



D.T2.5.7

Summary report on Pilot Action to assess Industrial sectors RE projects in Austria

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

Prepared by	PP5 Research Burgenland
Project number and acronym	CE 1131 FIRECE
Lead partner	Chamber of Commerce of Venice Rovigo Delta-Lagunare
Address	Steinamangerstraße 21, 7423 Pinkafeld
Email	Johann.Binder@forschung-burgenland.at Nina.bruckner@forschung-burgenland.at
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2 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.

This report collects and analyses data of industry assessment in Austria, useful for the evaluation of the Pilot Action 2.



3 EXECUTIVE SUMMARY

Country / region / PA2 Implementation area

Austria

Relevant energy saving funds:

ERDF: The European Regional Development Fund in Austria 2014-2020

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

Number of SME's involved: 8

6 medium sized

2 small sized

Type of projects:

8 companies were analysed, 5 are finalized, 3 are ongoing projects.

Energy saving measures and renewable energy sources:

The following energy saving measures were involved:

- Installation of a PV system
- Installation of a solar thermal system
- Installation of a heat pump
- Replacing the illumination on LED
- Installation of cogeneration units
- Decrease of losses in heat contributions
- Change of technological processes
- replacement of compressors
- waste heat utilisation
- buildings insulation

**)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.*



4 SUMMARY OF THE RESULTS OBTAINED FROM THE IT TOOL CALCULATION

The pilot projects were analysed one by one with the tool. The individual parameters were calculated with the real values in the initial case.

Two further scenarios were run through to check the applicability and to achieve comparability with the other partners who also used these scenarios. The results are presented in the following chapters.

The applied measures in the pilots, are summarized in Figure 1: in seven projects PV-systems are installed, in 3 projects heat pumps are installed, in four projects the Lighting was changed, in 2 projects cogeneration units were installed; the decrease of losses, the change of technological processes, a new buildings insulation and the installation of a solar thermal system was in realized.

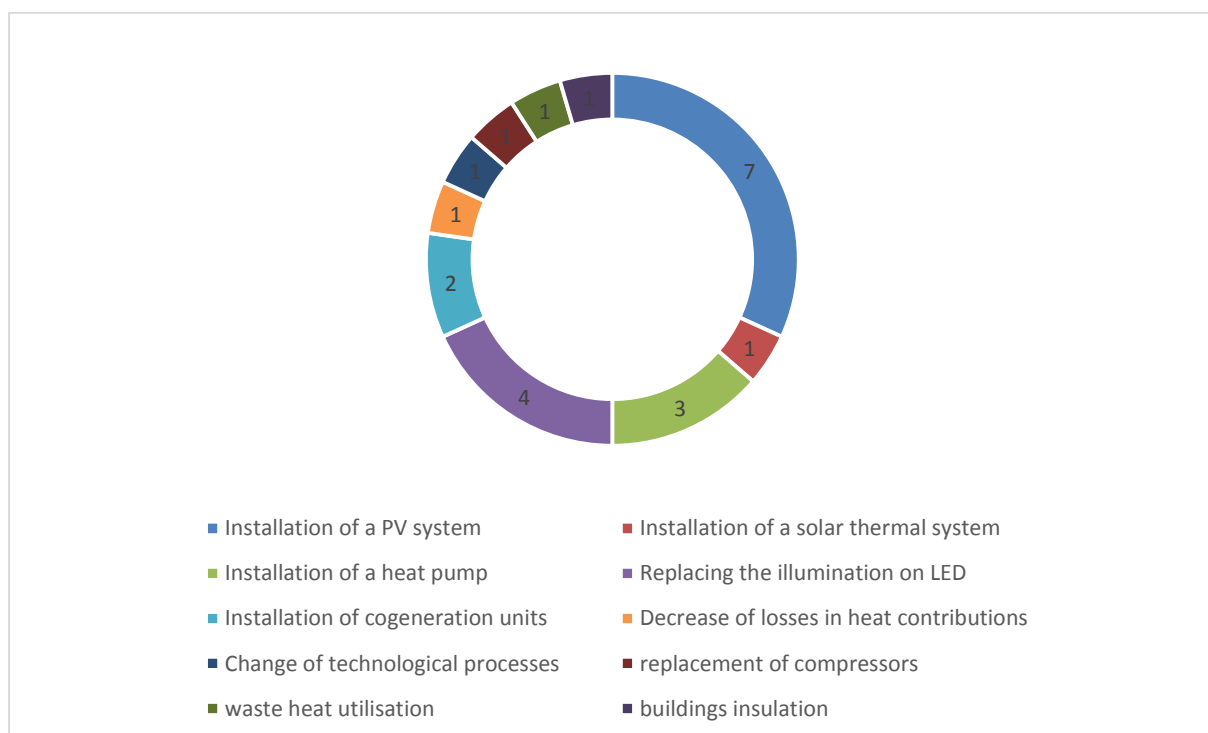


Figure 1 Applied measures



In Table 1 are the pilot projects shown. In almost all projects (seven out of eight) were renewable energy sources changed, in one project (project 03) energy efficiency was improved.

Table 1 comparison of 8 pilot projects

Company	Sector	Size	Measures	Investment	Status
01	Technical engineering	medium	Installation of PV system	295.450 €	finalized
02	Manufacturing (joinery)	small	Installation of PV system	22.000 €	finalized
03	Manufacturing (metal)	medium	Change of technological processes Installation of cogeneration Replacement compressor Waste heat utilisation	100.000 €	finalized
04	Engineering Bureau	small	Installation of PV system Installation of heat pump Lighting	31.000 €	finalized
05	Civil Engineering	medium	Heat pump LED lighting PV system	250.700 €	ongoing
06	Manufacturing (wood)	medium	Heat recovery Heat pump Lighting PV system	284.400€	ongoing
07	Civil engineering	medium	New insulation Lighting Solar thermal system PV system	208.200 €	ongoing
08	Food Processing	medium	Installation of PV system	85.000 €	new



4.1 Energy savings

The total amount of energy savings varies from 14 to 173 MWh per project. As it depends on the amount of investment, it does not have adequate information value as such.

. The lowest costs are in project 04- where a small PV system was installed, with about 22.000€. The highest costs were in project 01, with about 272.300 €/ MWh.

Project	Energy savings [MWh]	Cost of energy savings [€]
01	173, 25	272.298,73
02	164 ,10	257.917,58
03	145, 80	229.155,29
04	160, 24	251.850,78
05	14,00	22.003,94
06	30, 26	47.559,94
07	30,00	47.151,30
08	95,00	149.312,43



4.2 GHG savings

The total amount of GHG (CO₂eq) savings varies from about 8.400 kg to 48.200 kg per year. As it depends on the amount of investment, it does not have adequate information value as such.

The CO₂eq savings are ranging from about 254 to 310 kg/ MWh. The costs of CO₂eq savings were calculated with an average of **5,57 €/ kg**. The costs of the CO₂eq savings are calculated with an average of **1571,71€ / MWh** and range from about 1.417 to 1.730 €/ MWh.

Project	CO ₂ eq savings [kg/ year]	CO ₂ eq savings [kg/ MWh]	CO ₂ eq savings [€/ MWh]
01	44.070,00	254,37	1.417,28
02	48.200,00	293,72	1.636,53
03	43.800,00	300,41	1.673,79
04	44.870,00	280,02	1.560,17
05	3.920,00	280,00	1.560,07
06	9.380,00	309,98	1.727,11
07	8.400,00	280,00	1.560,07
08	26.600,00	280,00	1.560,07



4.3 Economic performance

In three projects (02, 04 and 08) the annual cash flow is negative, which is equal to annual energy savings. The CF-breakpoint never appears in these projects- the NPV is negative and the simple payback is over 37 years in both projects. The higher the investment sum, the higher the energy yields, the more energy could be saved.

Table 2 economic performance of pilot projects

Project	CF - Breakpoint [years]	NPV [€]	Simple payback [years]
01	17	49.312,15	22
02	never	-4.172,54	37
03	10	79.264,01	12
04	never	-11.551,07	56
05	18	12.902,33	23
06	12	85.785,56	17
07	11	89.978,43	15
08	never	-279,09	21



5 CONCLUSION OF THE INDUSTRIAL SECTOR ENERGY EFFICIENCY PROJECTS ASSESSMENT ANALYSIS

In this chapter two scenarios are played through and compared -all information comes from the Tool.

In **scenario 2**, a subsidy of 35% and a loan of 65% is assumed - in contrast to 1% and 2% interest rate and repay lasts 10 years. In **Scenario 3**, no subsidies are granted at all and an interest rate of 0% is assumed - here a loan of 70% or 90% is assumed and calculated.

In terms of results, energy and GHG emissions savings remain the same in the described scenarios as in the initial scenario. Concerning economic indicators, the cash flow and the simple payback period also do not change, while the cash flow breakpoint and the net present value differ.

5.1 Scenario 2 - subsidy + loan

In the following the results of the scenario 02 are shown. In Table 3 the projects were calculated with 35% subsidy, 65% loan and an interest rate of 1%. In all cases the alternative subsidy share was at 40 %.

Table 3 Scenario 02- economic parameters- 1 % interest rate

Project	CF - Breakpoint [years]	NPV [€]	Alternative investment [€]
01	17	54.923,95	176.858,36
02	never	-2.780,14	13.214,07
03	8	90.496,61	60.063,97
04	never	-8.965,85	18.619,83
05	17	13.702,86	150.580,37
06	13	77.357,33	170.821,93
07	10	106.728,97	125.053,19
08	21	15.059,51	51.054,37



In Table 4 the same parameters (subsidy 35%, loan 65%) are used, with an interest rate of 2%. In all cases the alternative subsidy share was at 37 %.

Table 4 Scenario 02- economic parameters- 2% interest rate

Project	CF - Breakpoint [years]	NPV [€]	Alternative investment [€]
01	18	45.301,54	186.480,77
02	never	-3.499,09	13.922,02
03	9	87.228,68	63.331,90
04	never	-9.978,90	19.632,89
05	19	5.510,17	158.773,07
06	13	68.063,34	180.115,92
07	11	99.925,15	131.857,01
08	21	12.281,77	53.832,11

The use of financial instrument (subsidies) instead of own resources for financing of the project can increase its NPV and decrease the CF breakpoint - which is valid for both interest rates (1% and 2%) analysed.



5.2 Scenario 3 - own resources + loan

In the following Table 5 the results of scenario 03 is shown. In this scenario no subsidies are granted at all and an interest rate of 0% is assumed - here in comparison of loan of 70% and 90% is assumed and calculated. In the results with 70% loan (30% own resources) are shown. In the cases with 70 % loan the alternative subsidy share was at 9 %.

Table 5 Scenario 03- economic parameters with 70% loan

Project	CF - Breakpoint [years]	NPV [€]	Alternative investment [€]
01	>25	-36.955,77	268.738,09
02	never	-9.644,99	20.078,92
03	13	59.292,76	91.267,82
04	never	-18.639,04	28.293,02
05	never	-64.525,18	228.808,42
06	>20	-11.386,41	259.565,67
07	17	41.762,56	190.019,6
08	>21	-11.463,76	77.577,64

In Table 6 the results with 90% loan and 10% own resources are shown. In all cases the alternative subsidy share was at 11 %.

Table 6 Scenario 03- economic parameters with 90% loan

Project	CF - Breakpoint [years]	NPV [€]	Alternative investment [€]
01	>25	-29.609,51	261.931,83
02	never	-9.096,11	195.30,04
03	12	61.787,67	88.772,91
04	never	-17.865,62	27.519,6
05	never	-58.270,44	222.553,68



06	>19	-4.290,89	252.470,15
07	16	46.956,96	184.825,19
08	>21	-9.343,09	75.456,97

The use of financial instrument (interest-free loan) and own resources without any subsidy very significantly decreases the projects NPV and increases the CF breakpoint compared to both basic scenario and scenario 2- which is valid for both amounts of a loan analysed.

5.3 Comparison

Comparison the three different financing models, are:

- subsidy + own resources + loan (initial scenario);
- subsidy + loan (scenario 02);
- loan + own resources (scenario 03) .

In *scenario 02* the interest rate were different- first the projects were analysed with 1 % then 2% .

The projects with 1% interest rate had the CF breakpoint earlier than the projects with 2% interest rate. Also the NPV was better at 1% interest rate. The alternative investment was higher at 2% interest rate. The annual financial savings are higher than the annual loan- the companies can achieve a good performance without own resources.

In *scenario 03* the increasing of the loan (from 70% to 90%) the annual instalment is too high to be covered- only after the repayment of the loan a positive cash flow is given.

All projects have the potential to achieve energy and greenhouse gas savings, thus supporting the objectives of energy plans. In order to make the projects economically feasible a certain level of subsidy component seems to be required to be included in the financing programmes.



6 CONCLUSION OF THE PERFORMANCE OF THE PROJECT LEVEL TOOL (O.T1.4) TO ASSESS PUBLIC INVESTMENTS FOR INDUSTRY'S LOW CARBON TRANSITION

The Tool was developed with the aim to provide a calculation of energy, environmental and economic performance of the energy-related projects, and to allow the user to simulate and compare different possibilities of financing.

The Tool and the presented outputs are built on basic calculations that definitely could be extended to make the Tool more robust and the results more precise - which, however, would require more data to be inserted as inputs and would pose more requirements on the users. (ENVIROS, 2020)

User friendliness:

This version of the Tool is more friendly to use, as the first draft version. The input data is clear and easy to fill for the investment data. The input data for the expected energy savings is more difficult- the data (emission factors) for the Tool were not available in Austria first. To run the Tool in Austria, Enviros had to help with the conversion of the input data. However, some more questions/ suggestions would arise:

- ◆ Which expected values are meant? those that are produced or consumed? You might want to think about explaining that somewhere.
- ◆ The units in the input data is wrong- it is MWh or kWh- not MW/h or kW/h
- ◆ Maybe consider different subsidy rates for different measures
- ◆ Maybe consider different lifetimes of measures in case of projects that consist of several measures
- ◆ The line “cumulative discounted cash flow of own resource and subsidy share without loan equivalent to the current investment share” is not clearly understandable what is meant (for “not- economics”)

The tool can certainly be used at national level, but whether it is of interest to individual companies would have to be investigated further - 8 pilot projects are not sufficient for this, as each project is very individual, with very different parameters. To analyse the detailed information (behind the tool) is the bigger challenge to ensure a meaningful application.