german cooperation
DEUTSCHE ZUSAMMENARBEIT

CF4EE - Crowdfunding for Energy Efficiency

Can Debt or Equity Crowdfunding contribute to scaling up Energy Efficiency in Developing Countries?

Published by:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Contents

List of Abbreviations 3
Executive Summary 4
1 Introduction: Crowdfunding for Energy Efficiency – it already exists! 8
1.1 Purpose of this Study 8
1.2 Crowdfunding for Energy Efficiency: Practical Examples 10
2 CF4EE And the Broader Context of the Crowdfunding Sector 12
2.1 Global Growth of Crowdfunding 12
2.2 More than only a financing instrument 13
2.3 Trends in Crowdfunding 14
2.4 Typical Crowdfunding Process 15
3 Framing the Study: The Potential of Crowdfunding As a Source of Financing for Energy Efficiency 18
3.1 Lead Questions 18
3.2 Scope 18
3.3 Study Approach 18
4 Case Studies to Explore the Potential of Crowdfunding for Energy Efficiency Financing 19
4.1 Case 1: Equity Crowdfunding for Energy Efficiency in Mosques of Morocco 19
4.1.1 Context 19
4.1.2 Description of the Case 19
4.1.3 Rationale for Considering Crowdfunding 20
4.1.4 Description of the Crowdfunding Instrument 21
4.1.5 Financial Terms and Conditions of the Equity Crowdfunding Instrument 24
4.1.6 Financial Results 25
4.1.7 SWOT Analysis Equity Crowdfunding for energy efficiency in Mosques 26
4.2 Case 2: Debt Crowdfunding for Commercial Building Energy Efficiency in Indonesia 30
4.2.1 Context 30
4.2.2 Description of Case 31
4.2.3 Rationale for Considering Crowdfunding 31
4.2.4 Financial Terms and Conditions of the Debt Crowdfunding Instrument 32
4.2.5 Financial Results 32

4.2.6 SWOT Analysis Debt Crowdfunding for energy efficiency in Commercial Buildings 34
5 First Conclusions: CF4EE Has Potential – Under Certain Conditions 38
5.1 Comparative Advantages of Crowdfunding – A conceptional view 38
5.2 Potential of CF4EE as an Instrument to Finance energy efficiency 39
5.2.1 A new source of funding 39
5.2.2 A new class of investors 40
5.3 Barriers to Scaling Up CF4EE 41
5.3.1 Overview 41
5.3.2 Evolving Legal Framework 42
5.3.3 Lack of Crowdfunding Institutional Capacity 43
5.3.4 Lack of Foreign Exchange Risk Management Tools 43
5.3.5 Lacking Quality Control Mechanism and related Reputational Risk for CF4EE 44
5.3.6 'Competition' from Highly Subsidized energy efficiency Funding 44
5.3.7 The Unknown Crowd 45
6 Conditions Conducive For CF4EE 46
6.1 Introduction 46
6.2 Essential Conditions for Scaling Up CF4EE – a Proposed Framework 46
6.3 Application of the Framework to the Cases Presented in this Study 48
6.3.1 Rating of Conditions for CF4EE in Morocco's 'Greening Mosques' Program 48
6.3.2 Rating of Conditions for CF4EE in Indonesia's 'Energy Efficiency in Commercial Buildings' 49
7 Recommendations 51
7.1 The 5 Cs of Supporting CF4EE 51
7.1.1 CF4EE Enabling Regulation 51
7.1.2 Credibility and Transparency Through a CF4EE Portal 52
7.1.3 Capacity for CF4EE 53
7.1.4 Co-Funding and Challenge Grants 54
7.1.5 Confidence of Crowd Investors Through De-risking 55
7.2 Opportunities for GIZ Engagement in Scaling up CF4EE 56
7.2.1 CF4EE Regulation: Policy Advice and stakeholder consultation on crowdfunding legislation and regulation. 56
7.2.2 CF4EE Portal 57
7.2.3 Capacity Building 57
7.2.4 Matching Funding and Challenge Funds 57

7.2.5 De-risking..... 57
7.3 IKI Proposal to Pilot Test CF4EE.....58
7.4 CF4EE as a Complementary Instrument in the Broader Context of Development and Climate Finance.....59
ANNEX: References.....62

List of Abbreviations

CF4CC	Crowdfunding for Climate Change
CF4EE	Crowdfunding for Energy Efficiency
CFP	Crowdfunding Platform
CO2	Carbondioxid
EBRD	European Bank for Reconstruction and Development
ESCO	Energy Service Company
EU	European Union
GCF	Green Climate Fund
GDP	Gross Domestic Product
GIZ	Gesellschaft für International Zusammenarbeit
IKI	Internationale Klima Initiative (International Climate Initiative)
IRR	Internal Rate of Return
kWh	Kilowatt-hour
MAD	Moroccan Dirham (local currency)
MWh	Megawatt-hour
NDC	Nationally Determined Contribution
SWOT	Strength-Weakness-Opportunities-Threats
UK	United Kingdom
USA	United States of America

Executive Summary

Crowdfunding for Energy Efficiency (CF4EE) is a new concept and put into practice since 2013, at least in Germany. **This report explores, to what extent CF4EE could play a relevant role in accelerating investments in energy efficiency in developing countries**.

This study starts with the assumption, that energy efficiency measures in developing countries are desirable, and that **the potential for cost effective energy efficiency measures has not been exhausted, because of, inter alia, difficulties in financing** the necessary upfront investments to achieve energy efficiency.

Crowdfunding has grown exponentially over the last 5 years, **offering advantages over existing financial instruments in** few areas, including: (i) Tapping into new funding sources, such as small investors with risk appetite for venture capital and small impact investors, (ii) Empowering responsible investors seeking greater control over their investments, (iii) Encouraging investors to increase their risk tolerance by offering greater diversification and smaller amounts per investor, and (iv) Increase speed of decision and transaction processing, through standardized online processes.

This **study is a first effort to explore the potential of crowdfunding for financing cost-effective energy efficiency measures in developing countries,** in particular in situations where lack of affordable financing is a main barrier to scaling up energy efficiency measures.

To that effect, it identifies conditions which are conducive for CF4EE and recommends policies and institutional actions that can help scale up CF4EE, where the conditions are favorable, **in particular for debt and equity crowdfunding**.

The study builds on **two cases which were selected in consultation with GIZ in Morocco (Green Mosques Energy Efficiency Program) and in Indonesia (Commercial Building Energy Efficiency)**.

In response to the specific project financing needs, **customized crowdfunding models were developed**: **sharia-conform equity crowdfunding** for Morocco, and **debt crowdfunding for Indonesia**. In both cases the rationale for looking at CF4EE were constraints in accessing finance for implementing or scaling up cost-effective energy efficiency measures.

These two cases were analyzed from a financial perspective, using a dynamic **investment analyses tool**, and from an institutional viability perspective, using a **SWOT** (strength-weakness-opportunities-threats) framework.

In **both cases, the energy efficiency measures and the crowdfunding approach were found to be, in principle, financially viable.** The Internal Rates of Return (IRRs) are attractive at above 20% in Morocco and even up to 50% in the case of Indonesia. However, returns became very low in the case from Morocco once the additional costs

for using the crowdfunding option were factored in. Those costs can amount to 10 to 20% of the funds raised.

In the case of Indonesia, the project could generate **CO2 reductions without relying on government subsidies**. To the private sector, additional funding coming through crowdfunding would offer **opportunities to expand the Energy Service Company (ESCO) business** and tap into energy efficiency and cost savings potential where currently owners have no willingness to invest own money. In addition, involving the crowd can lead to **greater public awareness** and support for energy efficiency measures.

Both cases face serious challenges which would need to be addressed before CF4EE could be implemented: (i) **legal uncertainty** because regulations are missing or are inappropriately adopted from existing pre-crowdfunding legislation; (ii) **missing institutional capacity**, including competent crowdfunding platforms (CFP) and support services, such as online-payment to ensure high quality projects and efficient on-line processes; (iii) **possible 'competition' in the future from donations** or government subsidies, rendering crowdfunding by comparison too costly; and (iv) **foreign exchange risk in cross-border crowdfunding**, which neither crowd investor nor project owner want to bear.

In summary: CF4EE has potential to be replicated in developing countries and help finance energy efficiency – ***under certain conditions.***

Taking the perspective of a development organization, a **simple framework** has been developed to determine, whether some **essential conditions exist for CF4EE** and make it worth considering support for scaling it up.

The **following five essential conditions were identified**: (i) Demand and Technical Capability for energy efficiency, (ii) Financing Barriers, (iii) Clear Regulations for Crowdfunding, (iv) Institutional Capacity and (v) an Interested Crowd. For each condition, several specific aspects have been elaborated.

This **framework was then applied to the two case studies** as a practical test.

In the **case from Morocco, the study concluded, that equity crowdfunding for mosques does not lend itself for a CF4EE initiative** for four main reasons: (i) a financially only marginally viable project, once crowdfunding and ESCO costs are calculated, i.e. demand will be weak; (ii) alternative sources of government subsidies or donations will be readily available for financing energy efficiency measures in mosques; (iii) individual mosques may have limited incentives for undertaking energy efficiency as long as energy bills are being paid by someone else (e.g. Ministry); and (iv) a strong assumption, that the potential crowd will rather donate than invest in a mosque on ethical grounds. Setting up the institutional infrastructure of an ESCO, CFP, and sharia conform financing mechanism, for which no precedent or regulation exist yet, would require a sustained development effort and strong national champion, which is currently not in sight.

In the **case from Indonesia, the study deemed the conditions for CF4EE favorable enough to warrant a support for scaling up CF4EE.**

The study **recommends 5 approaches, the "5 Cs", to create conditions conducive to the introduction and the scaling up CF4EE:** (i) **CF4EE Regulation** – establish an enabling legal and regulatory environment through policy advice; (ii) **Credibility** – enhance the credibility and transparency of CF4EE products and services **through a CF4EE Portal**; (iii) **Capacity** – enhance the capacity of the relevant CF4EE actors, in particular regulators, CFPs and relevant support systems (e.g. payment services) mainly through practical trials and training; (iv) **Co-Funding** – enhance impact through matching of funding from the crowd; (v) **Confidence** – enhance confidence of crowd investors **through de-risking.**

It suggests that **GIZ is strategically positioned to play a significant role** in: (i) developing appropriate CF4EE regulation through policy advice and consultations; (ii) to offer capacity building to the main stakeholders: CFPs, regulators, and support service providers; and (iii) help establish a CF4EE Portal. GIZ could play a facilitating role in designing matching funds and de-risking instruments.

GIZ may consider submitting a proposal to the International Klima Initiative (IKI) in 2017 to pilot test CF4EE in a selected group of countries. In its 2016 call for proposal, IKI put particular emphasis on developing innovative climate finance instruments which would help accelerate implementation of ambitious Nationally Determined Contributions (NDCs). The IKI proposal could include the following measures: (i) **Diagnostic of the regulatory framework,** in particular for cross-border crowdfunding and for setting up new in-country CFPs; (ii) **International exchange** and workshops between countries with a highly developed crowdfunding sector and countries at an early stage of crowdfunding development. (iii) **A feasibility study on setting up a new CFP focused on energy efficiency** or building on existing CFPs. (iv) **Testing systematically crowdfunding markets, to better understand crowd** preferences and sensitivities with regard to risk and returns and to better target campaigns in the future.

As **crowdfunding** is being increasingly considered in the development context, it is useful to look at it as **a complimentary instrument in the broader context of development and climate finance.** The study suggest **a 'sandwich' approach**: in a stylized 3-step development process of introducing, piloting, and scaling up a new business model (e.g. shared savings ESCO) or technology, **crowdfunding could be sandwiched in between grant funded upstream innovation on the one side, and downstream large scaling up through regular bank financing on the other side.**

This view of CF4EE as a complementary development financing instrument calls for a **dialogue with established public and private financial institution. GIZ would be in a strong position** to initiate and facilitate such dialogue**, as part of its ongoing work with national development banks, its climate finance readiness work for Green Climate Fund (GCF), and possibly as part of a future IKI project described above.**

In terms of structure, the report first briefly introduces the topic of energy efficiency and crowdfunding. It then analyzes two scenarios, which build on real life energy

efficiency measures in two different countries. This provides the basis for a SWOT analysis, followed by first conclusions as for the usefulness of crowdfunding as a financing instrument for energy efficiency, including a simple framework to determine whether essential conditions for CF4EE exist. The report finishes with recommendations, including for possible involvement of GIZ in supporting CF4EE.

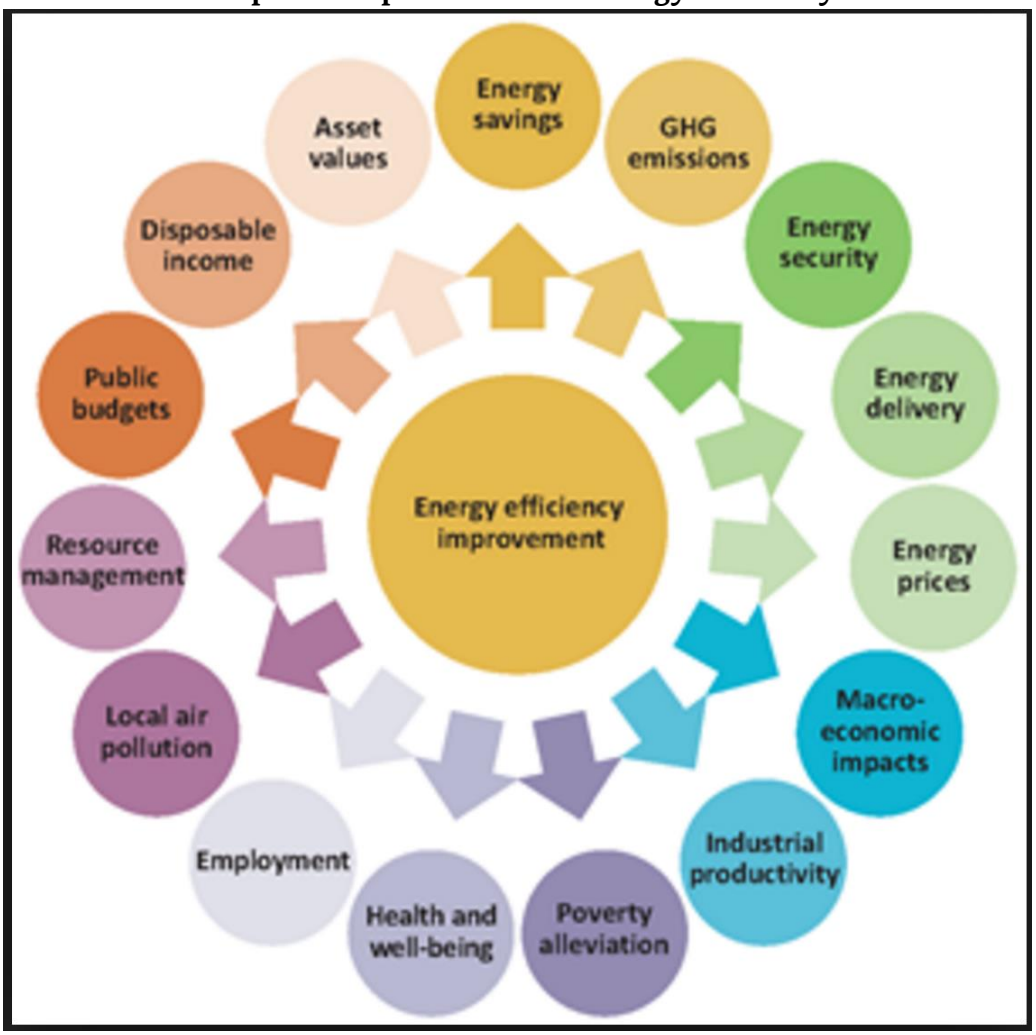
1 Introduction: Crowdfunding for Energy Efficiency – it already exists!

1.1 Purpose of this Study

The purpose of this feasibility study is to explore, at the request of GIZ, the feasibility of crowdfunding for energy efficiency (CF4EE) projects in developing countries and emerging economies. Crowdfunding is the mobilization of funding for projects from a large number of investors ('the crowd') using internet based platforms and online processes. The size of the investment of an individual investor can range from very small (say €50) to large (several thousand Euros).

Energy efficiency is a corner stone of energy and climate policies, offering multiple benefits, including many cost-effective opportunities to reduce energy costs, fossil fuel dependency, and CO2 emissions. See the graph by the International Energy Agency capturing the multiple benefits from Energy Efficiency.

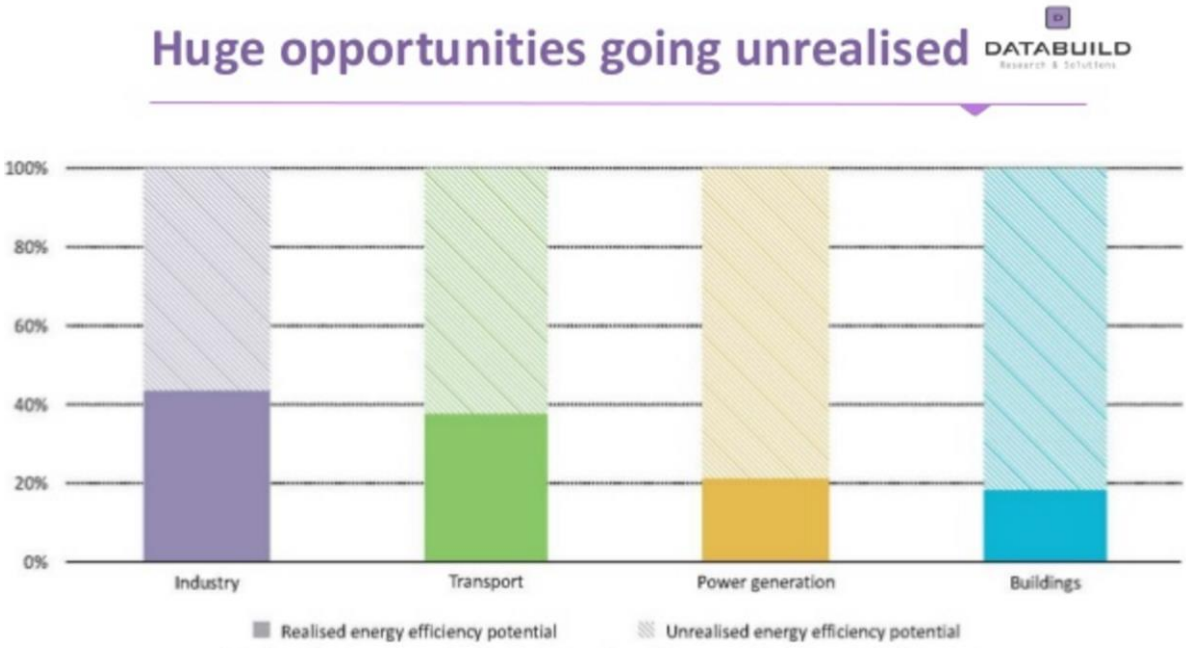
Graph: Multiple Benefits of Energy Efficiency



Source: IEA, Capturing the Multiple Benefits of Energy Efficiency. 2015

Despite its virtues, investment in energy efficiency falls short of its potential for a number of reasons, including a financing gap, i.e. limited access to affordable finance for the upfront investments in energy efficiency.

Graph: Untapped Economic Potential of Energy Efficiency



IEA (2014), *Capturing the Multiple Benefits of Energy Efficiency,* OECD/IEA, Paris.

Hence the guiding question behind this report is to what extent and under what circumstances crowdfunding could serve as a financial instrument to overcome such financial gap.

To that effect, this study briefly introduces the topic of CF4EE. It then analyzes two scenarios, which build on real life energy efficiency measures in two different countries. This provides the basis for a SWOT (strength-weaknesses-opportunities-threats) analysis, followed by preliminary conclusions concerning the potential of crowdfunding as a financing instrument for energy efficiency and the conditions conducive for scaling up CF4EE. The study finishes with recommendations for policies and technical assistance, and the specific role GIZ could play in making crowdfunding more relevant for energy efficiency.

1.2 Crowdfunding for Energy Efficiency: Practical Examples

CF4EE has been pioneered by a German crowdfunding platform Bettervest[1]. Since 2013, Bettervest has hosted 39 energy efficiency projects, all of which reached their funding target (which is quite an achievement in the crowdfunding world). Project sizes range from as low as €4,150 to over €200,000, tendency growing over time.

Projects have been primarily located in Germany, with few exceptions, such as the LED lighting project for a school in Hungary. (See the box for a brief description). This exception was made possible because the project developer was based in Germany and was already known to Bettervest from previous crowdfunding campaigns.

Graph: Successful Crowdfunding Campaign for Energy Efficiency Project in Hungary.

This school facility was built toward the end of the 19th century with a total area of 10,000m2. Currently this church-run institution serves 1,150 children and youths. The project focused on installing LED lighting in a new extension of 1,100m2, built in 2001, and on the sports field. The project with a total investment cost of €46,400 will generate savings from reducing electricity costs for lighting by 71.46 % (or € 7,282.29 annually, not accounting for possible increases in energy prices) and from reduced maintenance costs. As such the project also contributes to climate protection in Hungary. In addition to the financial savings, the project serves as an educational project to demonstrate to young people practical steps towards a low carbon future.

[1] www.bettervest.com

The School management welcomed the Crowdfunding option, because no internal budget was available to implement this project. The project is being executed by the Hungarian subsidiary of a German Energy Service Company (ESCO). The ESCO sells the LED installation to the school through a lease purchase over 10 years with an annual payment of €6,542 denominated in Hungarian Florint.

The ESCO is the recipient of the €46,400 crowdfunded 7-year loan with an approximate interest of 7% p.a. The loan is euro-denominated, and the ESCO bears the foreign exchange risk. The funding campaign mobilized 92 investors and was completed within 16 days. [2]

Since Bettervest's pioneering work, few other crowdfunding platforms (CFP) have started offering energy efficiency projects, such as ECONEERS, but no other platform, at least in Europe, focuses exclusively on energy efficiency projects.

It is interesting to compare the fast growth of CFPs dedicated to renewable energy development to the relatively slow growth of platforms dedicated to energy efficiency. Possible explanations, none fully satisfactory, include:

- Energy efficiency projects are per se less attractive than renewable energy projects, independently of crowdfunding, as they are less visible and eye catching.
- In countries like Germany, highly concessional funding is available for energy efficiency, rendering crowdfunding less competitive and attractive.
- We have less experience with incorporating crowdfunding into energy efficiency business models than for renewable energy (e.g. citizen energy, community cooperatives etc.).

Graph: Crowdfunding for Renewable Energy

Source: Solar Plaza

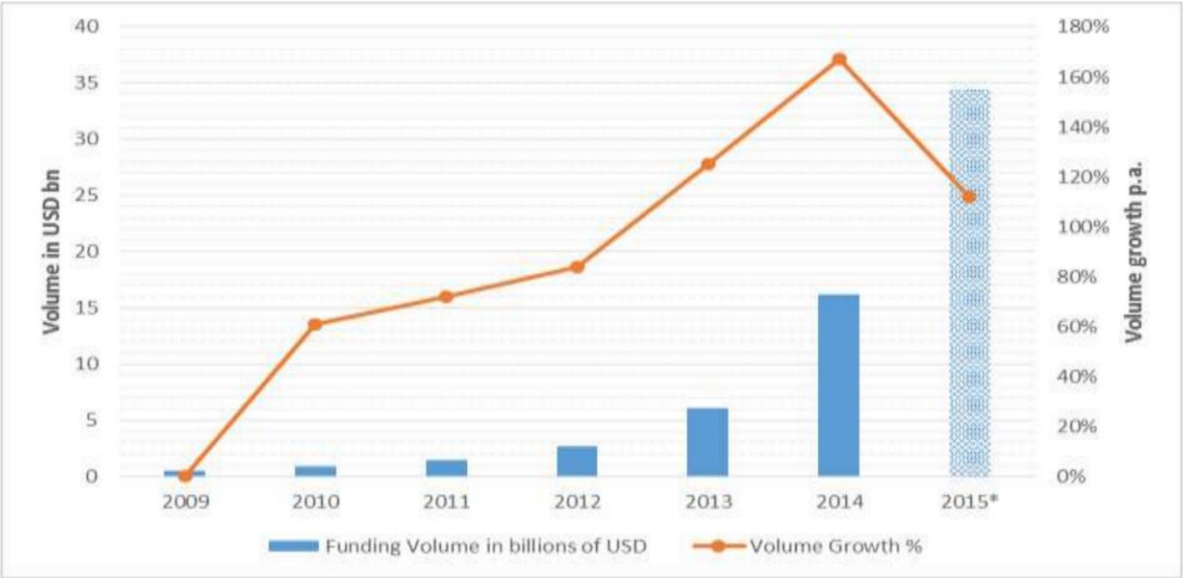
[2] Source: Bettervest https://www.bettervest.com/projekt/LED-Karolinaschule-Ungarn

2 CF4EE and the broader Context of the Crowdfunding Sector

2.1 Global Growth of Crowdfunding

Energy Efficiency and Renewable Energy account only for a small share of overall crowdfunding. The Crowdfunding sector on the whole continues to grow exponentially, with annual growth rates above 100% and reaching a volume of more than €30 bn globally in 2015. [3]

Graph: Rapid Growth of Crowdfunding (USD bn) and Growth Rates (in %)



Source: Massolution (2015), authors' compilation

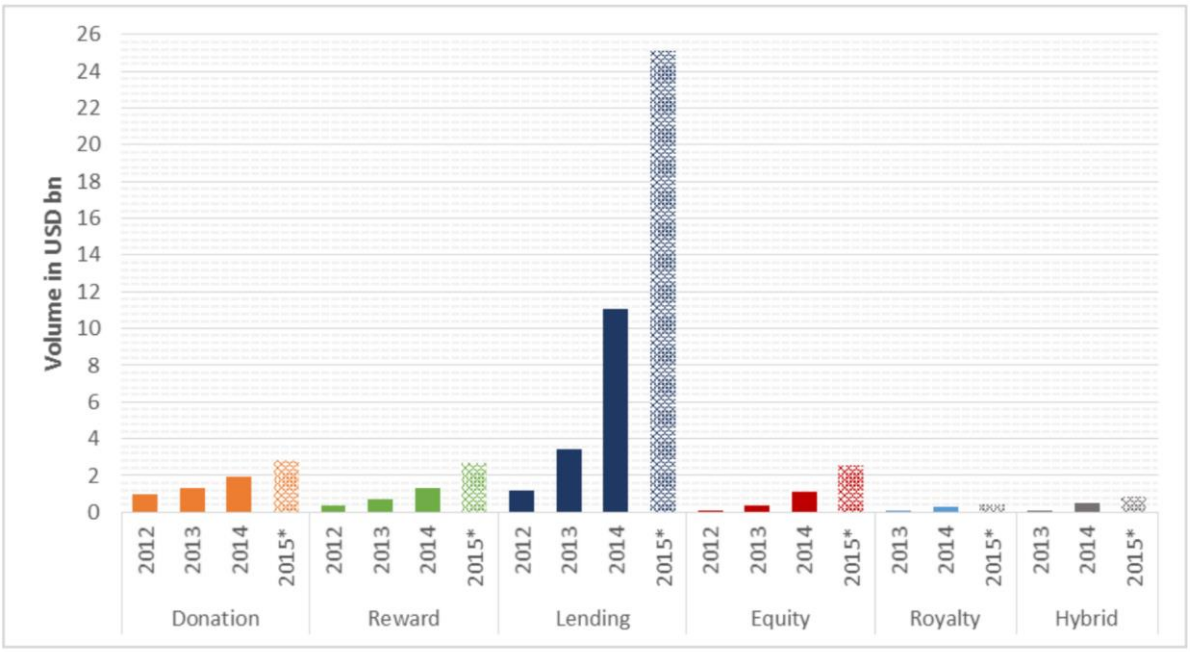
Crowdfunding is generally divided into four different modalities:

- **Donations** – the oldest form of crowdfunding, using the internet to fundraise for projects, causes, and organizations.
- **Rewards** – in exchange for a contribution, the crowd investor receives a non-financial return, such as new music CD, the production of which was crowdfunded, or vouchers to make purchases in a specific shop.
- **Debt** – the crowd investor provides a loan to a project or to another person (e.g. peer-to-peer lending) and expects in exchange interest payments and the return of the principal.
- **Equity** – the crowd investor acquires a share in a company and expects dividends and/or a value increase in return. Here the crowd participates in upside and downside risks of the business.

[3] Source Massolutions Annual Report 2016.

The now largest and fastest growing segment is peer-to-peer lending, accounting for almost three quarter of all crowdfunding volume.

Graph: Crowdfunding Development by Type of Crowdfunding (in USD bn)



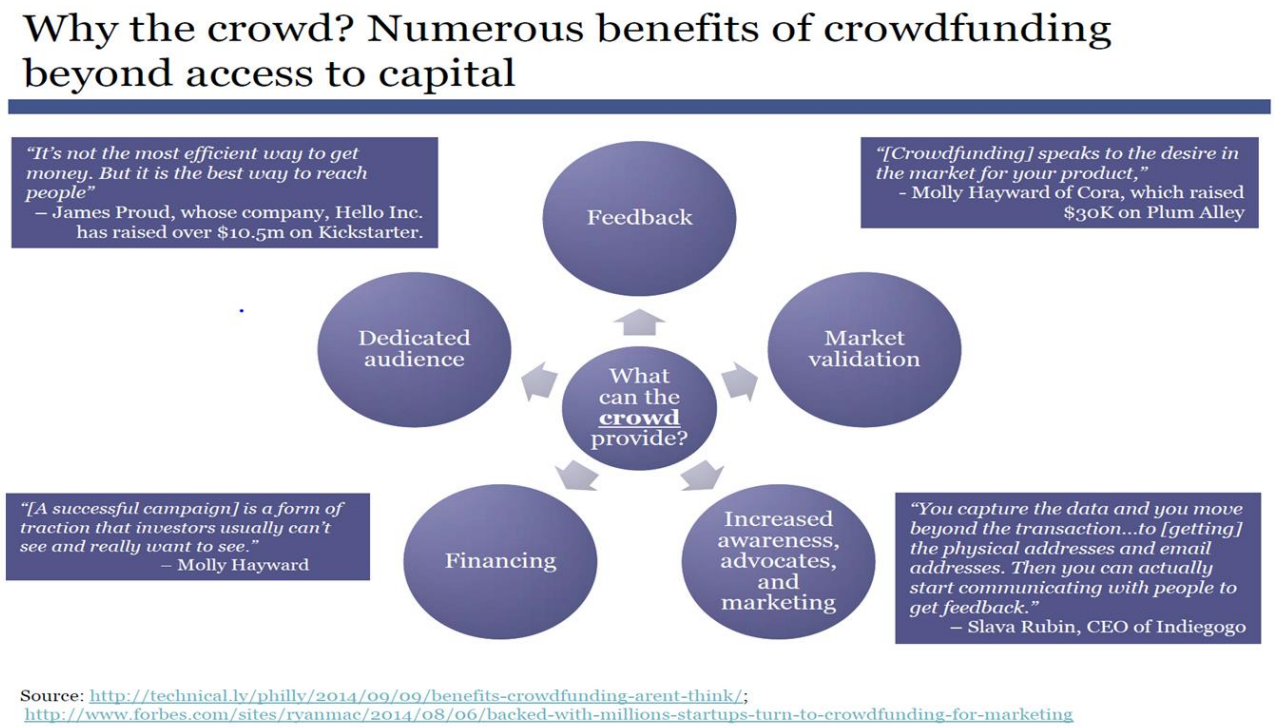
Source: Massolution (2015), authors' compilation

Note: Royalty and Hybrid are so far only marginal in size and are not further addressed in this study.

This report focuses on debt and equity crowdfunding: first, because energy efficiency projects are generally assumed to be cost-recovering and hence can offer a financial return to investors. Second, because debt and equity crowdfunding have a greater potential to scale up, and therefore are more relevant when considering financing a growing pipeline of energy efficiency projects with costs often exceeding €100,000 and therefore typically beyond the scope of donations or reward crowdfunding.

2.2 More than only a financing instrument

Crowdfunding is more than a financing instrument. It offers outreach to the market, e.g. if a company wants to introduce a new product or service, and through crowdfunding with pre-sale validates its market. Crowdfunding can create a followership for a specific platform (e.g. Kiva) or type of project (clean energy projects). This crowd can convert itself into an advocacy group in favor e.g. energy efficiency projects, which crowd investors have invested in. The graph below provides an overview of various non-financial benefits of crowdfunding.



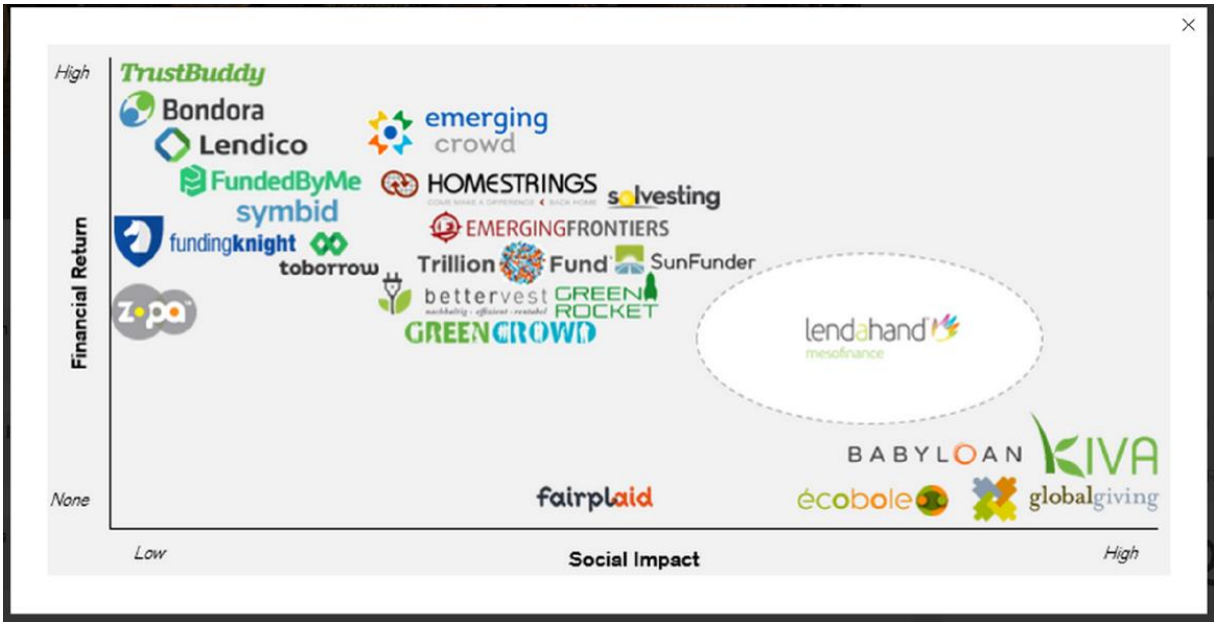
Source: http://technical.ly/philly/2014/09/09/benefits-crowdfunding-arent-think/;
http://www.forbes.com/sites/ryanmac/2014/08/06/backed-with-millions-startups-turn-to-crowdfunding-for-marketing

2.3 Trends in Crowdfunding

The nature of the crowdfunding sector is evolving fast. Some of the important trends include:

- Crowdfunding is expanding faster in the non-donation space, i.e. in debt, equity, which increases the scope of possible applications of crowdfunding in larger investments.
- Crowdfunding is expanding fast, from a low base, in sectors of immediate relevance from a climate change perspective, in particular in Renewable Energy, but also in transport, energy efficiency and sustainable agriculture.
- The Sector sees a growing involvement of professional financial institutions, institutional investors, venture capital and angel investors. This enables CFPs to tackle more complex and larger projects but at the same time forces it to pay greater attention to due diligence to satisfy information requirements of larger and more sophisticated investors.
- As a result, the balance in terms of return expectations of crowd investors is shifting from an emphasis on social-environmental benefits toward greater importance of financial returns. The graph below illustrates how some CFPs position themselves on this continuum of financial return and social impact.

Graph: Positioning of Crowdfunding Platforms between Social Impact and Financial Return



Source: Lendahend

- With rising regulatory demands and intensifying competition among CFPs, it is widely expected that 2016 and 2017 will see a 'market shake out' with further concentration and consolidation of few larger platforms and the exit of a number of less successful smaller platforms, which have not been able to reach a break-even point and are running out of their start-up capital.

This will dampen some of the 'crowdfunding hype', which has painted crowdfunding as a panacea to overcome all sorts of financial market deficiencies, including constrained access to finance by start-ups, shortage of funding for environmental and social projects, and high costs of funding, e.g. in the micro-finance sector. Crowdfunding is not a 'cure-all': it is not necessarily a cheap way to raise funds, it is increasingly subject to similar regulations as the existing financial sector, and faces similar risks as established lenders and equity investors.

2.4 Typical Crowdfunding Process

Crowdfunding nowadays span a wider range of modalities and business models. The following description captures some of the main features of a debt or equity crowdfunding process.

Hence, a typical crowdfunding campaign includes the following steps:

- **A contract between the project developer and the CFP**, regulating the fees and conditions. Often, fees include:

    - a one-time listing fee of 5 to 10% of the amount raised, and
    - an annual fee of about 1% fee on the amount raised (or sometimes on the outstanding balance). Additional costs can include
    - a financial services fee of 0.25% to up to 3%, for handling financial transfers between the crowd investor, the CFP, and the project.
    - some platforms may charge an extra fee for marketing efforts, up to 5%, depending on how much effort the CFP itself, as opposed to the project, undertakes.

- **The listing of the project on the website of the CFP**. Before listing, the CFP and the developer would agree on:

    - the duration of the campaign (typically 1 to 3 months),

    - a minimum target amount to be raised, and

    - a clear description of the terms and conditions for the crowd investment. This description (the 'pitch') would include at a minimum a brief explanation of the project and the project developer, the target amount for the campaign (minimum and maximum thresholds), the minimum (and depending on the national legislation also the maximum) amounts each investor may invest, the dividends and other rewards the investor can expect, the duration of the project and the exit strategy for the crowd investor to recuperate its full investment and dividends. Typically it also includes

    - a long description of all the risks and a warning, required by the financial oversight authorities of the country, that this is a risky investment, and that the investor may lose all his/her money.

- **The fundraising campaign** runs through several stages, from pre-kick-off presentations to the crowd announcing the upcoming investment opportunity, to the kick-off of the campaign, with continuous updates to potential investors about progress in fundraising, and a final stretch all-out effort to reach at least the target, or even better, overshoot it.

- **The pledge and contract phase.** Crowd investors can pledge online a certain investment amount. Then they need to be cleared in accordance with money-laundering regulations and crowdfunding legislation, a service often provided by

a bank or payment services provider. Once cleared, investor and the CFP (or in some cased the project itself), enter into individual equity investment agreements, preferably online.

- **The implementation phase**, when the crowdfunded amount is transferred to the project and the project provides regular payments and update reports to crowd in accordance with the agreement signed by the project. During that phase, the project pays an annual fee to the CFP (here 1% p.a. on the original fundraised amount) for monitoring and continued investor communication.

3 Framing the Study: The Potential of Crowdfunding as a Source of Financing for Energy Efficiency

3.1 Lead Questions

This study is a first effort to explore the potential of crowdfunding for financing cost-effective energy efficiency measures in developing countries, in particular in situations where lack of affordable financing is a main barrier to scaling up energy efficiency measures.

To that effect, the study attempts to offer first answers to the questions:

- Under what conditions is debt or equity crowdfunding, potentially a useful instrument to finance energy efficiency in developing countries? What if, any, are the advantages of crowdfunding over existing financing mechanisms when it comes to financing energy efficiency measures and ESCOs?
- Where conditions are conducive, what barriers constrain CF4EE from being scaled up?
- What policies and institutional actions can help overcome such barriers? What role could specifically GIZ play to support developing countries interested in scaling up CF4EE?

3.2 Scope

The scope of the study is defined:

- Thematically, focusing on the potential for CF4EE, projects, that are cost effective and generate a financial net benefit, without exploring in any depth general aspects of crowdfunding and energy efficiency.
- Geographically, focusing on financing of energy efficiency measures in developing countries and emerging economies, developing specific cases for Indonesia and Morocco.
- By type of crowdfunding, focusing only on the use of debt and equity crowdfunding.

3.3 Study Approach

The study is a desk top study which approaches its subject bottom up, building on two concrete cases of energy efficiency measures in the planning stage. The cases were identified by GIZ in Morocco and Indonesia, based on availability of financial project data and potential replicability of the measures. These two cases were then analyzed from a financial perspective, using a dynamic investment analyses tool[4]. Appropriate

[4] The Investment-grade Calculation, Analysis & Financing of Energy Projects (Efficiency and Renewables). Economic, Financial and Technical Calculation Tool. Version 4.6, January 2016, developed by Mr. Jan Bleyl for the GIZ.

adjustments were made to create a realistic business case, e.g. assuming no subsidies and an incremental startup of operation.

The analysis was complemented through telephone interviews with project proponents, GIZ staff, and crowdfunding experts, to identify specific barriers the projects are facing and to better understand the challenges of a possible crowdfunding campaign. However, there were no field visits or practical market tests foreseen in this phase of the study.

Building on the case analysis and the interviews, the study then develops a framework for recommending policy and institutional actions, including a special focus on possible actions by GIZ.

4 Case Studies to Explore the Potential of Crowdfunding for Energy Efficiency Financing

4.1 Case 1: Equity Crowdfunding for Energy Efficiency in Mosques of Morocco

4.1.1 Context

In Morocco, GIZ is supporting the national "Green Mosques" programme that was initiated by four Moroccan organizations.[5] The Green Mosque programme aims at introducing cost-effective energy savings measures in mosques.

4.1.2 Description of the Case

Based on the feasibility study provided by GIZ for one specific mosque, the highest priority measures included:

- Replacement of existing internal lighting with LED. Expected savings are 10 MWh/year or about €1,500/year. Investments amount to €2,700 and the payback period is 1.8 years. And
- Increase in the storage capacity of the hot water boiler linked to the Solar Water Heater to reduce the electricity consumption of the back-up system, which currently kicks in regularly during night time. Expected savings are 1.3 MWh/year and about €180/year. Investments amount to €1,000 and the payback period is about 5.5 years.
- A third measure was to install solar PV to generate electricity and reduce the cost of purchasing electricity from the grid. This measure was excluded from this case study because of comparatively lower savings per investment and hence longer

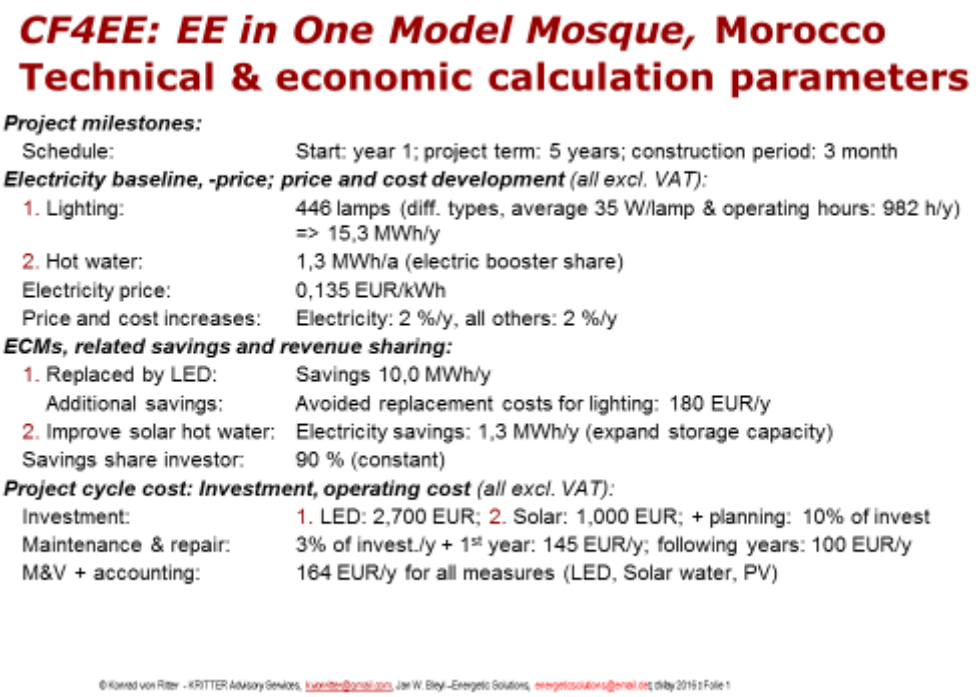
[5] Ministère de l'Energie, des Mines, de l'Eau et de l'Environnement; Ministère des Aouqaf et des Affaires Islamiques, Société d'Investissements Energétiques, Agence de Développement des Energies Renouvelables et de l'Efficacité Energétique (Ministry of Energy, Mining, Water and Environment and its Renewable Energy and Energy Efficiency Agency; Ministry of Charitable Trusts and Islamic Affairs; Ministry of Energy Investments.

payback periods, close to 10 years, and lower Internal Rates of Return (IRRs) than for the other measures, making the package less attractive for potential investors.

The estimated total investment costs for the LED lighting and the solar water heater storage are about 40,000 MAD (€ 4,000), of which 67% are for the LED lighting retrofit.

In summary, for this example, the proposed energy savings measures make sense in terms of energy cost savings, reduced maintenance, and environmental benefits. It is important to mention, that this is ONE example of a mosque but that the overall pool of mosques is actually quite heterogeneous. For instance, looking at a larger sample of about 100 mosques, the average investment is 30,000 MAD for LED lighting, and the savings amount to 5 MWh. Very few of the mosques have hot water, and those which do have, use mostly gas, which is highly subsidized and hence provides little incentive for savings[6].

The table below summarizes the assumptions used to calculate costs and energy savings for this one model mosque for which a feasibility study was available.



4.1.3 Rationale for Considering Crowdfunding

Morocco has some world famous mosques, but then thousands more in larger and smaller towns. Should Morocco want to introduce these energy savings measure in all of these mosques, it would have several options to finance such investments:

[66] Based on feedback from the GIZ Project Team.

- Government (national or local) finances directly the energy efficiency investment, possibly with international funding support.
- A private ESCO would pre-finance and recuperate its investment under a shared savings scheme.
- Theoretically, an individual mosque might want to self-finance the energy efficiency measures, but reportedly in most cases they have only a limited incentive to do so as long as the energy bills are paid directly by the Ministry.

For the purposes of this study, we assume that Government supported finance will cover only 600[7] mosques , that only a limited number of mosques can mobilize enough donations for such energy efficiency measures, and that private ESCOs have not yet engaged with mosques on energy efficiency measures.

We further assume that mosques would reject debt financing involving interest payments for loans as a source of financing, because it is incompatible with Islamic Finance.

In response to the specific case presented by GIZ and the assumptions made, this study developed a scenario in which **equity crowdfunding** would fill the financing gap to implement energy efficiency measures in mosques not covered by the national support program.

4.1.4 Description of the Crowdfunding Instrument

Islamic Finance and Crowdfunding

The basic principles of Islamic Finance include that transaction must involve a real asset (so that money does not generate money), and that investor must share in risks and rewards. [8]

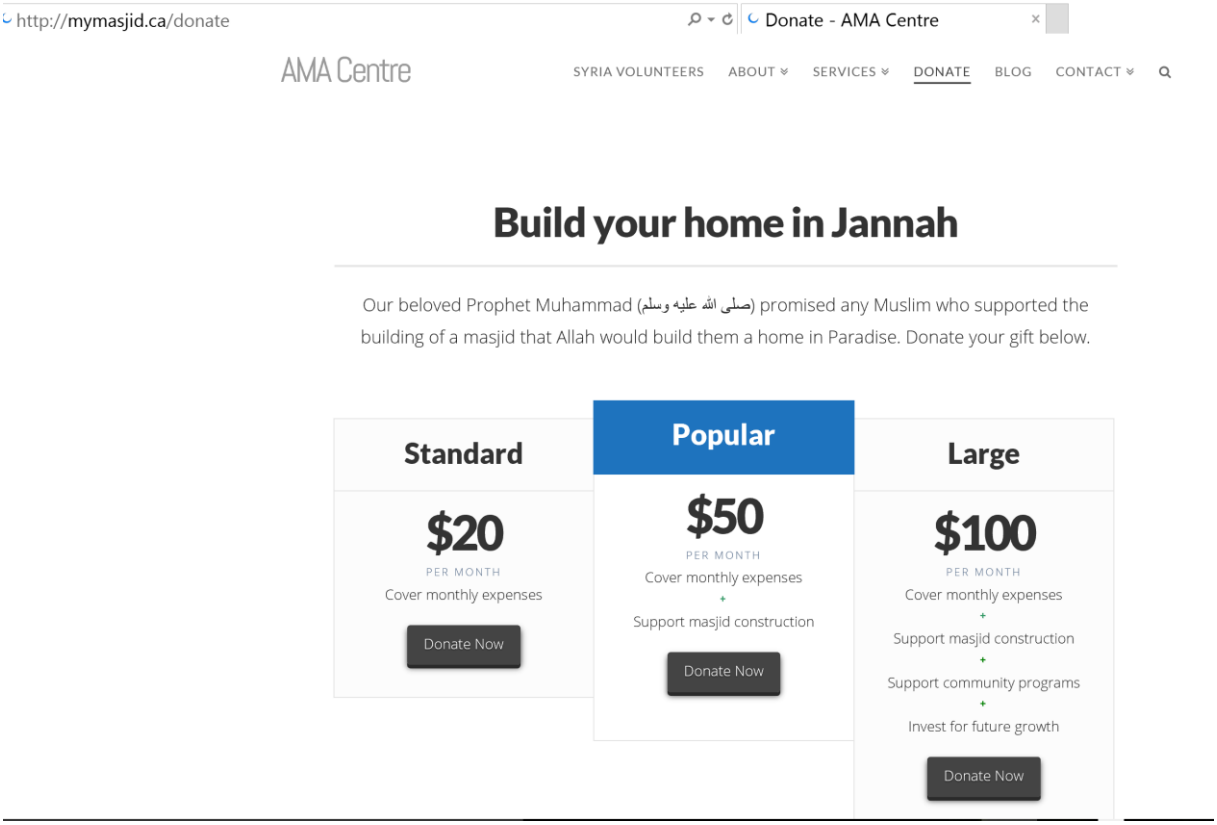
In principle, donation and equity crowdfunding can be compatible with Islamic Finance. By contrast, debt crowdfunding involving interest payments would clearly not be compatible.

The use of crowdfunding for mobilizing donations is already practiced, e.g. for the construction and maintenance of mosques. See for example the graph below referring to the website: http://mymasjid.ca/donate.

[7] Planning figure provided in: Morocco - Green Mosques. Morocco plans to create jobs in the areas of energy efficiency and renewable energy, starting with modernising energy use within the country's mosques. P.2. BMZ, Information sheet. 2016

[8] For more detailed references on Islamic Finance for investors see recommended readings in: https://blogs.cfainstitute.org/investor/2013/05/03/a-selection-of-books-in-islamic-finance-by-professor-rodney-wilson/

Graph: Donation Crowdfunding Platform Dedicated to Mosque Maintenance



Key Features of the Crowdfunding Scenario

Such donation campaigns could, in principle, be expanded to finance energy efficiency measures in mosques, offering here in addition some environmental benefits and electricity cost savings (although these savings would accrue in most cases to the Ministry footing the energy bill).

However for the purposes of this case study, it is assumed that only a limited number of mosques will be able to finance energy efficiency measures exclusively through donations and that ESCOs are not able and willing to pre-finance the energy efficiency investments.

We therefore developed the following scenario in which equity crowdfunding generates the necessary finance in a manner compatible with Islamic Finance.

The key features of this scenario are:

- An **ESCO** undertaking the energy efficiency measures, in a large number of mosques (in order to achieve economies of scale);
- A **shared savings contract** between the Mosque, or in the case where the Mosque does not manage itself, between the responsible Ministry and the ESCO;
- An **Islamic Finance compatible finance scheme**, such as a Mudarabah or a Musharaka Partnership between the Crowd Investors and the ESCO.

BOX: Description of Shared Savings Contract ESCO and Mosque (or Ministry)

The ESCO would enter into a contract with the mosque or where appropriate with the responsible Ministry managing the affairs for the Mosque, under which the ESCO would finance the investment to purchase and install the energy saving assets, such as e.g. LED lamps. These are real assets which generate income in the form of savings of energy costs. The ESCO would share in the rewards (the savings) as well as the risk (volatility of the amount saved). In addition, the ESCO may agree with the mosque, to maintain these assets for the duration of the contract.

The mosque, or Ministry, would not have to invest its own money: these investments would be covered by the ESCO. But the mosque, or Ministry, would continue to pay its electricity bill at the (high) level before the energy savings measures have been implemented. After undertaking the savings measures, the actual electricity costs will be lower. The difference, i.e. the savings, will be shared between the mosque and the ESCO at a mutually agreed level. With the revenue from these savings, the ESCO will recuperate its original investment, plus the cost of operation and maintenance, plus a reasonable profit. The mosque and the ESCO agree ahead of time on the duration of the contract, to give the ESCO the opportunity to fully recuperate its costs.

In the case presented here, the contract would last 5 years, and the share of the ESCO would amount to 90% and accordingly the share of the mosque (or the Ministry) to 10%.

After completion of the contract, ownership of the assets (e.g. the LED lights) passes from the ESCO to the mosque which from then on will benefit from 100% of the energy savings.

In many countries, ESCOs do not have enough working capital to finance the upfront costs of the energy efficiency investment by themselves, and therefore seek bank loans. Here we have assumed that debt financing would not be acceptable and that instead equity crowdfunding would be used to provide the required upfront financing for the ESCO.

One option would be for the crowd investors and the ESCO to enter into a Mudarabah partnership. The **Mudarabah** contract is a form of partnership between one who contributes capital (rabb al-mal/capital provider, here the crowd investor) and the other who contributes efforts in the form of managerial skills (mudarib/manager, here the ESCO)[9]. This arrangement is generally used by bankers (mudarib) collecting investment deposits from depositors (rab el mal), or by mutual funds managers collecting funds for the funds they manage.

[9] Reference: see for example http://www.financialislam.com/mudarabah.html

In this case, the crowd investor would entrust his/her capital to the ESCO, and thereby share in the risks and rewards of the energy efficiency investment. The ESCO would receive a fee (in this example 23% of total revenues, i.e. savings from reduced electricity costs) for its managerial services, and distributes the balance of the revenues (savings) to the investors in proportion to their investments. In this case, 100% of the equity investment would be mobilized from crowd investors.

Another option might be a **Musharaka**, another classical partnership agreement. All parties involved contribute towards the financing of a venture. The parties share profits on a pre-agreed ratio while losses are shared according to each parties equity participation (based on the principle that one cannot loose what one did not contribute). Management of the venture can be carried out by all or just one party member. The latter would apply in this case with the ESCO as manager.[10] This might be an appropriate arrangement when the ESCO co-invests next to the Crowd, which is not the case in the scenario used for this study.

4.1.5 Financial Terms and Conditions of the Equity Crowdfunding Instrument

A CFP would be responsible for the mobilization of the crowd investment. Such CFP does not exist yet in Morocco and would need first to be set up. Internationally there are few CFPs which offer Islamic Finance products, such as Groupe570 in France[11]. However, up to now, none of them seem to focus on energy efficiency.

The key features of the equity crowdfunding instrument would include the following elements:

- **A contract between the project developer (here the ESCO) and the CFP**, regulating the fees and conditions. For the case study, a total charge of 13% has been assumed, consisting of a 5% listing fee, a 1% annual fee (for 5 years), a marketing fee of 2%, and a financial services fee of 1%.

- **The listing of the project on the website of the CFP**. In this case, the target amount is EUR €4.070 (for one mosque 'sub-project'). The investment is returned in full in the course of the 5 years, including a dividend, with an estimated IRR of 2.2%. Payments are on an annual basis and amount to a 67.5% share of the gross revenues, i.e. the energy cost savings. The ESCO receives a management fee which is equivalent to 22.5% of the gross revenues, and the mosque, or Ministry, 10%.

[10] Reference: see for example http://www.islamic-banking.com/Musharakah_sruling.aspx
[11] See: Groupe570.com

The following table summarizes the key financial parameters and assumptions used in the design of the crowdfunding instrument.

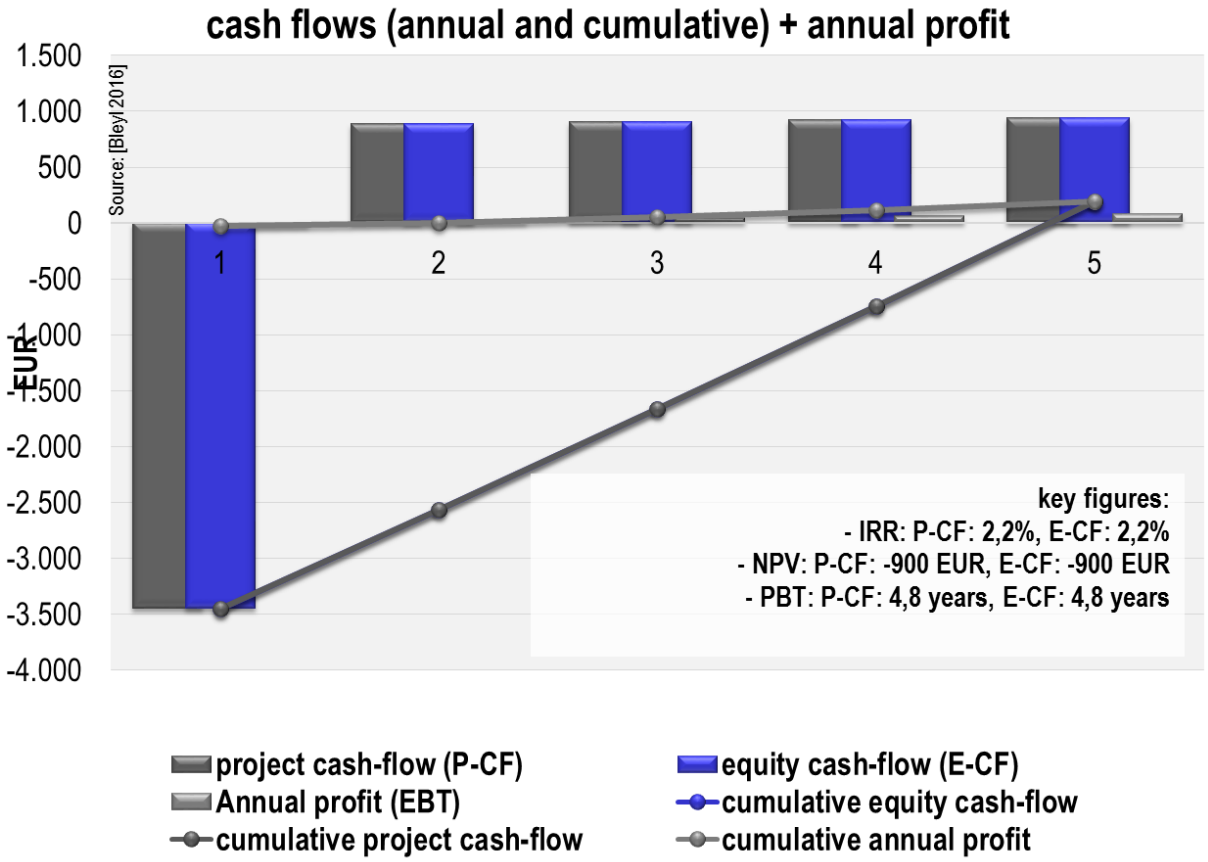
CF4EE: EE-Project in one Mosque, Morocco:
Key Parameters of Equity Crowdfunding (100%)

	Total	ESCO	Crowd	Mosque
Investment (EUR)	4.070			
Share of Equity in Financing	100%			
Sources and Shares of Financce (ESCO, Crowd, Owner)		0%	100%	0%
Amount Crowdfunded (EUR)	4.070			
Type Crowdfunding	Equity			
Years to Exit ("maturity") (Years)	5			
Revenues (EUR) and Rev Sharing (%)	6.320	22,5%	67,5%	10,0%
of which ESCO Management Fee		22,5%		
Cost Crowdfunding Platform (% of raised Cfunds)	13%			
Results:				
Payback period (years)	4,8			
IRR (%)	2,2		2,2	
CO2 Reductions (tCO2)/project life	36,4			

4.1.6 Financial Results

The project described above, based on the assumptions made for crowdfunding, would result in a financially only marginally viable project, that offers an IRR of 2,2 % and a payback Period of 4,8 years. The Graph below summarizes the financial results.

Graph: CF4EE: Energy efficiency in Mosques, Morocco: Cash Flows and Payback Periods

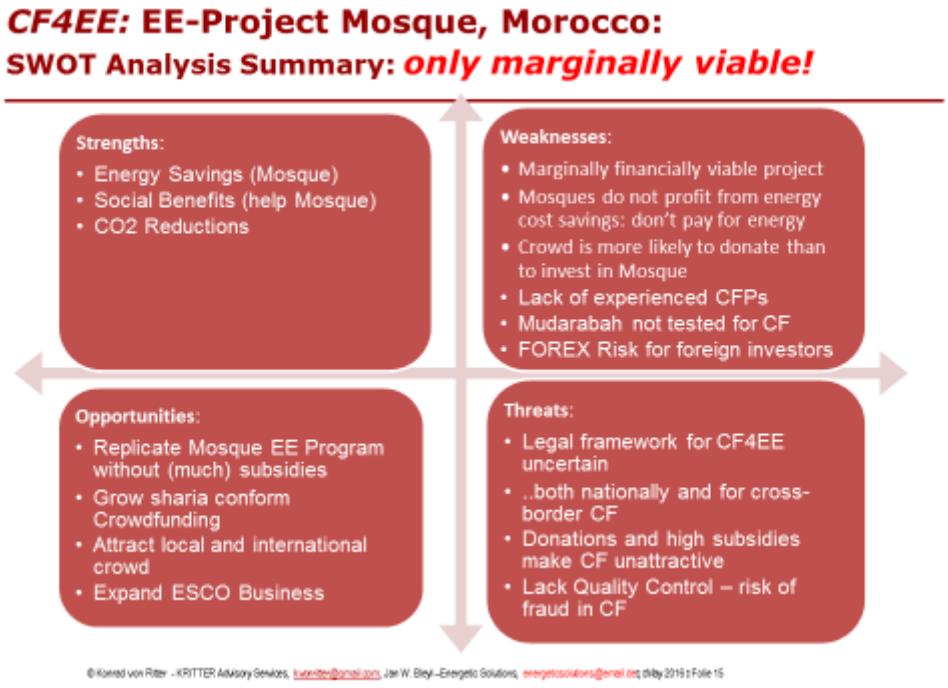


Note: Explanation for Year 1 Cash Flows:

Project cash flow (grey): Net-Project-cash flow of total in- and outflow. Inflow: revenues from energy cost savings; Outflow: investments, Operational Costs, CFP cost. (Just as a reminder: The project cash flow does not consider financing!)

4.1.7 SWOT Analysis Equity Crowdfunding for energy efficiency in Mosques

So far, the Equity Crowdfunding Model presented above has been assessed for its financial results. In this section, an effort is made to present a more qualitative assessment of the model using a SWOT Framework.



4.1.7.1 Strengths

The project of energy efficiency in mosques builds on a government and internationally supported initiative.

The crowdfunding scenario above would generate some tangible benefits for a number of stakeholders, including:

- The ESCO will receive a management fee equivalent to 22.5% of the savings.
- The CFP earns its commission of a total of 13% of the raised amount.
- The Mosque (or Ministry) would benefit from reduced energy costs without having to invest own resources.
- Global benefits would accrue in terms of CO2 reductions of 36t CO2 per mosque over the lifetime of the 5-year project.[12] This does not reflect the ongoing energy savings after the project has closed.

4.1.7.2 Weaknesses

But at the same time, the proposed crowdfunding model suffers from a number of weaknesses:

- With the crowdfunding and ESCO costs included, the project is only marginally viable with an estimated IRR of only 2.2% for the crowd investor.
- Even scaling up such model to say 50 or 100 mosques (with the same features) would not render it financially attractive, simply because the savings are too

[12] Emission factor for Morocco: 0.644 tCO2/MWh. Source: emissionfactors.com

modest to generate sufficient revenues for an acceptable return to the crowd investor, an ESCO fee, and for the CFP costs.

- In many cases the Mosques do not pay their energy bill themselves, but a central institution, such as a ministry. The motivation of the individual mosque for undertaking energy efficiency could therefore be quite limited.
- The attitudes of the 'Crowd for Mosques' are still largely unknown, but there is a strong assumption, that the crowd is more likely to donate to a mosque than to make an investment with expected profits. If true, this would render an equity crowdfunding model highly unattractive and unviable.
- Crowdfunding is still at a very early stage of development in Morocco. Few platforms are so far interested in operating in Morocco. None of them offers debt or equity crowdfunding, and only few, if any projects are listed. Key concerns include difficulties with the processing of online payments and lack of capacity to build effective campaigns with the result that so far only few reach their funding target[13].
- The Mudarabah model has not been tested for crowdfunding. Further research is needed by Islamic Finance experts to determine whether in principle this model is viable and applicable in an ESCO equity crowdfunding case. A market test with an interested CFP is needed to gauge the appetite of the crowd for this novel type of crowdfunding.
- For the international crowd, there would also be a Foreign Exchange Risk. In view of the benefit stream in local currency (in form of energy cost savings), and a volatile exchange rate of the MAD against the Euro ranging between 6 and 10 MAD/EUR over the last 10 years, the crowd investment carries a foreign exchange rate risk for foreign crowd investors. At least one source predicts the MAD to appreciate against the USD over the next 4 years [14] offering a windfall gain to the project, if earnings are expressed in foreign currency. In the case presented here, it is unlikely that a local ESCO would be capable or willing to assume the foreign exchange risk (despite possible upside benefits). But given the strong social character of this project, foreign crowd-investors might be willing to absorb this risk.

4.1.7.3 Opportunities

At the same time, the proposed model offers new opportunities:

- The national program to introduce energy efficiency in mosques, developed in cooperation with GIZ, could offer an attractive financing instrument to replicate the government financed pilot experience in few mosques in the rest of the country, without depending on subsidies.
- The ESCO has the opportunity to scale up business by leveraging its own resources with crowdfunding. And scaling up is critical here because of the

[13] Why crowdfunding isn't easy in North Africa by Eric Reidy, March 26, 2015 in http://www.wamda.com/2015/03/why-crowdfunding-isnt-easy-north-africa

[14] http://www.tradingeconomics.com/morocco/currency/forecast predicts that the MAD will trade at below 6 MAD/USD.

relatively small size of each individual mosque project. And while the ESCO model is admittedly still quite new for Morocco, several international organizations, including GIZ and EBRD are supporting the strengthening of the national ESCO industry[15] .

- A newly created national (or already existing international) CFP could develop a new line of business by engaging in sharia conform financing, such as Mudarabah, with a significant potential for replication not only in the energy efficiency sector. And while crowdfunding is still at a very early stage of development in Morocco, there are reportedly already four CFPs interested in operating in Morocco (Zoomaal, CoFundy, Smala & Co and JumpStart Africa). Despite the fact that all still face substantial difficulties operating, CFPs attempt to address these issues through various measures, such as education of the public, capacity building, locating the platform outside Morocco and the use of off-line payment systems[16].

4.1.7.4 Threats

Some developments or the lack thereof, threaten to stall the very introduction, let alone scaling up, of CF4EE.

- With the legal framework for crowdfunding still unclear in Morocco, project developers, potential platforms and investors face legal uncertainty at national level, as well as at international level for cross-border crowdfunding.
- 'Competition' from donations or highly subsidized programs can easily render equity crowdfunding models uncompetitive because more expensive and requiring a more engaged role of the project developer.
- Outside the scope of the GIZ cooperation, it is unclear who would provide project quality assurance. This creates the risk of few poor quality or even fraudulent crowdfunding campaigns ruining the reputation of an incipient CF4EE initiative.

4.1.7.5 Summary SWOT Analysis

In summary, there are significant weaknesses in the proposed equity crowdfunding approach, despite some attractive benefits it might offer to involved stakeholders. The main concerns are:

- After calculating the cost for ESCO and CFP, the project is financially only marginally viable.
- A strong assumption, that potential crowd investors would lean, on moral grounds, towards donating rather than equity investing for a profit in case of financing a mosque;
- The limited motivation of individual mosques to undertake energy efficiency as long as energy bills are paid for by third parties, such as a Ministry.
- The relatively small size of individual projects requiring bundling of a large number of 'sub-projects' which may present a logistical challenge and extra costs

[15] see http://www.ebrd.com/news/2014/securing-moroccos-energy-future.html
[16] See: Why crowdfunding isn't easy in North Africa by Eric Reidy, March 26, 2015 in http://www.wamda.com/2015/03/why-crowdfunding-isnt-easy-north-africa

- A CF4EE program could be designed in a sharia conform manner, but would require more in-depth consultations with Islamic Finance experts. Sharia conform crowdfunding is an untested and novel idea, and will likely raise regulatory issues, in particular for cross-border crowdfunding. Hence, before proceeding with such an approach, the interest of the main stakeholder to pursue a CF4EE option would first need to be confirmed and a national champion be found. In addition, Pioneer ESCOs and CFPs would need to be identified, which are willing to incur the cost and risk in pilot testing such a new approach.

It is important to note, that while equity crowdfunding is not attractive in this specific case with relatively small cost savings, it could very well be an attractive option for projects which are short on equity but generate more savings/cash to cover the costs of ESCO and crowdfunding.

4.2 Case 2: Debt Crowdfunding for Commercial Building Energy Efficiency in Indonesia

4.2.1 Context

Indonesia is a fast growing emerging economy. Its energy consumption has increased at an annual rate of 7 % over the last years. It is calculated that for every 1 percent increase in GDP the energy demand increases by 1.6 percent until 2020.[17]

Subsidized electricity rates for the last 2 decades have encouraged wasteful energy consumption behaviors and thwarted attention to energy efficiency in building design. This has now changed, with energy subsidies being systematically eliminated. As the country faces the risk of more power shortages, energy efficiency measures are gaining in importance and attractiveness.

In this context, and on the occasion of signing the Paris Agreement on April 22, 2016, Siti Nurbaya Bakar, Minister for the Environment and Forestry, Indonesia, said an industry evaluation had revealed that some 65% of this sector's emissions could be reduced through energy efficiency measures.[18]

Commercial buildings are a prime target for energy efficiency. Building owners have the option of undertaking energy efficiency measures under shared savings contracts with ESCOs. ESCOs are attracted to work with owners of large buildings, as they offer scale and easier negotiations with only a single decision maker.

It is in this context, the following case of an energy efficiency project in a hotel has been selected. While country circumstances vary, the core project and crowdfunding design should be quite replicable elsewhere with only moderate adjustments.

[17] Indonesia has failed to meet this demand growth with adequate system investments which has resulted in increased frequency and duration of power outages which prove costly to local industries. https://energypedia.info/wiki/Indonesia_Energy_Situation#Energy_Situation. Accessed 2016 05 11.
[18] Earth Negotiations Bulletin (ENB), Volume 12 Number 665 | Monday, 25 April 2016

4.2.2 Description of Case

A large international hotel in Indonesia plans to replace all its lighting with LED. Total investment is estimated to be about € 45,000. Total energy savings are estimated at about 120,000 kWh per year, which amounts under current electricity rates to about €9,730 plus an estimated €3,954 for reduced maintenance and replacement costs (given the longer lifetime of LED lights). The dynamic payback period for the project (investment/annual revenues) is about 3.7 years.

The implementation will be executed and financed by an ESCO, which has negotiated a 90% share in the electricity savings over 7 years to recuperate its investment and operating costs. This makes this investment highly profitable, with a project IRR of 28% and, assuming a 30% - 70% equity - debt split, an Equity IRR of 50%.

_CF4EE:_ EE-Project Hotel EE, Indonesia : Technical & economic calculation parameters

Project milestones:	
Schedule:	Start: year 1; project term7 years; construction period: 3 month
Electricity baseline, -price; price and cost development *(all excl. VAT):*	
1. Re-lighting:	6512 lamps (diff. types, average 43,6 W/lamp) =>285 MWh/y
Electricity price:	85,9 EUR/MWh
Price and cost increases:	Electricity: 7%/y,
ECMs, related savings and revenue sharing:	
1. Replaced by LED:	Savings 122 MWh/y (43%)
Additional savings:	Avoided replacement costs for lighting: 3,954 EUR/y
Savings share investor:	90 % (constant)
Project cycle cost: Investment, operating cost *(all excl. VAT):*	
Investment:	1. LED: 45,194 EUR
Maintenance & repair:	2% of invest./y
M&V + accounting:	

4.2.3 Rationale for Considering Crowdfunding

Despite being a profitable project, the ESCO faces difficulties raising the necessary debt finance from banks. Banks are unfamiliar with the ESCO model, where energy savings represent the income stream for paying back the debt. They may seek collaterals (e.g. in real estate) that a relatively young ESCO company cannot provide. Financing the project purely with equity, would be difficult: considering the expected returns and risks involved, it is unlikely that an investor could be found, unless the building owner himself decides to finance the investment. However, in this case, the building owner does not consider energy efficiency his first priority and is not willing to invest his own capital. And this is a quite common situation, not only in Indonesia.

4.2.4 Financial Terms and Conditions of the Debt Crowdfunding Instrument

In this scenario, the ESCO seeks debt financing through crowdfunding for a 7-year and 8% p.a. interest rate loan, with a balloon payment in year 7. The ESCO will mobilize the 30% of equity.

The key financial parameters of the crowdfunding instruments are summarized in the following table.

_CF4EE:_ EE in Commercial Building, Indonesia: Key Parameters of Debt Crowdfunding (100%)

	Total	ESCO	Crowd	Owner
Investment (EUR)	45.194			
Share of Debt in Financing	70%			
Sources and Shares of Financce (ESCO, Crowd, Owner)	100%	30%	70%	0%
Amount Crowdfunded (EUR)	31.636			
Type Crowdfunding	Debt			
Maturity (Years)	7			
Interest Rate to Crowd (% p.a.)	8%			
Revenues (EUR) and Rev Sharing (%)	94.065	46,6%	43,4%	10,0%
Cost Crowdfunding Platform (% of raised Cfunds)	13%			
Results:				
Payback period (years)	**3,90**	**3,10**		
IRR (%)	**28%**	**50%**		
CO2 Reductions (t CO2)/lifetime	**653,8**			

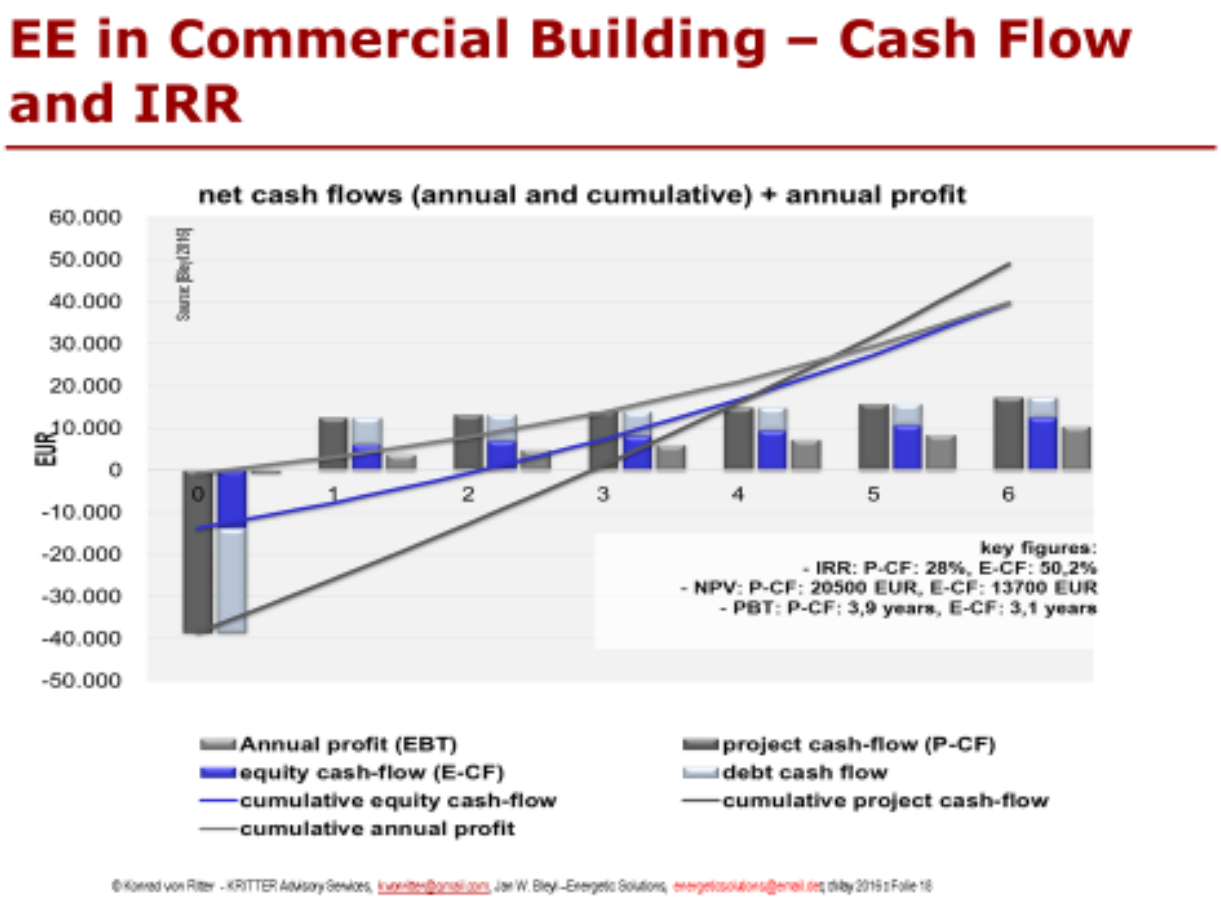
4.2.5 Financial Results

Total revenues in terms of energy cost savings (net of regular operating costs), amount to €94,065 over 7 years. These revenues are distributed in the following way: 10% to the building owner, per shared savings agreement with the ESCO; 43.4% to the crowd lenders in form of interest and principal payments; and the balance of 46.6% to the ESCO. From its income, the ESCO has to cover its own costs and also the cost of using the CFP (here 13% of the €31,636 raised through crowdfunding).

The project described above, including the assumptions for crowdfunding results in a financially viable project that offers an IRR of 50% to the equity holder, i.e. the ESCO, with a payback period of 3.1 years. The Graph below summarizes the financial results.

Graph: CF4EE: Debt Crowdfunding for Energy Efficiency in Commercial Building, Indonesia

Net Cash Flows and Profits (in Euro)



Explanation for Year 1 Cash Flows:

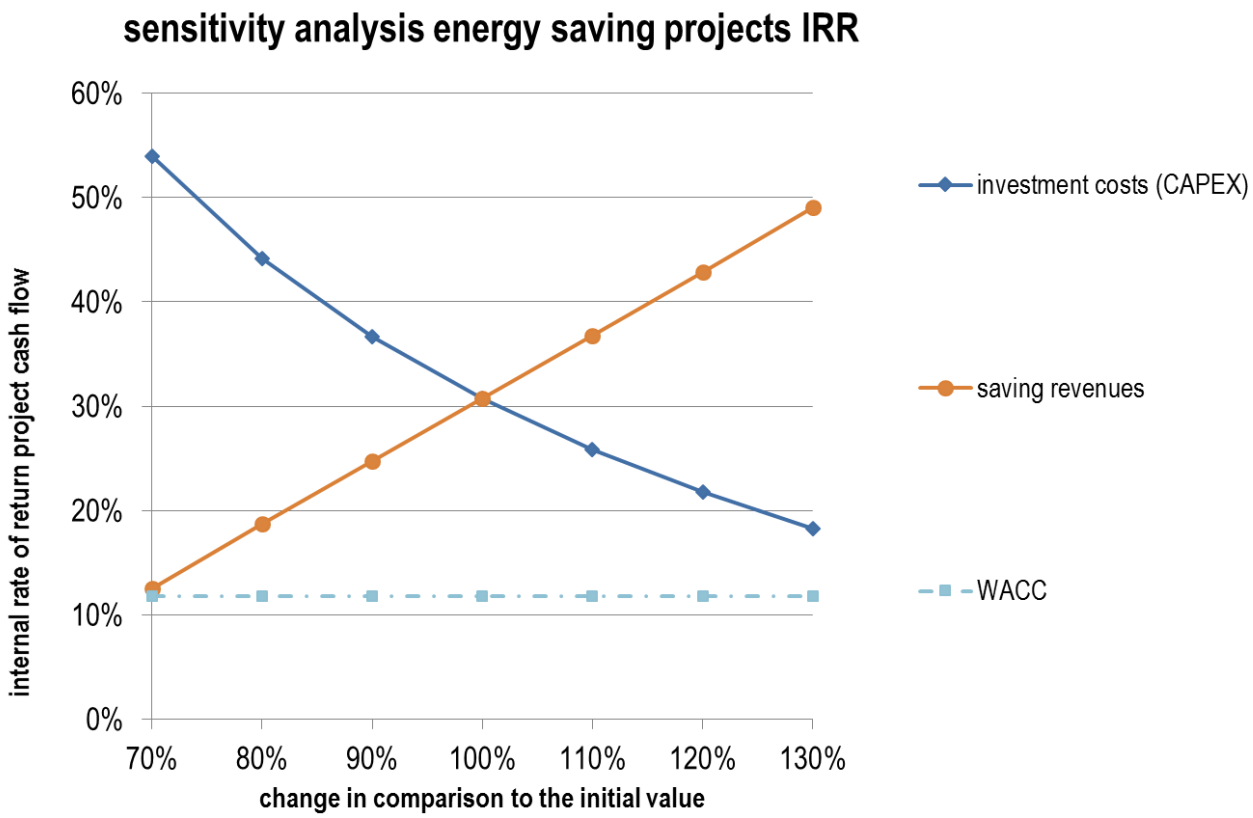
Project cash flow (grey): Net-Project-cash-flow of total in- and outflow. **Inflow:** revenues from energy cost savings; **Outflow:** investments (– subsidies), Operational Costs, CFP cost. (Just as a reminder: The project cash flow does not consider financing!)

Equity CF (blue): Net Equity cash flow is difference between Project- and Debt-cash-flow. **Inflow**: revenues from energy cost savings. **Outflow:** 30% equity share of investment plus Crowd debt cash flow (interest + principal), operation cost, plus initial CFP costs.

A sensibility analysis of the revenue stream (in Euro) indicated that even with a 20% reduction in total revenues (in Euro), e.g. as a result of devaluation, the project remains profitable with an IRR of 18% for the Project. See graph below.

Graph: CF4EE - Energy Efficiency in Commercial Building, Indonesia

Sensitivity Analysis of Financial Results



Note: Initial values (CAPEX and Savings) = 100%. At those values the IRR = 30%

E.g. a reduction of CAPEX by 10% (= 90% value) results in an increase of IRR to approx. 37%.

4.2.6 SWOT Analysis Debt Crowdfunding for Energy Efficiency in Commercial Buildings

The Debt Crowdfunding Model presented above has provided some initial financial results. In this section, again an effort is being made to present a first assessment of this model and its results, using a SWOT Framework.

4.2.6.1 Strengths

- Financial Benefits. The crowd investor can expect an 8% p.a. interest payment. These terms and conditions are slightly more attractive than the ones offered for similar size energy efficiency crowdfunding projects for example in Germany. The technology is proven and installation relatively simple, reducing technology risks to a minimum.
- Energy Savings. The building owner will enjoy energy savings without investing own resources. The savings are initially shared with the ESCO, but eventually will fully accrue to the owner. In the proposed scenario, the owner receives 10% of the savings during the first 7 years. It appears that the project could even offer a 20% share and still be profitable for the ESCO.
- Global Benefits. The crowdfunded energy efficiency projects will help reduce CO2 emission. Crowdfunding potentially allows to substantially scale up such energy efficiency measures.

4.2.6.2 Weakness

- Crowdfunding is still at an early stage of development in Indonesia. Few platforms are so far interested in operating in Indonesia. None of them offers debt or equity crowdfunding, and only few, if any projects are listed.[19]

[19] See Nadine Freischlad. Five crowdfunding sites in Indonesia. May 1, 2015. https://www.techinasia.com/crowdfunding-future-indonesia-crowdfunding-sites.

- For the international crowd, there would also be a Foreign Exchange Risk. In view of the benefit stream in local currency (in form of energy cost savings), and with an inflation rate average of 6% and a volatile exchange rate with a devaluation of the Indonesian IDR against the Euro of approximately 25% over the last 10 years, the crowd investment carries a foreign exchange rate risk for foreign crowd investors. In the specific case, the ESCO is debating whether to absorb such risk. A sensibility analysis of the revenue stream (in Euro) indicated that even with a 20% reduction in total revenues (in Euro), e.g. as a result of devaluation, the project would feature an IRR of 18% for the Project and 28% for the ESCO-equity owner.

4.2.6.3 Opportunities

- The Financial Services Authority (OJK) in Indonesia announced plans to issue crowdfunding regulation in 2016 (see http://www.fintechasia.net/ojk-indonesia-fintech-plans). This will help to create greater legal certainty for potential platforms and investors (see chapters 5.3.2 and 7.1.1. for more detail on crowdfunding regulation).
- Potential for crowdfunding in the energy efficiency sector is great with Indonesia being rated among the countries with the highest potential for energy efficiency savings.
- CF4EE could become one vehicle to finance early stage ESCOs with limited access to the banking sector.
- A massive scaling up of financing at attractive terms will boost the ESCO industry which is still in its infancy in Indonesia.

4.2.6.4 Threats

- Indonesia has delayed issuance of crowdfunding legislation, originally announced for 2015. Further delays beyond 2016 would create uncertainty. At the same time, there is also a risk of stifling the development of crowdfunding through too burdensome regulations, as Indonesia is generally known to be rather conservative emphasizing control of financial institutions. [20]
- An unresolved question of who will absorb the foreign exchange risk could become a deal breaker for cross-border crowdfunding (but would not necessarily prevent the emergence of a national crowdfunding market).

4.2.6.5 Summary of SWOT Analysis

In summary, while there is a tangible and profitable energy efficiency project, and a willing ESCO and owner to undertake the project, lack of access to debt financing is a significant barrier to scaling up such energy efficiency investments. Or more broadly, there is a large untapped potential of energy efficiency which could be realized through attractive finance for a nascent ESCO sector. This is the opportunity for CF4EE to play a

[20] See http://www.fintechasia.net/ojk-indonesia-fintech-plans

useful role, particularly at this early stage of development, when the formal system of government support and bank loans is still hesitant to engage in this new and largely untested market. This market provides for relatively high returns on investment (IRR > 30%) and short payback periods, which are needed to attract pioneer ESCOs to this new business model, and which provide for high enough profit margins to pay for the additional costs of crowdfunding.

However, to realize this opportunity, regulatory uncertainty regarding crowdfunding needs to be addressed through clear regulation, and practical crowdfunding capacity needs to be created, either locally or through encouraging international CFPs to reach out to Indonesia. The foreign exchange risk may deter international crowdfunders, if not absorbed by the project. Sensibility analysis shows that even at a 20% reduced revenue stream (in Euros), the project remains reasonably profitable.

As the market matures, it is to be expected that profit margins shrink with growing competition between ESCOs and that debt will become available from the regular banking sector, perhaps supported with government subsidies – all factors which will 'crowd out' crowdfunding.

5 First Conclusions: CF4EE Has Potential – Under Certain Conditions

Based on the two case studies and general reflections about crowdfunding and energy efficiency, a first attempt is being made to find answers to the principal questions of this study:

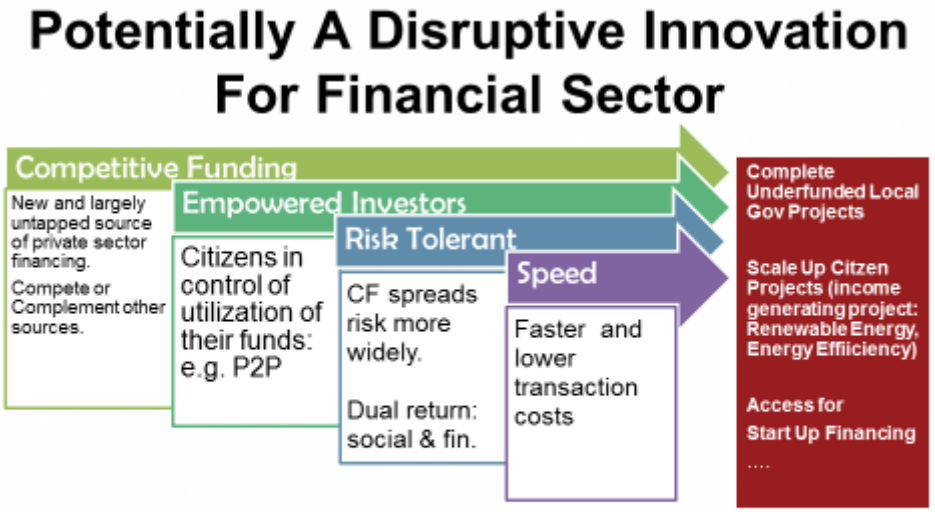
- Under what conditions is debt or equity crowdfunding potentially a useful instrument to finance energy efficiency in developing countries? What, if any, are the advantages of crowdfunding over existing financing mechanisms when it comes to financing energy efficiency measures and ESCOs?
- Where conditions are conducive, what barriers constrain CF4EE from being scaled up?

The following initial assessment of the potential of CF4EE is necessarily preliminary, based on limited evidence available, the few interviews with crowdfunding experts, and the financial scenarios developed in the previous chapter.

5.1 Comparative Advantages of Crowdfunding – A Conceptional View

Crowdfunding has grown exponentially over the last 5 years, because it has been able to offer advantages over existing financial instruments in the following areas:

- **Tapping into new funding sources**, such as small investors with risk appetite for venture capital and small impact investors seeking double social and financial dividends;
- **Empowering responsible investors** seeking greater control over their investments;
- **Encouraging investors to increase their risk tolerance** by offering greater diversification and smaller amounts per investor, and
- **Increasing speed of decision and transaction processing**, through standardized online processes.



Source: Konrad von Ritter, KRITTER Advisory Services

5.2 Potential of CF4EE as an Instrument to Finance Energy Efficiency

Beyond its generic potential, crowdfunding offers some specific advantages that could become relevant for energy efficiency.

5.2.1 A new Source of Funding

5.2.1.1 Debt Crowdfunding

Crowdfunding offers a possible funding solution for energy efficiency projects, where established banks do not offer loans at all for this kind of project or not at attractive conditions compatible with project needs, be it in terms of maturity or costs.

Debt Crowdfunding is the most frequently used crowdfunding modality. A crowdfunding loan is relatively simple in its design and can be easily communicated to potential crowd investors. Generally, it is offered as a sub-ordinated loan, i.e. with a lower rank than regular bank loans in case of an insolvency of the project.

As such, Debt Crowdfunding can, under certain circumstances:

- be the only source of debt financing accessible,
- reduce cost of debt financing,
- allow to extend maturity of existing bank finance, and
- offer sub-ordinated debt, shifting risk from the project to the investors.

5.2.1.2 Equity Crowdfunding

Equity crowdfunding is up to now rarely used for energy efficiency projects. However, with the fast growth of equity crowdfunding in general, opportunities will increase to overcome access-to-equity constraints encountered by companies focused on energy efficiency. Such constraints can have several reasons, including potential investors shy away from investing in the energy efficiency business because ESCO companies are young and lack a track record, or investors may be unfamiliar with energy efficiency investments and shared savings business models and related risks.

Equity Crowd Financing can, under certain circumstances,

- offer equity at early project stages, with less dilution of ownership in e.g. a young ESCO company, compared to a venture capital or angel investor,
- offer risk capital, complementing existing equity, and thereby increase the ability of the project to expand and to raise debt, and
- in the specific case of Islamic Finance, offer a sharia compliant alternative to debt financing of ESCOs and energy efficiency measures.

Other situations, in which equity crowdfunding could possibly be applied in the future are:

- Companies or organizations often allocate their discretionary investment capital to other priorities that increase production capacity. However, if funding is provided externally (off-balance sheet) they are happy to proceed with the energy efficiency measures. Typically, ESCOs would step up in such situations providing both technical and financial services. Crowdfunding could provide equity for such ESCO companies during their start up period.
- Public entities, such as municipalities, often prefer to allocate their discretionary capital expenditures to investments with greater public visibility (inaugurate a new school…), than energy efficiency measures, such as improved street lighting efficiency. In other words: energy efficiency measures may be 'profitable but not sexy'. Furthermore, they find it difficult to capture energy savings as an 'income stream' or return on investment in the public financial accounting scheme. Again, this is an opportunity for ESCOs to step in, and potentially, for equity crowdfunding to support the startup period.

5.2.2 A new Class of Investors

Demand by investors for investment opportunities which combine sustainable development impact with decent financial returns is growing and feeding a rapid

expansion of the crowdfunding scene. Energy efficiency offers some specific advantages to this type of crowd investor:

- Dual Return: CF4EE offer investors a robust financial return combined with a tangible environmental and climate change benefit, in terms of reduced emissions.
- Attractive financial return: as long as returns on savings and bonds remain at current low level, even a 4% plus return from energy efficiency investment can be attractive.
- Open even to small investors: even investors with limited resources and investment experience can engage because of low minimum contributions (could be as low as €50).
- Direct Engagement: interested investors can engage directly with concrete projects, and can follow the implementation progress closely (as opposed to an anonymous investment in a savings account or fund).
- Technical risks are low: energy efficiency measures use mostly tested technologies for which performance and expected savings data are available (e.g. for switching to LED lights), hence reducing the performance risk for the investor.

5.3 Barriers to Scaling Up CF4EE

5.3.1 Overview

While CF4EE offers potential benefits, as explained in the previous sections, it is also clear, that CF4EE is at a very early stage of development and faces a number of threats and challenges which may stifle its growth and scaling up. These challenges are compounded where crowdfunding is 'cross-border', e.g. the CFP is located in Germany and the project is located in an Asian country.

The principal threats identified by this study specifically for CF4EE (i.e. not the general threats for the underlying energy efficiency projects) include:

- A still **evolving legal framework**, which creates legal uncertainty, in particular for cross-border crowdfunding.
- A still **limited institutional capacity of CFPs** and lack of track record, evidence, and benchmarks as for the priorities and preferences of the 'crowd'.
- A lack of tools to manage **foreign exchange risk** in cross-border CF4EE.
- A lack of widely recognized **project quality assurance mechanisms**, with the risk of highly variable project quality, including in its extreme a fraudulent crowdfunding campaign, ruining the reputation of CF4EE, before it even had a chance to take off.

- **'Competition' from highly subsidized programs**, which may be put in place by governments in the course of implementing their national climate strategies, and which make CC4EE unattractive to project developers and investors.
- **Limited knowledge about 'the Crowd'** which potentially may be interested in investing in CF4EE.

5.3.2 Evolving Legal Framework

Crowdfunding operates in a legal framework which is still evolving, in particular as it relates to debt and equity crowdfunding. This creates uncertainty. Regulators in Europe and the USA are trying to catch up on the fast growth of crowdfunding, typically with the intention to protect small investors and to curb the emergence of a 'grey financial market' which could be used for money laundering. As a result, on the positive side, crowdfunding has become legally more clearly defined, but at the same time, is now subjected to more rigorous controls and reporting requirements, which increase the cost of crowdfunding. This will likely lead to the elimination of many smaller platforms, less competition and to a consolidation of CFPs into few larger ones.

The drive for tighter controls of crowdfunding is often fueled by strong lobbying group, such as consumer protection, which look at small investors as uninformed consumers, as well as established financial institutions, which sometimes consider crowdfunding as a competition. The emerging regulations, which result from balancing consumer protection and encouragement of financial innovation, differ considerably from country to country. This is the case between EU countries and between EU and non-EU countries.

In developing countries and emerging economies, crowdfunding regulation ranges from non-regulated (still the great majority), to encouraging (e.g. Malaysia), to restrictive (e.g. Singapore). Therefore, Crowdfunding 'cross-border', i.e. where the CFP is located in a different country than the project, presents additional legal hurdles for project proponents and investors.

Examples for relevant legal requirements for debt and equity crowdfunding can include:

- In the country where the CFP is located:
  - A requirement that project proponents, i.e. the recipients of crowdfunds, have a legal representation in the country. This makes it impossible for foreign project developers to use directly a CFP in a different country, unless they work through a local partner or establish a new company in the country of the CFP, both increasing the cost of crowdfunding.

  - The CFP also has the legal obligation to ensure, that investors are legitimate, that their funds do not come from money laundering, and that the investors respect limits on crowdfunding, such as annual limits per investor, or per-project limits. Typically, CFPs source this task out to a bank or a specialized service provider, both increasing the cost of crowdfunding.

- In the country where the project developer is located:
  - Countries may have regulations that restrict crowdfunding. E.g. Singapore restricts the number of investors in a project to 49, and does not allow online advertising of investment opportunities, unless the project proponent is a licensed financial organization or broker subject to onerous banking oversight rules. This makes crowdfunding practically impossible, as under these conditions very few CFPs will emerge which are able to comply with these rules.

5.3.3 Lack of Crowdfunding Institutional Capacity

While the concept seems simple, successful crowdfunding requires in-house capacity in the CFP and an enabling 'eco-system' of support services.

Key CFP functions, for which capacity often still needs to be developed, include:

- **screen project proposals** for technical and financial viability before hosting them on the CFP website;
- **understand the 'crowd'**. As the field is new, CFPs have little information about the 'crowd', what their preferences are, what their sensitivity to risk and reward (e.g. the interest rate) is. This is essential information to
- **develop a convincing 'pitch'**, often enriched with a video clip, and to run an effective campaign; and to
- **reach out to potential investors**, at times in person, to pitch new investments;
- **maintain ongoing involvement** with projects and investors through reporting to investors, in particular those who feel committed to the 'cause' of the project, i.e. energy efficiency and reduction of CO2 emissions.

Essential services to support crowdfunding, which often are missing in developing countries and emerging economies, include:

- **Online payment services**. As in the case of Morocco, processing of online payments can be restricted, particularly for international transfers, or be delayed, even for domestic transfers. Manual handling of transfers increases costs and time for processing.
- **Screening investors under money laundering laws.** This is a requirement which most CFPs want to outsource.
- **Screening projects for technical and financial viability.** Even experienced platforms, such as Bettervest, use external reviewers or technical advisers to independently confirm the feasibility of the proposed energy efficiency project.

5.3.4 Lack of Foreign Exchange Risk Management Tools

While not unique to crowdfunding, foreign exchange risk can present a significant deterrent for 'cross-border' crowdfunding. CFPs typically ask the project developer to

assume the forex risk, so that they can present to the crowd a 'clean and simple' proposal: crowd invests in Euro and is being paid in Euro!

ESCOs (and other project developers) are not happy to incur this risk, when working with international platforms. Indeed, lack of willingness to assume the forex risk may become a deal breaker for CF4EE.

Tools and products to hedge forex risks for developing country currencies are rare particularly for hedges over the duration of a project of 5 or more years. They can become prohibitively costly, unless subsidized by concessional finance or patient investors.

5.3.5 Lacking Quality Control Mechanism and related Reputational Risk for CF4EE

As CF4EE gets piloted and expands 'cross-border', new platforms will emerge with varying levels of technical competence and governance. In the absence of a credible mechanism to verify project quality and to monitor platform performance, the probability will increase that crowdfunded energy efficiency projects will fail and investors lose part or all of their investment. A series of such failures could lead to discrediting the entire CF4EE approach and project type, and deter crowd investors from further investing in CF4EE.

5.3.6 'Competition' from Highly Subsidized Energy Efficiency Funding

The growth of CF4EE has been slow in Germany and other European countries in terms of numbers of dedicated CFPs, number of projects listed by CFPs, and the volume of funding raised compared to the growth of crowdfunding in general, and the growth of crowdfunding for renewable energy, in particular.

Does this foreshadow a similarly slow growth in emerging economies? Not necessarily!

It is safe to assume that one explanation for such slow growth is the availability of cheaper alternatives of public and private financing for energy efficiency projects, such as subsidies and concessional loans. For example, Germany offers highly concessional loans and grants to its municipalities for undertaking energy efficiency in buildings with the result that municipalities politely declined offers by CFPs to mobilize resources for such energy efficiency measures: they had access to sources of funding which were cheaper and required less effort than a crowdfunding campaign.

As such incentives are less readily available in emerging economies, the opportunities for CF4EE to succeed and to play a useful role as 'financial gap filler' are greater. This gap may shrink over time, as developing countries and emerging economies attach more importance, and offer more generous subsidies, to energy efficiency. As an indispensable and cost-effective instrument to achieve ambitious mitigation targets under the Paris Agreement and to reduce energy imports and costs, energy efficiency is indeed likely to increase in importance.

5.3.7 The Unknown Crowd

The term ‘Crowd’ is frequently used, without actually a good understanding of its characteristics, preferences, and willingness to invest. This is particularly true for a new field of crowdfunding such as CF4EE. Few CFPs would have the capacity and resources to undertake the necessary market research and market testing to build a more robust knowledge of the crowd interested in CF4EE.

Developing a website offering projects has become relatively easy and low cost, if existing platform designs are being used and then customized to the specific needs. The more challenging task is to generate ‘visibility’ to bring traffic to this website, amidst fierce competition for the attention and the money of the ‘crowd’. This requires patient capital to finance the CFP during the development stage, including for qualified staff, outreach to potential investors, and building of an attractive pipeline of quality projects.

The likely result is a wait-and-see attitude of interested CFPs, to learn from the successes and failures of others, and slowing down the overall growth of CF4EE, and thereby to some extent of energy efficiency.

6 Conditions Conducive for CF4EE

6.1 Introduction

The lead question of this study was under what conditions is debt or equity crowdfunding, potentially, a useful instrument to finance energy efficiency in developing countries?

Building on the findings from the case studies and the general assessment, this chapter offers a simple framework describing the conditions that are conducive for scaling up CF4EE. It is meant as a simple guidance to development organizations, to determine whether it may make sense to support scaling up CF4EE.

6.2 Essential Conditions for Scaling Up CF4EE – a Proposed Framework

CF4EE already exists as a viable business model, e.g. in Germany. Under what conditions could it be replicated and scaled up in developing countries and emerging economies?

The study suggests that the following main conditions are essential for creating an enabling environment for CF4EE:

- **Demand and Technical Capability for energy efficiency**
- **Financing Barriers**
- **Clear Regulations for Crowdfunding**
- **Institutional Capacity**
- **Interested Crowd**

Demand and Technical Capability Exist for Energy Efficiency Measures

- Demand for energy efficiency: energy prices and other incentives in the country are conducive for undertaking energy efficiency measures and render energy efficiency investments profitable, with attractive pay back periods of say less than 5 years.
- Energy consumers, such as building owners, actually have to pay their energy bill, and thus are effectively motivated to undertake energy efficiency measures.
- Technical capacity exists to undertake energy efficiency measures: often this will require the existence of specialized service companies, such as ESCOs, providing technical knowhow, and at times also financing of energy efficiency measures.

Financing Barriers Exist for Undertaking Energy Efficiency Measures

- Financing barriers for energy efficiency: access to affordable and attractive financing of the upfront investment in energy efficiency through regular financial mechanisms, such as banks is highly restricted and limited to large borrowers and corporations.

- No grant or subsidy programs for energy efficiency: no (or only limited) grant based financing support mechanisms are available or accessible which would offer generous and cheap energy efficiency financing. CF4EE could typically not compete with them.
- Financing barriers for ESCOs: ESCOs find it difficult to mobilize debt or equity for pre-financing energy efficiency investments. This greatly limits their ability to offer shared savings contracts to clients and to grow their business.

Regulation for Crowdfunding Exist

- Crowdfunding regulation in place: ideally, an enabling crowdfunding regulation has been enacted, creating regulatory certainty for investors and CFPs. This is still a very rare case in developing countries, although a number of countries are planning to issue new regulations, such as Indonesia, or have already passed legislation, such as Malaysia.
- Regulations do not obstruct crowdfunding: where explicit crowdfunding legislation does not (yet) exist, current legislation does at least not prohibit or seriously obstruct crowdfunding. An example for serious obstructions would be Singapore's limit to 49 investors per project, or otherwise the requirement to obtain an onerous license as financial broker.

Institutional Capacity for Crowdfunding Exist

- CFPs exist and operate: ideally, CFPs already exists in the country. This is still a rare condition in developing countries, perhaps with the exception of China and India, and particularly rare for debt and equity crowdfunding.
- Alternatively, international CFPs exist willing to operate in the developing country in a cross-border mode.
- Access to internet: crowdfunding draws some of its comparative advantage from operating online, for the application, information, communication, and financial transfers. The larger the access to the internet, the larger the potential crowd to invest in projects.
- Online financial transactions are enabled: The ability to handle financial transactions online with a large number of investors for relatively small amounts in a swift and cost-effective manner is the centerpiece of a crowdfunding mechanism.
- Cross-border financial transactions: ideally, the country has few restrictions on transferring money in and out of the country. Sometimes such conditions already exist for donations, but are rarer for loans and equity investments.

Interested Crowd Investors exist, willing to lend or invest in Energy Efficiency Projects

- Interested crowd: No crowdfunding without a crowd, which has disposable income to lend or invest, is computer and internet enabled, and is interested in dual returns, e.g. from energy efficiency projects, in form of reasonable financial returns combined with social-environmental benefits, such as energy savings and CO2 reductions.
- Appetite for higher yield/higher risk investments: in a climate of low interest rates and low returns on regular investments, small (and large) investors are more likely to turn to higher yield investments offered through a CFP, even if this investment comes at a higher risk (foreign country, unknown company, exchange rate fluctuations, etc.). Crowdfunding allows such investors to spread their risk across multiple small investments.

6.3 Application of the Framework to the Cases Presented in this Study

In order to test its practicality, the proposed framework is applied to the 2 case studies in Morocco and Indonesia. The ratings are qualitative in nature, and are meant as guidance for decision makers in countries and in development support organizations. They are not to be understood as quantitatively exact evaluation tools.

6.3.1 Rating of Conditions for CF4EE in Morocco's 'Greening Mosques' Program

Conditions	Strong		Weak		Summary
Energy Efficiency Demand and Technical Capability	+	Gov. energy efficiency promotion	- -	Mosque do not pay for energy ESCO still new	+/--
Financing Barriers	+	Banks unfamiliar w/ energy efficiency Sharia Restricts Debt	- -	Strong Donation Culture Gov. subsidized energy efficiency program	+/--
Crowdfunding Regulation			- -	No crowdfunding regulation in place or planned	--
Crowdfunding Capacity			- - -	No debt or equity CFPs Online transfer restricted	---

				Cross-border payment difficult	
Interested Crowd Investors	+	Potential local citizen Potential overseas community	- -	Crowd unknown More likely donate than invest in Mosque	+/--

Based on these overall unfavorable conditions, this study concludes that equity crowdfunding for mosques in Morocco, under the specific circumstances of this case, does not lend itself for a CF4EE initiative. On purely financial grounds, an equity crowdfunding instrument would be only marginally viable.

The main concerns are:

- A crowdfunded project would be only marginally financially viable, in particular considering the substantial ESCO fee (22.5% of revenues) which includes the additional costs imposed by using crowdfunding (an estimated 13% of funds raised).
- A strong assumption that the potential crowd would rather donate than invest in a mosque on ethical grounds,
- alternative sources of government subsidies or donations will readily available for financing energy efficiency measures in mosques, and
- individual mosques may have limited incentives for undertaking energy efficiency as long as energy bills are being paid by someone different (e.g. Ministry etc.).
- Setting up the institutional infrastructure of an ESCO, CFP, and sharia conform financing mechanism, for which no precedent or regulation exist yet, would require a sustained development effort and strong national champion, which is currently not in sight.

6.3.2 Rating of Conditions for CF4EE in Indonesia's 'Energy Efficiency in Commercial Buildings'

Conditions	Strong		Weak		Summary
Energy Efficiency Demand and Technical Capability	+++	Large energy efficiency potential Energy subsidies stopped ESCO capacity -			+++

		growing			
Financing Barriers	++	ESCO face barriers to access debt			++
Crowdfunding Regulation	+	Crowdfunding regulation planned	-	Crowdfunding regulation delayed	+/-
Crowdfunding Capacity	+	Potential interest international CFPs	--	No debt or equity CFPs Distrust internet payment	+/--
Interested Crowd Investors			--	Crowd unknown	--

Considering the strong and weak points of this case, this study considers CF4EE a viable option for Indonesia, worth being supported through a comprehensive program, which is further described below.

CF4EE would be driven by a strong demand for energy efficiency, cost-effective and technically viable solutions, and an emerging ESCO sector with limited access to formal finance.

Support programs would need to address weaknesses in the area of (missing) regulations, crowdfunding platform capacity, support services (such as online payment systems), and market research on potential crowd investors.

7 Recommendations

In the previous chapter the study identified conditions under which CF4EE can possibly play a useful role in financing energy efficiency measures.

This chapter offers recommendations for how governments and development oriented organizations could support scaling up CF4EE, in situations where it has potential as energy efficiency financing instrument. In particular, it addresses the questions:

- What possible policies and institutional actions could help reduce barriers to scaling up and address weaknesses of CF4EE?
- What role could specifically GIZ play to support countries willing to undertake such actions?

We focus here on actions related to the crowdfunding aspects and not to the underlying energy efficiency projects, as there are already many programs and studies dealing directly with improving the quality of energy efficiency projects.

7.1 The 5 Cs of Supporting CF4EE

We can distinguish 5 approaches, the '5 Cs', to create conditions conducive to the introduction and the scaling up CF4EE:

- **CF4EE Regulation** – establish an enabling legal and regulatory environment through policy advice
- **Credibility** – enhance the credibility and transparency of CF4EE products and services through a CF4EE Portal
- **Capacity** – enhance the capacity of the relevant CF4EE actors, in particular regulators, CFPs and relevant support systems (e.g. payment services) mainly through practical trials and training
- **Co-Funding** – enhance impact through matching of funding from the crowd
- **Confidence** – enhance confidence of crowd investors through de-risking

7.1.1 CF4EE Enabling Regulation

During its initial growth period, crowdfunding could operate in regulatory grey zones, because the new development was difficult to fit into existing legislation.

Regulators in the financial and banking field are often surprised and overwhelmed by the new crowdfunding phenomena. The typical reaction is often to first apply existing legislation, even if circumstances differ fundamentally. In more advanced countries, new legislation is being drafted or passed, giving rise to the creation of associations or similar institutions to articulate the interests of the crowdfunding community.

There is no agreed 'best practice' crowdfunding regulation. EU countries provide a range of regulations from more consumer/investor protective (e.g. Germany) to more start-up

business oriented (e.g. UK). Also concerns about money laundering can lead to more restrictive attitudes (e.g. Colombia).

Most developing countries entering the field of crowdfunding would therefore benefit from:

- **Regular consultations between regulators and the regulated crowdfunding community** to discuss the ramifications of proposed new legislation and cost-effective means to achieve political objectives, such as consumer protection, without strangling new business start-ups in the crowdfunding field.
- **Hands-on technical assistance to regulators** to capture the lessons from international experience for the formulation of national regulation.
- **Participation in international venues to discuss strategies for expanding cross-border crowdfunding**, where appropriate, such as the Crowd Dialog [21].
- **Institutions** like the recently created Crowdfunding Hub[22] that started a review of EU countries' different crowdfunding regulations[23] and is beginning to look at cross-border crowdfunding. Publications such as the Jahrbuch Crowdfunding[24] provide an updated overview of the state of discussion.

  Many of these institutions have still to be created in developing countries, but a few have already come into existence, such as the Crowdfunding Asia platform[25] which shares knowledge about the status of Asia's crowdfunding scene and Allied Crowds[26] that tracks crowdfunding in particular in developing countries.

7.1.2 Credibility and Transparency through a CF4EE Portal

Credibility and trust in the CFP and in its projects is essential in crowdfunding, in particular because (i) often there is a large distance between the investor and the project (such as in cross-border crowdfunding), (ii) the crowd investor has not the capacity to undertake due diligence him/herself and (iii) crowdfunding is still new and untested.

Credibility depends on many factors. This recommendation focuses on setting up a **Portal for CF4EE**, featuring CFPs and their performance, thereby increasing transparency and quality.

A CF4EE Portal would be a web-based site, to which CFPs can apply for accreditation. Part of the accreditation requirements would be the use of transparent and standardized formats to disclose relevant information.

The CF4EE Portal would provide an independent overview of the different CFPs and their products, using a standardized reporting format for better comparability among

[21] www.crowddialog.eu
[22] www.crowdfundinghub.eu
[23] http://www.crowdfundinghub.eu/the-current-state-of-crowdfunding-in-europe/
[24] www.slingshotreturn.com, e.g. Oliver Gajda et.al. (Ed.) Jahrbuch Crowdfunding 2015, Wiesbaden, Germany, 2015
[25] www.CFAsia.org
[26] www.AlliedCrowds.com

CFPs. For example, it would report on the financial return to the crowdfunder (grant, interest-free loan, fixed or variable interest, or equity share), the performance risk (default rate, allocation to crowdfunder of all/partial/no risk), transaction costs (charged by CFP, the payment service), the climate relevance of its portfolio (sector, gender, average size investments, climate relevance). Furthermore, it would provide a feedback and user rating facility to quickly surface performance or other issues with a specific CFP. After some initial testing, this may lead towards an independent rating scheme to guide investors with regard to the growing number of energy efficiency oriented CFPs.[27]

To provide an initial incentive for accreditation under such Portal, such accreditation could be made a prerequisite for other forms of support (matching funding, technical assistance, etc.). Once the Portal reaches a critical mass in terms of numbers of CFPs and projects and users, it would attract other CFPs which do not want to miss out on the visibility and web-traffic generated by the Portal. At this stage (partial) self-financing of Portal becomes feasible.

7.1.3 Capacity for CF4EE

Crowdfunding may look deceivingly simple to implement. However, to be successful, crowdfunding capable institutions are needed to operate crowdfunding. Capacity building can focus in-country or internationally.

7.1.3.1 In-country Capacity Building

In-country capacity building works in countries which have already a basic crowdfunding infrastructure, but no focus on energy efficiency yet. Through training and incentives (e.g. matching co-funding, guarantees against first losses) some CFPs may be encouraged to extend their portfolio to include energy efficiency. Often, regulators and providers of support services need to be included in such trainings, in particular those dealing with payment systems and investor screening. Technical knowledge e.g. to assess the feasibility of energy efficiency projects and their predicted savings potential could initially be outsourced to an independent consulting company, including an active ESCO company.

Several 'white label' companies exist, which can help establish new CFP and support services, such as Crowd Valley[28] (the 'digital back office for online investing and lending') or crowddesk[29]. This has drastically reduced the cost of launching, and increase the quality of a new CFP (now estimated less than €20,000 only for the software and website).

[27] For more information see MIT Colab Winner: From the Crowd to the Base: Crowdfunding for Local Climate Action.
[28] www.Crowdvalley.com
[29] www.crowddesk.de

7.1.3.2 International Capacity Building

International capacity building is appropriate where cross-border crowdfunding is involved and where no crowdfunding infrastructure exists in the developing country, yet. International CFPs might be eager to expand into new markets but shy away from the cost and risks associated with opening up a subsidiary in the country and/or develop the due diligence capability of assessing project risks in other countries.

There is so far limited practical knowledge about crowdfunding in general and CF4EE in particular, which has been gathered and which is accessible through publications, often the only option is trial and error.

The Austrian Government therefore decided to finance the start-up of a new Crowdfunding for Climate Change Platform (CF4CC) to mobilize debt crowdfunding in Austria and Germany for energy projects in developing countries. The new platform is managed by a private firm (Energy Changes) in close collaboration with Oegut, a semi-public organization focused on sustainable development. The platform is scheduled to go live in 2016 and to become financially self-sustaining within few years.[30]

One approach to reduce the cost of due diligence and enhance the quality of projects when starting up cross-border crowdfunding, particularly with developing countries, could be the strategic alliance of a CFP with a larger organization that regularly develops new projects, but lacks funding to implement all of them. For instance, the Austrian CF4CC (Crowdfunding for Climate Change) platform is working closely with private and public development institutions in Austria to build its initial pipeline. In the future, development finance institutions may consider reaching out to existing CFPs or set up independent new CFPs to mobilize crowdfunding as private co-financing for projects in the pipeline.

7.1.4 Co-Funding and Challenge Grants

Challenge funds, or matching funds, would help mobilizing funding from 'the crowd' by magnifying its impact and attracting funding into energy efficiency related projects. From the perspective of the investor or institution which offers the match, crowdfunding provides a leverage of their resources from a largely untapped resource, thereby avoiding a mere reallocation of limited donor resources within different categories.

An example for a challenge grant for crowdfunding in a different field is the Mayor of London challenge grant of 20,000 British Pound for the best crowdfunded initiative hosted by the CFP Spacehive[31]

[30] Contact: Gottfried Heneis (gottfried.heneis@energy-changes.com).
[31] www.spacehive.com

7.1.5 Confidence of Crowd Investors through De-risking

Crowdfunding is often associated with higher risk and more patient investors seeking social environmental in addition to financial returns. While this is certainly one segment of the market, the trend is to approach also professional investors. Risk sensitivity is therefore likely to increase among the 'crowd', and CFPs will begin to compete for the crowd with higher returns and lower risks. Risk reduction can come from improved due diligence of projects (CFP capacity, specialized technical organizations), more CFP transparency (Portal), de-risking instruments, and lower risk projects (e.g. refinancing ongoing projects).

This recommendation focuses on de-risking and refinancing.

7.1.5.1 De-risking through Guarantees

Guarantees can reduce investment and lender risks through a 'de-risking' instrument, such as a first loss guarantee facility. The underlying assumption is that during an initial period the perceived risks are larger than the actual risks, leading to an under-investment in CF4EE. Guarantee schemes spread the risk over al large portfolio. CFPs could apply to such a facility, and cover their portfolio, and their investors, against the (say 10%) of losses resulting from defaults of projects. This would give investors comfort that dividend and interest payments would be kept up, even if the project defaults, and could help attract new investors with interest in financing energy efficiency projects in developing countries, but with a lower risk profile. CFPs and its investors would always share some of the risk to align interests in a high quality portfolio of energy efficiency projects that is capable of generating the dividends and interest payments to the Crowd.

7.1.5.2 De-risking Exchange Rate Fluctuations

A particular de-risking instrument is needed to reduce the **foreign exchange risks in cross-border CF4EE**. Hedging against currency volatility is typically beyond the capacity of CFPs or the energy efficiency projects. Organizations such as TSX of the Toronto Stock Exchange [32] offer forex hedges also for developing country currencies and for longer maturities than otherwise available on the market. Absorbing part or all of the forex risk will enhance the attractiveness of cross-border crowdfunding for CFPs, projects and investors. During a phase-in period of CF4EE, forex risk cover could be partially subsidized until the market has learnt to price this risk in and have become willing to assume or share part of this risk among investors and project.

[32] See www.tsx.com/?lang=en

7.1.5.3 De-risking through Refinancing Ongoing Projects

De-risking is also possible through selecting ongoing projects for re-financing. For instance, energy efficiency projects which are already under implementation, with institutional set up in place and a track record of actual savings represent a lower risk than new energy efficiency projects. The ESCO may have an interest to sell its stake in the project (i.e. remaining income stream from energy savings), after deducting a premium for having developed the project, in order to have liquidity for undertaking new projects. This is common practice renewable energy feed-in-tariff projects, when the developer sells its stake after operating successfully the project for few years. By offering an exit strategy to ESCOs, CF4EE can help attract investors with lower risk appetite into the ESCO field, while offering low risk steady income to crowd funders.

7.2 Opportunities for GIZ Engagement in Scaling up CF4EE

GIZ has been engaged in many aspects relevant to CF4EE, and is therefore well positioned to develop CF4EE support programs, in particular in the following areas.

7.2.1 CF4EE Regulation: Policy Advice and Stakeholder Consultation on Crowdfunding Legislation and Regulation.

Crowdfunding regulation touches, inter alia, upon banking regulations and financial services licensing, drawing the boundaries within which crowdfunding can operate without banking license, without a full investment prospectus, or a professional broker license.

GIZ is familiar with banking and financial sector development (e.g. recently in Myanmar), and knows the relevant government bodies, including the ministries of finance. Furthermore, GIZ has extensive experience in facilitating stakeholder processes, including when conflicting interests run the risk of stalling the regulation or legislation process.

This puts GIZ in a strong place to engage with key decision makers in the government in creating a country-appropriate CF4EE regulation. In order to bring the relevant crowdfunding actors to the table, GIZ may want to consider partnering with an international crowdfunding associations or knowledge platform, and at the same time support the creation of domestic crowdfunding associations, to effectively voice the interest of the crowdfunding community.

7.2.2 CF4EE Portal

For the CF4EE Portal, GIZ may wish to be in the role of facilitating the establishment, rather than operating the portal itself. Long-term management requires a sustainable funding source, in the best of cases self-financing, which is not easily combined with the time-bound project finance culture of the GIZ.

But GIZ could draw on its practical experience and track record of establishing an operating web based portal (e.g. Länder Information Portal) and support the development of the key parameters which the CFP would publicly disclose, drawing on work done for good governance and transparency.

7.2.3 Capacity Building

Capacity building is core business for the GIZ. While GIZ may have little in-house knowledge about crowdfunding in general and CF4EE in particular, it could organize international exchanges and workshops to bring together known experts and practitioners and in the process develop learning programs. Alternatively, it may want to partner with a crowdfunding knowledge hub to be selected in a competitive process. Training activities could piggy bag on international (or in large countries like China national) crowdfunding events.

For CF4EE, GIZ could offer training to evaluate energy efficiency projects from a financial, technical, and environmental perspective, for which ample training material and tools already exist, including the one used for analyzing the two cases in this study.

7.2.4 Matching Funding and Challenge Funds

Actual financing or co-financing of projects is not GIZ core business. However it could help design eligibility criteria for selecting projects that can be co-financed

7.2.5 De-risking

Again, operating a de-risking facility is not GIZ core business. However advising on how to set up a guarantee facility and operate it, is.

Assessing the risk of ongoing projects to ensure a high quality pipeline could easily be included in the capacity building package.

Forex Risk cover, by contrast, is a highly specialized area which is not a GIZ core competence.

7.3 IKI Proposal to Pilot Test CF4EE

The Internationale Klima Initiative (IKI) is a grant funding facility of the German Ministry of Environment to foster innovation in climate policy and implementation. In the 2016 call for proposal, particular emphasis has been put on developing innovative climate finance instruments which would help accelerate implementation of ambitious Nationally Determined Contributions (NDCs).[33]

Energy efficiency is an important element of many NDCs, such as e.g. in Indonesia.

GIZ may therefore consider submitting an IKI proposal in 2017 to pilot test CF4EE in a select group of countries. The package of measures should include at a minimum:

- Diagnostic of the regulatory framework, in particular for cross-border crowdfunding and for setting up new in-country CFPs and facilitating a stakeholder process to formulate a country appropriate crowdfunding regulatory framework.
- International exchange and workshops between countries with a highly developed crowdfunding sector and countries at an early stage of crowdfunding development.
- A feasibility study on setting up a new CFP focused on energy efficiency or building on existing CFPs. Based on this study provide technical and financial assistance to create CF4EE capacity and start operating pilot operations that would fund actual energy efficiency projects (cf. the Austrian CF4CC initiative).
- Testing systematically crowdfunding markets, to better understand crowd preferences and sensitivities with regard to risk and returns and to better target campaigns in the future.
- A feasibility study on a CF4EE Portal, identifying key functions, potential host organizations, and business models to reach cost-recovery. Based on this study, facilitate the design and start-up of such portal.

As results, this IKI project could offer tangible CO2 reductions from concrete energy efficiency projects financed with crowdfunding, a solid knowledge platform on climate relevant crowdfunding, and a regulatory framework which, together with a portal, creates conditions for transparency, quality, and good governance in CF4EE.

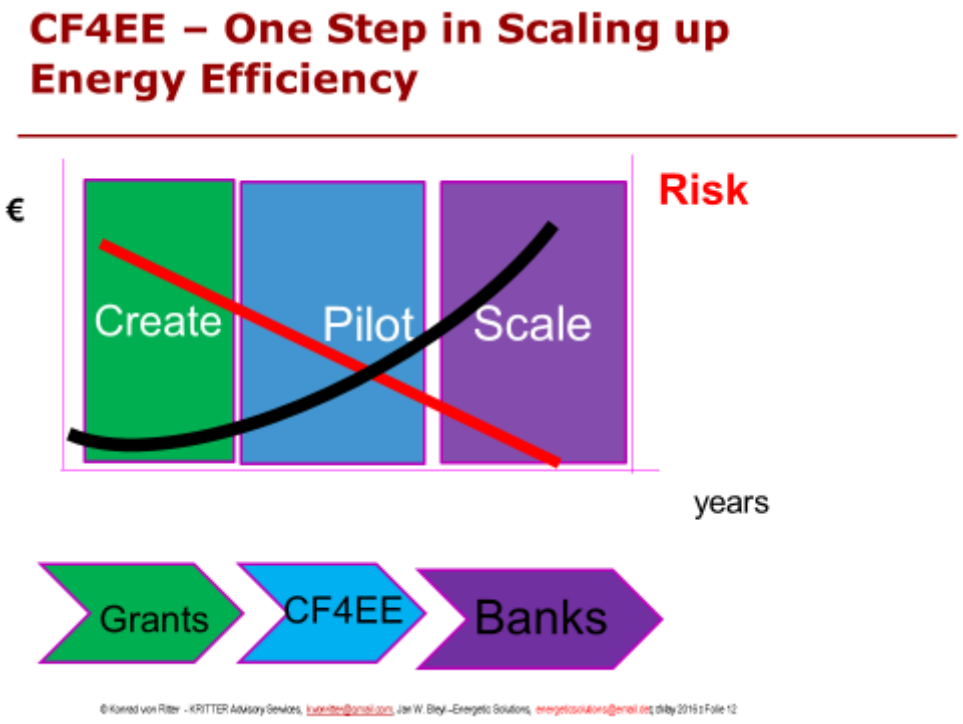
It may make sense to choose a broader scope for such IKI proposal, such as Crowdfunding for Energy Projects, including energy efficiency and renewable energy, or even Crowdfunding for Climate Change, that could include crowdfunding for adaptation projects.

[33] www.international-climate-initiative.com

7.4 CF4EE as a Complementary Instrument in the Broader Context of Development and Climate Finance

This study made very clear that CF4EE is not a panacea to overcome all the barriers to accelerate and scale up energy efficiency measures in developing countries and emerging economies.

However, given its particular characteristics, CF4EE can be envisioned as part of a 'sandwich' approach to introduce and scale up effective energy efficiency business models (such as ESCOs) in new markets.



At the risk of over-simplification, the process of scaling up energy efficiency in a country could be divided into three phases:

- **Create and innovate new technologies and applications of energy efficiency measures.** This can involve research, demonstration projects, awareness campaigns and capacity building.

  Often there is a reliance on public funding, subsidies, and grants during this stage, because of the cost and externalities of this learning phase is not attractive to the private sector.

- **Develop and pilot business models** which demonstrate financial viability, profitability, and global climate benefits and local social benefits. Based on initial capacity building, few pioneer CFPs would be encouraged to develop a pipeline of energy efficiency projects. They would be offered hands-on technical advice in assessing project risks and structuring deals. They may also be offered

concessional financing and de-risking instruments (see above). A university or similar technical institution could be involved to undertake an independent monitoring & evaluation of the pilot and to ensure real time reporting on results to other interested CFPs or investors. Based on the results of a meaningful sample of successful pilot investments (perhaps 10 to 20), guidance notes could be developed for CFPs, regulators and financial institutions with check lists for the main risks of CF4EE and how to manage them.

This is an interesting niche for CF4EE, because regular financial institutions may not yet be interested in financing these types of energy efficiency projects, but enough knowledge and capacity already exists to undertake pilot projects (as demonstrated in the case of Indonesia). With its higher risk tolerance, fewer collateral demands, and patience, CF4EE may be able fill this (temporary) financing gap.

- **Scale up proven business models nationwide.** Once the (crowdfunded) piloting has confirmed the viability of a technology and demonstrated credibly the profitability of (at least some) business models, banks and other established financial institutions may get now very interested in this new market and build up their own pipeline of projects. Risks are now considered predictable and manageable.

  At this stage, the formal banking sector 'takes over' and moves into the energy efficiency field, to make profits in this now tested market. Approval processes are now being standardized and become faster. Sometimes this will be accompanied by an increase in government subsidies, for example to meet ambitious climate targets through energy efficiency measures.

  Overall this is positive, because it allows a large scale expansion of energy efficiency measures. However, it reduces at the same time the attractiveness and niche of CF4CC, which cannot compete in price and conditions with large scale regular energy efficiency financing, in particular if also subsidized, such as is the case for instance in Germany.

In this stylized model, **CF4EE is 'sandwiched' between grant funded upstream innovation and downstream large scaling up of regular bank financing. Debt and equity crowdfunding (the focus of this study) does not lend itself for grant funding upstream knowledge work, nor can it compete with large scale, and at times subsidized, regular energy efficiency financing.**

CF4EE is therefore likely a temporary financial 'gap filler' in a longer development process. Of course, this is not a one-time cycle, but technological innovations, more ambitious targets, and greater awareness will call for new business models and pilot experiences, facing similar constraints as the previous cycle.

In other words, crowdfunding becomes part of a blend of public and private energy efficiency finance, including:

- Grant Funding for capacity, awareness, and demonstration models, largely from domestic and international public sources.
- Risk tolerant debt crowdfunding for piloting, from private sources.
- Regular bank financing or refinancing through development banks with concessional.

This view of CF4EE as a complementary development financing instrument calls for a dialogue with established public and private financial institution. GIZ would be in a strong position to initiate and facilitate such dialogue, as part of its ongoing work with national development banks, its climate finance readiness work for the Green Climate Fund (GCF), and possibly as part of a future IKI project described above.

ANNEX: References

On Crowdfunding:

Allied Crowds. www.AlliedCrowds.com

Bettervest. https://www.bettervest.com/projekt/LED-Karolinaschule-Ungarn

Crowddesk. crowddesk.de

Crowddialog. www.crowddialog.eu

Crowdfundinghub. The current state of crowdfunding in Europe. http://www.crowdfundinghub.eu/the-current-state-of-crowdfunding-in-europe/

Crowd Valley. www.Crowdvalley.com

Fintechasia. http://www.fintechasia.net/ojk-indonesia-fintech-plans

Freischlad, N. Five crowdfunding sites in Indonesia.In Techinasia, May 1, 2015 https://www.techinasia.com/crowdfunding-future-indonesia-crowdfunding-sites.

Massolutions. Crowdfunding Industry Report. 2015.

Oliver Gajda, O. et.al. (Hrsg) Jahrbuch Crowdfunding 2015, Wiesbaden, Germany, 2015 www.slingshotreturn.com

Reidy, E. Why crowdfunding isn't easy in North Africa, March 26, 2015 in http://www.wamda.com/2015/03/why-crowdfunding-isnt-easy-north-africa

Ritter, Konrad von, and Diann Black-Layne. Crowdfunding for Climate Change. A new solution to finance local climate action? European Capacity Building Initiative. Oxford, UK. 2013. http://www.eurocapacity.org/downloads/CF4CC.pdf

Spacehive. www.spacehive.com

On Islamic Finance:

Groupe570. See for reference: https://www.ajib.fr/2011/04/groupe570-finance-islamique/

Islamic Finance for investors. Recommended readings in: https://blogs.cfainstitute.org/investor/2013/05/03/a-selection-of-books-in-islamic-finance-by-professor-rodney-wilson/

On Investment Projects and the Specific Cases:

Bleyl.J. The Investment-grade Calculation, Analysis & Financing of Energy Projects (Efficiency and Renewables). Economic, Financial, and Technical Calculation Tool. Version 4.6, January 2016, developed for the GIZ.

BMZ. Morocco - Green Mosques. Morocco plans to create jobs in the areas of energy efficiency and renewable energy, starting with modernising energy use within the country's mosques. P.2. 2016.

GIZ. Projet Mosquées vertes au Maroc. Rapport de diagnostic de 15 mosquées. Mosquée El Guermaï.

Indonesia power outages: see https://energypedia.info/wiki/Indonesia_Energy_Situation#Energy_Situation. Accessed May 11, 2016.

Imprint

Published by
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Sector Programme ‚Technology Cooperation in the Energy Sector'

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn / Germany
T +49 61 96 79-41 02
F +49 61 96 79-80 41 02
energy@giz.de
www.giz.de

As at

October 2016

Text
Konrad von Ritter, Kritter Advisory Services
Jan Bleyl, Energetic Solutions

GIZ is responsible for the content of this publication.

On behalf of the
German Federal Ministry for Economic Cooperation and Development (BMZ)