



AUDIT2MEASURE

D5.1 Report on the internal training workshop and methodology for application of energy efficiency measures



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ABOUT

Industry is a key player in energy consumption and economic impact in the European Union (EU) and energy audits represent an important tool to improve energy efficiency in the sector; despite both the spread of energy audits and the knowledge of their benefits, the actual implementation rate of the Energy Savings Measures (ESM) proposed by energy audits is relatively low. **The main aim of the AUDIT2MEASURE (Leading businesses towards climate neutrality by speeding up the uptake of energy efficiency measures from the energy audits) project is to support companies in the uptake of audits measures necessary to reduce the energy consumption supporting their energy transition.** AUDIT2MEASURE will develop and implement a new engagement strategy (called "Audit2Action") to put into action the opportunities emerging from energy audits.

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PROJECT PARTNERS



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ABBREVIATIONS

A2M	Audit ₂ Measure
EEM	Energy Efficiency Measure(s)
ESM	Energy Saving Measure(s)
NEBs	Non-Energy Benefits
RE	Renewable Energy

EXECUTIVE SUMMARY

The Task5.1 Methodology design and training consists of two subtasks: T5.1.1, centred on the creation of a methodology for the partners to follow when supporting the companies during the implementation of Energy Efficiency Measures (EEM, same as “Energy Saving Measures” (ESM)), and T5.1.2, which consists of an internal training workshop organized to train the partners on how to follow this methodology.

Such workshop has been held in Madrid, Spain, on the first day with a visit to an insulation factory and the second with the explanation of the methodology and energy systems and tips provided by some experts on how to motivate the companies to implement the EEM.

This deliverable presents the methodology, describing the different phases by which it is composed, and which have to be followed and considered when supporting a company on the implementation of EEM. In the next part of the deliverable the results that emerged during the training workshop are presented.

1. INTRODUCTION

AUDIT2MEASURE is a project in which several partners from different countries take part with the aim to engage and motivate companies, in their national context, to implement Energy Efficiency Measures (EEM¹). The lack of understanding on the methodology to support companies in the implementation of EEM can be a barrier faced by partners.

To overcome such a barrier, according to Task 5.1 of the Grant Agreement, a methodology has to be designed so that partners can follow it when supporting the engaged companies on the implementation of EEMs. Nevertheless, there is flexibility in the approach to be followed with the companies, taking into consideration their level of engagement, identification of the appropriate EEM, their readiness to implement them, etc.

This deliverable presents in detail the methodology developed by the A2M partners: This methodology is built upon the previous A2M activities and it is strictly interconnected with WP4 activities. Moreover, this deliverable presents the results of the internal training workshop organized by ESCAN and AEDHE to guide the partners on this methodology, in order to facilitate its uptake and, consequently, ensure the effectiveness of the support given to the engaged companies.

2. METHODOLOGY FOR APPLICATION OF ENERGY EFFICIENCY MEASURES

The methodology belongs to WP5 which is focused on the support to the engaged companies of the project. On previous work packages, there has been a preparation in order to lead to this support: for instance, the methodology is mainly based on the Audit2Action strategy, from WP3, and, once developed, it has been presented to the partners on an internal training (T5.1.2) so they can follow the same methodology when supporting the companies for the rest of the tasks of WP5. The methodology also addresses the use of engineering, technical assessment and financial analysis tools (as analysed and identified in WP3) that can facilitate the process of EEM implementation.

Description of the methodology

The methodology for promoting the application of Energy Efficiency Measures aims at providing direct support to the company decision makers, increasing their interest and speeding-up the process of implementing EEM in their companies. The support that the partners will provide will have a common methodology to benchmark the results and obtain conclusions for the replication of this methodology.

This document is based on previous project activities and the energy experts understanding and work in the EEM application. The main document describing the methodology is a Power Point presentation (which is available in the Annex) where the methodology is explained step by step.

¹ “Energy Efficiency Measure” (EEM) is used instead of the term “Energy Saving Measures” (ESM) since the latter has a broader spectrum of measures which some of them might not be related to efficiency (i.e., change of the electricity supplier to reduce the bills).



Figure 1: Front page of the methodology

It includes the following steps:

- **Introduction to the methodology**, where a short summary is explained to show a global view of the methodology and its content;
- The most important **preparatory activities** to ensure a positive support to companies, the scope of the counselling to the companies and the main stages of the EEM implementation. The most important preparatory activities are ensuring the availability of energy experts that can provide support to the company, defining a geographical scope, having available the equipment needed and developing an implementation plan to follow the process. The support that will be provided, will include decision-making, technical, economic and regulatory aspects as well as a follow-up of the EEM implementation. The main stages for implementing have to be clear, which are:
 - analysing the viability of the measure,
 - developing the engineering project,
 - acquiring the necessary equipment,
 - installing and commissioning the equipment and the services of the measure and
 - measuring and verifying the savings;
- **Engaging the companies** that are interested in participating. Invitation to companies with fair and transparent selection criteria, considering the companies' strategic maturity, technical and financial potential for EEM implementation as well as their interest in the project goals. Before establishing a first contact, the partner should have a clear picture of the benefits the company will have from this cooperation, what is expected from the company to provide and prepare a short presentation about the A2M project;

- **Understanding the company's strategies, plans and targets** linked to EEM. Identifying their need, wishes, energy efficiency targets and other related issues that could influence the uptake of EEM;
- **Finding “the momentum” for the EEM** by identifying opportunities linked to other motivations besides energy efficiency like subsidies available, need of replacement of equipment, internal policies, etc.; contact **stakeholders and partners that can support** to define and implement the EEM. Not only energy experts or energy auditors are relevant, but also equipment manufacturers and distributors, installers and maintainers, financing providers and ESCOs and some departments of the public administration can help in the implementation of EEM. The partners will also be backed up by the AzM Internal Advising System which will provide ad-hoc support, as well as provide useful resources;
- Assess **multiple benefits besides energy efficiency and financial savings**, like environmental, social and corporate governance benefits. Consider specific benefits related, for instance, to increase productivity, reduce O&M costs, to have a safer work environment, etc. together with other Non-Energy Benefits derived from the implementation of EEM;
- Use of **digital tools and platforms for monitoring** and management of the systems. ICT technologies and tools may facilitate the monitoring, control and management of the company which helps to identify new EEM. It can also be implemented aiming at being certified by the standard ISO 50001;
- Lead **corporate culture towards greener objectives** by improving the attitude and actions for a sustainable business, to implement a sustainability strategy and goals, to partner with other sustainable companies/stakeholders, etc.;
- Explanation of the **Audit2Action report** that will be used for the activation, registering and follow-up of the actions developed by the partners to support the companies. The report includes (more information in Annex I):
 - Techno-economic description of the energy efficiency measures selected for the specific industry, including reference to applicable regulation, financing opportunities, non-energy-benefits;
 - The decision-making process for the application of the measures (depending on each business, could be one or several);
 - The schedule and milestones for the application of the measures, which include both the original schedule and the follow-up;
 - An assessment of incentives or barriers identified for their application, including financing, behavioural and others;
 - Follow-up of the schedule and activation measures taken.

3. INTERNAL TRAINING WORKSHOP

General information

The goal of this workshop is to improve the skills of the AzM partners in mobilising and engaging with the companies for the implementation of EEM identified in the energy audits.

This workshop took place in Madrid, Spain on September, 21st -22nd. It has been face-to-face and has been divided in two parts:

- a visit to an insulation factory (Saint-Gobain Isover Ibérica) and
- the explanation of the methodology, combined with the presentations by some experts on the implementation of EEM. The invited experts explained different energy efficiency technologies/systems and provided some tips on how to motivate the companies to implement them. It has been prepared to train all the partners to facilitate the process of supporting the companies on the implementation of EEM.

Table 1: General information about the internal training

Workshop	Information
Location	Madrid, Spain
Type	Face to face
Date/time	21/09/2023 9:30-11:30 22/09/2023 9:00-10:45
Short description/scope of the meeting	The main objective is to train the partners on the application of the methodology in order to facilitate the process of supporting the companies towards a successful implementation of EEM.

Agenda

The agenda of the internal training is divided into two different days. On the first day, the participants have visited the Isover Saint-Gobain insulation factory.

On the second day, the internal training has been held from 9:00 to 10:45; some speakers have been invited to the training so they could explain some tips to motivate the companies to implement EEMs and explain their energy systems. The speakers are representatives from Sedical and Signify: Sedical is a company that works on the area of manufacturing heating systems and their control systems, while Signify, formerly known as Phillips lighting, operates on the lighting sector. Also, the methodology has been presented and explained by ESCAN.

Table 2: Agenda of the internal training

AGENDA		
Time (CER)	Activity	Speaker
Thursday, 21/09/2023		
9:30-11:30	Visit to insulation factory – Saint-Gobain Isover Ibérica	---
Friday 22/09/2023		
9:00-9:30	WP5 Direct support to industries/Internal Training: Methodology	ESCAN
9:30-9:50	WP5 Direct support to industries/Internal Training: Audit2Action report	HERA
9:50-10:10	WP5 Direct support to industries/Internal Training: EEM expert	Sedical
10:10-10:30	WP5 Direct support to industries/Internal Training: EEM expert	Signify
10:30-10:45	WP5 Direct support to industries/Internal Training: Questions & final remarks	ESCAN

Participant list

All the project partners have been invited to the internal training and actively participated in it. On Table 3, there is a list of the people that have come to the workshop.

Table 3: Participant list of the workshop

AUDIT2MEASURE Project Meeting		PARTICIPANTS LIST	
		1st day - 21st Sept.	2nd day - 22nd Sept.
AFFILIATION	NAME	SIGNATURE	SIGNATURE
RSE	Simone Maggiore	Yes	Yes
	Giulia Bellini	ONLINE	ONLINE
	Stefano Moscarelli	ONLINE	---
IEECP	Esther Hardi	Yes	Yes
	Ivan Sangiorgio	Yes	Yes
	Erik Faassen	ONLINE	ONLINE
	Anousheh Parsaei	ONLINE	ONLINE
ADELPHI	Jeremy Bourgault	Yes	Yes
	Milan Matužek	Yes	Yes
ESCAN	Francisco Puente	Yes	Yes
	Margarita Puente	Yes	Yes
	Sara Font	Yes	Yes
POVAS	Stelios Lamprakopoulos	Yes	Yes
	Nikolaos Vourdas	Yes	---
NTUA	Ioanna Makarouni	Yes	Yes
	Nikos Vourgidis	ONLINE	ONLINE
HERA	Margherita Cumani	Yes	Yes
	Alessandra Veri	Yes	Yes
	Claudia Vignudelli	Yes	Yes
ENVIROS	Michael ten Donkelaar	Yes	Yes
	Michal Scheinherr	Yes	Yes
AEDHE	Ignacio Vilela	Yes	Yes
	Alejandro Bernabé	Yes	Yes
CCIK	Dimitris Daskalopoulos	Yes	Yes
	Penny Laska	Yes	Yes
	Panagiotis Louziotis	Yes	---
CINEA	Filippo Gasparin	ONLINE	ONLINE
Advisory Board	Manuela Manzano	Yes	---
	Juan José Orta	Yes	---
External speakers	Jose Manuel Santiago	---	Yes
	Alberto de la Paz	---	Yes
	David Marsal	---	Yes

Workshop summary

The workshop was divided into 2 main parts, the first one was a visit to the Saint-Gobain Isover factory where the participants were able to see firsthand the fabrication process of glass wool insulation. Firstly, a safety presentation was held for the participants to be safe during the visit. This step was key, since during the project, partner will have to visit the facilities of other companies and they have to know the precaution measures. Secondly, they visited the facilities and were explained all the manufacturing process.



Figure 2: Safety training before visiting the factory and group picture

The second part of the workshop was through a face-to-face presentation. It included a presentation and debate with Escan about the methodology to support the companies to implement ESM; also, about the template of the Audit2Action report introduced by HERA and two interventions of external companies that are collaborators of ESCAN, Sedical and Signify. Questions after each intervention were addressed.

The presentation of the methodology included the topics mentioned on the previous section, like the necessary preparatory activities before contacting the companies or how to engage them. Some interesting questions arose like the scope of the assistance that project partners would offer the companies.

Afterwards, HERA explained the Audit2Action report. This report should be done for each of the 5 companies involved on the project and include in total 25 ESM that are going to be considered for implementation per country. It is a live report, which should be updated every time there is an interaction with the company in order to register all the actions (companies should be contacted, at least, quarterly). It includes information in detail about each ESM implemented, like a quantitative (if possible) assessment of associated NEBs. Also, the cost benefit analysis of the proposed measures and an implementation plan.



Figure 3: Presentation of the Audit2Action Report on the internal training workshop

The first external speaker, from Sedical, explained the benefits of energy efficiency measures implementation, showed a couple of new technologies which lead energy efficiency in steam systems and the importance of Energy Management Systems for improving efficiency.

The second external speaker was Signify, formerly known as Phillips Lighting. They explained the changes in lighting technologies and the once used nowadays. Also, they presented the Lighting as a Service (LaaS), a financing mechanism that they offer, similar to an EPC, where Signify pays for the investment to change the lighting system, in return of a fee which will be lower than the savings generated by the implementation. This system offers the opportunity to overcome some of the usual financing barriers that companies face.

4. CONCLUSIONS

The definition of a common methodology is a fundamental step for AzM activities, which will ensure that all the partners have a clear common idea on how to properly support the companies engaged. It will also help to establish some homogeneity on the implementation process of the EEM, as well as the monitoring step. This methodology links the theoretical part, with the analysis done in previous work packages like the state of the art on WP2 and the strategy on WP3, with the practical part on how to proceed for the implementation of EEM and reporting the results on the Audit2Action report. This report will be kept updated along the implementation process in order to have a clear view on the progress of each company and the EEMs they are interested to implant.

The workshop was successful thanks to the mix of theory and practice, with the visit to a factory and the presentations showed. For the presentations, there was on the one hand, the explanation of the methodology provided by ESCAN, and, on the other hand, to two experts advise on the topic. On this training, all the partners were informed on how this methodology can be applied to successfully support the engaged companies in their respective countries during the process of the implementation of EEM. This also led to some discussions about on how to proceed. Moreover, two experts from external companies provided their input on how to engage companies and overcome some usual barriers on the implementation.

This way, all partners have been able to acquire a common theoretical and more practical approach on how to support the companies to enhance the uptake of EEM, increasing the outreach of the AzM activities.

ANNEXES

ANNEX I: THE AUDIT₂ACTION REPORT

The Audit₂Action Report is a document that includes all the important information about a company and the EEM they consider on implementing/they implement. It is intended to be a brief and concise document that helps to easily keep track of the energy efficiency measures. It includes the following contents:

- General information about the company, the update dates, sector, energy consumption, contact information, needs/expectations/requests;
- Record of the engagement and support activities performed;
- Table with the analysed EEMs with a summary of their status;
- For each EEM:
 - Technical description of the measure;
 - Energy and environmental impact;
 - Non energy benefits;
 - Financial analysis;
 - Decision making process, with the main barriers to the implementation and if the implementation is approved;
 - Implementation plan, which should be developed early in the engagement process, and modified as/if needed during implementation;
 - Implementation update and follow-up;
 - Lessons learnt from the process.

ANNEX II: PRESENTATION OF SEDICAL FOR THE INTERNAL TRAINING



Good Reasons to Implement Energy Efficiency Investments in Industry

by Jose Manuel Santiago
Industrial Engineer
Sedical Central Area Sales Department
Sep/23



The Importance of Energy Efficiency



Reduced Costs	Environmental Impact	Sustainability
Energy efficiency investments can significantly reduce operating costs and increase profits for industries.	Reducing energy consumption and waste can diminish a company's carbon footprint and help protect the environment.	Adopting energy-efficient technologies and practices can help ensure the long-term sustainability of a company's operations.

Benefits of Energy Efficiency Investments



Increased Energy Independence

Energy-efficient technologies can reduce reliance on traditional energy sources, making companies less susceptible to energy price fluctuations and supply disruptions.



Improved Reputation

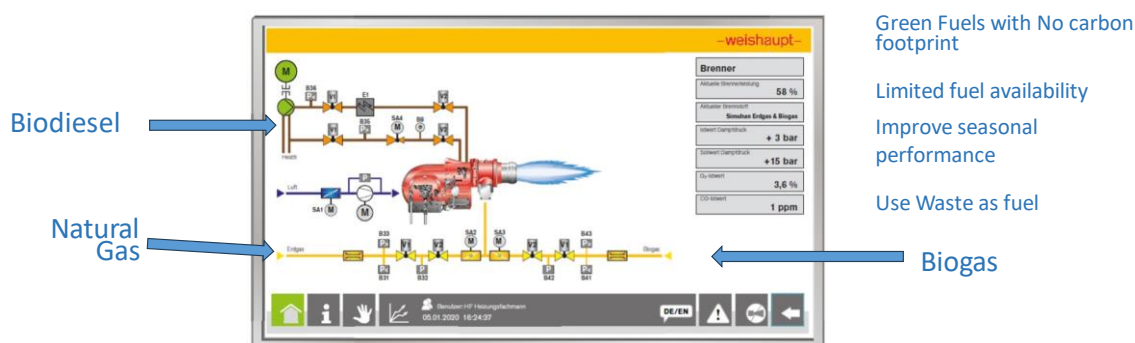
Investing in energy efficiency sends a positive message to customers, shareholders, and the public, demonstrating a commitment to sustainability and responsible business practices.



Enhanced Productivity

Energy-efficient technologies can often improve production processes, increase output, and enhance employee comfort and health, resulting in a more productive workforce.

Technologies and Strategies for Improving Energy Efficiency



Simultaneous Multi-Fuel Burners

Technologies and Strategies for Improving Energy Efficiency



Heat Source
8-120 °C

- Cooling Water (Typ 30-90 °C)
- Heat recovery (Typ 30-120 °C) °C)
- Condensate cooling (Typ 40-60 °C) 60 °C)
- Machine Waste heat (Typ 50-90 90 °C)
- Process waste heat (Typ 50-120 120 °C)



COP: between 2-7
AT: 60-120°C

Heat pump
steam generation

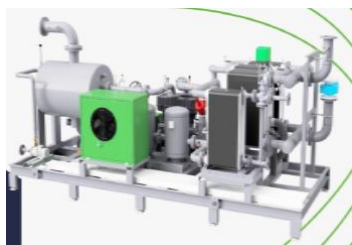
Heat Sink
80-165 °C

- Hot Water (Typ 80-165 °C)
- Feed Water preheating (Typ 80-80-165 °C)
- Saturated Steam (110-165 °C)
- Air Heating (Typ 90-165 °C)
- Warm Water (Typ 80-120 °C)

Technologies and Strategies for Improving Energy Efficiency



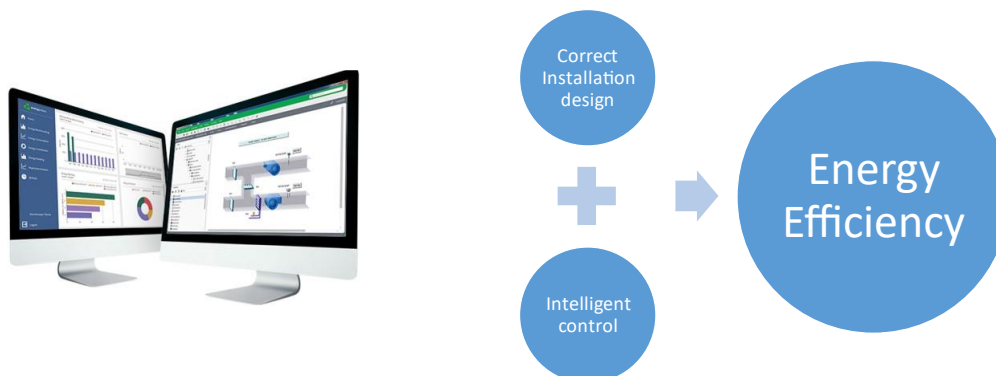
Project Gelatine



- ThermBooster
 - Single Compressor
 - Heat Source:
 - Water
 - 85/70°C
 - Cooling water from CHP
 - Heat Sink:
 - Saturated Steam
 - 2 bar abs, 120°C
 - Feed in existing steam network
- Heat Pump performance:
 - Heating capacity: 514 kW (812 kg/h)
 - Cooling capacity: 407 kW
 - Electrical consumption: 114kW
 - COP: 4,4
- 4,1 GWh thermal power production per year
- 550 T CO₂ emissions per year will be avoided by this solution

Technologies and Strategies for Improving Energy Efficiency

Automatic Control: the way-to-go in Industry Energy Management



Barriers to Implementing Energy Efficiency Investments

1 Lack of Awareness

Many industries lack understanding of the benefits and opportunities for energy efficiency investments, making it difficult to justify the costs.

2 Upfront Costs

Investing in energy efficiency often requires significant upfront capital, which can be a barrier for small and medium-sized enterprises with limited resources.

3 Existing Infrastructure

Current facilities and equipment can be difficult to retrofit retrofit with energy-efficient technologies, requiring requiring careful planning and execution.



Financial Incentives and Return on Investment



Carbon Credits

Many countries offer carbon credits to companies that reduce emissions, providing additional sources of revenue.

Green Loans

Banks and financial institutions offer low-interest loans for energy efficiency investments, providing easier access to capital.

Energy Savings

Energy efficiency investments can often pay for themselves over time through reduced energy costs and increased profits.

Conclusion and Call to Action



Implement Energy Efficiency

Implementing energy efficiency investments can help companies reduce operating costs, increase profits, and improve their reputation while protecting the environment and promoting long-term sustainability.

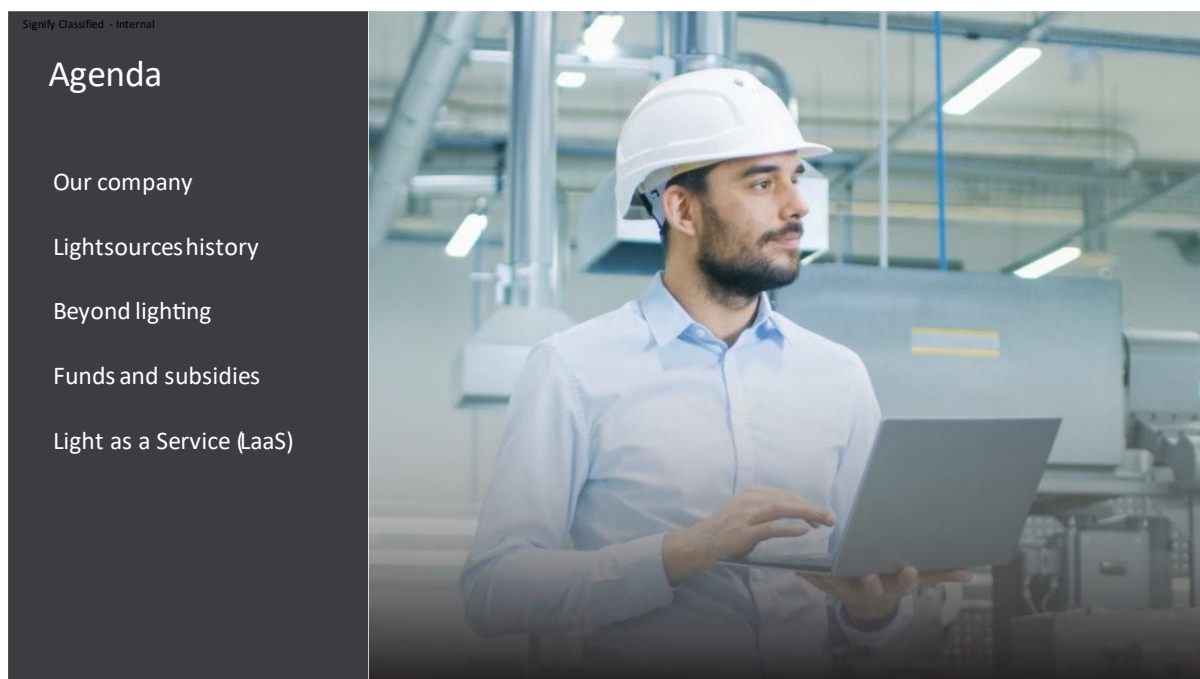
Start Small

Small changes such as upgrading lighting, improving insulation, and reducing heating and cooling can have a big impact on energy efficiency and can be a great place to start.

Collaborate

Collaborating with industry partners, suppliers, and other stakeholders can help companies identify opportunities for improvement and overcome barriers to implementing energy efficiency investments.

ANNEX III: PRESENTATION OF SIGNIFY FOR THE INTERNAL TRAINING



Signify Classified - Internal

Who is Signify?

3

©ignify

Signify Classified - Internal

New company name

©ignify

Our global brand

PHILIPS

Our IoT brand

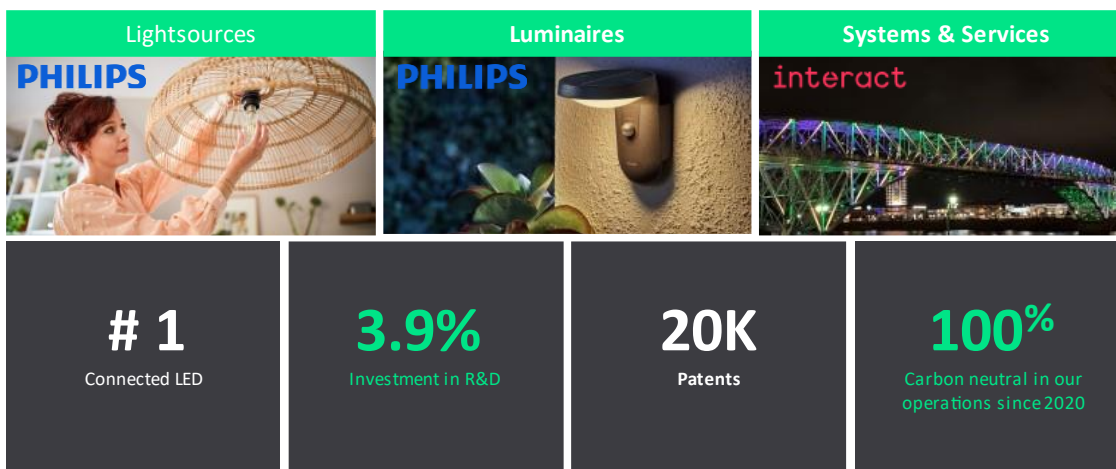
interact

4

©ignify

Signify Classified - Internal

Signify, the worldwide leader in Lighting since 1.891



©ignify

Signify Classified - Internal

Road towards lightsource sustainability

6

©ignify

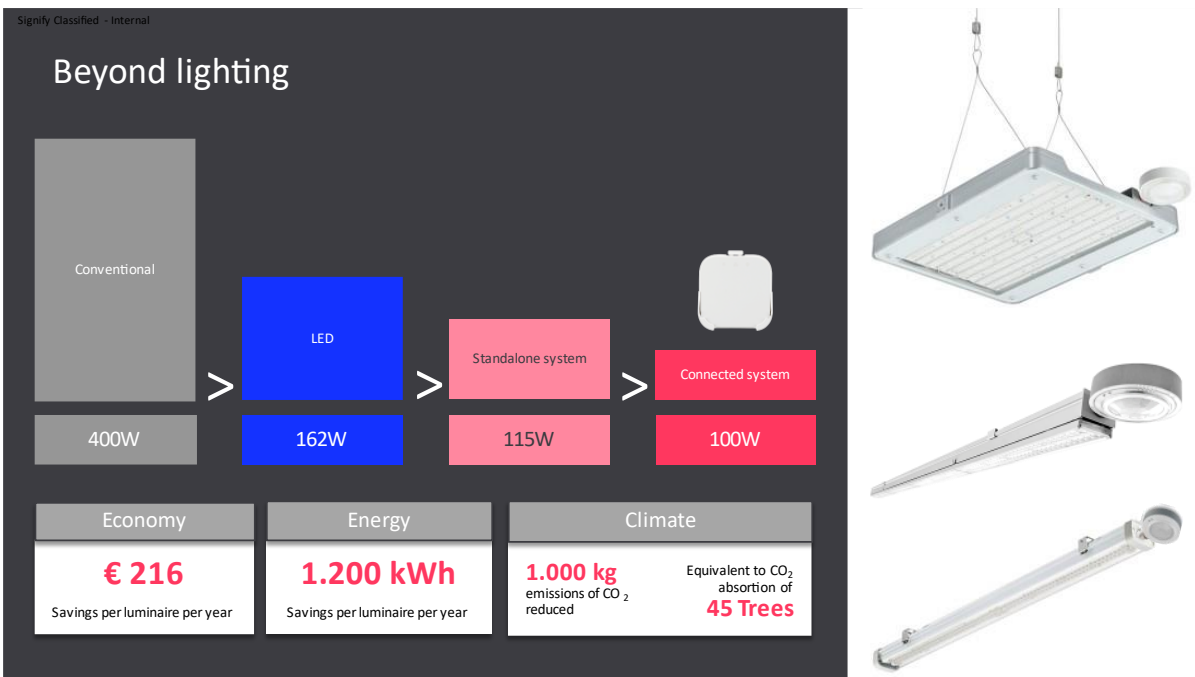
Signify Classified - Internal

Incandescent 15 lm/W 1.000h	Halogen 25 lm/W 2.000h	Fluo T8/HID 90 lm/W 15.000h
Fluo T5 100 lm/W 20.000h	1st LEDs 115 lm/W 25.000h	Current LEDs >200 lm/W 100.000h

7 ©ignify

Beyond lighting

8 interact



Signify Classified - Internal

Funds & Subsidies

10

©ignify

Signify Classified - Internal

Support on request for subsidies

SUBSIDY

PROs

- Ease the acces to the most efficient technologies
- Approx. 30% of eligible investmentfor the subsidy

CONs

- Bureaucracy in the request and justification. Too complex
- Long process (publish, request, approve + >12 months to get the funds)

CAE

PROs

- Incentive to investin the maximum energy savings
- Approx. 30% of eligible investmentfor the subsidy
- Quicker: Less bureaucracy, contactless with public administration

CONs

- Identify the delegatedsubject
- Minimum project value to ask for CAE, but multiple project can be joined
- Process still pending to be fully defined

11

©ignify

Signify Classified - Internal

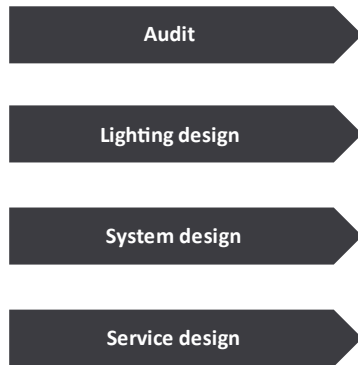
Light as a Service (LaaS)

12

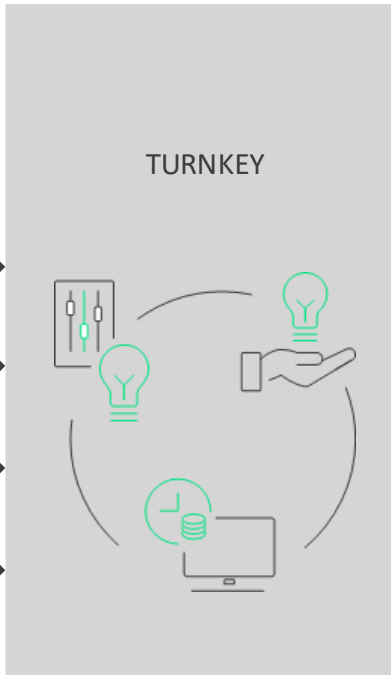
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How it works?

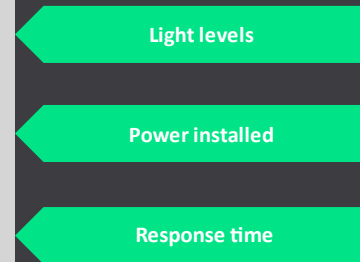
DESIGN & CONTRACT



TURNKEY



COMMITMENT



13

How it works?

- No initial investment needed
- Instant savings
- Positive cashflow from the beginning
- Monthly, Quarterly or Yearly fees
- Commitments on light levels, power installed and quality of service during the contract

Costs (€)



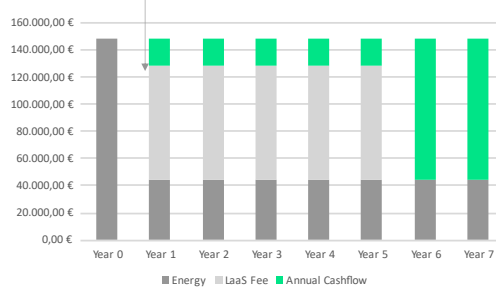
14

Signify Classified - Internal

LaaS vs. CAPEX

LaaS is based on OPEX model, and the total project cost is higher (due to added services), but the decision to execute it, is way quicker than CAPEX

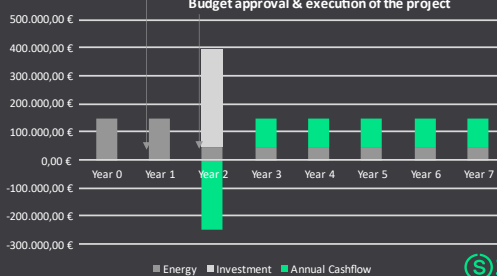
Approval and execution of the project



CAPEX, as a total project cost is lower, so apparently looks more attractive. However, in the best case, the customer takes 1 year to approve the investment (budget request, multiple committee meetings, etc).

Budget request

Budget approval & execution of the project

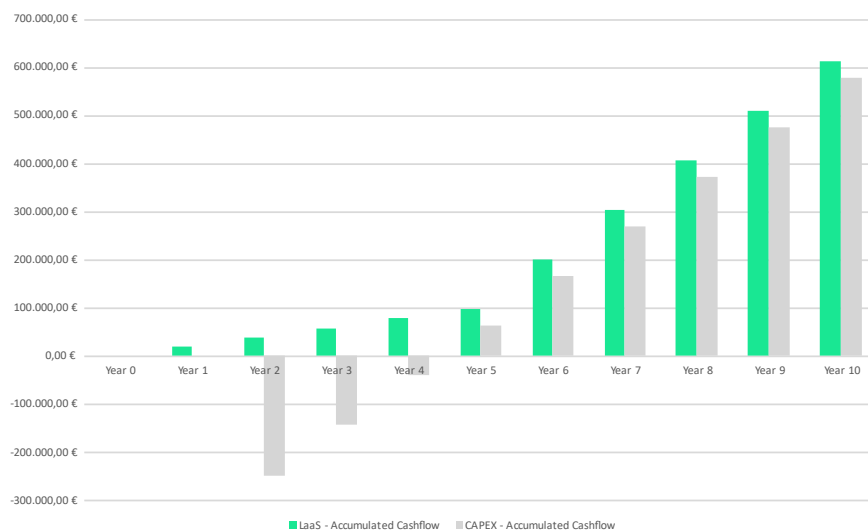


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LaaS vs. CAPEX – Accumulated Cashflow



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Q & A



David Marsal Sàbat
Business Developer Industry, Warehouse & Data Centre
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©signify



ANNEX IV: PHOTOS OF THE INTERNAL TRAINING WORKSHOP



Figure 4: group picture before the visit to the factory



Figure 5: closing remarks of the workshop



Figure 6: Project coordinator (RSE) and organisers of the internal workshop (ESCAN and AEDHE)