D.T2.5.3

Report of the pilot activities to assess Industrial sectors RE projects in Germany

WP T2: Activity 2.5 PA 2: Improving energy efficiency in Industry Sector

Prepared by	Neu e.V.
Project number and acronym	CE 1131 FIRECE
Lead partner	Chamber of Commerce of Venice Rovigo Delta-Lagunare
Address	Augustusplatz 7, 04109 Leipzig
Email	vorstand@energiemetropole-leipzig.de
Date, venue	21.08.2020, Leipzig

INDEX

Introduction

The FIRECE project aims to contribute to the achievements of targeted results of Regional Energy Plans through an increased use of (innovative) financial instruments in the Central Europe area. The particular focus is on public support to industry to invest into energy efficiency and renewable energy sources.

The activity 2.5 Improving energy efficiency in Industry Sector includes Pilot Actions carried out in five partner countries to assess Industrial sector RE projects using the Project level tool developed in WP T1 (O.T1.4) and updated in WP T2 (O.T2.2). The goal is to assess the public investments to support Industry low carbon transition: analysis of projects/investment plans elaborated by SMEs on EE/RES to verify their quality and quantity contribute to achieve the Energy Plans' targets.

The Project level tool's main focus is to evaluate economic parameters of a particular project (e.g. NPV – net present values, CF – cash flow, etc.) as well as its environmental benefits in terms of decreased carbon emissions.

This report summarizes the activities that were carried out in the region of Leipzig, Germany.

EXECUTIVE SUMMARY

Country / region / PA2 Implementation area

Germany, Region of Leipzig

Relevant energy saving funds:

Operational Programme Saxony 2014-2020 (ERDF) – Priority: Reduction of CO2 emissions

Target group – SMEs involved: *micro / small / medium-sized*

SMEs are the main target group of the Pilot Action 2. Under Regulation (EU) No 651/2014 of the European Commission, micro, small and medium-sized enterprises (SMEs) are enterprises with fewer than 250 persons and whose annual turnover does not exceed EUR 50 million and / or \ their annual balance sheet total does not exceed EUR 43 million.

Number of SME's involved:

Type of projects:

176 implemented energy efficiency projects which were accompanied by regional energy agency and subsidized by grants of the Operational Programme Saxony 2014-2020 (ERDF).

Energy saving measures / type of investments analysed

LED, compressing air, heat recovery, cooling, ventilation, heater, furnace, other

Involved stakeholders

SAENA (Saxon Energy Agency)

1. SELECTION OF THE FINANCIAL INSTRUMENT ADDRESSED TO ENERGY SAVINGS FOR INDUSTRY

As all other partners assigned to deliverable D.T2.5.3, also NEU e.V. started promoting and disseminating the project level tool in its region. In May 2019, during a local seminar the tool had been introduced to SMEs for the first time. During a side session of the event, interested companies were able to "play" with the tool and get an overview of its possibilities. At that time, the tool hadn't been adapted for Germany yet. Furthermore, in Saxony, a regional energy agency is already established for long and offers similar support in calculating energy efficiency measures. The agency accompanies SMEs from planning their measure to applying for public subsidies. This led to the feedback, that companies showed interest in the functions of the tool for project level, but less in its usage for the company itself.

In the following months, NEU e.V. worked on adapting the IT tool for approaching companies. Finding suitable parameters and adapting the requirements of the tool became a challenge during this part of the project. The process was also influenced by the shortage of personnel at NEU e.V. and later, in the beginning of 2020, by the effects of the COVID-19 pandemic and the economic struggle for many SMEs.

Therefore, NEU e.V. reached out to the regional energy agency SAENA in order to obtain project data on energy efficiency projects. It was able to receive data of 176 projects (cleaned) implemented and accompanied by SAENA between the years 2014 and 2018. As the regional energy agency was established by the Saxony government, all received projects were subsidized with public grants from the Operational Programme Saxony 2014-2020 (ERDF). Under the programme, the Saxon Government established the Sustainable Energy Supply funding guideline. The regional government is granting up to 80% of eligible costs for each project meeting the requirements of the guideline. With these funds, SMEs have the possibility to develop and implement energy efficiency and renewable energy measures.

Therefore, in the following chapters, the analysis of the obtained data will highlight results of the financial instrument of public subsidy by grants for the implementation of energy efficiency projects.

2. SELECTION OF SME's INVESTMENT PROJECTS FOR THE ASSESSMENT

2.1 Criteria followed to identify projects

The basis to analyse SME's investment projects results from the data provided by the regional energy agency SEANA. There, all 176 listed projects have been implementing energy efficiency measures and were founded by public grants from the Operational Programme Saxony 2014-2020 (ERDF).

2.2 Description of SME's investment projects analysed

All 176 projects were implemented between 2014 and 2018. Most projects invested in improving lightning with LED (93 projects), decrease the losses in heat distribution/improve heat recovery (27) and replace the boiler/heater system. In 16.7% of the projects more than one energy efficiency measure has been implemented.

Energy Efficiency Measure	**No. of projects where measure was implemented**
Installation of LED lightning	93
Installation of cogeneration units	10
Installation/replacement of compressors	9
Decrease of losses in heat distribution (heat recovery)	27
Thermal insulation of technologies/Cooling processes	11
Improvement of ventilation system	4
Replacement of boiler/heater	25
Others	29

Tab. 1: Overview of implemented energy efficiency measures of projects accompanied by SAENA between 2014-2018.

3. CONTRIBUTION OF SME's PROJECTS TO ACHIEVE REGIONAL ENERGY TARGETS

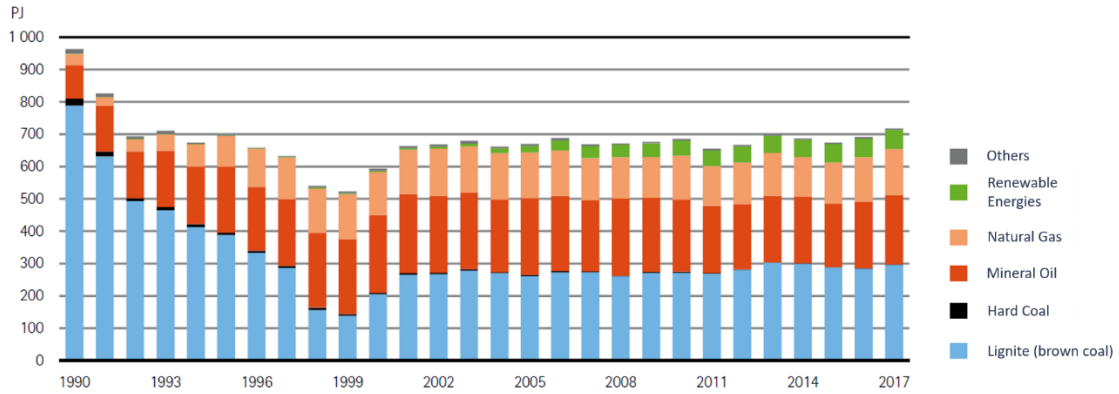
The general reference framework for energy saving targets is set by the German Energy Concept 2050. The federal government is targeting to reduce the primary energy consumption by a minimum of 50% (100% = year 2008) and the greenhouse gas emissions by a minimum of 80% (100% = year 1990) (Tab. 2).

	2008/ 1990*)	**2020**	**2050**
GHG *)	100%	60%	20-5%
Primary Energy Consumption	100%	80%	50%
Electricity Consumption	100%	90%	75%

Tab. 2: Selection of energy and emission saving targets of German Energy Concept 2050

The Free State of Saxony adopted its Energy and Climate Programme 2012-2020 in 2013, where the national framework is adapted on a regional level. The programme summarizes the conceptual bases of measures to meet the national targets and develop them further. In September 2019, the process of updating the programme had started.

A closer look on the latest energy consumption analysis shows, that in Saxony until the late 1990s the primary energy consumption was dropping almost every year. Since the beginning of the 21st century, however, the values stayed constant, especially within the period of the Energy and Climate Programme 2012-2020.



Tab. 3: Primary energy consumption (PEC in PJ) in Saxony after energy carrier, Energy Report 2017, Free State of Saxony

In total, the numbers of the primary energy consumption changed from 671.6 PJ in 2008 to already 717.4 PJ in 2017, which marks an increase by almost 14%.

This illustrates that there are difficulties in reaching the goals which have been set by the end of 2020, but also the challenges for the upcoming decades until 2050. As the FIRECE project is trying to achieve to create suitable and feasible financial instruments and to promote them amongst companies and institution can have an important part of a more successful development.

The projects that have been provided by the regional energy agency of SAENA are partially showing results of the impact public funding programmes can generate. The data is not delivering information about the size of the companies but it indicates the broad variety of energy efficiency measures that have been implemented (Tab. 1). From 176 analysed projects, the most chosen measure was the installation or upgrade of the companies LED lightning (in 93 projects). The second and third most measures are heat recovery (24) and investments the heater and/or boiler system (25).

To get an idea of the different sizes of the companies that made use of the public grants, the projects which implemented only LED lightning (88) measures are further considered. In these projects, the electricity savings per year are varying from around 7,300 to 314,000 kWh. Therefore, it can be assumed, that - from small, medium to big enterprises – all kinds of companies are taking advantage from public funding programmes and are therewith actively contributing to the regional energy targets.

All analysed projects are contributing to an energy saving of around 26,100 GWh per year, which is in average 148 GWh per year per project. The total accumulated amount of saved CO2 is around 11,700 t CO2 per year and per project around 66.6 t CO2.

Unfortunately, the data didn’t provide the total energy consumption of the companies before the implemented energy efficiency measure at the time of this report. Without the proportional change of energy consumption (percentage of saved energy in total), it is not able to valuated the impact in a final way.

4. ACTIVITIES CARRIED OUT TO ASSESS INDUSTRIAL SECTORS RENEWABLE ENERGY PROJECTS

To assess the industrial sectors for renewable energy and energy efficiency projects, NEU e.V. was mainly including its regional cluster network of public authorities (economic development office City of Leipzig) and local companies in the field of energy and environmental technology. During events of the network, companies from different industry sectors were invited and introduced to the alternative and innovative financial instruments for financing energy efficiency measures as well as the project level tool for simulating suitable options. Most communication was done via newsletter, emails, personal contacts and physical events as local seminar.

The engagement of local SMEs began in May 2019 during a regional workshop. A draft of the project level tool was introduced to local SMEs for the first time. At this time, the response of SMEs was reluctant because the full functionality of the tool was not able to present. In the aftermath of the event, suitable data for finalizing the tool for Germany was searched. At this point, it became recognizable already, that the available German data was not fitting the relevant indicators of the tool. Therefore, an adaption and simplification of the project level tool was discussed, but without concrete results.

In the beginning of 2020 another attempt was made in gathering suitable data for finalizing the tool. Besides intense research on European and national level, PP2 established contact with the SAENA, the regional energy agency. In the course of this action it was able to partially deliver necessary data, but not to the extend for finishing the project level tool adaption. Unfortunately, finding a solution took more time. It was not able to engage SMEs without a proper version of the tool. In March 2020 then, the implementation of the pilot action was interfered by COVID-19 pandemic where companies were struggling with the effects rather than focusing on investments.

Therefore, PP2 tried to elaborate mitigation measures to compensate the envisaged activities according to the AF. In cooperation with SAENA, PP2 was analysing 176 energy efficiency projects that have been funded by the Operational Programme Saxony 2014-2020 (ERDF) – Priority: Reduction of CO2 emissions. Additionally, PP2 compared the financial planning tools provided by SAENA and FIRECE in order to extract their benefits and way of usage.

The results aim to support the general project goals of FIRECE by evaluating existing financial instruments and to create more effective financial and regulatory environments for SMEs in order to succeed in the low-carbon transmission. SAENA received important information about the implementation of their funding

programme and feedback on the development of project planning tools. With this an indirect outreach and support to SMEs was able to established as well as contribution to a main actor in achieving regional energy targets.

5. ASSESSMENT PROCEDURE OF SME's PROJECTS

All energy efficiency project data was provided and assessed by the regional energy agency SAENA under the Operational Programme Saxony 2014-2020 (ERDF) and its funding guideline "Sustainable Energy Supply". These projects were all funded by public grants to a certain extend.

The database gives indications about following parameters, which were limited in their extend due to privacy regulation by the agency:

- Branch/Sector of company (e.g. food production, Metal construction/ mechanical engineering etc)
- Annual savings/consumption of CO2, Electricity, Natural Gas, Fuel Oil and others per project
- Annually saved costs caused by the project
- Investment costs and amount of subsidy per project
- Technical classification of implemented measures (e.g. LED, heat recovery, etc)

5.1 Input and output data of the investment assessment

The data provided by the regional agency SAENA emerges from the application of a tool owned by the agency. Therefore, all values are already resulting from previous calculations and are not suitable for the input of the FIRECE IT tool anymore. Furthermore, a simulation of different economic outputs became obsolete as well, due to the fact that all projects represent only public subsidies and that there is no information of other financial instruments being part of the project.

As preparatory activity a user-friendly IT instrument was developed as the final result of an analysis of public investments addressed to Industry low-carbon transition projects and the identification of quality and quantity criteria to be applied for the assessment analysis. The tool focuses on the evaluation of the project's economic parameters and environmental benefits.

Investment/funding related inputs:

- The Total investment
- Type of financing (Loan, Subsidy, Own resources)
- The Interest rate
- The Repay of the loan
- The Discount rate
- The Lifetime of the project/measure

Energy saving related inputs:

- Electricity
- Natural Gas
- Coal
- Heat
- Solid biofuels
- Gaseous biofuels
- Other fuels

Figure outputs

The following figure outputs are obtained from the evaluation of SME's investment project:

- The expected drop of CO2eq emissions
- The expected Cash Flow
- The NPV - Net Present Value
- The simple payback

The equivalent scenario is also calculated that relates to the situation when the project does not use any financial instrument (loan) and the co-financing is secured only by own resources. The NPV of both scenarios is the same, while the cash flow becomes positive sooner in case of the equivalent scenario – as shown in the figures. The investment with this direct investment is completed by the missing subsidy share.

The input and output data of the 8 SME's investment assessment are presented in the attached tables:

/

5.2 TABLES / IT TOOL CALCULATION RESULTS

As mentioned in chapter 5.1., the underlying data, which was able to be acquired during the pilot action 2, was not feasible for applying to the IT tool. Therefore, no calculation results from the IT tool can be presented.

Project No. / Name			
General investment data			
Enterprise Size (*Please tick*)	Micro	Small	Medium-size
Type of business activity (*Please tick*)	Production	Services	
Type of economic activity to which the investment relates			
Type / subject of investment	*Please tick or indicate % share of energy savings*		
Buildings insulation			
Change of technological processes			
Control of circulation pumps			
Decrease of losses in heat distribution			
Energy management			
Installation of cogeneration units			
Installation of flue gas pre-heaters to boilers			
Installation of frequency inventors			
Installation of heat pumps			
Installation of photovoltaic systems (for electricity generation)			
Installation of solar thermal systems (for heat generation)			
Installation/replacement of compressors			
Replacement of coal boiler with biomass boiler			

Replacement of coal boiler with gas boiler	
Replacement of coal boiler with new coal boiler	
Replacement of existing lighting with LED80 or higher efficiency	
Replacement of lighting LED80 with LED110 or higher efficiency	
Thermal insulation of technologies	
Transformers replacement	
Waste heat utilisation	
Other – please indicate type	

Investment / funding related inputs

		In Euro	As % of Total
Investment	Total		
	Loan		
	Own resource		
	Subsidy		

Loan	Interest rate (in %)	
	Repay (in years)	
Own resource	Discount rate (in %) (if no data use typical country value)	
Measure	Lifetime/expected payback period in years	

Energy saving related input

Energy type	The value of energy saved	Energy unit	verage cost of the unit of energy in Euro
Electricity			
Natural gas			
Coal			
Heat			
Solid biofuels			

Gaseous biofuels			
Other (indicate type)			

Output data	
Expected drop of CO2 emissions	
Expected drop of CH4 emissions	
Expected drop of N2O emissions	
Expected drop of CO2eq emissions	
Expected Cash Flow	
Net Present Value	
Simple payback *(in years)*	
Equivalent scenario without loan investment	
Own resources investment in Euro	
Subsidy share (in %):	

Annex: Tool – Description of inputs and outputs

Investment/funding related inputs:

- The Total refers to the total investment in the project, including each funding share (Loan, Subsidy, Own resources).
- The Loan is the share of the loan funding on the total investment
- The Subsidy is the share of the subsidy funding on the total investment
- The Own resources is the share of own funding by the project beneficiary on the total investment
- The Interest rate is the rate linked to the loan share
- The Repay is the period length to repay the loan
- The Discount rate refers to the rate used for the discount factor on cash flow, in order to estimate the NPV
- The Lifetime is the expected lifetime of the project

Energy saving related inputs:

- Electricity
- Natural Gas
- Coal
- Heat
- Solid biofuels
- Gaseous biofuels
- Other fuels

Figure outputs

The following figure outputs are obtained from the evaluation of SME's investment project:

- The expected drop of CO2eq emissions is the sum of CO2, CH4 and N2O emissions
- The expected Cash Flow is calculated based on the energy savings and the energy cost inputs
- The NPV is the Net Present Value calculated for the project funding mechanism
- The simple payback is the total investment divided by the Cash Flow
- The equivalent scenario: Subsidy share is a theoretical share of subsidy that would be needed in case of implementation of the equivalent scenario (without loan) to keep the same NPV of the project.

- The equivalent scenario: Own resources is the share of own funding by the project beneficiary in case of the equivalent scenario.