

H2020 Work Programme



D7.3 – SO WHAT TRAINING PLAN AND GUIDELINES FOR TRAINING MATERIAL

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Deliverable 7.3 SO WHAT Training plan and guidelines for training material

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Executive summary

This document showcases a structure of the training plan and guideline for training material, defining the outlines of the project and giving a detail explanation of each topic. It also defines the structure of HOW training modules will be. It also provides unified, detailed and productive guidelines. In extension, it features important topics, individual participation and objectives in the framework of EU policies.

Task 7.3 aims at proactively educating various audiences to the SO WHAT project and its results by providing targeted information. The promotion activities will be part of the dissemination and communication plan, and this document presents the first step in achieving a partial objective for training modules and it is the first step in order to promote and prepare the training.

An active training module has been structure and design which is accessible by any device. The content and description of the training module are explained in this document and it will also be incorporated in the SO WHAT website defining the purpose of the SO WHAT project and describing the targeted groups which can be classified in different stages, including general public, scientific audience, industry and government, with an objective for decarbonization.

The structure of these modules has been developed by ENVI with the support of all the partners involved in SO WHAT project. As the responsible partner for the training modules, it has been looked up that it should be a timeline and represented in such a way that it is handy by all kind of users associating with SO WHAT. In this document a detailed description of the training modules and the guidelines has been given and on how to access it through SO WHAT webpage. To improve the outcome of the training modules for better understanding to the users, SO WHAT training modules will be regularly communicating with the fellow partners and users, for constantly updating the webpage and the training modules for better results.

Abbreviations

CBA: Cost-Benefit Analysis
DH: District Heating
DHC: District Heating and Cooling
DLT: Distributed Ledger Technologies
ESCO: Energy Service Company
EU: European Union
HU: Heat Upgrade
IEC: Integrated Energy Contracting
ICT: Information and communications technology
KPI: Key Performance Indicator
LCOH: Levelized Cost of Heat
R&D: Research and Development
RES: Renewable Energy Sources
REII: Renewable Energy Intensive Industries
TES: Thermal Energy Storage
UI: User Interface
UX: User experience
WH/C: Waste Heat/Cold
WHTC: Waste Heat to Cold
WHTH: Waste Heat to Heat
WHP: Waste to Power

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1 Introduction

The main intention of the training plan and guidelines activities of the SO WHAT project is to make sure that the information about the project tool and results can be effectively delivered to the germane public and to educate in the tool by different means of training modules.

The training plan and guidelines identify the requirement for providing information about the SO WHAT tool to the target audiences at local, national and EU level. That also includes the key topics regarding the tool and explaining about the selection of appropriate operations for solving complex issues regarding the decarbonization of the relevant sectors.

The outcome of this document for SO WHAT project is to timeline the training sessions and describing the uses of the tool, as well as to prepare detail structure of all training modules (E-learning, PowerPoint presentations and handbook manual).

The main purposes of the training modules and its guidelines are:

- To chronicle all the details of the training and guiding plan through the activities that were undertaken;
- To make sure to explain every details of the SO WHAT tool and enhance the skills of the targeted groups;
- To ensure a detailed explanation about the classification of login regarding academic and industrial professionals;
- To classify the training modules and their details regarding how they are structured and explaining the topics it involved.

2 Results from the survey

The starting point of the training plan comes from the results of online survey prepared by SO WHAT consortium to identify end-users needs and expectation, which have been investigated externally (online survey) and internally to the consortium SO WHAT

The “questionnaire” analysis reports interesting ideas useful for the development of an effective training plan connected with questions regarding the development of the SO WHAT tool:

- What the associates are expecting from the tool form?
- Which can be adapted with their necessity?
- What is the knowledge of WH/C?
- What are the economical perspectives, roles play, limitations?

As follows we have reviewed the results and expectations: around 40 answers were processed to understand expectations and current status of stakeholders.

Question 2. How aware are you about Waste Heat and Waste Cold (WH/C)?

- ❖ It emerged that around a quarter have no idea about the WH/C, about the 15% knows little about technology and the 33% know the WH/C technologies but both percentages don't know how to take advantage and exploit it. Therefore, training is necessary in order to offer the advantages of the tool and allow the technicians of the convoys to deepen their knowledge on the topics (WH/C and valorisation).

Question 5. Ignoring economic issues, what might be your main technical considerations for introducing in a company/city/facility external recovered WH (or renewable energy sources - RES)?

- ❖ The question was useful to check what the main technical considerations could be (excluding economic evaluations), in order to introduce these technologies in the Company. Among the various answers given, the lack of knowledge and training on the topic is highlighted as a barrier to approaching this type of enhancement.

Question 6. Have you ever used a software tool like before mentioned one? If so, what are the most interesting functionalities of this tool you used? Did you miss any functionality?

- ❖ The basic idea for this question is to get an overview of the existing tool and training platform for gathering new pitches for the tool and training modules for improving it further on. As there are some similar tools used in calculating WH/C like Simulink, Excel calculator, Fluent ., etc. and websites providing online training for their associated tools like planheat.eu, mfix.com, .etc. from this question, we estimate and understand the expectations of the users as well as understand the basic essentiality required on how to structure user-friendly training modules for the users associating with SO WHAT tool.

Question 8. In your opinion, what kind of roles of your organization would be interested in this kind of software tools?

- ❖ By the above question we can see that the 36.76% of interviewers think that the department interested in the WH/C topic come from the Energy Manager Department, with a high level of knowledge, technicians that in the future will be involved in developing new options for valorising the WH/C, mostly working for decarbonisation are taking into this categories and also technician who conduct experiments and cross-reference for the simulation data are also play an important role in SO WHAT tool.

The survey reports also a focus on R&D actors, they could work on the tool where the organization can estimate and map the possibilities for valorising the WH/C.

Finally, we can extract that the main “users” can come from the energy manager department and they are mainly high-level technicians. These analyses permit us to structure the training focusing on these targets.

Question 10. What are your expectations regarding documentation, training lessons and training material?

- ❖ For this survey around 45 individuals have participated who come from different kinds of the profession and sharing their opinions and ideas regarding the training materials. 62,22% of the interviewers are willing to take online training for which a team is allotted for the constant update of the web page and training modules will be done. About 20% says it enough if we can provide a user manual or handbook which can give a detail explanation about the tool and its functions. Around 15,55% of the individuals would like to participate in the Face to Face training sessions where a training team will be responsible for providing training sessions face to face and this session can be done in group or individual depending on the individuals.

The answers analysis underline that the interviewers are mainly interested in online training, structured with videos, manuals and slides.

3 Target group definition

In this section, a focus on the description of the individuals who are and will be involved in the SO WHAT tool training activities is presented. These individuals will be characterized and will be described as peer the role they play in SO WHAT tool considering some key factors like:

- a) What kind of organizations or individuals are of interest to be involved in this project, to identify what role does SO WHAT tool is playing for them
- b) How important the training modules can be for the individuals involved in this project?

The main targeted groups of SO WHAT tool and training are:

- Industrial sector
- Municipality/Energy Agency
- Academic sector

3.1 Industrial sector

The target group of this training strategy is formed of industrial energy managers and industrial owners as well as energy companies who are willing to develop WH/C recovery solutions that are environmentally and economically sustainable and based on the local peculiarities of the territory they work in.

The industrial sector is interested in sell waste heat and cold energy, interested in internally reuse waste heat energy and renewable energy, interested in purchase external waste heat and/or cold energy and renewable energy.

The training developed is useful for the Industrial sector:

- Helps to understand how to enhance WH / C
- Helps identify the best technology to implement
- Helps to identify the most suitable business model for the company

The basic act of corporate training is to ensure any employee has basic knowledge and skills to undertake the SO WHAT tool and specify an operation to enable an organization to continue to operate. Fundamentally, corporate training is centred on knowledge transfer. For example, conferences and workshops are an essential, yet expensive, part of business, but, for instance, e-learning makes it an affordable and efficient way to understand the tool. E-learning can play a key role in transferring knowledge at a lower cost and to deliver training in a when employees are spread worldwide. Corporate education, however, adds another dimension and depth to training by involving learners as participants in generating new knowledge that assists an organization to develop and evolve.

- SO WHAT tool will audit and identify the industrial process to understand where waste H/C could be exploited and maintain the price
- SO WHAT tool can map the potential of locally available RES sources and forecasted demand for heating and cooling
- The tool is capable to simulate alternative cost-efficient scenarios
- The tool evaluates the impacts considering the new scenarios which are generated against the current situation for both industrial and local RES
- It will all promote innovative contractual arrangements and financing models to guarantee economically viable solutions and less risky investment

SO WHAT tool will analyse the legal framework and regulatory issues related to the different options, these topics will be addressed in D6.2 and information delivered via the Tool.

Aspects a corporate sectors employee/trainee would achieve by training modules tool:

- Simulation platform for modelling the industrial environment
- Demonstration at TRL8 of first of their kind urban WH/C recovery
- WH recovery towards additional flexibility in REIs

An employee/trainee in the industrial sector can expect from SO WHAT tool a guidance for the exploitation of industrial waste heat/cold and/or surplus renewable energy, especially how to recover it according to competitive technologies and schemes:

- Better impact of the various factors/variables on the cost-benefits

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- Valorisation in assessments of cost-benefits of industrial waste heat
- Accurate prediction and holistic modelling
- Number of industrial sectors
- Investment in sustainable energy
- Primary energy saving
- Reduction of greenhouse gases emissions and/or air pollutants triggered by the project

3.2 Municipality/Energy Agency

The SO WHAT tool allows Municipality/Energy Agency to learn about the reuse of hot and cold waste which is very helpful in the decarbonization of the H/C system. The SO WHAT tool will help to map the condition given and simulate additional configurations: the user will be able then to compare the results via a KPI panel and choose a wise option for the reuse heat and cold, both in the industrial perimeter but also outside it.

Things a Municipality/Energy Agency trainee achieve by training modules tool:

- Validate an integrated tool for local authorities developing low carbon H&C
- Integrated ICT energy management system
- Examine synergy between DLTs, building monitoring and control, including grid and weather forecasting and P2P trading
- Identification of best locations for implementation of projects for harnessing waste H/C energy

A Municipality/Energy Agency trainee can expect inputs for its work related to waste heat/cold and/or surplus renewable energy integration, especially if coming from industries or other sources nearby:

- A number of public authorities, large private facilities and DHC operators
- Investment in sustainable energy
- Primary energy saving
- Reduction of greenhouse gases emissions and/or air pollutants triggered by the project
- Map the potential of Municipality/Energy Agency sources and forecasted demand for heating and cooling.
- Support policies development

3.3 Academic sector

In comparing with the corporate sector, learning in the education sector focuses primarily on knowledge transfer and not on training i.e. in education, they are mainly striving to learn things with global scope (e.g. a subject such as mathematics) whilst corporate e-learning is more focused on business needs (e.g. new recruit induction). The academic sector will be the intermediary for the uptake of WH/C in industrial sites/DHN, especially with regards to more advanced technologies.

Things academic sector trainee achieve by training modules tool:

- Learn new technics to be updated with the technologies available

- Techno-economic analysis
- Modelling and mapping

An Academic sector trainee can expect to gain from the SO WHAT tool and project a deeper knowledge and understanding about waste heat and cold and/or surplus renewable energy both from industrial sector and its integration in the surrounding environment:

- Up to date with the new technologies for achieving optimum results
- Can create new opportunities for the individuals who are looking to work in the waste management sector
- Can deepen its knowledge on cutting edge technologies for WH/C recovery as well as specific schemes for the integration of the recovered energy
- Can opt for new options and possibilities for new optimization technologies by researching in WH/C using SO WHAT tool.

4 Benefits of SO WHAT Tool

The main objectives of SO WHAT is to develop and demonstrate an integrated software which will support industries and energy utilities in selecting, simulating and comparing alternative Waste Heat and Waste Cold (WH/C) exploitation technologies that could cost-effectively balance the local forecasted H&C demand also via renewable energy sources (RES) integration.

INPUTS in SO WHAT tool: The main inputs to provide the tool will be data coming from final users/demo sites as well as every external system with the relevant required information for diagnosis: sensors/ actuators, monitoring/ control/ management subsystems and external data sources. Mapping and quantification of relevant sources for waste H/C and RES (installed capacity and operative conditions) will be performed via the Tool.

- Opportunity to engage with the stakeholders in the value chain and identify the appropriate business model for how more detailed analysis could be carried out focusing on the industrial facility, carrying out a complete energy audit and asset inventory with respect to its baseline energy end-use and collecting data with respect to its systems, schedules and processes as well as an inventory of available equipment and machinery.
- Information regarding the surrounding community will also be collected, including information on building types and use, which will be helpful to generate demand profiles.

IMPLEMENTING TECHNOLOGIES: Techno-economic analysis of WH/C recovery technology is implemented in the database, including i) active technologies that transform or upgrade WH/C (e.g. heat to power cycles, heat pumps, chillers), ii) passive technologies that use heat/cold directly or at a lower temperature level (e.g. heat exchangers for process reintegration, regenerators, thermal storage, indirect condensation recovery).

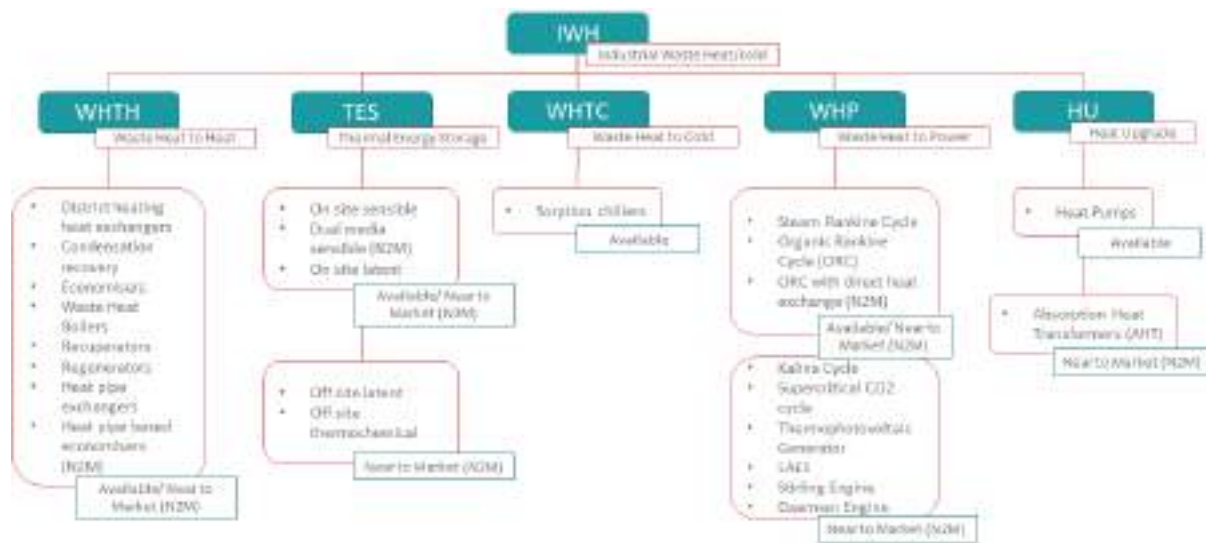


Figure 1 Available technologies for WH/C

Considering the above mentioned factors that will be integrated into the SO WHAT modelling tool, a set of technologies suitable for the scope has been identified: some of them are already available in the market commercially and some other will be introduced in future so that we can make sure that SO WHAT can identify current business cases as well as near-future ones for WH/C recovery. Both active and passive technologies will be included. WHTC, WHP and HU technologies are active ones, where WH/C might be either transformed or can be upgraded. The WHTH and TES technologies are passive technologies where WH/C are used or transported at the same temperature or at the lower temperature. Both the technologies i) active and ii) passive will further refined to include a detailed feature of specific realizations of WH/C recovery technologies. Further on a detailed action of events are adopted for technologies enabling them to capture the technological data, economic data and environmental data.

For the data collected from each WH/C recovery technology, was designed a scalable input-output model based on performance-cost equation with respect to the installed capacity and operating conditions, ensuring the applicability of the database to a wide range of industrial sites and processes. A screening will be embedded in the database enabling individuals to perform an initial assessment and identify suitable WH/C technologies given the specifications of the WH/C stream.

OUTCOMES: The user can access a detailed energy analysis with the integration of the more suitable WH/C recovery technology based on a techno-economic evaluation.

Main outcomes:

- The main outcome of the project will be a tool designed starting from insights of industrial partners that will give the opportunity to end-users to examine WH/C recovery option. A training plan devoted to the use of the tool will maximise its usability
- Analyse the legal framework and regulatory issues related to the different options
- The user can access a detailed energy analysis with the integration of the more suitable WH/C recovery technology based on a techno-economic evaluation
- Provide technological solutions to optimally exploit the identified available sources
- Evaluate the actual local H/C demand
- Enable industrial stakeholder to individuate WH/C streams in an industrial site

- Provide to industrial stakeholders as well other potentially interested actors (DH providers, public authorities, energy agencies, etc.) financing schemes and business and risk models as well as deployment plans to effectively implement the identified technologies
- SO WHAT tool, in parallel to technical evaluation, will suggest the end-user different schemes to finance recovery according to its needs and the technical solution is chosen

BENEFITS: The main benefits for the final user can be so divided:

- Technical benefits
- Cost benefits
- Environmental benefits
- Socio-economic benefits
- Indirect socio-economic benefits

5 Expectation from the training

This section reports some input related to the training from SO WHAT Clusters, which are one of the main contacts with demo-sites and relevant stakeholders.

In general the training should allow the end-user to engage in their own time and select the training courses that best suit their individual needs should be clearly report:

- What kind of output is possible to get from the tool, based on the inputs provided?
- What are the uses of using SO WHAT tool?
- How the tool is different from other similar tools.
- Instruction to user on what inputs are needed
- How does user start to use the tool?
- Time and resource demand to use the tool should be specified
- Data security (using SO WHAT tool) is high for the tool - "Can anyone else access my data?"
- Some practical examples
- About videos timeline i.e., not be longer, better to have several videos.
- Different format to learn: videos, handbook, tutorials and physical training
- The training should point out clearly the limitations of the tool and its reliability
- Avoid misinterpretation of a "Black Box" calculation tool. There should be some guidance about how to interpret the results provided by the tool and foment critical thinking

In the following bullet point, some suggestions from the prospective of training modules linking Industrial and Regional Energy Agencies are presented:

- How to identify, list and evaluate (energetically and economically) the sources of waste heat of the factory and those industrial production facilities in a region where there is greater potential for waste heat with the possibility of being used externally.
- General introduction to the concept of waste heat. Description of the practical aspects to be considered when addressing the search for sources of waste heat.

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- How to identify, list and evaluate (energetically and economically) the sources of waste heat of the factory.
- Generic information on the equipment necessary to perform the recovery of specific waste heat sources of the factory. The information refers to the type of exchangers/machinery, the physical dimensions range and the values of operating characteristics as well as the required costs (in estimation ranges, not in exact values).
- Warnings about possible problems to be considered if you want to recover energy from some waste heat sources. Notices for the presence of corrosive or obstructive materials in the waste heat flow, etc, ...
- A simple and generic list of possible processes or machinery where the identified recovered waste heat could be used (generic information non-dependant of the type of factory).
- Recommendations about how to match within the factory itself the list of sources of waste heat with the list of processes of the factory itself.
- Practical (general) considerations when considering a waste heat recovery for external use in the factory. Generation of general warnings are to be considered, as well as specific ones, associated with the values of the waste heat sources identified in the factory.
- Suggestions for the integration of renewables-based on the information of the factory production processes that have been previously introduced and renewable energies in buildings or in district heating networks.
- How to calculate (fast approximation) the thermal energy demand of the possible buildings of a region may have. Mainly public buildings but also commercial buildings and residential blocks with communal heating.
- How to measure the distance between the waste heat source factories and the possible waste heat receiving buildings. Practical advice to consider when calculating these distances and obtaining an economic approximation of the cost of interconnection pipes.
- Provide information related to financing schemes and business and risk models as well as deployment plans to effectively implement the identified technologies.

6 Training methodology

SO WHAT project provides not only a simulation tool to evaluate the techno-economic viability of WH/C potential valorisation but also with a specific training strategy (based on both traditional and e-Learning tools) to guarantee their autonomy in the use of the tool.

FACTORS TO BE CONSIDERED	WHY IS IT IMPORTANT?
Region or geographic area in which learners reside	As the course is asynchronous and is developed in 3 modules.
Kind of organization or institution in which learners work and their professional roles within them	The main objective of the SO WHAT tool is to educate and train three important sectors; <ol style="list-style-type: none"> 1. Industrial. 2. Academic. 3. Municipality/Energy Agency

Learners previous knowledge and expertise on the subject	The learner should possess the basic knowledge of heat transfer and process involved in an industrial plant and RES.
Learners computer skills and technical expertise	Basic knowledge of how to access the web page and technicalities and modelling
The location where learners will participate in e-learning and from where they can access the internet.	Anywhere having access to the internet
Network bandwidth	Bandwidth limitations may slow the connectivity of the learning process since they take less time to transmit. So, as a suggestion, it would be advised to have a high-speed bandwidth for interrupted streaming.
Computer and software capabilities	Basic

A total of 12 training sessions for professionals will be performed during the project development, 2 at each in the 6 SO WHAT Clusters.

There will be two types of training sessions: online and physical.

The online training will be easy to understand and follow, flexible (online training courses can be taken anytime and anywhere), will allow exchanges of ideas (trainees with same interests or with the same learning goals may join a community that interacts effectively exchanging questions, doubts, and ideas).

During most of the learning sessions (especially the e-learning ones), more than one country will be represented so that the training can also be a moment during which stakeholder can exchange views, share visions, identify common barriers and share best practices.

The physical training will be organized at Clusters' premises involving the local stakeholders and Cluster members. The objective is to perform a face-to-face and half-day training conducted in local language.

The following training modules will be developed and uploaded on the e-learning platform. Training materials (presentations, papers, etc...) will be made publicly available on the project website and uploaded on the e-learning section as well.

The three Training Module are foreseen:

- Training module 1: How to investigate our own energy consumption, the potential of WH/C Technologies and how to exploit it externally to the industrial plant
- Training module 2: Suitable business and financing schemes for WH/C installation
- Training module 3: Using SO WHAT Tool

Additional training sessions could be added based on potential needs that would arise from end-users during the project implementation.

The Free tool will be intuitive and user-friendly and designed for non-technical users. However, it must be connected to online videos and tutorials for those that may need some extra help.

The material charged on the training section, depending on the Module Training typology, will consist on:

- Introduction videos with a duration of 5 minutes, detailing the structure of the Module, the objectives and main arguments treated in the section;
- Different videos between 5-10 minutes that will give more deeper details on business model and economical aspects, information on how performing the installation of the tool;
- Power points with contents, mainly useful to recap, summarize or to fix some specific arguments (i.e. elaboration of business model, contractual arrangements, financing methodologies);
- Manual of users/handbooks structured taking main inputs from specific deliverables;
- Short tutorial mainly focused on the use of the tool;
- Practical session at the end of Module 3 focused on using the tool and performing some exercises.

All the material will be available for downloading.

6.1 WEB MODELLING

The e-Learning sections will be settled on the project website and maintained using the latest technology to develop a user-friendly platform. The e-learning section will be designed with an easy-to-follow structure with clear, modern graphics design focused on presenting the value of the content. From these aspects, SO WHAT has successfully launched the website, it will require further development of it to manage aspects, like registrations and the log-in access towards the training material and session.

Access/login. For the complete access of the training modules, it will be requested that every individual has to sign-up and compile a set of questions as following in order to complete the registration, this requirement is envisaged to track the trainees.

The access will be guaranteed from the SO WHAT website from a dedicated Training page. The “student” will start the first step of registration inserting mail and password after that additional information is requested:

- General student information: first name, last name
- Company name
- email
- Type of Organization
 - Academic/ Research centre
 - Energy Agency
 - Utility/ESCO
 - Regional Authority
 - Municipality
 - Industry
 - Other
- Industry sector activity
 - Chemical & Petrochemical
 - Food & Beverage
 - Paper, Pulp & Printing

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- Iron & Steel
- Power & Energy
- Other

As mentioned, the first registration of the students is useful to track them and identify from which target group they derive. Under evaluation the best way to create the access analysing also some similar experiences, where the site itself and the repository with the "educational" material are separated. The project site might have a link that refers to a platform hosted on the servers of the partner responsible for this material and, from there on, you can make login and access everything. As shown in Figure 2, a mock-up image regarding an individual login to access when he/she had successfully finished the registration: the individual must enter his credentials created while registering for further access the training materials and e-learning module as all the training module are free to access to have an account on the members involving and access the SO WHAT training modules it is must have a SO WHAT account.



Figure 2: user login

Interactive sessions. The online content will include interactive sections in which "students" can post comments, suggestions, exchange views and best practices:

- Forum/discussion: the trainees can post messages visible to all parties.
- A section to contact directly the Course responsible for updates, answers.
- Satisfaction section, with some oriented questions:
 - Did the course meet your expectations and objectives (0-5)?
 - Assess the eLearning platform (0-5)
 - Assess the general methodology (0-5)
 - Did you learn as much you as you have expected from the SO WHAT training? (0-5)
 - Do you think the SO WHAT tool could help your Company?
 - If yes, please explain better how (open session)

First training webpage. The page will report a short summary of the main benefits of SO WHAT tool and the modules proposed.



Figure 3 Outlook of first training webpage

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Once the student accesses the module, he will have the opportunity to view and download videos material, handbooks and slides.

6.2 TRAINING MODULES STRUCTURE

6.2.1 Module 1 – How to investigate our own energy consumption, the potential of WH/C technologies and how to exploit it externally to the industrial plant

The training module 1 material development is under the responsibility of RINA-C and CAR and will be supervised by ENVI as training plan responsible. It will consist of one intro video and a handbook.

The objective of such a module is to provide both high-level information about industrial energy consumption, following standard auditing techniques and insights about the WH/C technologies that could be implemented. Therefore, it is intended to constitute an introduction to SO WHAT project concepts, analysis and methodologies that will be implemented in the tool.

Module1_Intro video

The section of the training starts with an intro video of 5 minutes (show of a *pptx with the voice of the “teacher”). Below the main points described:

- Description of the SO WHAT project.
- General information about the course and explaining the training methodology.
- Objectives of the training module 1.
- Structure of the training module 1 (chapters division and main issues of each chapter).
- Auditing an industrial site.
- Potential ways of exploiting waste heat (internally and externally).
- WH/C technologies.
- SO WHAT tool, inputs and outputs.

Module1_handbook

The training module 1 follows a user manual/handbook of the SO WHAT tool in which we will describe all the details consisting of the How? Where? What?

In this module, it will be given a detail description of how to investigate the waste heat & cold energy consumption and the potentials regarding the technology and how to exploit it externally for an industrial plant. The main inputs at this document come from the study conducted in WP1 and some deliverables linked (D1.2 First release of SO WHAT Industrial Sectors WH/C recovery potential, D1.5 Strategies and protocols for input data collection, D1.6 Report on H/C recovery/storage technologies and renewable technologies).

Three pillars will constitute the basis for this training module: industrial energy auditing, WH/C exploitation inside and outside the industrial site and the related technologies to achieve such objective, which is reflected in the following structure of the handbook. This module will address the topics related to general aspects of the above-mentioned pillars and it will provide technical inputs to the trainee, in order to provide a solid basis for the prosecution of the training activities, not taking for granted any key point that a student might lack (as highlighted in the survey).

The handbook structure is here reported:

- Chapter 1: The handbook will give a detail description of the waste H/C: how it is generated, where it can be seen most in the industrial plant, municipality.
- Chapter 2: Analysis of WH/C technologies (consolidated and emerging) will be reported.
- Chapter 3: Insights into the data needed to be collected to run the simulations and the related formats.
- Chapter 4: Inputs related to the mapping, the tool's needs to map local RES and municipality or an industrial plant feature.
- Chapter 5: High-level information and details linked to the simulation environment, including possible checks and evaluation of the consistency of data.
- Chapter 6: The cause-effect relation between input data and outputs will be introduced in terms of qualitative and quantitative information.

Module1_ppt

The handbook will be translated in easy to follow, summarising slides to be presented in a live event that would include the key information above mentioned as well as the references to both the handbook and public deliverable, where extensive explanation could be found to deepen the subject.

Such presentation will be prepared in a widespread format (i.e. pdf or PowerPoint) and it will constitute the main tool to be exploited during the training sessions that will be organised within SO WHAT project scope, including success stories and examples retrieved from real use cases.

6.2.2 Module 2 - Suitable business and financing schemes for WH/C installation

The training module 2 material developed under the responsibility of IVL and ENVI and it is supervised by ENVI as training plan responsible. It will be formed by 3 videos and 3 pptxs.

Module2_Intro video

The section of the training starts with an intro video of 5 minutes (show of a pptx with the voice of the "teacher"). Below the main points described:

- Objectives of the training module 2
- Structure of the training module 2 (video and main issues of each pptx)
- How to interpolate simulated data
- The available new business model for WH/C installation
- Financial audit for the new WH/C technologies installation

Module2_video

The video will project the new business models available considering the aspects of technological, environmental and social issues for the countries of the demo sites. Inputs for this video will be acquired from the D3.3. The duration of the video will be between 5-10 minutes and it will report slides with the comment of the teacher.

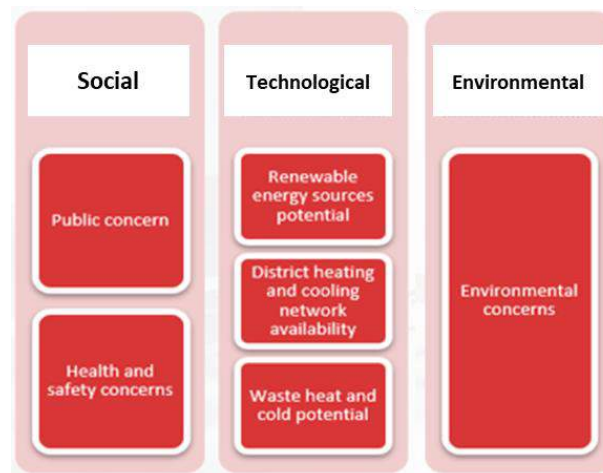


Figure 4 Topic discussed in video 2

Module2_video

This video will project the financial methods for auditing the new installing models considering the aspects of political, economic and legal factors for each country of the demo sites. Inputs for this video will be acquired from the D3.4. The duration of the video will take between 5-10 minutes and it will report slides with the comment of the teacher.

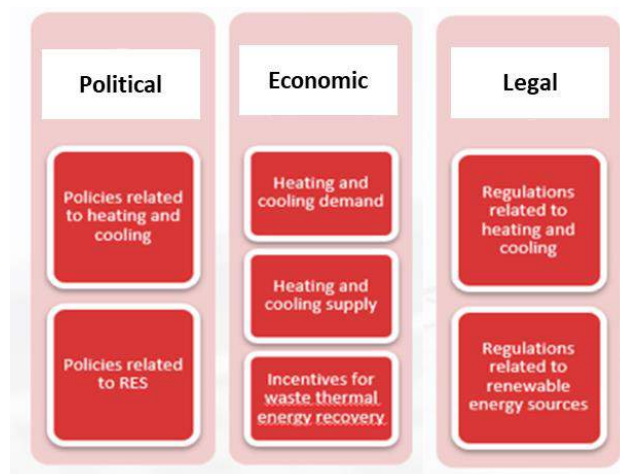


Figure 5 Topics discussed in video 3

Module2_ppts

As in module 2, we mainly focus on educating the fellow individuals to understand the limitations and how they can take advantage of WH/C for industries and learn about socioeconomics by the implementation of new technology or local RES benefitting the EU. The module will be structured as pptx and the main inputs will come from WP3 and some deliverables produced (D3.2 Report on the CBA of industrial waste heat and cold and RES in industry investments in Europe, D3.4 Business and risk models for industrial WH/C recovery and exploitation towards replication, D3.5 Financing and

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ESCO models for industrial WH/C recovery and exploitation towards replication). The main argument that will be present in the slides are so summarized:

- Cost-Benefit Analysis (CBA) used to aggregate social benefits, waste H/C recovery investments.
- Socio-economical cost & benefits using industrial waste H/C.
- RES integration analysis (considering the surplus production of Local area RES and new installations from which we will identify the WH/C source for obtaining different solutions): technical flexibility, the profitability of the investment and limitations.
- Risk analysis: for implementation on a new business model of RES integrated into heat recovery investments.
- Risk analysis linked to the investment: including industrial corporations shut down, new knowledge is developed/ new WH/C recovery and connected irregularity in deriving RES production.
- A study to capitalize the investment for enhancing the market for industrial waste heat/cold recovery and RES installation, type of investors, return on investments and financial decision impacting the social and environmental aspects.
- Identifying the effective business model especially focusing on Energy Supply Contracting (ESCO), Energy Performance Contracting (EPC), Integrated Energy Contracting (IEC), for an example an ESCO model is developed to showcase the business risk of industrial waste heat recovery taking RES into consideration.
- A value chain analysis for industrial waste H/C recovery and the RES investment are identified.

The arguments reported above can be spread in 3 ppts with these titles:

- First pptx: Introduction of the module sharing also some previously described topic for a recap.
- Second pptx: In this slide will discuss the detail elaboration of the business models and how to evaluate it. Contractual arrangements and LCOH calculations for selling industrial waste heat/cold
- Third pptx: Financing methodologies and ESCO models

6.2.3 Module 3 – Using SO WHAT tool

The training module 3 is developed under the responsibility of IESRD and will be supervised by ENVI as the main responsible for planning the training modules. It will be split into training relevant to the SO WHAT Simple tool and training relevant to the SO WHAT Commercial tool.

As the SO WHAT Simple tool will be free to use and web based, all training content will be either built into the tool or available to download. The tool is intended to be intuitive and easy to use with as little data entry as possible required from the user. For this tool, guidance and help will be provided at each step in the tool, as well as an embedded video and ppt available for download.

As the Commercial tool will be desktop based the training may not be built directly into the tool and will instead consist of 1 intro video, 1 pptx, a SO WHAT tool manual that is made of a handbook, a video and a tutorial, and in final a real-time practical session. The idea is to offer more user interaction where every individual will be provided with a set of examples consisting of a PowerPoint presentation asking every individual to map, accommodate, simulate and post-process with the of data collected and will also prove the solutions for further query and cross-check the steps he/ she

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has followed it correctly for the understanding of user knowledge. As the example which are provided to the individuals will be real-time data with minimal changes for a hand on experience.

Module 3_Intro video

The section of the training starts with an intro video of 5 minutes (show of a pptx with the voice of the “teacher”). Below the main points described:

- Objectives of the training module 3
- Structure of the training module 3 (video and pptx)
- Advantages of the SO WHAT TOOL in comparison with other available tools (the plus)

Module3_ppts

The structure of the ppt will help the student to recap many aspects treated in the previous module:

- Recap of previous modules
- The SO WHAT TOOL: advantages
 - User-friendly software, modelling the industrial environment
 - Software that models both the industrial environment and the surrounding community on a single platform
 - UX and UI to enable non-building physics experts to use the software
 - Integration of other technology solutions to enable informed decision making
 - Custom dashboards for non-technical experts to enable informed decision making
- The SO WHAT TOOL: benefits, impacts
- How it is structured and the chronology of the creation: inputs, technologies, outcomes
- KPI panel description

The main inputs come from the WP₄ (scheme below) and from specific deliverables (D_{4.1} SO WHAT tool KPI Panel – useful also for validation activities, D_{4.2} Simplified Version of SO WHAT tool for Quick Decision Making, D_{4.3} Detailed Version of SO WHAT that Includes Network Modelling Capabilities to Enable a More Flexible and Cost-Effective Solution across the Industrial Environment, D_{4.8} SO WHAT Manual).

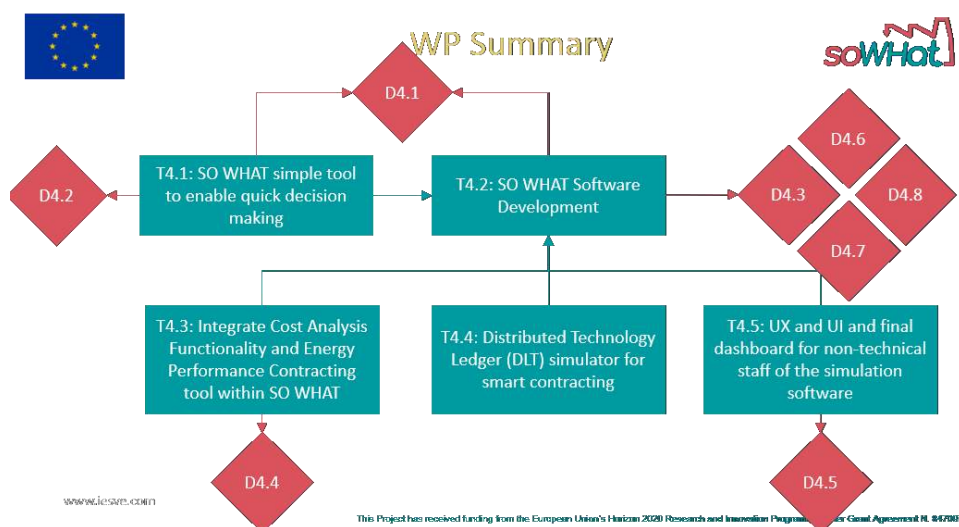


Figure 6 Description of tool development

Deliverable 7.3 SO WHAT Training plan and guidelines for training material

Module 3_ SO WHAT manual

The deliverable developed by IESRD at M30 will be inserted as training material. It will include a handbook, online videos and tutorials for how to use the final platform (see below).

Module 3_Video HOW to INSTALL SO WHAT TOOL

The short video will give support for the installation of the tool.

Module 3_How using the tool (short tutorial)

The tutorial will give description more immediate of the tool structure:

- Tool configuration and description of each part of the tool
- Where charge the inputs needed
- What calculation you can perform
- Outputs

Module 3_Practical session

The student can install the SO WHAT free tool and performing some exercises with direct interaction with the tool.

6.3 TRAINING AT CLUSTERS

A total of 12 training sessions for professionals will be performed during the project development, 2 per each SO WHAT Clusters.

Thanks also to a stakeholder's engagement campaign at each Cluster premises will be organized training sessions with local stakeholders, including audiences representing the potential end users of the Tool. Each Cluster will promote the training internally with Cluster members and their network. Such training sessions will be performed using the training material produced and potential re-adapted to better reflect the audience and the specific training needs.

The physical training will be done in half a day using local language. The training material has to be finalized by M30, but some of the training sessions (trials) will be performed before, using inputs to test the material developed and as best practices for the deadline of M30, therefore improving it.

7 Conclusions

In this document the initial planning of the web page and the classification of the training modules are been structured in detail with pre-describing the targeted groups topics, importance of the targeted users and benefits of using SO WHAT tool. The training modules will be subjected to update regularly upon necessity and guidelines for the preparation of the training material will be presented regularly.

The period between M9 to M12 will be devoted to the coordination with fellow partners active in other Work Packages as the responsible partner for the development of training modules preparation will be focusing especially WP1, WP2 which give outputs regarding the preparation of training module1 like data requirement, the user interface of SO WHAT tool, working of SO WHAT tool on WH/C recovery and mapping of local RES and Industries. Eventually working of WP3 for analysing the new business and risk models and financial schemes alternatives from which will be extracting content required in preparing training module 2 describing the business and risk model for industrial WH/C recovery.

The actual training plan will start in M12 and the training resources will be available at M30. During this period the modules will be prepared, improved via the feedback received during the training sessions and finalized to be uploaded on the project repository.

However, starting from Stakeholder Group, already expressed their interest in the project outcomes and willing to attend the training activities in the framework of the project, it will be implemented with new stakeholders that could potentially be interested in the SO WHAT project and they will be engaged and involved in SO WHAT training.

Thanks also to active dissemination the main users of SO WHAT will be involved in eLearning training.

For simplicity, the table below summarise some inputs related to what “do” and what “don’t” for the planning and preparing training material:

DO's	DON'T's
Do have easily study timeline	Don't use heavy technical words
Do have a pictorial description where needed	Do not provide heavy manual
Do elaborate the topic to be discussed	Don't rush the testing phase
Do use a different kind of interactivities	Do not add extraneous information
Create a collaborative learning environment	Don't anticipate a silver bullet modules
Interaction with fellow partners and user	Don't over discuss the same topic in training and materials
Do allow the users to interact	Do not over delay the reply to users' questions
Do update the webpage and training modules	Don't forget to ask feedback from users