



D4.4 Online analysis and calculation toolset to activate and enable SMEs in taking EE measures

GEAR@SME: GENERATE ENERGY EFFICIENT ACTING AND RESULTS AT SMALL & MEDIUM ENTERPRISES



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Gear@SME
Saving energy together





Project Factsheet

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Executive Summary

This report presents a deliverable consisting of the analysis and calculation toolset developed within the GEAR@SME project and made available online in the smart advisor of the GEAR@SME platform www.energyefficientsme.eu.

In this context “Analysis and calculation tools” refers to tools which support SMEs in analysing their energy use, identifying areas of potential improvement, evaluating benefits of potential measures, and monitoring energy efficiency improvements.

In this report, the selection of tools for the toolset is described and motivated. The delivered toolset consists of eight tools in total. This includes two new tools, and adaptation of an existing tool for new applications.

For each use case country, the toolset provides a set of tools, available in the local language, which covers the following main functionalities:

- Analysis of energy demand
- Identification of potential areas of improvements
- Financial evaluation of energy efficiency measures
- Highlighting of multiple benefits
- Monitoring of energy-related KPIs over time

To guide the user to the right tool for their needs, key information about each tool is presented in the smart advisor, together with access to the tools either through downloadable files or direct links to external sources.



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1 Introduction

This report presents an overview of the deliverable from Task 4.3 of the GEAR@SME project. The aim of this task has been to provide an analysis and calculation toolset which supports the GEAR@SME methodology in each country use case. The deliverable thus consists of a set of tools that are available from the smart advisor, developed in work package 7, which is part of the online platform www.energyefficientsme.eu.

The deliverable meets the following objective of work package 4:

Adaptation and connection of existing analysis and calculation tools in a toolset that will support the task of activating and enabling SMEs into taking energy efficiency measures

SMEs commonly need support to better understand the potential for energy, economic, and other savings and benefits related to energy efficiency measures and renewable energy projects in their own company. To meet this need, this task focuses on tools meant to support companies to perform an initial, energy scan or simplified energy audit, to identify areas of improvement, to evaluate the benefits of suggested measures, and to follow-up the effect after implementation of energy efficiency improvements.

As a guiding principle, the toolset should include tools corresponding to the following five subtasks:

- Subtask 1 **Analysis of energy demand tool**: Given input from the SMEs related to their energy demand (energy bills, own estimates, etc.), this tool should provide an analysis of the current state of energy efficiency of the company.
- Subtask 2: **Energy Actions tool**: This tool should provide suggestions for actions for improving energy efficiency.
- Subtask 3: **Financial tool**: Suggested actions and interventions are evaluated from a financial perspective, providing estimates of financial KPIs such as net present value, payback time, and internal rate of return.
- Subtask 4: **Multiple benefits tool**: This tool should be able to highlight the multiple benefits of the proposed solutions, going beyond energy and economic savings.
- Subtask 5 **Energy monitoring**: A tool that uses energy data from several years to support the evaluation and follow-up of energy (and cost and emissions) savings.

The development of the toolset followed the principle that overall, for each use case country, a set of tools should be provided which together provides all the main functionalities as specified by the subtasks.



Furthermore, the selection and development of tools was based on the specific context of each country and use case. In particular, this means that focus was on retaining, adapting, connecting, and improving tools that already exist and are widely adopted and accepted in the different communities. This procedure was facilitated by the inventory of existing tools resulting from Task 2.3 and Task 3.3.

2 Toolset development process

The figure below illustrates the overall work process for the development of the final toolset. The different activities are further described below.



2.1 Selection of tools & identification of development needs

A starting point for this task was the list of existing tools collected in Task 3.3. Among these tools, a number of analysis and calculation tools which could support SMEs in doing energy scans and taking energy efficiency measures were identified. These tools were first reviewed, by the project partners involved in the task, to identify to what extent they covered functionalities corresponding to the subtasks of Task 4.3. A classification was also made regarding how promising the tools were, and to what extent project partners were familiar with the use and development of the tool. Overall, this resulted in a list of 15 promising tools that were selected for a more deep-dive evaluation of strengths and weaknesses and opportunities to use within the project.

To deep dive into the features of the most promising tools, workshops were held together with the partners having most insight and familiarity of each tool. These workshops aimed, firstly, at clarifying whether the tools were available for the project consortium to use, further develop and share publicly; the latter with respect to both copyright and licensing conditions as well as more technical issues related to tool format, access to background program code, and estimated resource requirement for tool development. Secondly, the workshops analysed to what extent the tools had the desired functionalities. Strengths and weaknesses of each tool were collected to allow selecting the best options. The identification of strengths also helped pinpointing features from tools that could be incorporated into further development of other or new tools. Weaknesses of otherwise promising tools indicated issues that should be overcome by development efforts.



Based on this input, as well as some further test evaluations of some of the tools, a selection of existing tools to include in the toolset was made. The basic criteria for the tool selection were:

Local embedment	prioritizing tools that are already available and used in a country.
Possibilities to use, adapt and share	considering both rights (e.g. copyright and licensing) and technical issues (e.g. access to editable files or code)
Desired functionalities	strengths and weaknesses in relation to the subtask specifications
Complementarity to other tools	avoiding having more than one tool that overlap too much in functionality for the same country

The final selection was thus the result of an overall evaluation of the criteria listed above, based on information about the tools received in previous tasks, mainly work package 3, Task 3.3 (summarized in D.3.1), and the deep-dive workshops that were held with the partners being most familiar with each tool.

To be able to provide toolsets covering all subtasks for each use case country, the resulting selection of tools revealed gaps that needed to be filled by new tools or required a further development of existing tools. The table on the next page shows one of the preliminary toolset plans, where tools in italics indicate tools that partly cover the desired functionalities of the subtasks, but also are associated with critical weaknesses or limitations (see further descriptions of these drawbacks below the table).

Based on the identified gaps, it was decided that two new tools should be developed:

- A business case and multiple benefits tool (covering both Subtasks 3 & 4)
- A monitoring tool

Furthermore, based on extended testing and dialogue with the original developers, it was decided to generalize the SET Tool to be applicable to SMEs from different sectors, and thereby cover the need for a Subtask 2 tool for Germany and Romania, as well as a Subtask 1 (& 2) tool for Italy. For the Italian case, development efforts have also been put into another new energy scan tool. This development is still ongoing.



Overview of toolset after first tools selection and SWOT analysis with identification of gaps indicating development needs					
	Subtask 1 Analysis of energy demand	Subtask 2 Energy action	Subtask 3 Financial	Subtask 4 Multiple benefits	Subtask 5 Energy monitoring
Germany	Energiebuch E-Tool		(Profitability LEG Tool)		Energiebuch E-Tool
	(PINE Audit)				
Romania	Monitoring & Targeting				
	(PINE Audit) (SME Energy CheckUp)				
Italy	(PINE Audit) (SET Tool) (SME Energy CheckUp)				
		(ENEA Efficiency 1.0)			
Netherlands	SME Energy CheckUp Energy Potential Scan (EPS) for Business Parks		Collective business case tools		

The PINE Audit tool is developed to be used by energy auditors and was seen as considerably too advanced to be used by SMEs or Trusted Partners in general. ENEA Efficiency 1.0 on the other hand was seen as very useful and user-friendly, but required substantial modernization and unlike most other options for energy scan tools (Subtask 1 & 2) did not include functionalities related to basic analysis of energy demand (i.e. Subtask 1). SME Energy CheckUp is a widely used and appreciated tool in the Netherlands and was selected for the Dutch case. However, it suffered from certain weaknesses in translations and benchmarks for other countries which called for updates. This development was found to not be possible within the framework of this project. The Profitability LEG tool was a concrete option as a financial tool for the German case, but could not be translated to cover the need of a financial tool in the other countries. The SET tool finally included all the desired functionalities of Subtask 1 & 2 at an appropriate level and was already available in Italian, German, Romanian and other languages. However, it was developed for the Textile sector, and would need to be adapted for a more general application to a broader set of SMEs.



2.2 Development of new tools and adaptation of existing tools

The new tools have been developed with existing tools as starting points or inspiration. However, the new tools provide significant extensions in the form of add-on modules, novel and improved structure, and are complemented with additional features inspired by other tools.

New business case and multiple benefits tool

The new business case and multiple benefits tool allows the user to evaluate and compare costs and benefits of energy efficiency measures and renewable energy projects in an SME, and present the output as a business case.

The starting point for the development of the tool was an existing Swedish tool for calculation of Life Cycle Costs of energy efficiency measures. The tool has been significantly extended, with new modules for multiple benefits and business case outputs. The tool also incorporates improved user guidance and possibilities for additional input and output data, largely inspired by the German Profitability LEG tool and the Dutch Collective business case tools.

The main novel feature of the new business case tool is the possibility of including non-energy benefits of an energy efficiency measure in the business case. These can be considered qualitatively by simply selecting them from a list or giving them a quantitative estimation and if possible taking them into account in the economic evaluation. Another add-on feature of the tool is that the results can be output in a business case template, which is designed to emphasize the information needed for decision-makers. This template explicitly highlights non-energy benefits, in addition to presenting the results of the financial evaluation.

New monitoring tool

The new Monitoring tool provides the ability to monitor the energy consumption and energy-related key performance indicators (KPI) that may be of interest to an SME. This kind of tool is widely available, but from the review of existing tools, no one was identified that satisfactorily fulfilled the screening criteria. Instead, the new tool combines features from different existing tools (amongst other a Swedish tool for monitoring of energy consumption data, and the Romanian tool Energy Analytics), collected into a complete and structured format, which is fully guided and user-friendly.

In particular, the tool includes the possibility to select among alternative KPIs while keeping the tool simple and not requiring all KPIs to be defined. The tool also includes the option of entering data for a wide range of energy carriers but keeps unused data sheets hidden when not needed. For further guidance, the tool provides help with unit conversions, heating values, etc. Thereby, the tool fills a gap between advanced



monitoring tools, which are often perceived as difficult to fill in by non-experts, and the basic tools that only follow up energy consumption and one or a few predefined KPIs.

Development and adaptation of the existing SET tool

The SET Tool was originally developed as user-friendly energy scan tool for the textile industry. It had all the general features required by a basic energy scan tool, including analysis of the company's energy consumption (Subtask 1) and suggestions for areas where energy efficiency can be improved based on qualitative input about energy-related technology and management (Subtask 2). Furthermore, the tool was already tested (in its original "textile sector" version), and available in several languages.

However, the tool also included some parts which were very specific to the textile sector, such as comparison with sector benchmarks, input data for sector-specific technology, and best practice suggestions for energy efficiency improvements, which relate to activities in textile and clothing production. A more general version was therefore developed, where the sector-specific content and functionalities were removed, thus emphasizing the mapping of energy use, and measures in common support processes.

2.3 Testing and validation

New tools have been tested in different steps of the development process. The new tools were developed by teams of two project partners. A first version in English was then tested and evaluated by the other partners involved in the task. Based on the feedback, minor updates were implemented to solve errors, clarify instructions, and generally improve the functionalities. The updated tools were sent to the partners for translation into local languages. The translated tools were checked for consistency by the original developer. Finally, the tools have been available for testing in the use cases, in a final validation round. However, the new tools target later stages in the process of improving energy efficiency and requires the input from energy scans or similar. Since most use cases have not reached this far in their implementation, the opportunities for tool validation so far have been limited.

The SET tool was extensively tested and evaluated as part of the tool selection process. This testing was performed mainly by the project partners in countries where this tool was suggested to be used. The evaluation aimed at ensuring that the tool could fulfil desired functionalities, and that no textile-specific content was left. Based on this evaluation round, critical development needs were identified and prioritized. General testing of the tool was not considered necessary since the tool has previously been used within the Textile sector with good experiences.

2.4 Toolset online with documentation

Besides being available for the use cases of the GEAR@SME project, the toolset is made available for any users of the online platform www.energyefficientsme.eu. Here Trusted



Partners can easily find the tools that may be useful for SMEs in their local energy collective, depending on in which phase they are in the process of analysing and improving their energy efficiency.

To guide users to the right tool, each tool has been documented in a two-page format, which explains the target group for the tool, the main output that can be obtained, and also which input would be required. Where relevant, it is indicated where the input can be obtained, and especially if it can be obtained from other tools, and similarly if the output can be used as input in a tool for a subsequent analysis step. This information thereby indicates potential (soft) linkages between the tools. The tool descriptions are used to present the tools in the online platform together with links to downloadable files or external sources. The tool descriptions are also available in the Annexes of this report.

3 Overview of the developed toolset

The table below shows an overview of the final toolset developed and how this serves to cover the functionalities specified by all Subtasks for each use case country. For descriptions of the features and target groups for each individual tool, the reader is referred to the Annexes of this report.

Overview of the delivered toolset for each use case country					
	Subtask 1 Analysis of energy demand	Subtask 2 Energy action	Subtask 3 Financial	Subtask 4 Multiple benefits	Subtask 5 Energy monitoring
Germany	Energiebuch E-Tool	SET Tool	Business case and multiple benefits tool		Energiebuch E-Tool
Romania	Monitoring & Targeting SET Tool	SET Tool			Monitoring tool
Italy	SET Tool				
Netherlands	SME Energy CheckUp Energy Potential Scan (EPS) for Business Parks		Business case and multiple benefits tool Collective business case tools		



Several of the tools are available also in English and can be used by SMEs or Trusted Partners in any country. Overall, the tools available in English together also forms a complete toolset covering all Subtasks 1–5.

It should be noted that the Subtask 2 tools suggest potential areas of improvement of energy efficiency in the company. This enables a “soft” connection to the best practice database, where the suggested areas of improvement can be used to guide a search in the database, by indicating in which areas to search for good examples of best practice energy efficiency measures.

Only the Netherlands have tools explicitly targeting collective measures and projects. It has been investigated whether these or similar tools could also be provided to the other use cases. However, due to lower maturity in collective approaches, there was, so far, a limited need and interest for these kinds of tools, and it was agreed that the quite substantial resources that would be required to adapt the tools to local conditions, translate them, and handle licensing, was not motivated.

The table below lists all tools provided in the toolsets, and indicates besides subtask and language, the format of the tool and whether the tool was developed within the project or not. More information about the new and adapted tools can be found in Section 2.2.



Complete list of tools in the delivered toolset				
	Format	Language	Development within project	Subtask
Energiebuch E-Tool	Web-based	German	Existing tool ^b	1 & 5
Monitoring & Targeting	Excel	English	Existing tool ^c	1
SET Tool	Excel	German Romanian Italian English	Adaptation of existing tool ^d	1 & 2
SME Energy CheckUp	Web-based	Dutch English	Existing tool ^e	1 & 2
Energy Potential Scan (EPS) for Business Parks	Licensed ^a	Dutch	Existing tool ^f	1 & 2
Business case and multiple benefits tool	Excel	German Romanian Italian Dutch English	New tool	3 & 4
Collective business case tools	Excel	Dutch	Existing tool ^g	3
Monitoring tool	Excel	Romanian Italian Dutch English	New tool	5

^a Currently five organisations hold an EPS license and can be contacted to perform a scan for a business park: Bureau Boudesteijn (erik@boudesteijn.com ; boudesteijn.com), CCS (baskan@ccsenergieadvies.nl; ccsenergieadvies.nl/werkgebieden/gebouwde-omgeving/), CLOK (j.bosma@clok.nl; clok.nl), Enerless (hklooster@enerless.nl; enerless.nl/energie-potentieelscan-eps/), Projectbureau Duurzame Ontwikkeling (dick@dejongbelastingadviseurs.nl)

^b Developed by Mittelstandsinitiative Energiewende und Klimaschutz - Regionale Werkstätten des Handwerks gefördert durch das Bundesministerium für Wirtschaft und Energie (www.energieeffizienz-handwerk.de)

^c Developed within the SMePower Efficiency project (<https://smempower.com/>)

^d Developed by ENEA, CROSS-TEC laboratory in collaboration with the partners of the SET project and with the support of European Union IEE programme.

^e Developed within the SME Energy CheckUp project (<https://energycheckup.eu/>)

^f Developed by TNO in two subsidised Dutch innovation projects (TKI)

^g Developed by TNO, IVAM and ECWF.



4 Annexes – Tool descriptions

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Energiebuch “E-Tool”

The Energiebuch E-tool helps SMEs to evaluate energy consumption data and energy-related key performance indicators over time. With a minimum of work, it is possible to obtain a good overview of all relevant operating data: recording of energy costs, examination of machines and vehicle fleet, and evaluation of CO₂ emissions. The results can be compared to sector benchmarks. The tool also provides “add-on modules” (eg. PV calculator, electricity and energy tax rebate, business development plan, CO₂ pricing).

The tool was developed by Mittelstandsinitiative Energiewende und Klimaschutz - Regionale Werkstätten des Handwerks gefördert durch das Bundesministerium für Wirtschaft und Energie (www.energieeffizienz-handwerk.de)

The **target group** for this tool is business owners or energy managers of **SMEs that want to have all energy-relevant data at once and use it as an uncomplicated decision-making basis for future action.**

What’s included?

- Recording of energy costs
- Examination of machines and vehicle fleet
- Evaluation of CO₂ emissions
- Sector benchmark (handcraft sector)
- Add-on modules: PV calculator, electricity and energy tax rebate, business development plan, CO₂ pricing

The tool provides the data basis for decision-making process regarding energy efficiency.

Required input:

- Company data, business data, locations
- Energy data (electricity, own electricity, fuels, water, waste water)
- Key figures

Possibility to enter monthly or annual data for energy. Not all fields are mandatory.

The tool can be used in different ways

The tool can be used **by SMEs themselves**. It is rich with description and information for each field. The user can choose a standard mode (guided data collection) or an expert mode. Access can also be given to a third party (ie, **energy advisor**) to get better advice.

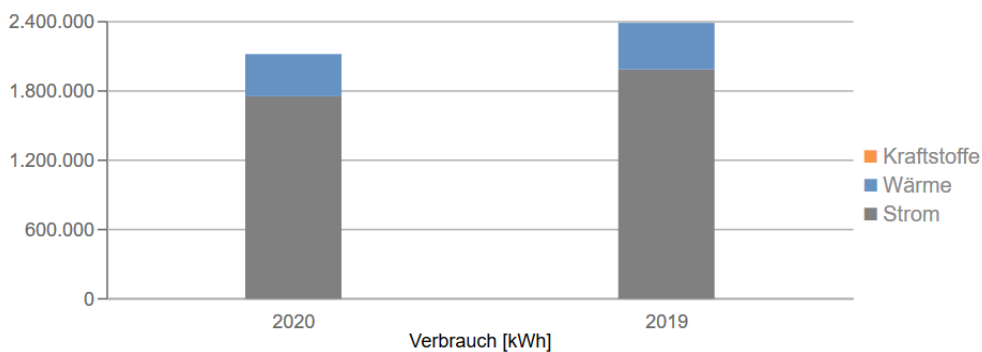


ENERGIEDATEN - tabellarisch

Energieträger	Verbrauch [kWh]		Kosten [€]		CO ₂ [t]	
	2020	Vorjahr	2020	Vorjahr	2020	Vorjahr
Strom	1.754.024 ▼	1.986.624	280.930 ▼	293.942	421,74 ▼	489,51
Wärme	366.000 ▼	403.100	41.944 ▲	40.691	23,06 ▼	25,40
Kraftstoffe	0	0	0	0	0,00	0,00
Gesamt	2.120.024 ▼	2.216.100	322.874 ▼	334.633	444,80 ▼	514,91

ENERGIEDATEN - grafisch

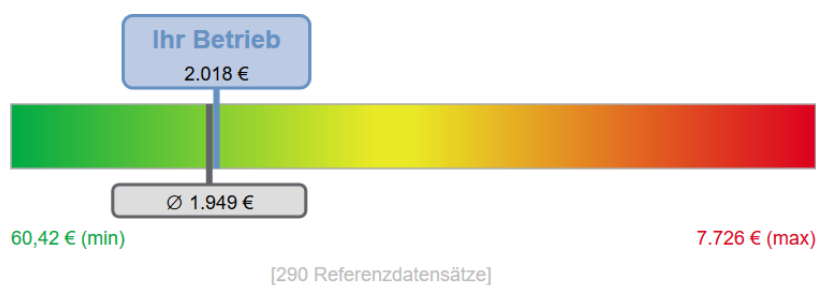
Auswahl: Energieverbrauch



BETRIEBSVERGLEICH

1: f Energiekosten / Mitarbeiter

2: f Energiekosten / Umsatz



Source: E-Tool, Mittelstandsinitiative Energiewende und Klimaschutz - Regionale Werkstätten des Handwerks gefördert durch das Bundesministerium für Wirtschaft und Energie



Monitoring & Targeting

The Monitoring & Targeting (M&T) tool provides SMEs with a trend for the energy consumption and an understanding of the correlation between energy consumption and production, which is used to set targets for energy efficiency improvements. The general objective of the M&T tool is to calculate energy efficiency targets by exploiting basic energy management information. The tool is built upon two concepts, namely “monitoring” and “targeting”. The monitoring concept refers to the collection of data that describes energy use. The targeting part defines the desirable energy consumption, through a potential energy saving.

The tool was developed within the [SMEmPower Efficiency](#) project funded by the EU Horizon 2020 research and innovation programme under the Grant Agreement No 847132. The tool is described in more detail in a deliverable from the SMEmPower Efficiency project: [D4.4 Monitoring & Targeting \(M&T\) tool for energy analytics](#).

The **target group** for this tool is **SMEs** who wants to set an energy saving target.

What’s included?

- Monthly energy consumption
- Monthly production data
- Optimised level of the energy consumption and production
- Potential estimated energy saving
- Data visualisation and graphs

Based on the output, the SME can quantify the energy saving potential in correlation with the production.

Required input:

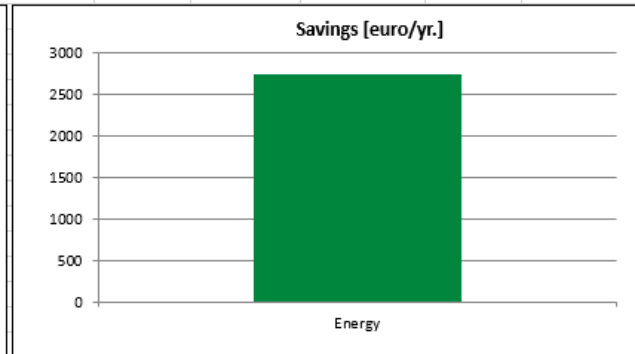
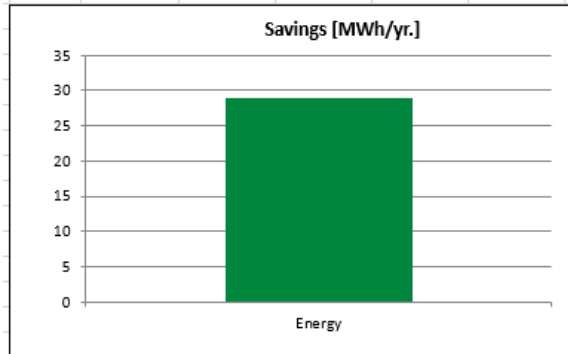
- Production data for at least two consecutive years
- Energy consumption data for at least two consecutive years
- Energy price

Monitoring can be applied at an aggregated level, e.g. total electrical consumption or individually per facility. Monitoring requires a diverse set of data, such as electrical consumption, thermal or fuel consumption, energy billings and variables that influence the consumption.

The tool can be used by SMEs themselves. This is likely to require some support and guidance.



Utility type	Real							Potential energy savings	
	Interval analysis		Production		Energy		Unit price	[MWh/yr]	[euro/yr]
	Start	Stop	Value	U.M.	Value	U.M.	[euro/MWh]		
Energy	JAN	DEC	1424150	buc	852	[MWh]	95	29	2755





SET Tool

The SET Tool allows a company to do a self-assessment of their energy efficiency and identify potential areas of improvement. The tool guides the user through the process of completing the necessary input, which makes the tool easy to use. Information and data about the company and its energy consumption is used to calculate energy-related key performance indicators. Based on the data provided and qualitative input about the company, its equipment and practices, the tool suggests promising energy efficiency opportunities from a database of best practices.

The tool was developed by ENEA, CROSS-TEC laboratory in collaboration with the partners of the SET project and with the support of European Union IEE programme.

The **target group** for this tool is **SMEs that want to do a preliminary self-assessment of their consumptions and their energy efficiency**. The tool also provides a preliminary list of potential measures/actions that can be undertaken.

What's included?

- Energy and process related key performance indicators
- Summary of energy costs and energy carriers used
- List of energy efficiency opportunities based on the data provided
- Preliminary investment evaluation and comparison between different solutions

Based on the output, the SME can prioritize energy efficiency actions and investigate them through feasibility studies and the creation of a business case analysis.

Required input:

- General data of the business (including turnover, working time, production)
- Information on buildings, production and auxiliary systems
- Energy data (purchased and self-produced energy, energy costs)
- Data relating to the company's main energy consumption areas

Note that the tool offers the possibility of entering both annual and monthly energy and production data. Not all fields are mandatory! Please consider that the more information you provide when entering data, the more accurate are the evaluations obtained regarding the energy efficiency measures provided. However, the tool allows useful information to be obtained even with a limited amount of input data.

The tool can be used by SMEs themselves. Even people with limited experience in the energy field are able to use the tool. If needed, support can be provided by the so-called Trusted Partner (a neutral actor who leads the development of a local energy collective and supports SMEs in energy efficiency tasks). **The tool can also be used by the Trusted Partner**, who can fill out the tool with data collected in the SMEs of the local energy collective to assess in a preliminary way the potential of energy efficiency.



Energia acquistata ricavi

File Home Inserisci Layout

Incolla Arial G C S

Appunti Carattere

Quantità totale di prodotto

Inserisci i dati mensili relativi

Energia acquistata nel corso esame:

Cogenerazione di energia elettrica (se presente)

Dati mensili

Anno 2019

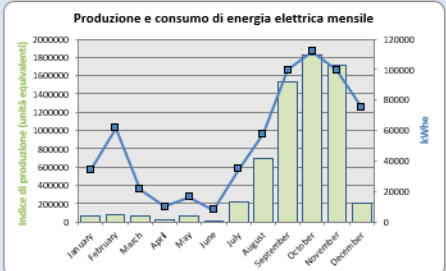
Energia elettrica

	Quantità	Costo (IVA esclusa)
	Seleziona l'unità: kWh	EUR
Gennaio	33859 kWh	6177 EUR
Febbraio	61453 kWh	4734 EUR
Marzo	21220 kWh	3468 EUR
Aprile	10037 kWh	2316 EUR
Maggio	16427 kWh	3019 EUR
Giugno	7984 kWh	1455 EUR
Luglio	34738 kWh	5805 EUR
Agosto	57682 kWh	9228 EUR
Settembre	99913 kWh	15359 EUR
Ottobre	111730 kWh	17171 EUR
Novembre	99813 kWh	14985 EUR
Dicembre	75055 kWh	11325 EUR

SCHEDA DI OUTPUT - Analisi dei dati mensili



Variazione mensile



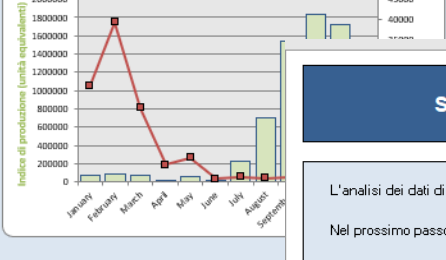
Diversi grafici consentono di indagare sul rapporto tra PRODUZIONE e CONSUMO DI ENERGIA.

Esaminando questi grafici si ottengono alcune informazioni sulla variazione del consumo di energia in relazione alla produzione.

I grafici sulla variazione mensile mostrano i consumi energetici dello stabilimento e la relativa produzione su base mensile.

Save Energy Tool

Produzione e consumo di energia termica mensile



SCHEDA DI OUTPUT - Best Practices trasversali consigliate

L'analisi dei dati di input suggerisce di valutare l'attuazione delle seguenti misure energetiche.

Nel prossimo passo, puoi analizzare i tuoi processi produttivi e le relative best practices.

Analisi dei consumi Passo 2

Categoria	Azione	Costo	Risparmio di combustibile	Risparmi di energia elettrica	Pay back time	Priorità
1 Organizzazione	Riesame del contratto di fornitura d'energia termica / costo dei combustibili utilizzati.	Trascurabile	0% (nessun risparmio di energia, ma può esserci un risparmio economico)		Immediato	1
2 Organizzazione	Spegnere le macchine e le luci durante la pausa pranzo.	Trascurabile		< = 1% di consumo di energia elettrica della fabbrica	Immediato	1
3 Organizzazione	Aumentare la consapevolezza del risparmio energetico in tutti i lavoratori.	Basso/Medio	< = 1% di consumo di energia elettrica e termica	< = 1% di consumo di energia elettrica e termica	Breve	1
4 Organizzazione	Stabilire un sistema di monitoraggio e di gestione dell'energia.	Medio/Alto	Variabile	Variabile	Variabile	2



SME Energy Check-Up

With this energy scan you get insight into your energy consumption and advice about energy-saving measures. The energycheckup.nl has been developed to help both SMEs and consultants get a first impression of potential energy savings and relative performance on energy usage.



The main **target group** for the tool is **SMEs** in the following sectors in the Netherlands:

- Offices
- Storage buildings (warehouses)
- Hotels Restaurants and cafés
- Healthcare
- Retail (food / non-food)
- Data centers

The tool could be used in other countries but will lose some of its relevance.

What's included?

- Relative energy usage compared to companies in the same sector and of similar size
- Indicative energy diagram showing for what purpose energy is used
- List of potentially interesting measures for energy saving, including an indication of payback time

Based on the output, the SME can decide which measures to put on their energy efficiency action plan and start contacting suppliers.

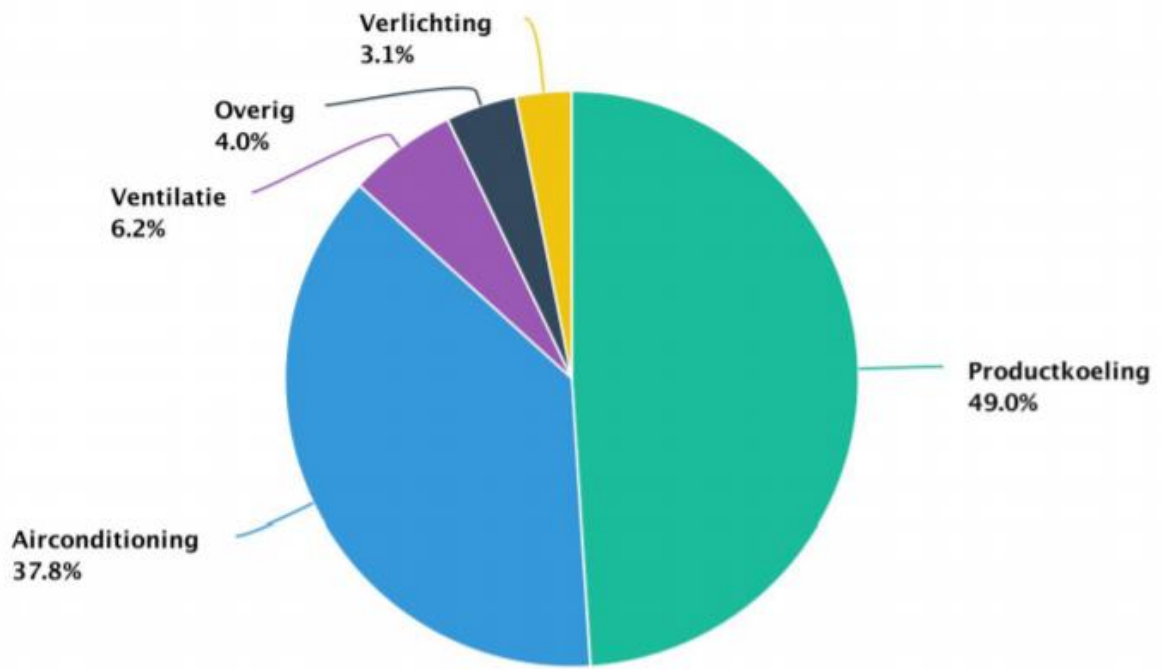
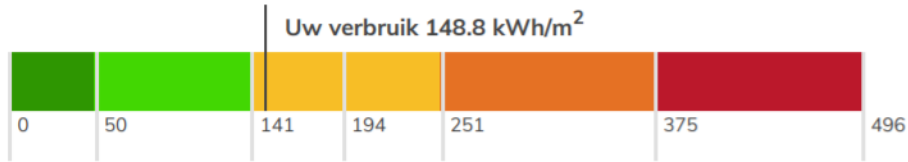
Required input:

This tool guides the user through the required information which includes the following:

- Energy use
- Building size
- Used heating and ventilation
- Used lighting

The SME Energy Check-up is a web-based tool and **can be used by the SMEs themselves**.

The tool can also be used **by energy consultants or Trusted Partners** (a neutral actor who drives the development of a local energy collective and supports the SMEs in tasks related to energy efficiency) to quickly get a first impression of building related energy usage at an SME.





Energy Potential Scan (EPS) for Business Parks

The Energy Potential Scan for Business Parks (EPS) gives a first order estimate for the business case for sustainable energy measures on business parks, for individual companies and for the business park as a whole. It has been developed in practice and successfully applied for over 100 business parks in the Netherlands. It does not require company-specific data for a first estimate, as it uses geographical and other data which is open or commercially available on a national scale. Therefore, it is a relatively quick and cost-effective scan. The results are presented at the building-level and can be visualized using GIS software.

The EPS was developed in two subsidised Dutch innovation projects (TKI). It was developed in The Netherlands and *currently only configured for application for Dutch business parks*.

The [target group](#) for this tool is [Trusted Partners or \(a group of\) SMEs that want to have a first order estimation of the business case of sustainable energy measures on business parks](#) and use that estimation to start the conversation and further investigate the different measures (through for instance an energy audit). It is *not* meant as a tool to base investment decisions on.

What's included?

- Estimation of energy usage in two scenarios: current and after implementing measures.
- Calculation of the business case (simple payback time) of sustainable energy measures (on a building level)
- Export of results to Excel files and GIS files.
- Flyers with results for business park and individual SMEs, see figure left and right respectively.

Based on the output, a more in-depth analysis of different measures can be executed, through for instance an energy audit at the different locations.

Required input:

- The only input required is a check on the automatically generated EPS input data for buildings and companies on the business park. Incorrect data can be adjusted, missing data can be added.
- This should be done together with a contact person on the business park.

The tool is only [available through licensed energy service suppliers](#). Currently nine organisations hold an EPS license and can be contacted to perform a scan for a business park with the EPS tool. Findings can be used to raise awareness and interest in energy measures on a business park.



ENERGIE POTENTIEELSCAN BEDRIJVENTERREIN

Huidig gebruik

Het geschatte jaarlijkse energieverbruik per jaar is:

- 75.039.000 kWh stroom
- 13.738.000 m³ gas

De milieubelasting van dit energieverbruik is: 51.000 ton CO₂ uitlaat.

Plaatsgrond bedrijventerrein

Relevante opties

Techniek	Technische beschrijving	Investering	Jaarlijkse besparingen	Milieuwinst CO ₂
LED verlichting	4.800.000 kWh/j	€ 1.157.000	€ 679.000	2414 ton
FV	40.226.000 kWh/j	€ 47.763.000	€ 5.360.000	14.280 ton
Warmtepomp	1.585.000 m³	€ 6.374.000	€ 469.000	1.515 ton
Deurbekijk	1.299.000 m²	€ 5.811.000	€ 682.000	2113 ton
Carportdak	576.000 m²	€ 2.024.000	€ 314.000	1029 ton
Roofisolatie	229.000 m²	€ 619.000	€ 126.000	408 ton
WV isolatie	736.000 m²	€ 1.395.000	€ 378.000	1289 ton

Totale investering: € 65.823.000
Totale gemiddelde terugkerende tijd: 8 jaar
Totale CO₂ besparing: 23.247 ton

ENERGIE POTENTIEELSCAN A

Huidig gebruik

Het geschatte jaarlijkse energieverbruik van uw pand is:

- 37.000 kWh stroom
- 4.000 m³ gas

Dit neegecijfer aan 16 ton CO₂ uitlaat.

Het geschatte jaarlijkse energieverbruik van uw productiesite is:

- 8 kWh stroom
- 6 m³ gas

Dit neegecijfer aan 0 ton CO₂ uitlaat.

Het aantal van uw totale energieverbruik is dat van het bedrijventerrein is 624%

duurzame technologie opties

LED

LED lampen zijn een energiebesparende technologie. In vergelijking met de in de bestaande armaturen. De levensduur van LED lampen is langer dan van veel andere lampen, waardoor deze minder vaak hoeven worden vervangen.

Techniek	Technische beschrijving	Investering	Geplande besparing	Milieuwinst CO ₂
LED	3.400 kWh	1.400 euro	3 jaar	1 ton

Zonnepanelen (PV)

Een zonnepaneel of fotovoltaïsch paneel, kortweg PV-paneel is een paneel dat zonne-energie omzet in elektriciteit. Hiermee kunt u uw dak voor het opwekken van energie.

Techniek	Technische beschrijving	Investering	Geplande besparing	Milieuwinst CO ₂
Zonnepanelen (PV)	30.000 kWh	54.000 euro	6 jaar	7 ton

Warmtepomp

Een warmtepomp is een duurzame warmtebron ter verwarming van een gebouw. Een warmtepomp gebruikt warmte uit de bodem, de buitenlucht, ventilatie- of afvalwater voor de verwarming van gebouwen.

Techniek	Technische beschrijving	Investering	Geplande besparing	Milieuwinst CO ₂
Warmtepomp	3.200 m³	30.400 euro	11 jaar	3 ton

isolate opties

Techniek	Technische beschrijving	Investering	Geplande besparing	Milieuwinst CO ₂
Deurbekijk	400 m²	3.600 euro	13 jaar	1 ton
Deurbekijk	400 m²	1.400 euro	11 jaar	1 ton
Roofisolatie	3.200 m²	7.200 euro	8 jaar	4 ton
WV isolatie	600 m²	1.300 euro	4 jaar	1 ton

CO₂ uitlaat na duurzame opties: - 1 ton



Business Case and Multiple Benefits tool

The Business Case and Multiple Benefits tool provides a calculation support for financial evaluation and comparison of energy efficiency measures which have previously been identified by energy scans or audits, other self-assessment tools, or best practice examples. The tool allows for considering multiple (non-energy) benefits of the measures – either qualitatively or as monetary values. The output of the tool is summarized in a business case template.

The tool was developed within the GEAR@SME project.

The **target group** for this tool is **SMEs that want to compare energy measures, prioritize between them, and decide which ones should be implemented.**

What's included?

- Calculation of Payback Period, Net Present Value and Internal Rate of Return based on user input about investment costs, energy use, energy prices etc
- Checklist for multiple benefits (MBs)
- Possibility to provide quantification of MBs and include in profitability calculation
- Output in business case template

Based on the output, the SME can decide which measures to put on their energy efficiency action plan and start contacting suppliers.

Required input:

- Suggestions for energy measures with their estimated impact on energy use
- Investment and operating costs for the measures
- Other potential impacts of the measures
- Assumed energy prices

Suggestions for energy measures may be identified in different ways. Self-assessment tools for energy analysis may guide you to areas with a potential for improvement, and measures for this area may be found in the best practices database. You may also find inspiration from successful examples shared by other SMEs or invited experts in your network. Potential energy efficiency measures are also be identified as a result of an energy scan or audit.

The tool can be used in different ways. The tool can be used **by SMEs themselves**. This is however likely to require some support and guidance. A so-called Trusted Partner (a neutral actor who drives the development of a local energy collective and supports the SMEs in tasks related to energy efficiency) may be able to provide this support or arrange support from other advisors. The tool can also be used **by a Trusted Partner**, who can fill out the tool with examples of energy efficiency measures that are of interest to many SMEs in a local energy collective. The Trusted Partner can then share the business cases for these measures with the interested SMEs.



Profitability (including multiple benefits)

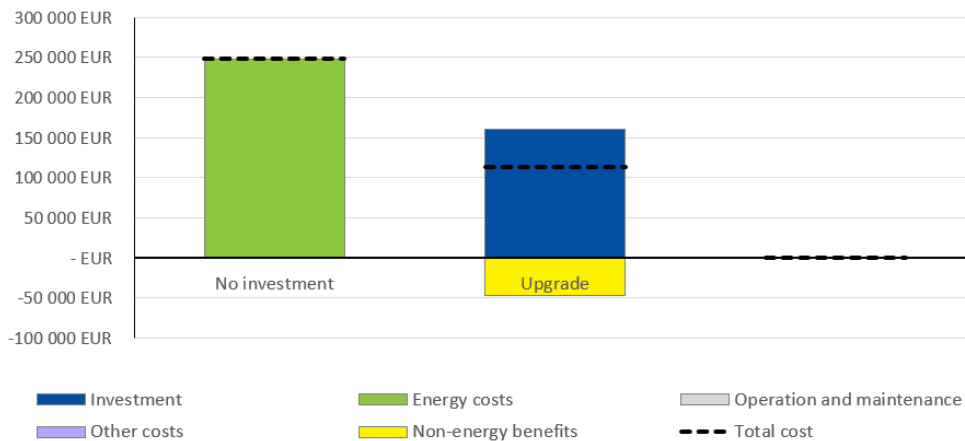
Simple payback time (years)

Net present value (NPV) of investment (EUR)

Internal Rate of Return (IRR) (%)

	3,4	-
	134 965	-
Calculate IRR	8%	-

Comparison of total costs over project lifetime



Business case templates

Alternative A		Import data from main sheet	Import list of multiple benefits	Restore template
Measure:		Upgrade		
Process area / equipment:		Galvanization plant		
Compared against base case:		No investment		
Description:	Upgrade of the cooling system and installation of a more efficient control system.			
Comparison against base case (all costs, savings and benefits are additional compared to base case)				
Additional investment cost (EUR)	160 000			
Energy saving (MWh/yr)	400 000			
Energy cost saving (EUR/yr)	40 000			
Maintenance and other costs (EUR/yr)	0			
Value of non-energy benefits (EUR/yr)	7 500			
Net Present Value (EUR)	134 965			
Payback time (yr)	3,4			
Reduced emissions of fossil CO ₂ (kg/yr)	500			
Non-energy benefits				
<ul style="list-style-type: none"> • Reduced consumption of utilities/ancillaries • Greater efficiency and control of water use 	Upgraded cooling system is assumed to reduce cooling water flow. In general, this also leads to greater efficiency and control of water use.			
Other consequences of implementing the measure :				



Collective Business Case tools

These four Excel tools can be used to calculate the business case for different collective actions for the businesses in a business park: 1) [setting up an ESCo](#) (Energy Service Company) for either shared savings or shared supply, 2) [setting up a “GebiedsESCO”](#) – an ESCo combined with a fund of different investors, 3) [collective purchase of LED](#), 4) [collective purchase of PV panels](#). The tools provide insight in the most important financial information for the park manager, for each of the participating companies, and for the ESCo or the energy service supplier respectively.

The tool was developed by TNO, IVAM and ECWF (2016) and adopted for the GEAR@SME project (2022).

The [target group](#) for this tool is [park managers that want to calculate the business case for collective actions](#) and use those business cases in the communication with the energy service supplier and the different SMEs involved.

What’s included?

For LED and PV:

- Calculation of payback period and environmental impact for individual companies
- Costs and profit for the energy service supplier and the park manager
- Overview of all participating companies to keep track of agreements with individual companies and calculate total costs, profit and environmental impact

For the “ESCO” and “GebiedsESCO” tools:

- Calculation of payback period for the ESCo and overview of the profit and loss account of the GebiedsESCO
- Total costs, profit and environmental impact for participating companies
- Calculation of total costs and profit for the park manager

Based on the output, the park manager can provide the different participants with a global overview of costs and profit (and use this as a conversation starter on the actual implementation of measures).

Required input:

- Estimated energy usage and corresponding energy prices
- Details on the contract (in case of ESCos)
- Costs made by the park manager
- Investment and operating costs
- Other costs (such as insurance, etc.)

The tool can be used [by the park manager](#), who can fill out the tool with input from the energy service supplier and the SMEs. The park manager can then share the business cases with the interested SMEs and the energy service suppliers.



BUSINESS CASE BEDRIJF	
Kosten	
Aanschaf- en installiekosten	5.500 euro
Extra kosten	0 euro
Eenmalige SDE-kosten: brutoproductiemeter	0 euro
Uitbetaling inkoopvoordeel aan parkmanager	138 euro
Honorarium voor PM	0 euro
Totale kosten	5.638 euro
Baten	
Inkoopvoordeel	138 euro
KIA	1.540 euro
EIA	638 euro
Besparing op energierekening per jaar	555 euro
SDE-subsidie per jaar	0 euro
Terugverdientijd	6,0 jaar

MILIEUWINST DOOR BEDRIJF		
Energiebesparing per jaar	4.625	kWh
	16.650	MJ
CO2 besparing per jaar	2,74	ton

TOTAALOVERZICHT DEELNEMENDE BEDRIJVEN						
Bedrijfsnaam	Aantal zonnepanelen	Honorarium voor PM (euro)	Verdeelsleutel (% voor bedrijf)	Baten voor PM (euro)	Milieuwinst (kWh per jaar)	
Bedrijf 1	30	300	100%	300	6.938	
Bedrijf 2	30	300	100%	300	6.938	
Bedrijf 3	30	250	100%	250	6.938	
Bedrijf 4	30	200	100%	200	6.938	
Bedrijf 5	30	200	100%	200	6.938	
Bedrijf 6	50	100	50%	156	11.563	
Bedrijf 7	50	0	50%	56	11.563	
Bedrijf 8	50	0	50%	56	4.625	
Bedrijf 9	20	0	50%	23	4.625	
Bedrijf 10	20	100	50%	123	4.625	
Bedrijf 11				0		
Bedrijf 12				0		
Bedrijf 13				0		
Bedrijf 14				0		
Bedrijf 15				0		
Totaal	340			1.664	71.691	

TOTAALOVERZICHT	
Totaal aantal zonnepanelen	340 stuks
Totale investering	93.500 euro
Totale baten: bedrijven → PM	1.664 euro
Totale milieuwinst	71.691 kWh per jaar



Monitoring tool

The Monitoring tool allows SMEs to follow up their energy consumption and energy-related key performance indicators over time, in order to follow the effect of implemented energy efficiency projects.

The tool was developed within the GEAR@SME project.

The **target group** for this tool is **SMEs that want to follow up their improvements in energy efficiency**.

What's included?

- Annual follow-up of total
 - energy consumption,
 - energy costs, and
 - greenhouse gas emissions associated with energy use
- Monthly follow-up of energy consumption for individual energy carriers
- Possibility to select from a list of five types of predefined KPIs to be evaluated, based on:
 - Employees
 - Floor area
 - Turnover
 - Operating time, and/or
 - Production
- Evaluation and graphical follow-up of key performance indicators (KPIs) in relation to targets set by the user

Based on the output, the SME gets an indication of the overall effect of implemented energy efficiency actions, which would be indicated by an improvement in relevant KPIs.

Required input:

- General company information such as number of employees or turnover
- Annual and/or monthly energy consumption data for energy carriers used by the company
- Average annual prices for each energy carrier paid by the company

Energy consumption data may be entered in different units (e.g. litres of diesel or Nm³ of natural gas). The tool has predefined data for heating values and supports the required unit conversions. The tool also has predefined input greenhouse gas emission factors for most fuels and guides the user to find appropriate emission factors for electricity.

The tool can be used by SMEs themselves. It is fully guided and easy-to-use. The tool opens with the most basic input data and results sheets, while more detailed options are available by the choice of the user.



Energy consumption	Unit	2020	2021		
Electricity	MWh/year	239	203	Electricity	<input type="checkbox"/> Electricity
District heating	MWh/year			District heating	<input type="checkbox"/> District heating
Fuel oil	m ³ /year	36	35	Fuel oil	<input type="checkbox"/> Fuel oil
Natural gas	MWh/year			Gas	<input type="checkbox"/> Natural gas
Biogas	m ³ /year			Wood fuel	<input type="checkbox"/> Biogas
Solid wood fuel (e.g. pellets)	tonnes/year			Transport fuel	<input type="checkbox"/> Wood fuel
Diesel	litre/year	2 400	2 400	Other	<input type="checkbox"/> Diesel
Petrol	litre/year				<input type="checkbox"/> Petrol
Other	MWh/year				<input type="checkbox"/> Other

