGS product prices with highly subsidized utility tariffs. Subsidies, for example in the form of results-based financing (RBF), can level the playing field. RBF can provide ex-post, measured subsidy payments to mini-grid developers and OGS product suppliers for quality service delivered to customers. Standardized performance reporting protocols and digital platforms can measure quality of service. The GMG QAF, for example, can be used by a funding organization (usually national regulators or DFIs, but

this could even be crowdfunded donors) to automatically determine, whether the RBF applicant meets eligibility criteria. If coupled with a project aggregation platform, the funding organization can easily review performance records on an online monitoring dashboard.

A second possible development is that the increase of deal sizes enabled by project aggregation platforms may link the energy access market with a much broader set of potential investors. This could eventually encourage the entry of institutional investors who seek stable, long-term investments with inflation-related returns, but need large minimum transaction sizes.<sup>152</sup> In the future, project

152 – UNEP, Crossboundary, Stanford University & UC Berkeley, Increasing Private Capital Investment into Energy Access: The Case for Mini-Grid Pooling Facilities, 2015 ([link](#))



aggregation platforms could also reduce project CAPEX through wholesale procurement of components.

Crowdsourcing platforms are getting ever better at standardizing due diligence and investor marketing processes and tapping into larger funding groups. They could start using digital planning tools to further automate and standardize project oversight and impact measurement.

## FURTHER READING

IIED's report, *Moving More Money – Can aggregation catalyse off-grid financing?*, 2019, ([link](#)), provides an overview of the value of consolidating companies and assets into portfolios and bundling financing in the off-grid sector. The report features case studies.

Energy 4 Impact's report, *Crowdfunding & P2P Lending for Energy Access*, 2019, ([link](#)), provides an overview of the state of the energy access crowdfunding market in 2018. It features deep dives into all forms of energy access crowdfunding, along with a variety of examples.

UNEP, CrossBoundary, Stanford University & UC Berkeley's report, *Increasing Private Capital Investment into Energy Access: The Case for Mini-Grid Pooling Facilities*, 2015, ([link](#)), discusses how project aggregation can reduce investment risks and transaction costs in the mini-grid sector.

Energy 4 Impact and NREL's report, *Financial and Operational Bundling Strategies for Sustainable Micro-Grid Business Models*, 2018, ([link](#)), discusses potential implementation strategies for project aggregation and financial bundling in the mini-grid sector.



Photo by Random Institute on Unsplash

## ABOUT TFE ENERGY

TFE is dedicated to achieving universal energy access and to improving investments into remote infrastructure. Our team consists of data technology experts on the one side and village electrification experts on the other. This breadth allows us to continuously test and validate new data technologies in the field and work towards specific solutions – such as Village Data Analytics – that create tangible value to the electrification ecosystem. We are always looking for passionate, talented people to join our teams in Munich/Germany and Cape Town/South Africa (for open positions see [here](#)).

## CONTACT US

10 Franz-Joseph Str.  
Munich 80801  
Germany

[contact@tfe.energy](mailto:contact@tfe.energy)  
[www.tfe.energy](http://www.tfe.energy)

## PUBLISHER

TFE Energy GmbH  
10 Franz-Joseph Str.  
Munich 80801  
Germany

## DESIGN

**Concept & layout:**  
[www.simpelplus.de](http://www.simpelplus.de)

**Cover design**  
[Alessandro Burato](#)