

**FIRECE – Interreg CENTRAL EUROPE Project CE1131**

**WPT2 Implementation of the instruments, testing and transferability actions**

# **Finalisation of the ex-ante assessment Analysis and implementation of the FI in Germany**

*DELIVERABLE*

*D.T2.4.1*

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## Abbreviations

APEE	Anreizprogramm Energieeffizienz (Energy Efficiency Incentive Program)
BAFA	Bundesamt für Wirtschaft und Ausfuhrkontrollen (Federal Office for Economic Affairs and Export Control)
BMBF	Bundesministerium für Bildung und Forschung (Federal Ministry of Education and Research)
BMU	Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (Federal Ministry for Environment, Nature Conservation and Nuclear Safety)
BMVI	Bundesministerium für Verkehr und digitale Infrastruktur (Federal Ministry of Transport and Digital Infrastructure)
BMWi	Bundesministerium für Wirtschaft und Energie (Federal Ministry for Economic Affairs and Energy)
CBILS	Coronavirus Business Interruption Loan Scheme
CO2	Carbon Dioxide
DLR	Deutsches Zentrum für Luft- und Raumfahrt (German Aerospace Center)
EC	European Commission
EIB	European Investment Bank
EEH	Energy Efficiency House
EFRE	Europäischer Fonds für regionale Entwicklung
ESF	European Social Fund
ERDF	European Regional Development Fund
EU	European Union
IFI	Innovative Financial Instrument
KfW	Kreditanstalt für Wiederaufbau (German state-owned development bank)
LED	Light Emitting Diode
SAB	Sächsische Aufbaubank (Saxonian Reconstruction Bank)
SME	Small and medium size enterprises
SWOT-Analysis	Strengths, Weaknesses, Opportunities and Threats - Analysis
UBA	Umweltbundesamt (German Environment Agency)
UK	United Kingdom

# 1 Introduction

The present report D.T2.4.1 “Finalisation of the ex-ante assessment Analysis and implementation of the financial instrument in Germany” is one of the biggest and important contribution within the FIRECE project on behalf of the Fraunhofer IMW. The development of the innovative financial instrument (IFI) especially for small and medium size enterprises (SMEs) for investing in energy efficiency measures follows the suggested Guidelines from the European Investment Bank and European Commission.<sup>1</sup> Together with the previous report D.T2.1.2 (Preparation of PA 1: CE Ex-Ante Assessment Analysis report), Fraunhofer IMW finalize the first two phases of the development of a concept for IFI: design phase and set-up phase. Due to this fact, the two reports (D.T2.1.2 and D.T2.4.1) should be considered as description of one inseparable process because D.T2.1.2 provides the basics with the assessment of the ex-ante analysis and an overview of the financial market situation in Saxony, Germany, regarding the financial possibilities for SMEs’ investment in energy efficiency measures. The present report will use this information and deepen it regarding some issues, where needed, before presenting the concept of the IFI and the related information for the implementation of this instrument.

The structure of the report after the short introduction is as follow:

Chapter 2 is divided in three subchapters giving the basics needed as well as additional information on which the development of the concept is firmed up. Subchapter 2.1 presents a short overview of the main conclusions and results from the ex-ante assessment report (D.T2.1.2). The following subchapter pays special attention to the specific energy efficiency measures being subsidized from different levels the financial sources are coming from. The last subchapter (2.3) provides detailed information about the financial resources funded through the alternative financial instrument crowdfunding and the specifics of the crowdfunding campaigns in this particular context.

In chapter 3, the concept of the IFI for the SMEs is detailed illustrated. The basic idea of the concept is briefly introduced in subchapter 3.1, following by the explanation of other possible combinations (subchapter 3.2), as well as a detailed explanation why exactly this kind of IFI is chosen (subchapter 3.3). The last subchapter

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<sup>1</sup> European Investment Bank; European Commission (2014): Ex-ante assessment methodology for financial instruments in the 2014-2020 programming period. General methodology covering all thematic objectives - Volume I; European Investment Bank; European Commission (2013): Financial instruments Guide: Setting up and implementing financial instruments, S. 55.

(3.4) is dedicated to some interesting examples of the concept and its implementation in different context as financing energy efficiency measures.

The SWOT-Analysis, revealing the strength, weaknesses, opportunities and the risks related to the concept for the IFI is to be found in chapter 4.

The last chapter 5 summarizes the main results of the report and give some recommendations.

## 2 Specific market of the innovative financial instrument in Saxony, Germany

Before describing the concept of the innovative financial instrument for SMEs implementing energy efficiency measures, a brief overview of the financial market in Germany in this specific context will be given. Subchapter 2.1 provides a short summary of the main conclusion from the previous report (D.T2.1.2) “Ex-Ante Assessment Analysis report” and gives information about the market failures regarding financing energy efficiency measures as well as the financial sources depending on the level or type of financial market (traditional or alternative). The next subchapter (2.2) deals with specific energy efficiency measures being subsidized from different financial sources coming from funding institution at differed levels. The last subchapter (2.3) is dedicated especially to the energy efficiency measures financed with sources from the alternative financial market and more specifically through crowdfunding. The analysis provides a closer look what kind of energy efficiency measures are financed with this kind of alternative financial instrument and the specifics of the crowdfunding campaigns like what is the funded amount and the needed time for the crowdfunding campaigns as well as which industrial sectors initiate such crowdfunding campaigns.

All this insights will be the basis for the development of the innovative financial instrument, taking into consideration the specific of the financial market for energy efficiency measures in Saxony, Germany and the identified trends on the traditional as well as on the alternative financial market.

### 2.1 Ex-Ante-Assessment Analysis – main conclusions

In this chapter the main conclusions from the ex-ante assessment analysis (D.T2.1.2) are extracted and will be presented shortly.

The goal of the ex-ante analysis is to give a brief overview of the financial market situation in Saxony, Germany, regarding the financing possibilities for SMEs investment in energy efficiency measures. The structure of the analysis trace the regional development starting with general macroeconomic indicators through indicators for regional energy supply and energy efficiency and going deeper and more concrete by investigating the currently available financial instruments for low carbon measures in Saxony. Further, an empirical assessment of the existing obstacles with regard to different regional stakeholders (e.g. SME, financial institutions, managing authorities etc.) have been done. The results of the empirical assessment and some conclusions based on the carried out desktop research as well as the relevant macroeconomic analysis are shown on Figure 1.



Figure 1: Problems and decision drivers for SMEs investing in energy efficiency measures in Saxony, Germany

		Problems	Decision drivers
Internal	from the side of the SMEs	<ul style="list-style-type: none"> <li>▪ Limited Management capacity                             <ul style="list-style-type: none"> <li>▪ Lack of time resources</li> </ul> </li> <li>▪ Lack of experience, knowledge and confidence                             <ul style="list-style-type: none"> <li>▪ Transaction costs</li> </ul> </li> <li>▪ Asymmetric information                             <ul style="list-style-type: none"> <li>▪ Share of own financial contribution</li> </ul> </li> <li>▪ Specific company features</li> </ul>	<ul style="list-style-type: none"> <li>▪ Internal motivation                             <ul style="list-style-type: none"> <li>▪ Visible savings from energy efficiency measures</li> </ul> </li> <li>▪ Awareness (e.g. perceive the need for energy efficiency measures)</li> </ul>
	from the side of the financial supporter	<ul style="list-style-type: none"> <li>▪ Complicated and slow bureaucracy                             <ul style="list-style-type: none"> <li>▪ Complex regulations</li> </ul> </li> <li>▪ Challenging conditions/ requirements</li> </ul>	<ul style="list-style-type: none"> <li>▪ Variety of financial support opportunities                             <ul style="list-style-type: none"> <li>▪ Consultancy with regard to funding in this context</li> </ul> </li> <li>▪ Consultancy with regards to appropriate energy efficiency measures</li> </ul>
External	from the general environment	<ul style="list-style-type: none"> <li>▪ Not enough convenience/ persuading incentives (e.g. prices of conventional sources still very low, not very high taxes and missing CO2 emission trading etc.)</li> </ul>	<ul style="list-style-type: none"> <li>▪ National and regional policy towards low carbon economy                             <ul style="list-style-type: none"> <li>▪ Actions of competitors in this area</li> </ul> </li> </ul>

Source: Own illustration based on own empirical assessment and research.

It is obvious, that there are a number of relevant problems and important decision drivers on both sides (supply – external and demand – internal). The difference between a problem and a discussion driver is based on the source of its assessment. The problems were mentioned from the different regional stakeholders during the empirical assessment and are seen as a direct obstacle for the decision about investing in energy efficiency on behalf of the SMEs in Saxony. The decision drivers have been devised regarding the desktop research and exchange experience between parties from different German federal states. They may not refer especially for SMEs in Saxony, but are also important and should be taken under consideration by developing the innovative financial instrument, because this decision drivers could affect the investment decision depending on the difficulty which the SMEs should handle in this regard. Of course, it is not possible to be taken under consideration all the problems and decision drivers by the development of the IFI, but this issue will be discussed in detail in chapter 3.

The ex-ante assessment gives also an overview of the financial sources available for SMEs in Saxony, Germany, to invest in energy efficiency measures. Figure 2 shows the financial actors and the origin of the financial sources available for SMEs in Saxony, Germany, in this specific area.

Figure 2: Financial sources available for SMEs in Saxony to invest in energy efficiency measures (last update: January 2020)



Source: Own illustration based on own research.

As shown on the figure above, there are a lot of financial sources available, not only from different institutional levels, but also from both – classical and alternative – financial markets. This might be one of the reason hidden behind the mentioned above two problems: complex regulations and challenging conditions/ requirements, because each financial instrument is through different processes and requirements conducted.

This are some of the main conclusions from the ex-ante assessment analysis and will be taken under consideration by the development of the innovative financial instrument later on. The specific energy efficiency measures are the next important issue by the development of the financial instrument. This information is only briefly introduced in the ex-ante assessment analysis and that is why, a more detailed overview will be presented in chapter 2.2 and 2.3 regarding respectively the traditional and alternative financial markets. The goal is to determine the needed information for the development of the innovative financial instrument from all points of view.

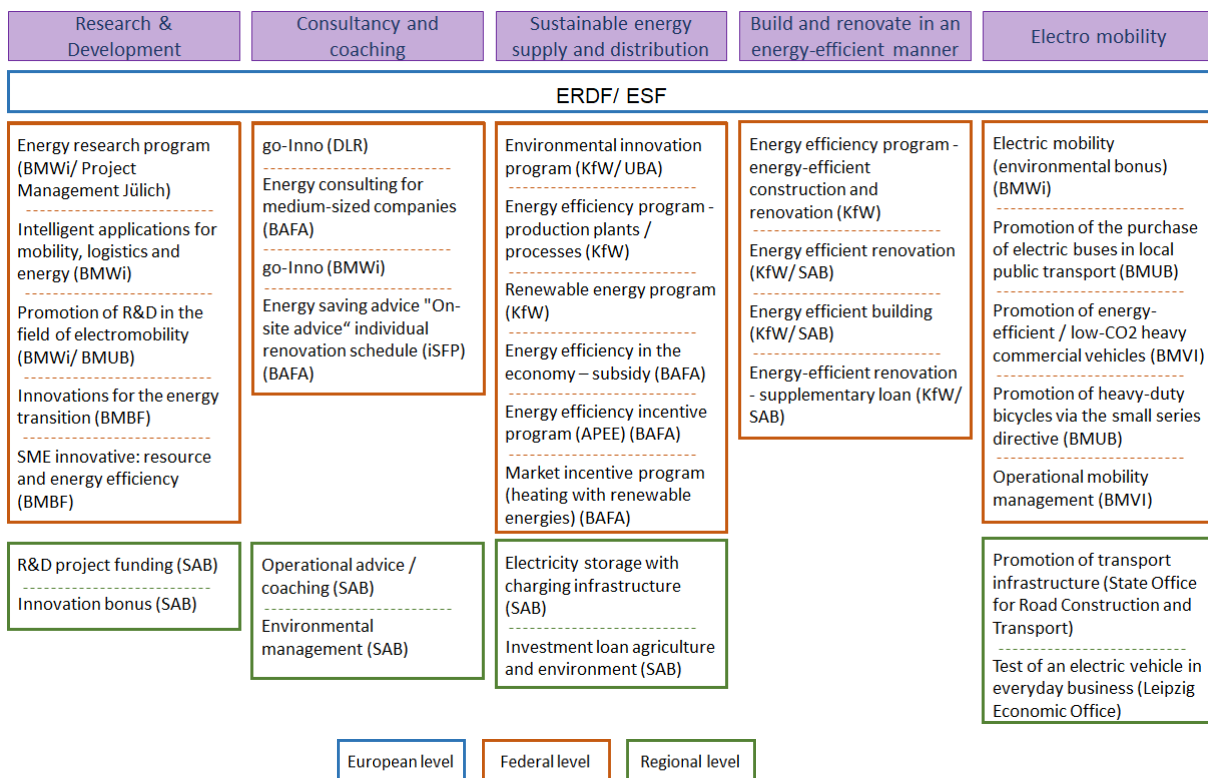
## 2.2 Energy efficiency measures eligible for subsidies/ grants in Saxony, Germany

Based on a desktop research, the data for the available financial instruments for SMEs in Saxony, Germany, were collected and the related energy efficiency measures were extracted. Five big groups of such a measures were built as follow:

- Research and Development in the area of energy efficiency;
- Consultancy and coaching in the area of energy efficiency;
- Use and modernization of renewable energy sources/ Sustainable energy supply and distribution;
- Build and renovate in an energy-efficient manner;
- Electro mobility.

Unfortunately it is difficult to determine the exact amount of the available financial resources regarding each one of the measure groups, because the financial resources are not only from different institutional levels, but they are also available for SMEs throughout Germany and not only for such a enterprises in Saxony. Nevertheless, figure 3 gives an overview what kind of subsidy<sup>2</sup> programs for the single measure group are available for SMEs in Saxony and where the money comes from.

Figure 3: Energy efficiency measures in Saxony, Germany, by program and financial source (last update: January 2020)



Source: Own illustration based on own research.

The specific energy efficiency measures regarding the European programs ERDF and ESF were already introduced in the ex-ante assessments analysis (D.T2.1.2, chapter 2.2.1). For this reason is only shown that there are relevant financial instruments on European level for all five specified measures. The new part is the single listed financial instruments at federal and regional level. The figure gives also an overview, which actors are more active and interested in financing the very specific energy efficiency measures. Those insights could

<sup>2</sup> A money as help for a company, which should not be paid back and it is provided by a government or other authority. Source: <https://www.collinsdictionary.com/de/worterbuch/englisch/subsidy>

be useful by the development of the innovative financial instrument, because it gives an important information in which area the IFI could be implemented regarding energy efficiency measures and which actors could be involved on the different institutional levels.

## 2.3 Energy efficiency measures financed through Crowdfunding in Germany

### Framework conditions and methodology

This chapter gives an overview of crowdfunding campaigns financing energy efficiency measures, while analysing the crowdfunding campaigns and putting them into relation to other criteria, likewise the target sum or funding period as well as the initiator of the campaign. The aim is to find specific pattern or correlation between the analysed criteria based on practical examples in Germany in this area. In the following, framework conditions will be defined, discussing selected criteria of this analysis, followed by a description of the method. Furthermore, statistical results will be revealed and conclusion to the current situation in Germany will be made.

Following framework conditions were established: Campaigns were considered as relevant, if their funding goal, for which money is collected, showed a reference to sustainability, with a direct effect for the company, conducting the campaign. This goes along with a reduction of CO<sup>2</sup> emission and perhaps a reduction of costs for the company. Furthermore, the enterprise conducting the campaign, needed to be a German SME. Only if all this conditions were fulfilled the campaign was considered as relevant.

After setting the framework conditions, the collection of energy efficiency campaigns began, arising the question where to find relevant campaigns. To find the right crowdfunding platforms [crowdfunder.de](http://crowdfunder.de) was used. This platform is an information portal giving interested parties general information and different perspectives about crowdfunding with the goal to provide a fundamental base regarding this alternative financial instrument. Another aim of the platform is to set the attention about the potential of crowdfunding and its possibilities to receive social added value. However, [crowdfunder.de](http://crowdfunder.de) gives a great overview over the different types of crowdfunding - reward-based crowdfunding, lending-based crowdfunding and equity-based crowdfunding.

### Types of crowdfunding

**Reward-based crowdfunding** is the oldest and most popular type of crowdfunding (Cholakova and Clarysse 2015). Almost everyone meaning private person, NGOs, public authorities and enterprises, can act as an initiator. The crowd gives money for projects for the common good or entrepreneurial initiatives. In return, they receive a token of appreciation or the first batch of the developed product (Xu et al. 2014). Hence, the

crowdfunding backers in this type can be considered as altruists, product testers, first customers or providers of feedback.

**Lending-based crowdfunding** is comparable to the issue of corporate bonds. In general, the initiators are enterprises. They collect money from crowdfunding backers through debt-like instruments, i.e. they typically offer a repayment of the invested amount after a specified time with a typically fixed interest payment on top (Koch and Cheng 2016).

**Equity-based crowdfunding**, often also referred to as crowd investing, typically grants backers stakes or mezzanine shares, like profit-participating loans, cooperative certificates, or silent partnerships in a company. In contrast to the aforementioned, there is no fixed exit date and there doesn't have to be a fixed interest payment, but as a shareholder, the investors have a claim on future cash flows and capital gains in the event of an exit.

The borders between the three types of crowdfunding are not clear. There are also platforms combining more than one type of crowdfunding. Accordingly, the research for crowdfunding platforms was filtered by the just mentioned types of crowdfunding and the results are based on the specification of the crowdfunding type made by the platforms on their own.

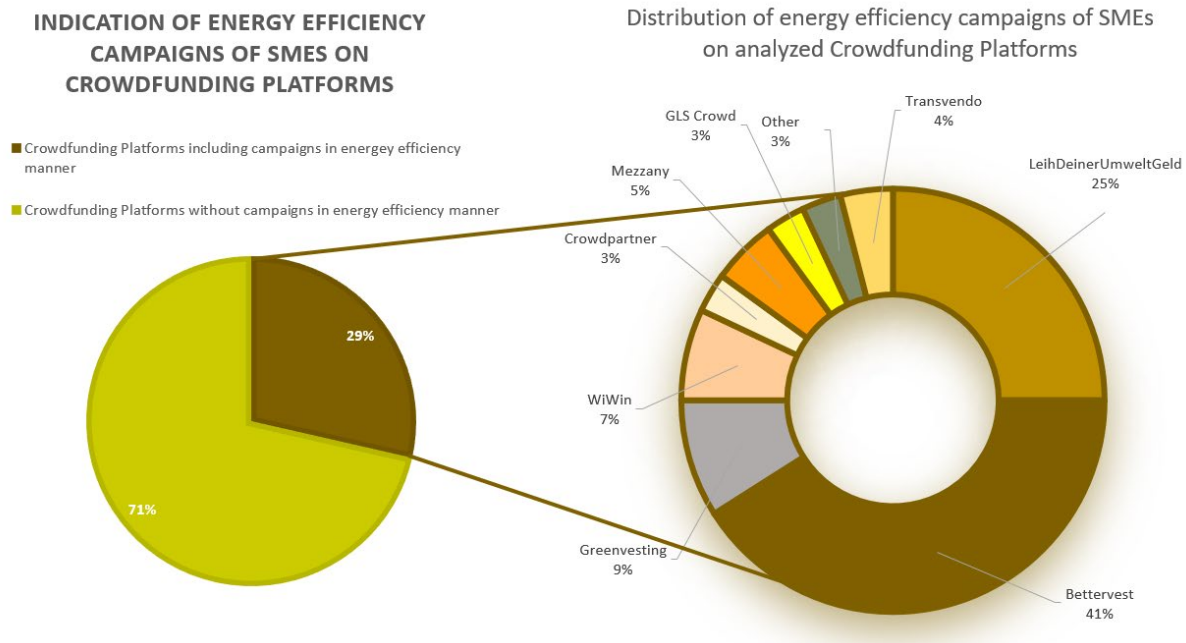
#### Summary of analyzation results

All the 129 registered German crowdfunding platforms on crowdfunding.de were scanned and 35 platforms were chosen as relevant for scouting energy efficiency campaigns on them. The selection of platforms was filtered by the type of platform, country focus and in addition the main emphasis needed to be on campaigns run by SMEs. A total sum of 3.174 campaigns was searched through all available on the relevant 35 crowdfunding platforms. Based on the above mentioned criteria, only 76 crowdfunding campaigns were considered as relevant for this analysis. The raw data documented include:

- name of the platform;
- type of platform (based on their own perception and online presence);
- funding goal meaning type of energy efficiency measure, which should be financed
- target sum meaning what amount should be reached with the campaign;
- funding sum meaning what amount of money in total really is funded;
- funding period (the time needed for reaching the target sum) and
- industry sector the company is active.

Following, the analyzed data and the relevant conclusions will be presented with respective charts and diagrams.

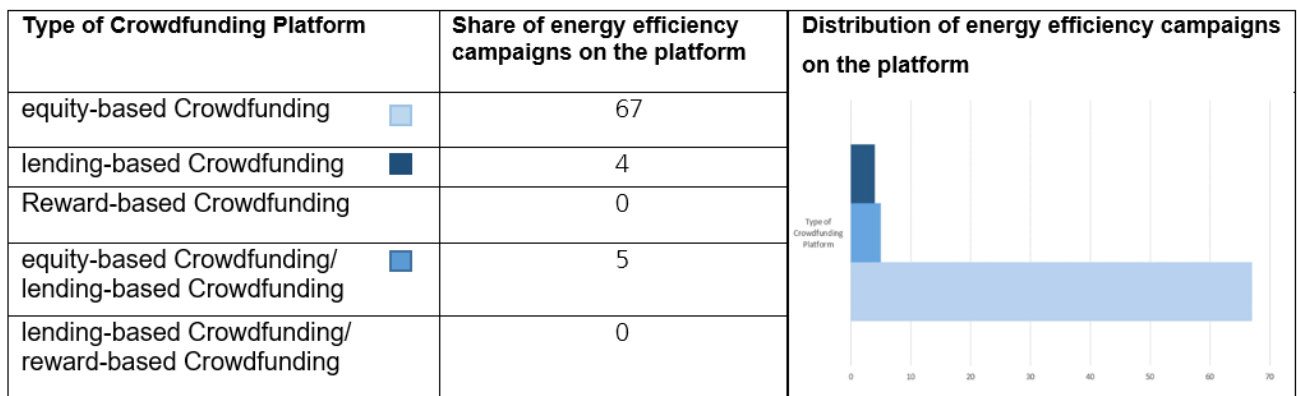
Figure 4: Distribution diagram of energy efficiency campaigns



Source: own illustration based on own research

Figure 4 shows the proportion of energy efficiency campaigns on the 35 screened crowdfunding platforms. Furthermore, it gives a closer look on the distribution of relevant campaigns on the 29% of screened platforms, which include campaigns in the area of sustainability, while meeting the criteria established at the beginning of the analysis. In the end, 11 crowdfunding platforms listed energy efficiency campaigns. As mentioned before, the analysis is based on 76 relevant campaigns, of which 41% were found on Bettervest, taking the greatest influence on this study. Based on these results, conclusion to the distribution of energy efficiency campaigns in manner of the type of platform are represented in Figure 5.

Figure 5: Distribution of energy efficiency campaigns in dependence of the type of crowdfunding

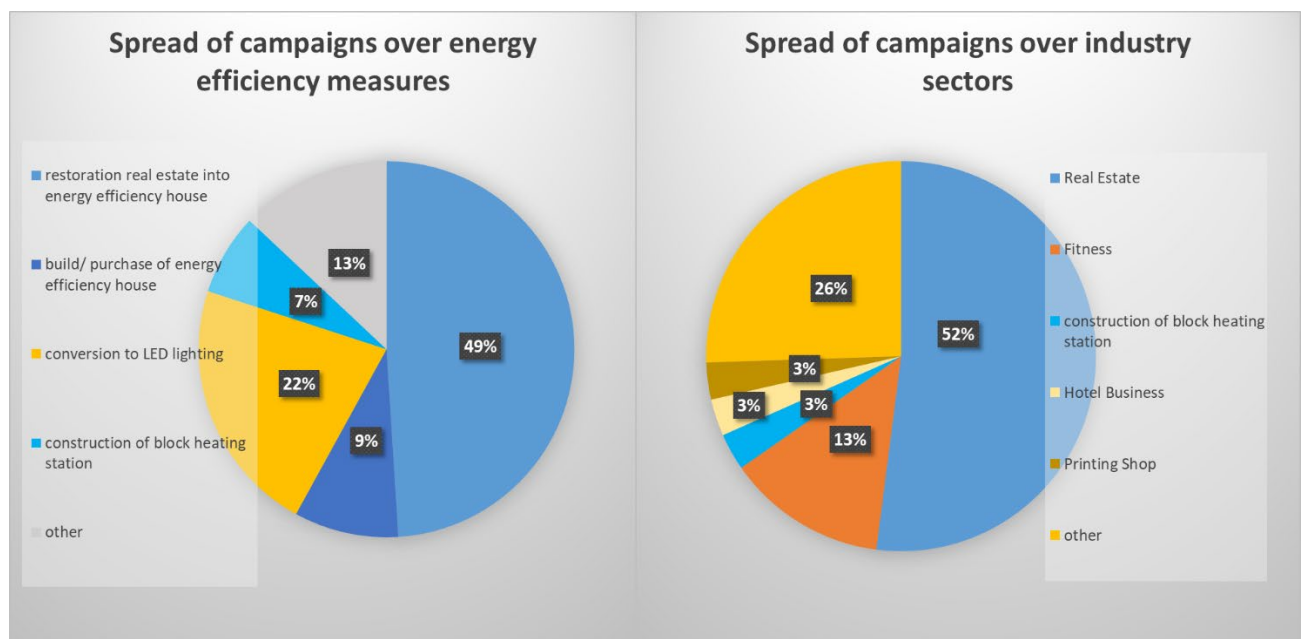


Source: own illustration based on own research

The table depicts the three types of crowdfunding, explained in the beginning of the chapter. Furthermore, some platforms present campaigns of different types of crowdfunding. In conclusion, most energy efficiency campaigns were found on equity based crowdfunding platforms, with Bettervest and LeihDeinerUmweltGeld taking the top positions. These two platforms have the greatest influence on this analysis, considering that most energy efficiency campaigns were found on these platforms. None of the relevant campaigns were found on reward-based crowdfunding platforms. This means that this type of crowdfunding is not seen as appropriate from the SMEs for financing energy efficiency measures. For this reason this type of crowdfunding will be excluded as an option for part of the IFI and will not be considered at all by the development of the IFI.

Based on the chosen criteria and conditions, regarding the relevant crowdfunding campaigns the analysis concentrates on the specific energy efficiency measures and the industry sectors the initiator of the campaign comes from. Figure 6 evaluates two more criteria. On the left hand side of the figure is shown the spread of relevant campaigns in manner of the financing energy efficiency measure. The other side reveals the industry sector, the initiating company acts in.

**Figure 6: Distribution of energy efficiency campaigns depending on energy efficiency measures and industry sectors**



Source: own illustration based on own research

Almost half of the total 76 campaigns chosen (49%) had the aim to collect financial resources for restoring real estates into energy efficiency houses (EEH). With distance this measure was found most frequently. At first, it was unclear if campaigns of this measure should be recorded within the relevant campaigns. Considering, that it is not clear to whom the company will rent the apartments, it was established that it could be a German SME. Accordingly, campaigns with the purpose of restoring real estates into EEH, building



or purchasing EEH were considered as relevant. The second place occupies companies launched crowdfunding campaigns with the goal to finance the switch of their lighting to LED lighting.

Regarding the relation between energy efficiency campaigns and the related industry sector, most screened campaigns were found not surprisingly in the domain of real estates, which is strongly correlated of course with the measures of restoring real estates or building and purchasing an EEH. This is indicated in the graphic by choosing similar colors of the shares in the chart. 52% of the chosen campaigns are determined by the real estate industry sector, making up the majority. However, further conclusion to the correlation between industry sector and energy efficiency measure could not be made.

Evaluating the next criterion, we take a closer look on the target sum of the 76 relevant campaigns. In total an arithmetic mean of 437.843 € was calculated, while the calculated median constitutes an average of 320.000 €. Furthermore, Table 1 shows the distribution of energy efficiency campaigns in manner of the target sum. In conclusion, most relevant campaigns are listed with a target sum up to 25.000 €.

**Table 1: Distribution of energy efficiency campaigns in dependence of the target sum**

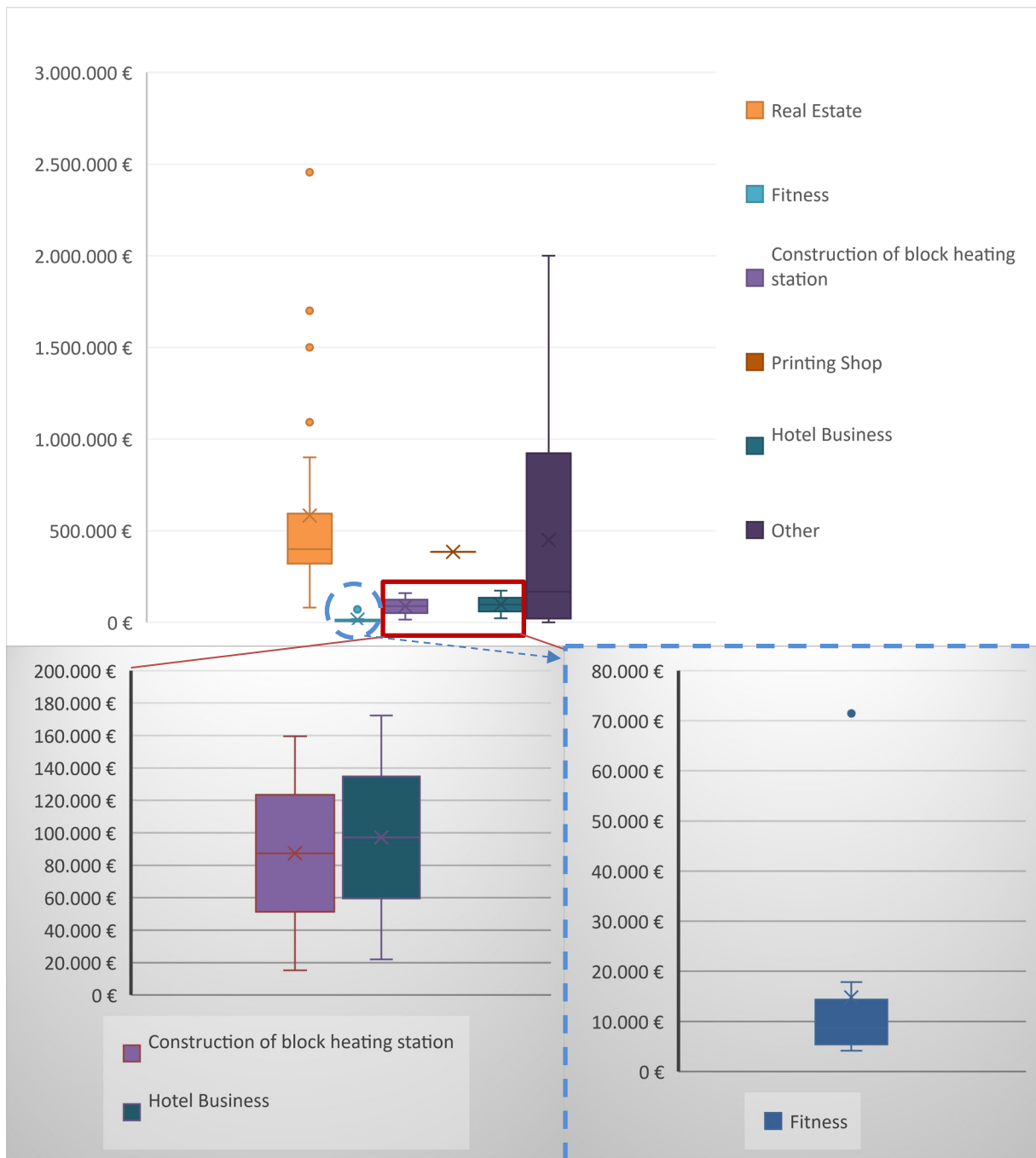
Target Sum	Absolute Frequency on energy efficiency campaigns	Relative Frequency on energy efficiency campaigns	Class Width
0-25.000€	17	0,227	1
25.000-100.000€	4	0,053	3
100.000-200.000€	7	0,093	4
200.000-500.000€	24	0,32	12
500.000-1.000.000€	18	0,24	20
1.000.000-2.500.000€	5	0,067	60

Source: based on own research

The following two illustrations are also showing the target sum but regarding the industry sector and the specific energy efficiency measure (Figure 7 and Figure 8). The arithmetic mean is calculated and illustrated by a cross and likewise records measure of dispersion and the measures of central tendencies, as well as outliers that can have a major influence on the statistics. The median is illustrated by the line in the middle of the box. It is a common measure of the center of the data, thereby the median also indicates the skewness. Furthermore, the box represents the interquartile range, which represents 50% of the data, restricted by the whiskers. These dates, extended from either side of the box, represent the range for the bottom 25% to the top 25% of the data, excluding outliers.



Figure 7: Distribution of the target sum in manner of the industry sector



Source: own illustration based on own research

Figure 6 shows that the arithmetic means differ in manner of the industry sector widely. For example, campaigns carried out in the industry sector of real estate point out an average of 582.612€, while campaigns for Fitness have an average of 14.795€. Table 2 gives an overview of the difference in value. At this point it is important to mention the sum of relevant campaigns found in manner of the industry sector. Values of the target sum in the industry of block heating construction, printing shops and hotel business conduct only two campaigns each. Accordingly, the box plots of the target sum in manner of these three industry sectors are not very significant.

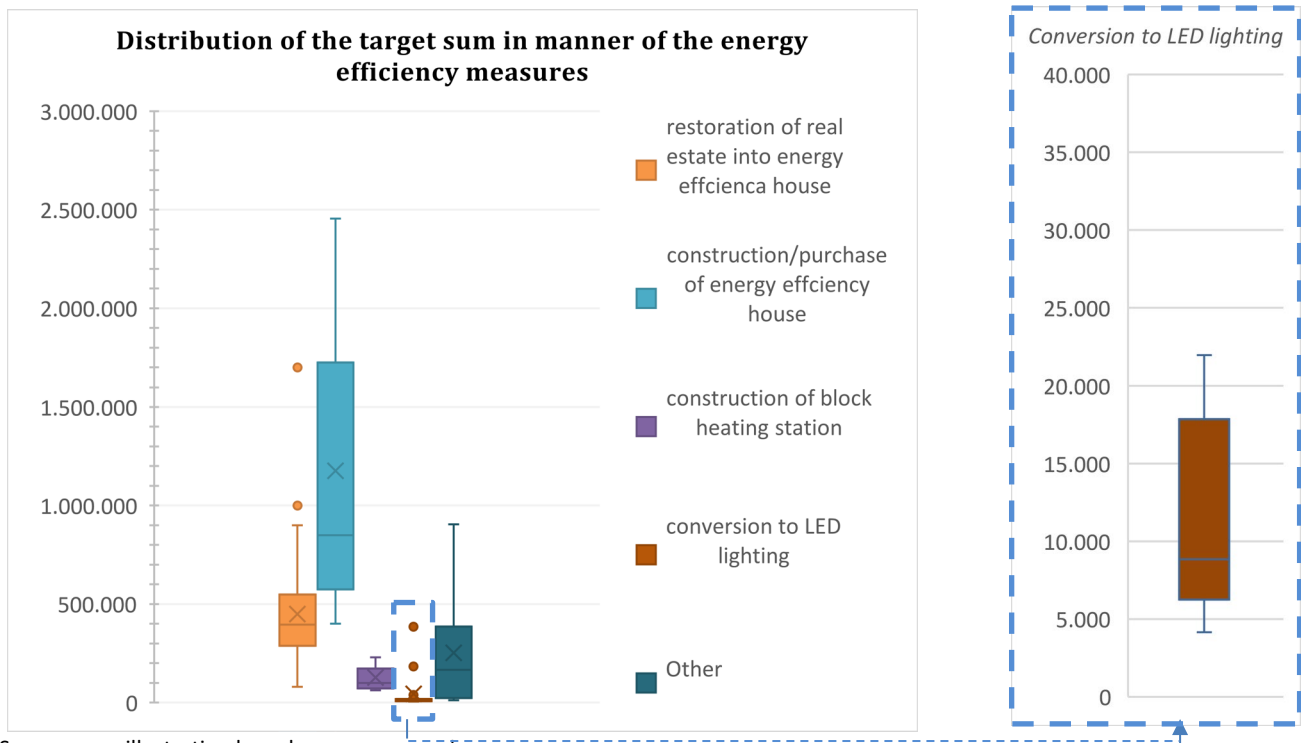
**Table 2: Distribution of target sum in dependence of the industry sector**

	Real Estate	Fitness	Construction of block heating station	Printing Shop	Hotel Business	Others
<b>Arithmetic Mean</b>	582.612€	14.795€	87.350€	385.150€	97.100€	471.534€
<b>Median</b>	400.000€	8.650€	87.350€	385.150€	97.100€	182.650€
<b>MIN</b>	80.000€	4.150€	15.200€	385.150€	21.950€	6.250€
<b>MAX</b>	2.455.000€	71.450€	159.500€	385.150€	172.250€	2.000.000€

Source: based on own research

Figure 8 and respectively Table 3 show that the target sum in manner of the measures also differs extremely. However, for the restoration of real estate into an EEH less money is needed then for the construction or purchase of an EEH. This also applies with regard to the further specified measure. Table 3 gives an overview of the difference in value.

**Figure 8: Distribution of funding goal in manner of energy efficiency measure**



Source: own illustration based on own research

**Table 3: Distribution of the target sum in dependence of energy efficiency measures**

	<b>Restoration of real estate into EEH</b>	<b>Build or Purchase of an EEH</b>	<b>Conversion to LED lighting</b>	<b>Construction of block heating station</b>	<b>Other</b>
<b>Arithmetic Mean</b>	449.804€	1.175.833€	43.753€	127.060€	251.904€
<b>Median</b>	395.000€	850.000€	8.850€	100.000€	166.740€
<b>MIN</b>	80.000€	400.000€	4.150€	61.000€	11.250€
<b>MAX</b>	1.700.000€	2.455.000€	385.000€	230.000€	904.050€

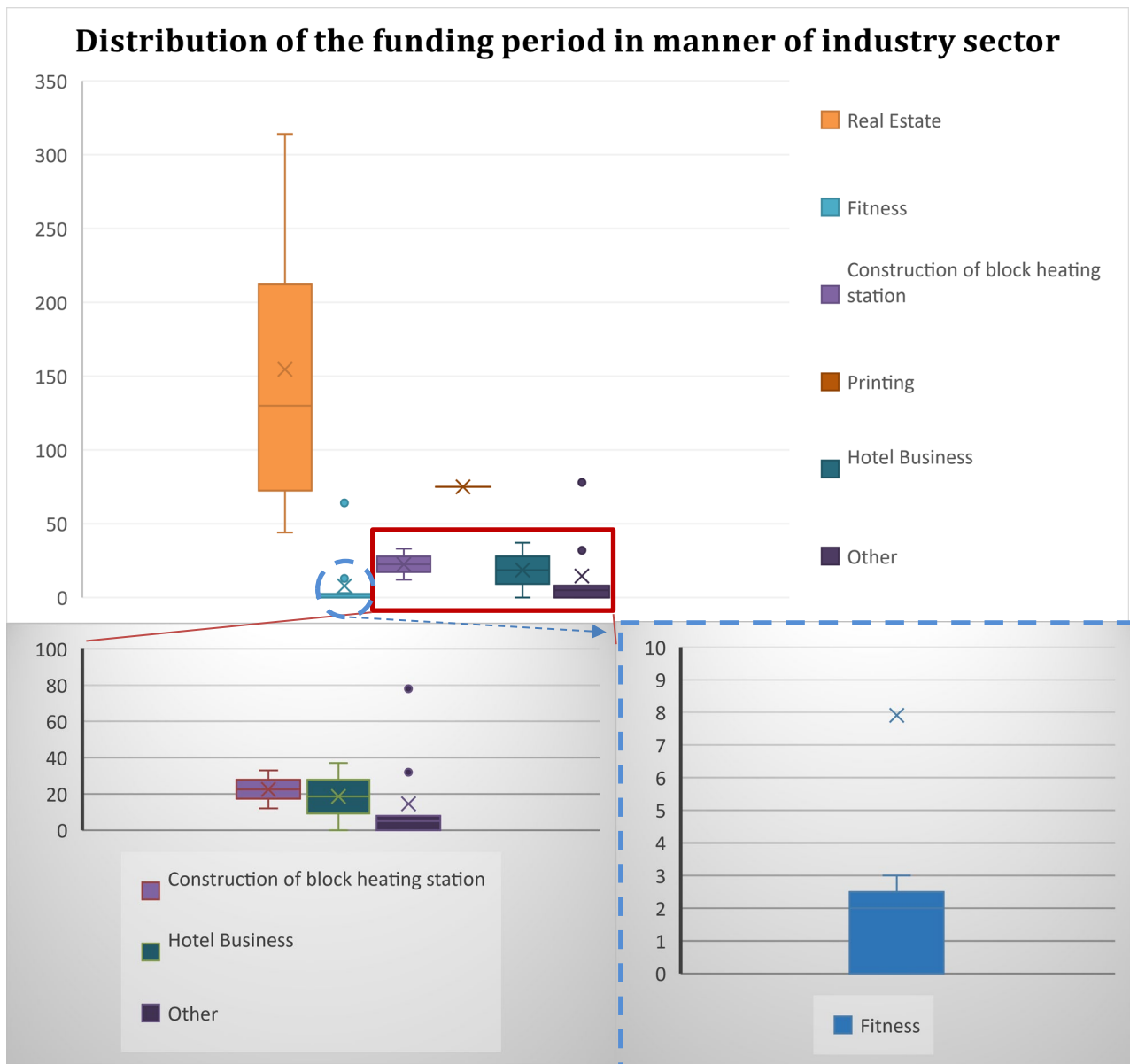
Source: based on own research

The next criterion we look at is the funding period. At this point it is necessary to mention that only 31 of the 76 relevant campaigns give information about the funding period. However, looking at the total of 31 campaigns, a campaign reaches its target sum within 33 days.

Figure 9 and Figure 10 use box plots again to show the distribution of the target sum in manner of the industry sectors and the specific energy efficiency measure. On the other hand, Table 4 and Table 5 provide the same information but with the concrete numbers for a better reading of data. According to the analyzed data is striking that the funding period of campaigns regarding the most industry sector and energy efficiency measures is under 30 days. 77% of the all campaigns with available information about the funding period (meaning in total 31 campaigns), reached their goal within one month, independent of further criteria.

But comparing the different industry sectors e.g. printing and real estate the funding period deviates greatly. On average the arithmetic mean of the funding period in manner of real estate constitutes 155 days and in manner of printing 75 days. Whereat, it is important to mention, that the values for the industry sector of printing shops are not very significant, considering the fact, that only two campaigns, in manner of printing shops were viewed for this analysis, conducting the same value of funding period. In relation to the further industry sectors, the difference is significant. Reaching the target sum for fitness, printing shops, block heating construction and other branches the funding period took well under a month, perhaps because of a minor target sum.

Figure 9: Distribution of the funding period in manner of industry sector



Source: own illustration, based on own research

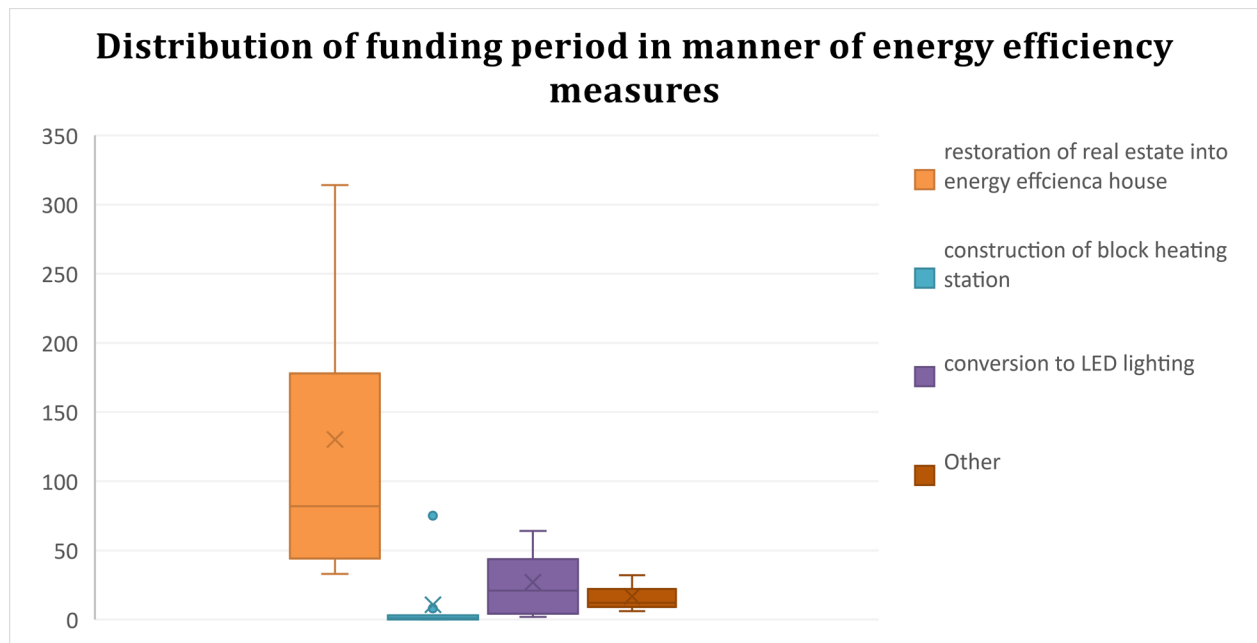
Table 4: Distribution of funding period in dependence of industry sectors

	Real Estate	Fitness	Construction of block heating station	Printing Shop	Hotel Business	Other
<b>Arithmetic Mean in days</b>	155	8	23	75	19	15
<b>Median in days</b>	130	2	23	75	19	6
<b>MIN in days</b>	44	0	12	75	0	0
<b>MAX in days</b>	314	64	33	75	37	78

Source: based on own research

A major deviation also applies looking at the funding period in manner of the measure. Reaching the target sum for restoration of real estate into an EEH takes vastly longer. On average the arithmetic mean conducts 131 days, while looking at the other specified branches, reaching the target sum takes less than one month.

Figure 10: Distribution of funding period in manner of energy efficiency measures



Source: own illustration, based on own research

Table 5: Distribution of funding period in dependence of energy efficiency measures

	Restoration of real estate into EEH	Build or Purchase of an EEH	Conversion to LED lighting	Construction of block heating station	Other
<b>Arithmetic Mean in days</b>	131	-	11	27	17
<b>Median in days</b>	82	-	1	21	12
<b>MIN in days</b>	33	-	0	2	6
<b>MAX in days</b>	314	-	78	64	32

Source: based on own research

The last criterion of this analysis is the type of crowdfunding platform. At this point it should be mentioned that the type of the platform respectively the type of the crowdfunding campaign depends on the description given on the specific platform meaning the platform identifies itself with the certain type for crowdfunding. The type is put in relation to the target sum, as well as the funding period and again regarding the industry sector and the energy efficiency measure.

Table 6 shows values of the target sum in manner of the type of crowdfunding platform.

An appropriate conclusion about the funding period could not be done, because all the relevant campaigns with such information available, were found on the platform Bettervest. Accordingly, there can be only statements made in relation to equity-based crowdfunding platforms but without a comparison to further platforms. On average a campaign, put online on Bettervest, reaches its target sum within 35 days, whereat the median is 5 days, the MIN is 0 days and the MAX conducts 314 days.

**Table 6: Distribution of the target sum in dependence of the type of crowdfunding**

	<b>Equity-based Crowdfunding</b>	<b>Lending-based Crowdfunding</b>	<b>Equity-based Crowdfunding/ lending-based Crowdfunding</b>
<b>Arithmetic Mean</b>	322.561€	1.038.750€	748.000€
<b>Median</b>	250.000€	650.000€	700.000€
<b>MIN</b>	4.150€	400.000€	320.000€
<b>MAX</b>	1.500.000€	2.455.000€	1.700.000€

Source: based on own research

## Conclusion

Coming to the end of this analysis the summary follows. 3.174 campaigns were viewed, wherefrom 76 campaigns turned out to be relevant for this study. In comparison this is a small amount of energy efficient campaigns. Correspondingly, it was difficult establishing criteria for the comparison of the distribution on manner of the industry sector or measure.

The research method employed for finding relevant energy efficiency campaigns and selecting useful campaigns may not avoid any loss of information, as relevant crowdfunding platforms or campaigns have been excluded from this analysis.

In the end, most campaigns were found on Bettervest and LeihDeinerUmweltGeld. Correspondingly, most campaigns were found on equity-based crowdfunding platforms. Reward-based crowdfunding seemed not to represent an option for financing energy efficiency campaigns. In the end, Bettervest and LeihDeinerUmweltGeld had the greatest influence on this analysis. Furthermore, it has been established that the target sum and the funding period vary greatly, dependent on the industry sector or measure. For example, funding an energy efficient campaign in the industry sector of real estate and the duty of financing the restoration of real estates or building and purchasing them, requires a higher target sum and correspondingly a longer funding period in comparison to campaigns, funding the conversion to LED lighting in the industry of fitness or printing shops.

### 3 Concept of innovative financial instrument

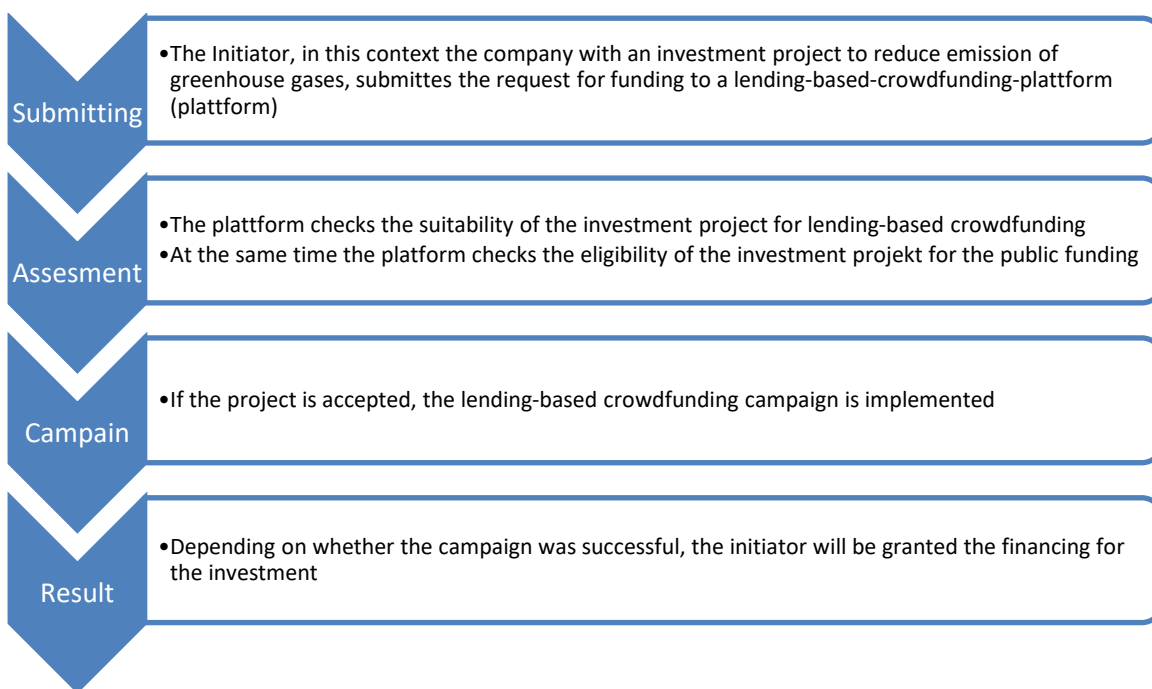
#### 3.1. Basic Idea

The basic idea of the presented innovative financial instrument (IFI) is to combine one of the three types of crowdfunding suited for business activities with one of the established forms of public funding, namely subsidies and promotional loans.

In theory, this means six possible combinations, each of which has some advantages. However, we shall see that one of them is the most practical in terms of promoting the implementation of the energy efficiency measure in small and medium-sized enterprises. This is the combination of lending-based crowdfunding with a subsidy. From here on we will refer to this combination as **match lending**.

The process of match lending could roughly look as follows:

Figure 11: The match lending process - outlook



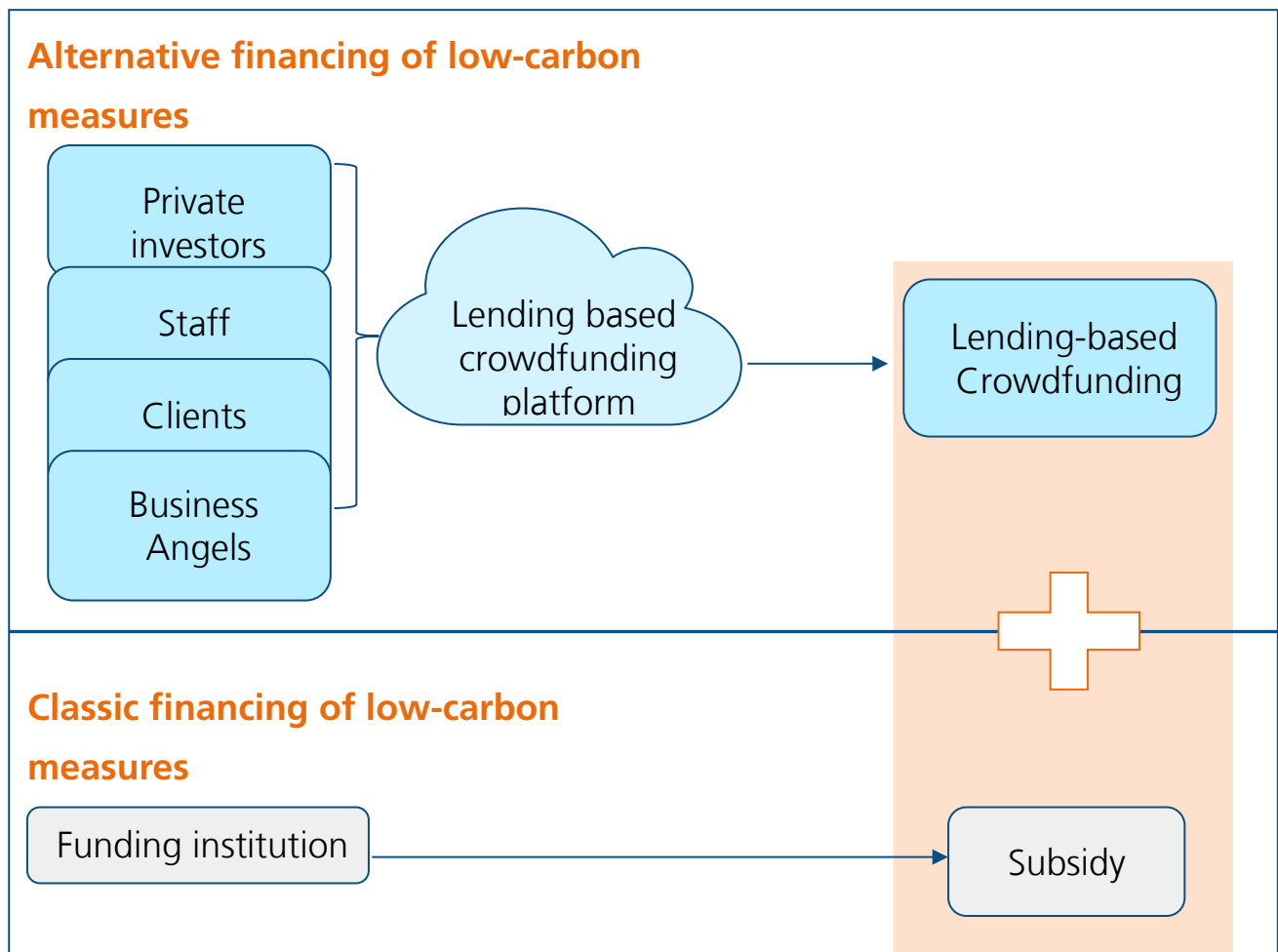
Source: own illustration

A more detailed view of the single aspects of the process follows in chapter 3.3.

As stated in chapter 2.1 (Ex-Ante-Assessment Analysis – main conclusions), two of the major problems for small and medium-sized enterprises with public funding are the **complex regulations** and the **challenging conditions/ requirements** among the many current funding instruments. For example, the requirements of a subsidy for modernizing the heating of company buildings are completely different from those for installing one's photovoltaic systems for self-sufficiency in energy. Finding a subsidy for a specific investment project

and examining the corresponding requirements of the subsidy is often a laborious and time-consuming task, because of a large number of small-scale funding instruments. The required time and expertise are frequently not sufficiently available especially in small but also in medium-sized enterprises. Consequently, investment initiatives to implement energy efficiency measures are being nipped in the bud. An effective innovative financial instrument must, therefore, be easily accessible to a wide range of different investment initiatives.

Figure 12: Concept of the Innovative financial instrument



Source: own illustration

Furthermore, certain proximity of the promoted innovative financial instrument to the capital market is desirable. On the one hand, to make use of its **efficiency** in the **allocation of financial resources** and on the other, to be able to acquire **additional private** funds for achieving the promotional objective.

These requirements are well-matched by the promoted match lending. Lending based crowdfunding is easily accessible for a wide range of different enterprises. The requested documents are not few, but similar to those required by banks and therefore mostly already available.

The problem is that investment projects to improve energy efficiency are often not competitive on the capital markets as a financial investment and therefore aren't financed. This also applies to finance CO2-reducing



investment projects via lending-based crowdfunding. It is at this point that the advantages of the combination with a subsidy become apparent. The subsidy lowers the risk/return ratio of investment projects to improve energy efficiency which, in addition to the economic objective, pursues the political goal of reducing CO2. That way, the investment becomes competitive in the capital market and thus attracts additional private funds.

However, care must be taken to ensure that the risk/return level is raised to a competitive level but does not exceed the level of comparable unsubsidized investments. If this succeeds, the capital market selection process can be used to identify economically efficient and sustainable investments while preventing the funding of inefficient investments.

### 3.2. Further possible combinations

As stated above, in theory, there are six possible combinations of established forms of public funding with the three types of crowdfunding suited for business. Besides match lending, the other combinations, depending on the occasion, have some interesting possibilities to offer, but although some drawbacks to consider. On the following pages, these possibilities will be explained as well as the possible drawbacks. This information is the basic for the decision to match lending as IFI in this specific context.

**Reward-based Crowdfunding** is the oldest and most popular type of crowdfunding as briefly introduces in subchapter 2.3. In the commercial context, it is best used for the testing of customers' reactions to new product ideas and innovative business models. The so-called testing for market proof via crowdfunding provides several significant information about costumers' willingness to pay and the potential demand for a new product. Additionally, it gives enterprises the possibility to interact with their community on a low threshold level. In other words, crowdfunding campaigns are an open channel for established enterprises/product designers to interact with potential customers to gain product feedback like adjustment wishes and recommendations. Even to collect some funds for the innovation of a specific product (see below), but not to gain working capital for established production processes and investments.

Nevertheless, Reward-based crowdfunding is well suited to collect first seed-funds for the foundation of a start-up or new product line. The mechanism works as follows:

Entrepreneurs present their product idea, via a reward-based crowdfunding campaign, to potential customers (crowd). Like a pre-purchase, the crowd can pre-order the presented product via the crowdfunding platform. If enough interest, in the form of pre-orders, is expressed the founder uses the money to put the idea into practice and produce the product. Strictly speaking, the crowd provides the necessary funds to pre-finance the production.

Table 7: Selected (reward-based) crowdfunding campaigns from established enterprises

Brand	Product	Result	Year	Plattform
<b>PHILIPPS</b>	Philips PicoPix Max Mini Full HD Projector	5,6 Mio. €; 12.498 backers	2019	Indiegogo
<b>CANON</b>	Canon IVY REC Klippbare Outdoor Camera	522 purchases	2019	Indiegogo
<b>LEGO</b>	LEGO FORMA Toys for grownups	6.673 purchases	2018	Indiegogo
<b>GILLETTE</b>	The Heated Razor Razer with heating function	1.562 purchases	2018	Indiegogo
<b>SONY</b>	Reon Pocket Air conditioning for clothing	0,6 Mio. €; 4.200 backers	2018	1. Flight von Sony
<b>COCA-COLA</b>	Valsler von Coca-Cola Drinking water from the Swiss Alps	9762€ von 193 backers	2018	Indiegogo

Source: Based on: [www.crowdfunding.de/magazin/bekanntemarken-die-crowdfunding-zum-test-von-innovationen-und-zurmarkteinfuehrung-nutzen](http://www.crowdfunding.de/magazin/bekanntemarken-die-crowdfunding-zum-test-von-innovationen-und-zurmarkteinfuehrung-nutzen)

A combination of reward-based crowdfunding with a small promotional loan or a subsidy could leverage these funds and thus increase the robustness and possibilities of these new, often highly innovative, enterprises. Such a combination would be interesting for the promotion of innovative business models and products but is only of limited use for the reduction of emissions in existing production processes.

**Equity-based crowdfunding** doesn't seem to fit as part of the proposed IFI either. The goal of the IFI is to promote the implementation of energy efficiency measures in already established small and medium-sized enterprises. Two exemplary measures are the improvement of an enterprise's building isolation or the substitution of its transportation fleet through more climate-friendly vehicles. In the context of equity-based financing instruments, the problem with both measures (and most others) is, that they resemble investments in quite integrated components of enterprises added value. Therefore, it is difficult to separate the cash flow generated by the investment into energy efficiency measurements from the overall cash flow of the whole company. Furthermore, the incentives of already established small and medium-sized enterprises give out shares, and therefore the control is minor in this context.

An exemption could be investments into supply services like for example thermal heat or energy supply through photovoltaic. In these cases, the systems required for supply could be outsourced to a project company with purchase guarantee agreements with the parent company. Investors could then invest in this project company independently of the parent company. However, this so-called "Contracting" contains a considerable counterparty risk for the investors investing in the project company. Furthermore, the cash flow provided by purchase guarantee agreements is eventually like fixed interest rates. Finally, there is no growth, and thus no capital gains to expect.

Thus, in the context of the implementation of energy efficiency measures within small- and medium-sized enterprises, there is little incentive for investors to invest via equity-based crowdfunding.

**Lending-based Crowdfunding**, on the other hand, seems to be a better fit for small and medium-sized enterprises. Since lending-based crowdfunding is debt financing a fixed-income rate is usually what an investor wants and the absence of capital gains is common as well. Furthermore, the owners of the enterprises don't have to share the control and the enterprises get a clear date of maturity for their financial planning. Finally, there is no need to separate the cash flow generated by investment into energy efficiency measures from the overall cash flow.

Nevertheless, like reward-based crowdfunding, equity-based crowdfunding is excellently suited for the financing of start-ups. The difference is that while reward-based crowdfunding, because of the limited sums, is better suited for the first and early stages of Start-up financing, equity-based crowdfunding enables the collection of much larger funds. These although could be leverage by subsidies or promotion loans. This is particularly relevant as there is a clear lack of venture capital in Germany. Such a combination could help, therefore, start-ups that have completed an initial concept test (prototypes, market feedback, etc.) and have already proven their business model on a small scale and now want to fully establish their enterprise on the market.

### 3.3. A closer look

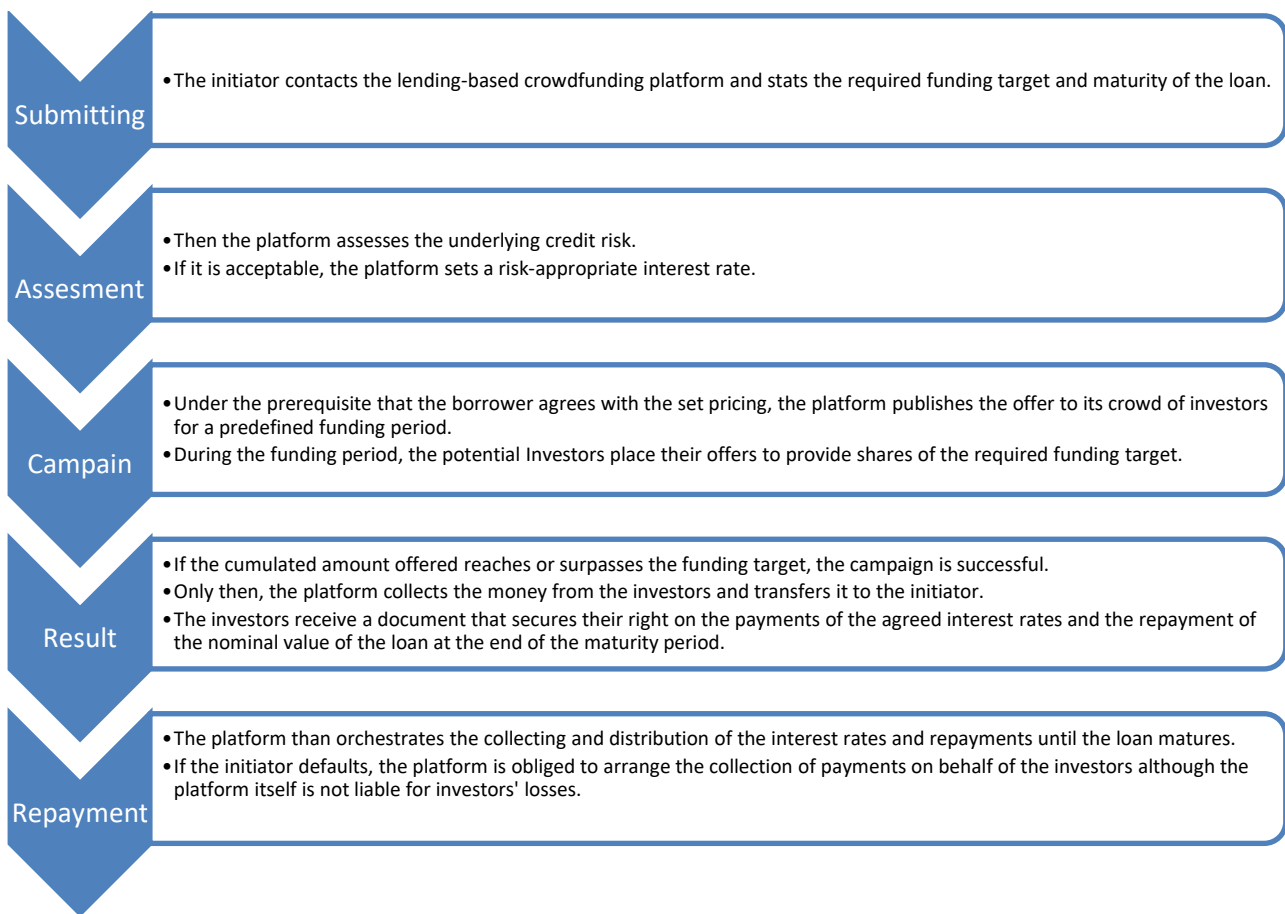
To achieve the main benefits described in subchapter 3.1, several conditions must be met for the process and the participants. To be able to classify these, the pure lending-based crowdfunding process will be looked at piece by piece.

In lending-based Crowdfunding, the initiators, in general, are consume orientated individuals or profit-orientated enterprises. The precise process varies depending on the legal construction of the lending-based Crowdfunding platform (platform)<sup>3</sup> and the legal framework of the country it is operating in. In general, it could be described as followed.

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<sup>3</sup> In the following text, the word "platform" will be used as a synonym for this word group: lending-based Crowdfunding platform.

Figure 13: The match lending process - in detail



Source: Based on: Lenz, Rainer (2016): Peer-to-Peer Lending: Opportunities and Risks. European Journal of Risk Regulation. 7 (4), S. 688–700. DOI: 10.1017/S1867299X00010126

As mentioned above, the key requirement for the new IFI is to make the funding process as straightforward as possible. The eligibility check for the subsidy should therefore be integrated into the credit application check carried out by the platform. The idea is that the initiator only has to submit one application including all necessary documents and not two (platform and funding institution), which would mean an unnecessary complication for him. Subsequently, the lending-based crowdfunding platform passes on the documents required for the eligibility check to the funding institution for verification. In a **parallel** process, the platform checks the credit risk and the funding institution checks the eligibility. If eligibility is given, the fair market interest rate calculated by the platform must be adjusted by the amount of the subsidy. The newly adjusted interest rate, with the consent of the initiator, can then be offered to investors on the lending-based crowdfunding platform. It should be stressed that the offer to investors is not a financing guarantee. The financing is achieved only if sufficient investors agree to finance the targeted amount. This is important to maintain the basic allocation mechanism of the market.

The maintaining of the market-mechanism is also the reason for separating the loan review and the eligibility check. Platforms earn their money by collecting fees for successfully arranging financing, and not by the interest rate. They, therefore, have an incentive to finance as many projects as possible successfully,

regardless of their economic prospects. If the platform were to carry out the eligibility check, there would be a strong incentive for them to also fund critical projects.

### 3.4. Practical Examples

As described in the first part of these sections, there are several interesting possibilities to combine the different types of crowdfunding, with forms of public funding. Even though the presented match lending in this version is unique and until now just exists theoretically, in Europe alone, there is a range of successful cooperation's between public institutions and crowdfunding-platforms to promote small and medium-sized enterprises.

An exceptional example can be found in the United Kingdom (UK). The lending-based crowdfunding platform Funding Circle Ltd. and the British Business Bank<sup>4</sup> now, in the wake of the corona crisis, are already working together for the fourth time.<sup>5</sup>

In the course of the "Coronavirus Business Interruption Loan Scheme" (CBILS) the British Business Banks goal is to supply small enterprises with debt capital to secure their liquidity. They guarantee 80% of the loan to the investors and pay interest and any fees for the first 12 months. One of the accredited lenders of this scheme is the lending-based crowdfunding platform Funding Circle. They offer loans given to SMEs and supported by the CBILS to the crowd as investments.<sup>6</sup> In this way, similar to the proposed IFI, the possibility of lending-based crowdfunding to acquire additional private funds is used to leverage the impact of public funds. Furthermore, the fast loan processing via crowdfunding platforms is an advantage over traditional instruments of public funding, especially in times of crisis. The choice of guarantees and debt service in the first year instead of subsidies is plausible in the context of the temporary external shock that the effects of the coronavirus containment measures on the economy represent.

But even outside times of crisis, the British Investment Bank has recognized the potential of cooperation with the lending-based crowdfunding platform. As part of its mission to promote the scope and types of debt financing and thus supporting the development of more diverse financing markets for SMEs, it has used Funding circle to participate in direct loans to SMEs via lending-based crowdfunding. In the first three

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<sup>4</sup> A government-owned business development bank dedicated to making finance markets work better for smaller businesses

<sup>5</sup> <https://www.british-business-bank.co.uk/british-business-bank-investments-ltd-expands-partnership-funding-circle/>  
<https://support.fundingcircle.com/hc/en-us/articles/214640706-What-is-the-British-Business-Bank-Investment-Programme-and-how-does-this-relate-to-the-Business-Finance-Partnership-programme->

<sup>6</sup> <https://www.british-business-bank.co.uk/funding-circle-accredited-under-the-coronavirus-business-interruption-loan-scheme-cbils/>

cooperation projects the British Investment Bank invested a total amount of £100m between 2013 and 2018.<sup>7</sup>

Outside the UK, for example Germany's authorities, have entered into fertile cooperation with crowdfunding platforms. Well-known are the cooperations of the reward-based platforms Startnext GmbH with the promotional banks of Berlin, Baden-Wuerttemberg and Hesse called "MicroCrowd". Crowdfunding campaigns were combined with promotional loans to provide entrepreneurs with the necessary seed capital to start their business.<sup>8</sup>

Another example, which is more similar to the IFI presented above, is the INVEST-program. INVEST is a program of the Federal office for economic affairs and export control to support innovative enterprises in their search for venture capital. By compensating investors for 20% of their amounts invested into eligible start-ups, INVEST creates an incentive to invest in those. Furthermore, if the holding period of the obtained shares surpasses three years, the investor receives a subsidy of 25 percent of the profit in the form of a tax refund. INVEST besides others is available for investments made via equity-based crowdfunding. However, an investor must invest at least 10,000 euros to be eligible for the compensation. This is problematic because according to §2a Abs.1 bis 3 VermAnlG private investors in Germany have to prove a free disposable asset of 100,000 Euro to invest 10,000 Euro via equity-based crowdfunding per company. At the same time, a maximum of 25,000 euros may be invested per company, regardless of the amount of the assets.

The minimum investment sum is probably required because the examination of the applications for support is not cost-effective for smaller sums. This is one of the reasons why we propose directly support to the company through grant, as only one eligibility check is necessary. Since the joint enterprise is being supported, all investors will benefit equally from the funding irrespective of the size of their shareholding.

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<sup>7</sup> Small Business, Big Impact The changing face of business finance; Evidence from Funding Circle; August 2016 S.17

<sup>8</sup> <https://www.l-bank.de/produkte/unternehmensfinanzierung/mikrocrowd.html>

## 4 SWOT-Analysis

As next step in our report, we are conducting a SWOT analysis to examine the strength, weaknesses, opportunities and the risks regarding the concept of the IFI described in the chapter 3. The results of the analysis are shown on Figure 15. The analysis is made from the sight of view of the initiator, in our case most likely small and medium sized enterprises.

Figure 14: Result SWOT-Analysis for the concept of IFI

Strength	Weaknesses
<p>Lower cost of financial intermediation</p> <p>Lower transaction cost</p> <p>More diverse financing markets for SMEs</p> <p>Larger volume of debt capital available for SME</p> <p>Back to Basics – financier as direct enabler</p> <p>Short time span from first contact until the loan pay out is received</p> <p>No necessity of collateral</p> <p>Flexibility, premature repayment</p>	<p>Two intermediaries that take their fee and there could be additional effort required depending on the exact structure of the financial instrument</p> <p>Potential Bankruptcy of the platform</p> <p>Previous research was done only in a boom phase</p> <p>Funding is uncertain</p> <p>No disclosure standard for information about borrowers or platforms credit assessment and therefore a lack of comparability of investment options between the platforms</p> <p>Fear of failure -&gt; the initiator is afraid, that an unsuccessful crowdfunding campaign will damage its image or it will show that he needs money</p>
Chances	Risks
<p>Energy efficiency is an issue very appropriate for crowdfunding</p> <p>Additional financial sources because of the promising incentives of the crowdfunding – higher interest rates as bank interest rates in case of savings account</p> <p>In some countries there are special legislative amendments enabling and simplifying this kind of financing especially in the case of crowdfunding</p> <p>Some of the actual problems and challenges regarding the SMEs and financing the energy efficiency measures could be minimized (e.g. share of own financial contribution, complicated and slow bureaucracy, challenging conditions/ requirements)</p> <p>Limitation of the information asymmetry</p> <p>Only projects with a high potential of success are shown on crowdfunding platform (important for</p>	<p>Adverse incentive platform vs. crowd</p> <p>Adverse incentive institutional vs crowd</p> <p>In case of crowdfunding campaign failure there are only additional cost and effort but no financing</p> <p>Damage of the image -&gt; if some implementation of such a combination had a bad experience at the beginning, the concept will suffer in general the negative image</p> <p>Too many crowdfunding platforms -&gt; strong competition among the platforms, not clear which is better for a specific issue</p>

the platform image and its success history) -> indicator for the feasibility of the project

The rate of growth of crowdfunding in general and more specific regarding lending based crowdfunding shows an extreme increase

The combination with subsidy or loan could be an extra incentive for the crowd to invest more or regularly

Source: Based on:

- Lenz, Rainer (2016): Peer-to-Peer Lending: Opportunities and Risks. *European Journal of Risk Regulation*. 7 (4), S. 688–700. DOI: 10.1017/S1867299X00010126
- Adhami, Saman; Gianfrate, Gianfranco; Johan, Sofia (2019): Risks and Returns in Crowdlending, S. 1–31.
- According to our research the interest rates for savings accounts in Germany are no higher than 0,4%. On the other hand the interest rate on crowdfunding platform e.g. bettervest is starting form 7%.
- 1 §2a Abs.1 bis 3 VermAnlG
- Based on own research and the results from D.T2.4.1.
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## 5 Conclusion, findings and recommendations

The present report presents an innovative financial instrument for SMEs to invest in energy efficiency measures – a combination of lending-based crowdfunding and subsidy – **match lending**.

The need for IFI in this specific context in Saxony, Germany, is based on the findings and conclusions made in the previous report D.T2.1.2. The report introduces not only the problems and decision drivers for taking a decision for investing in energy efficiency measures on behalf of the SMEs, but also the whole macroeconomic environment in which the SMEs in Saxony, Germany, are developing. Based on this information as well as on the additional gathered issues regarding the specific energy efficiency measures funded by institutional authorities and the characteristics of the already successful funded crowdfunding campaigns in this context, the set-up of the main structure of the IFI has been illustrated. The idea of the concept is detailed and introduced, accompanied by the reasons why exactly this form of financing is most suitable for SMEs to invest in energy efficiency measures. The other possible combinations of the different crowdfunding types and classical financial instruments are also briefly introduced with the respective explanations why those combinations have been excluded as an option suitable for financing energy efficiency measures. Nevertheless, the examples of the combination of crowdfunding and traditional financial instruments show the variety this IFI could be set-up and the areas where it could be respectively have already been implemented. As a final step of this report the SWOT analysis reveals the strength, weaknesses, opportunities and the risks of the introduced IFI.

Summing up, the analysis shows that there is a certain need for an innovative financial instrument for SMEs to invest in energy efficiency measures. The developed IFI could limit some of the market failures recognized in Saxony, Germany, and also draw out additional (private) financial sources for these measures. Furthermore, the characteristics of the IFI could also emphasize the attention to the SMEs and its sustainable development, which could also be profitable for the companies. Hence the IFI should not be seen only as a financial source for investing in energy efficiency measures, but also as an instrument adding additional value on one side to the SMEs and on the other hand to the specific issue – financing energy efficiency measures as general.

At least it should be mentioned, that the concept of the IFI is a general introduction of the advantages this financial instrument could have in the context of financing energy efficiency measures. The goal of the concept is to emphasize the positive effects this financial instrument could have not only regarding the SMEs, but also the (easy) availability to financial resources including private resources. Moreover, the feature of the IFI could lead to more awareness and involvement for reaching the main goal – low carbon economy. Nevertheless, it should be mentioned, that the concept should be critically observed one more time and some details respectively adjusted to the specifics of the authority and platforms behind the financial instrument, before introducing and implementing the concept of the IFI.

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