WP7 Business model, replication potential, market analysis

Hugo Grasset (Solintel)

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

WP 7 OBJECTIVES

Tasks:

- Task 7.1. Market Analysis: Provide an overview of the various market sectors targeted by the Heat4Cool solutions
- Task 7.2. Business Model: Definition of value propositions for Heat4Cool standalone products/results and Consolidated Retrofit Solution
- Task 7.3. Industrial viability of technologies and replication potential analysis: Assess the technical and economic viability of the solutions developed in the project

Objectives as presented in GA:

- Develop markets and marketing strategies including identifying target groups;
- Generate business models for the manufacturers of the products identified in Heat4Cool project;
- Development of a Business Plan for exploitation of results after the project;
- Outline financial arrangements including possibilities for cumulative funding, with relevant national / regional research and innovation programmes and/or European Structural and Investment Funds in connection with smart specialisation strategies;
- Ensure the maximum replication potential by a continuous monitoring of Heat4Cool development and mitigations of barriers.

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.1

T7.1 “Market Analysis” (M22 – M54)

Task leader Solintel, Participants: Polimi, W+V, Symelec, Iznab

T7.1 – task description and main elements

- The Value System and the various market sectors involved in the potential business opportunity for the Heat4Cool project products will be analysed with a “layered” approach.
- Identify high value geographic markets having the potential to accept the proposed model of retrofit solutions
- Provide characteristics such as market size, market growth rate, actors, needs, as well as technical, economic, organizational, infrastructural, administrative, social and environmental aspects when relevant and available
- Identification and characterization of competing products
- Identification of potential barriers to market entry of the Heat4Cool project products

Deliverables and milestones:

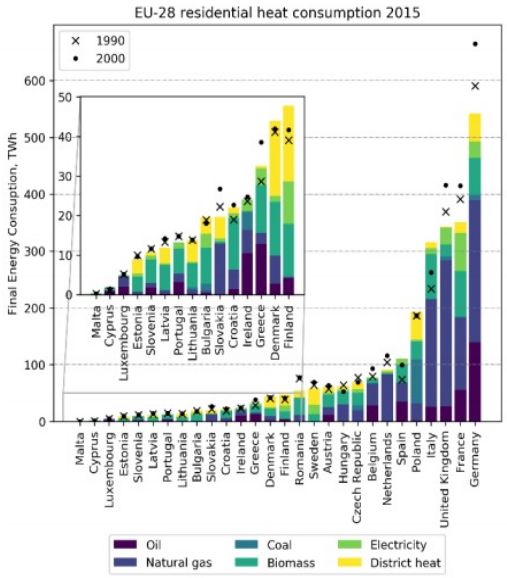
D7.2 Market Analysis M54

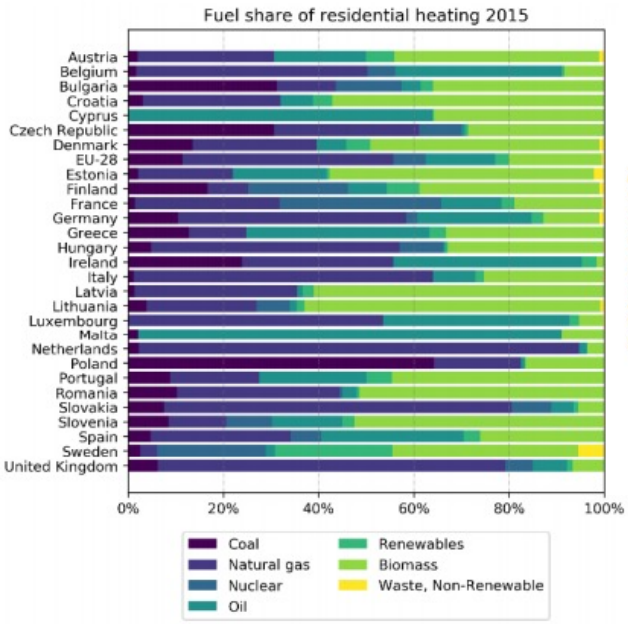
Heat4COOL project has received funding from the European Union’s Horizon 2020 research and innovation program under grant agreement No 723925

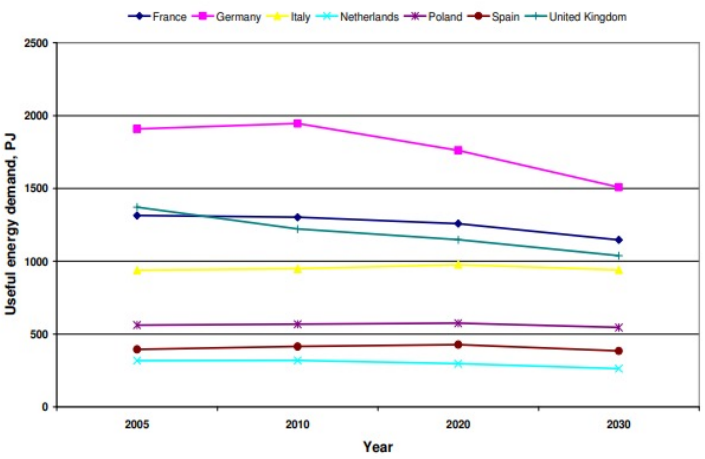
Work completed T7.1 M37-M54

Identification of high value geographic markets on the basis of:

- Local heating and cooling market dynamics





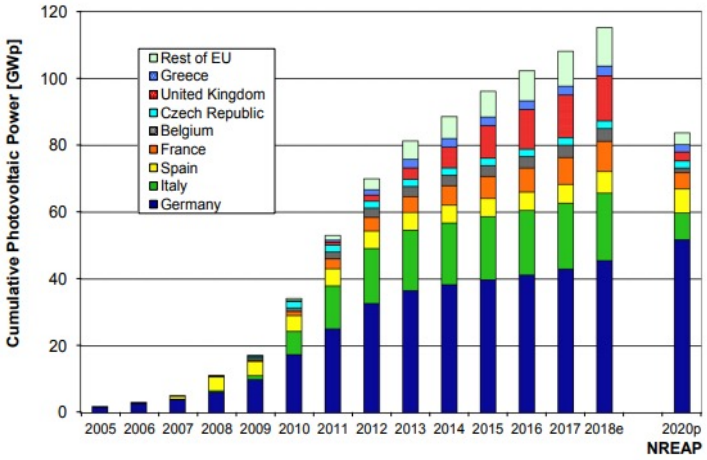


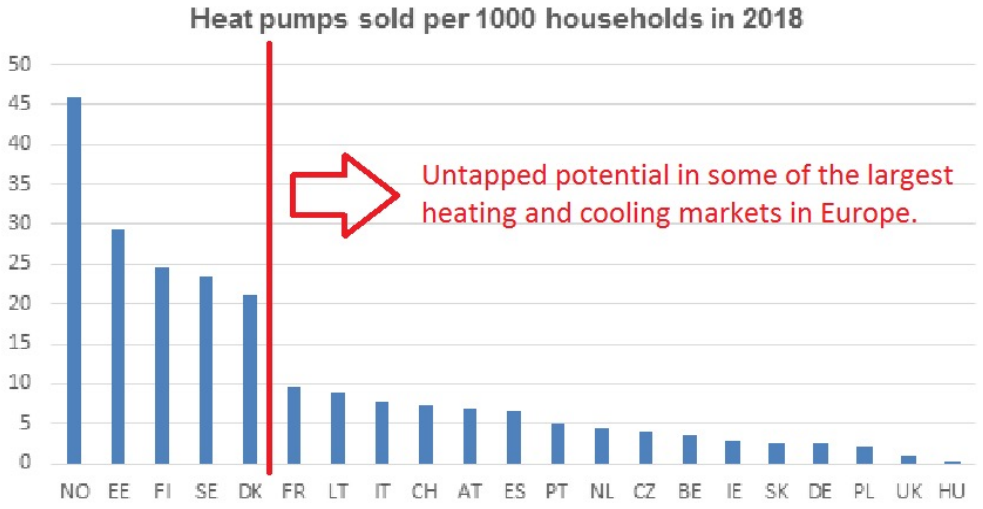
Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

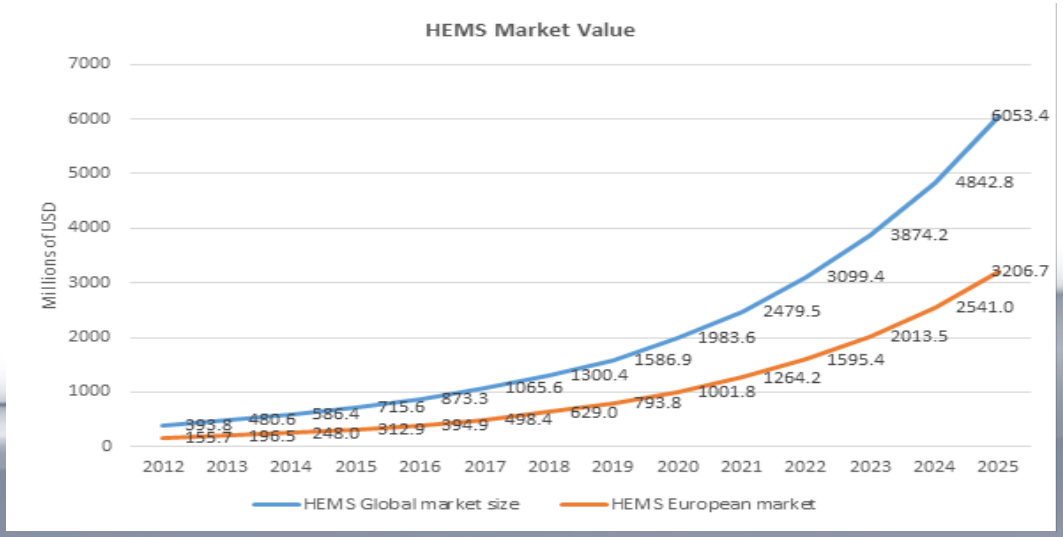
Work completed T7.1 M37-M54

Identification of high value geographic markets on the basis of:

- H4C technology markets
  - Photovoltaic market dynamics
  - Heat pump market dynamics
  - Smart home market dynamics
  - District heating and cooling



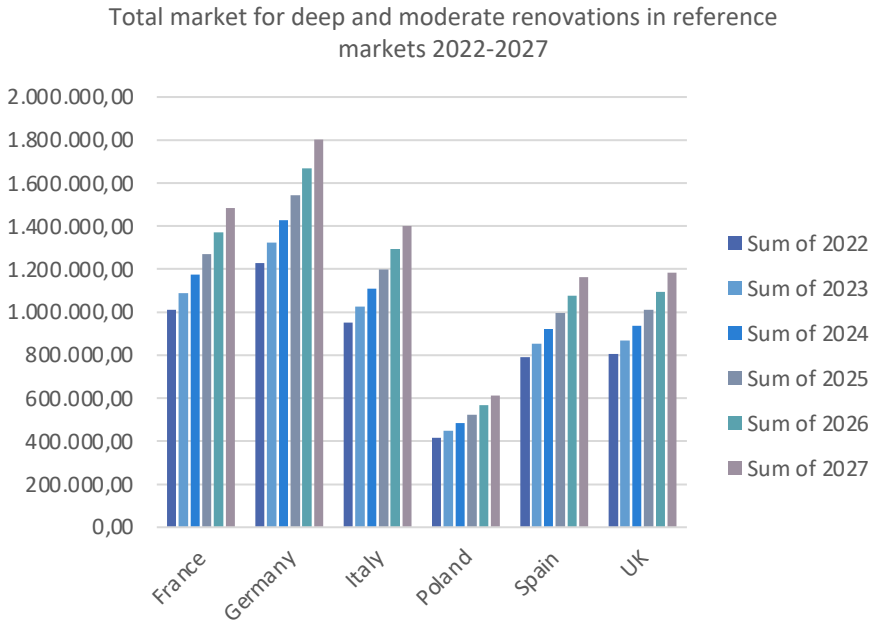


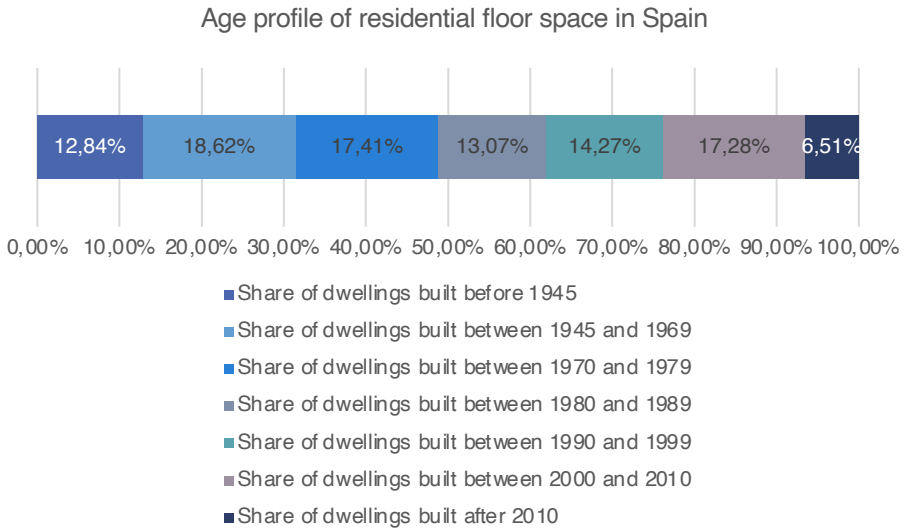


Work completed T7.1 M37-M54

Identification of high value geographic markets on the basis of:

- Building stock and renovation dynamics





Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.1 M37-M54

Identification and characterization of competing products

- Retrofit design planner tool
  - + | simplified immediate KPIs generation (very fast simulation)
  - - | not as comprehensive as some fully developed simulators
- Innovative heat exchanger
  - + | flexibility of system and high levels of efficiency when scaling over 1MW level
  - - | implementation requires specific set of conditions and typologies for optimal use
- Solar PV assisted powered heat pump connected to an advanced modular PCM heat and cold storage system
  - + | increase renewable energy self consumption by HP and easy installation in line with industry skills
  - - | space for PV
- Solar thermally driven adsorption heat pumps
  - + | solution is very interesting for hot weather markets
  - - | space for HP
- SCI BEMS
  - + | behavioural insights and M&V possibilities
  - - | highly competitive space with potential vendor lock in

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Example of competitor assessments

Company name: The National Renewable Energy Laboratory (NREL)

PVWatts® Calculator

Company profile:

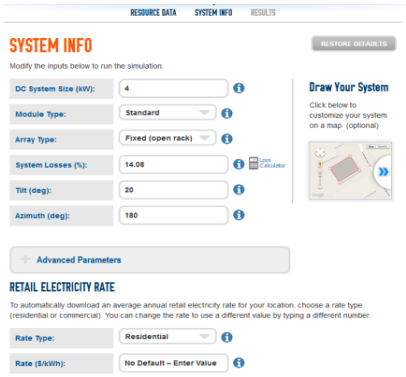
The National Renewable Energy Laboratory (NREL) It is a Research Institute who is transforming energy through research, development, commercialization, and deployment of renewable energy and energy efficiency technologies.

Solution type/name: PvWatts®

Description + picture

NREL's PVWatts® Calculator is a web application developed by the National Renewable Energy Laboratory (NREL) that estimates the electricity production of a grid-connected roof- or ground-mounted photovoltaic system based on a few simple inputs. To use the calculator, you provide information about the system's location, basic design parameters, and an average annual retail electricity rate. PVWatts® calculates estimates of the system's annual and monthly electricity production, and an estimate of the value of that electricity.

Important Note. PVWatts® is suitable for very preliminary studies of a photovoltaic system that uses modules (panels) with crystalline silicon or thin film photovoltaic cells. PVWatts® production estimates do not account for many factors that are important in the design of a photovoltaic system. If you are using PVWatts® to help design a system, you should work with a qualified professional to make final design decisions based on an assessment of the system location and using more detailed engineering design and financial analysis tools.



Applications:

Both academic and commercial applications of the considered technologies.

Performance and features:

- The calculator estimates the monthly and annual electricity production of a photovoltaic system using an hour-by-hour simulation over a period of one year. To represent the system's physical characteristics, PVWatts® requires values for six inputs:
- DC system size
- Module type
- Array type
- System losses
- Array tilt angle
- Array azimuth angle
- You can refine the system design assumptions with three optional advanced inputs:
- DC to AC size ratio
- Inverter efficiency
- Ground coverage ratio
- PVWatts® estimates the monetary value of the electricity based on an annual average retail electricity rate

Company name: Vela Solaris AG

POLYSUN® BY VELA SOLARIS

Company profile:

Polysun is the most effective software range for simulation-based planning, design, and optimization of holistic energy systems for buildings and districts. With the precision of Polysun and Vela Solaris as a competent service partner, you can master the complexity of coupled energy systems in the shortest possible time and thereby win over your customers in the long term.

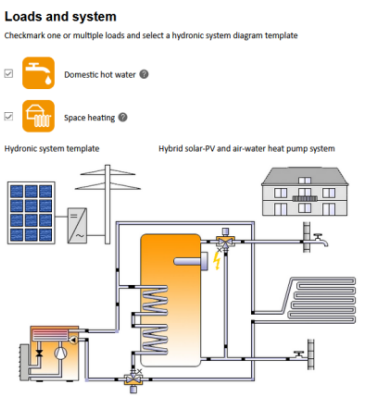
Solution type/name: PolySun Online

Description + picture

Polysun is a software that enables users to effectively simulate solar-thermal, photovoltaic and geothermal systems.

With the Polysun software from Vela Solaris you can rely on a multi-practice simulation of your energy system with reliable results in terms of functionality, energy efficiency and profitability – from single-family homes to districts, worldwide and for all market-standard technologies.

Polysun is a commercial simulation software for renewable energy systems which allows to combine different technologies with each other (solar thermal, PVT, photovoltaics, heat pumps, ground-source loops, cogeneration units etc.) and allows to edit the system templates and to create alternative ones. This is the most important selling point. Compared to other academic software, thanks to its clear depiction of the systems and its modularity it is much easier to use and therefore particularly suitable for teaching.



Applications:

Both academic and commercial applications of the considered technologies.

Performance and features:

- Validated calculation models for solar thermal collectors, thermal tanks (water, ice and ground tanks), ground-source loops, conventional heat generators, biomass boilers, air-to-water, brine-to-water and water-to-water heat pumps, adsorption and absorption chillers, hybrid collectors (PVT), photovoltaic modules, inverters, batteries, cogeneration units, fuel cells and many more
- Controlling strategies for the hydraulic systems can be freely defined
- Comprehensive product data bases of heat pumps, photovoltaic modules, inverters, batteries, solar collectors, cogeneration units and many more components
- Catalogs stored in the Cloud, no need to update your data bases
- Includes a selection of more than 1,000 pre-configured hydraulic templates (including company templates)
- Hydraulic templates for large-scale thermal systems, local, district heating and energy networks
- Import of thermal loads for process heat applications on an hourly or 15-minute-basis
- Integrated building model to calculate heating and cooling loads
- Interfaces to import the heating energy demand according to the German EnEV, the Swiss SIA etc.
- Automatic variation of parameters
- Reports that are accepted for diverse applications for subsidies
- Easy comparison of simulation results of several system diagrams

izon 2020
research and innovation program under grant agreement No 723925

Example of competitor assessments

COMPANY	PRODUCT	APPLICATIONS	PERFORMANCE	FEATURES
Vela Solaris AG	POLUSUN Online	Both academic and commercial applications of the considered technologies.	Polysun is a commercial simulation software for renewable energy systems which allows to combine different technologies with each other (solar thermal, PVT, photovoltaics, heat pumps, ground-source loops, cogeneration units etc.) and allows to edit the system templates and to create alternative ones.	— Controlling strategies for the hydraulic systems can be freely defined. — Catalogs stored in the Cloud, no need to update your data bases — Includes a selection of more than 1,000 pre-configured hydraulic templates (including company templates) — Hydraulic templates for large-scale thermal systems, local, district heating and energy networks — Integrated building model to calculate heating and cooling loads — Automatic variation of parameters — Detailed evaluation of simulation results per time step, 15 min., hourly or monthly values — Real time visualization using simulation analysis and graphic display of results — Variable prices for energy from the grid and for feed-in-tariffs can be imported — Easy to use, simple to handle
The National Renewable Energy Laboratory (NREL)	PVWatts Calculator	Both academic and commercial applications of the considered technologies.	PVWatts® Calculator is a web application that estimates the electricity production of a grid-connected roof- or ground-mounted photovoltaic system based on a few simple inputs. PVWatts® estimates the monetary value of the electricity based on an annual average retail electricity rate	— The calculator estimates the monthly and annual electricity production of a photovoltaic system using an hour-by-hour simulation over a period of one year. To represent the system's physical characteristics, PVWatts® requires values for six inputs: — DC system size — Module type — You can refine the system design assumptions with three optional advanced inputs: — DC to AC size ratio — Inverter efficiency — Ground coverage ratio

Work completed T7.1 M37-M54

Identification of barriers

- Regulatory overview
- EE Renovation and retrofit barriers
- Regulatory pilot level barriers

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.1 M37-M54

Barrier Category	Barrier Typology	Barrier	Description
Barriers that limit uptake of refurbishment solutions at the decision making level for homeowners, buyers or end-users. (likely to be found in most regions in some form or another)	Technical	Performance Gap and uncertainty	Difference between simulated or predicted savings with savings during actual building operation
			Hinders the appeal and formulation of financial approaches and incentives such as EPCs. Need for materiels and technologies that can be implemented faster (ie prefab solutions...) in order to limit the obstructiveness of renovations.
		Lack of technological and product developments	Need for digital technologies as well as materials and equipment aiming benefits such as shortened renovation times
	Embedded market inefficiencies	Split Incentives and conflicts of interest	Oversizing of equipment,
			Tenant vs owners
	Informative	Lack of knowledge dissemination and convincing end users of the benefits of deep renovations	Lack of information and awareness in relation to: • non-energy and non-financial benefits that result from refurbishments (comfort, spillovers on productivity, health...) • Financing options • Expert and unbiased advice to help small owners to balance between financial and technical risks/benefits • Uncertainties about contractor reliability
		Difficulties in conveying non-energy benefits of retrofits	non-energy and non-financial benefits that result from refurbishments (comfort, spillovers on productivity, health...)
	Financial	Investment approach and perspective	Opportunity costs too high
			Limited impact of Energy Performance Certificate improvements on property value
			Lack of integration of life cycle costs in financial decisions
		Limited financing	Lack of incentives and access to capital: • Limited involvement of third parties and banks to provide loans in energy performance contracts. • Limited ability for ESCOs to offer financing for energy performance contracts. High risk perception and high interest rates/discount rates/ Paybacks periods and ROIs vary and can be long.
		Externalities	Price of energy and its volatilities
Barriers that prevent or complicate stakeholders taking part in the renovation process (architects, ESCOS, construction companies...) to implement with ease successful business models.	Organization and structure of the EE renovation market	Fragmentation of the construction and renovation market	Short term coalitions and ad-hoc subcontracting leads to:
			•Lack of communication and poor coordination
			•Adversarial relationships
			•Inhibited learning opportunities
			•Short term vision with lack of life cycle cost integration in project process
			•Country specific cultural, industry and standardized processes
			Contract structures (PPPs…)
		Time and pressure on profit margins	Contractors are selected through competitive tendering with price being one of the main drivers
			Leads to reuse of bids and cookie cutter project approaches
		Public procurement barriers (especially towards SMEs)	• Insufficient resources on part of SMEs to tender for public procurement schemes • Sub-division of contracts into lots leads to unstable partnerships and difficulties for efficient teamwork
	Regulatory	Lack of supportive regulation	Lack of subsidies
			Minimum energy performance standards
			Renovation obligations
		Normative barriers	Local norms impeding the implementation of the optimal solutions or penetration of innovative technologies
			Difficulties of complying building codes
	Knowledge-informative based	Lack of skills/ Lack of training	Insufficient knowledge on EE refurbishment technologies, design approaches, contracting and when and how to implement existing solutions. Lack of specialized SMEs or other relevant companies

Work completed T7.2 M37-M54

T7.2 “Business Model” (M28 – M54)

Task leader Solintel, Participants: W+V, Iznab

T7.2 task description and main elements

- Defining value propositions capable of overcoming market barriers and leveraging KER unique selling points and features
- Business model canvases
- Overview market potential and financial KPIs
- Provide potential consolidated retrofit approach

Deliverables and milestones:

D7.4 Business plan M54

MS10 Preliminary business model

Heat4COOL project has received funding from the European Union’s Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.2 M37-M54

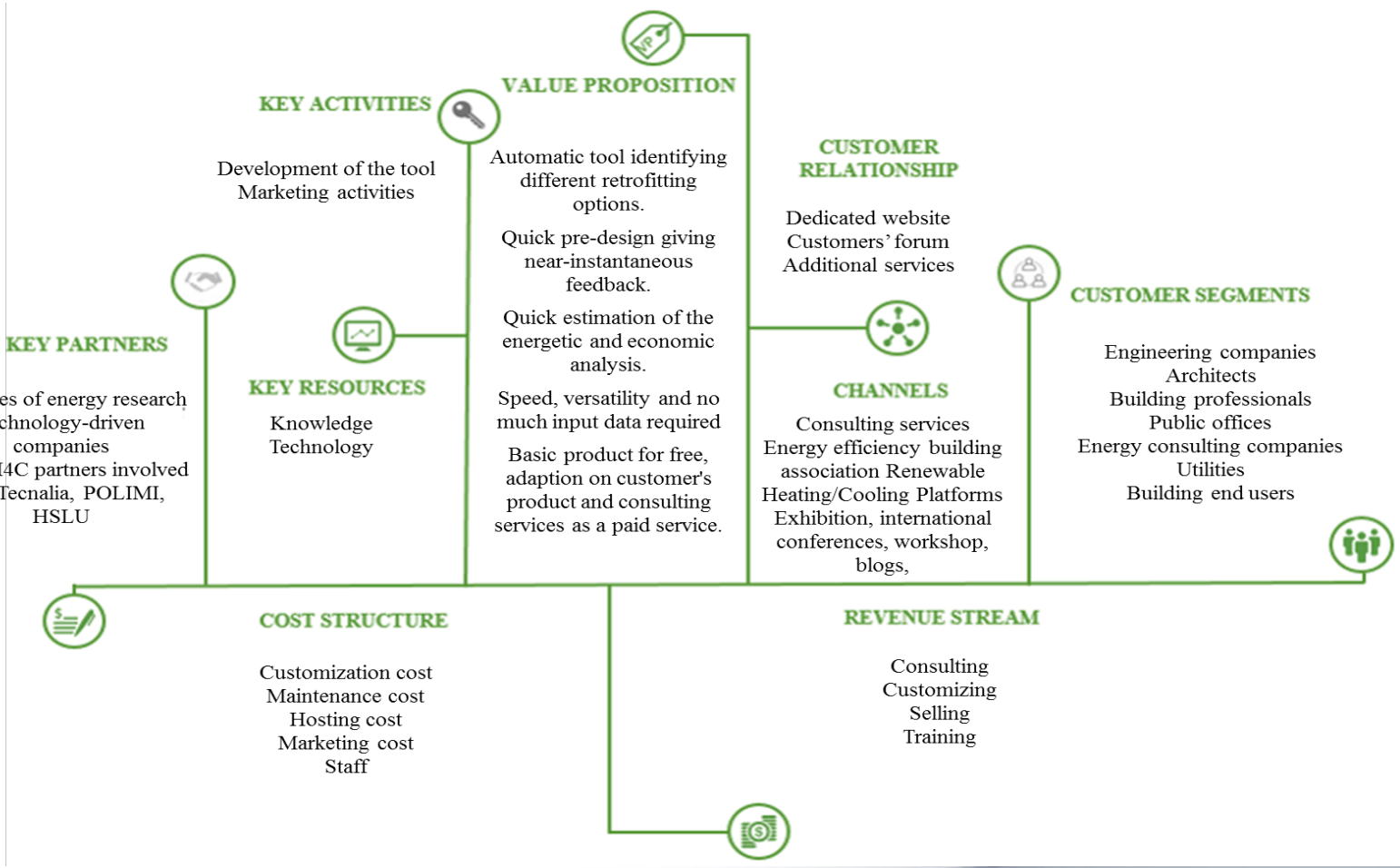
Value map

Value Map	
Products and Services: H4C RetroSim is an online tool which provides a quick estimation of the energetic and economic analysis and design optimization. Modelling principles are based on open licenses and framework; using standardized technologies that ensure the reliable operation of the platform - localization in different languages.	**Gain creators:** **Buildings owners and communities** - Tool will accelerate initial solutions and approaches assessments with virtually no capital outlay and lesser need for qualifications. **Architects engineers and ESCOS:** - The H4C Retrosim tool can be used as a low effort, fast and easy solution for architects and ESCOs to present home owners with potential retrofit solutions for their heating and cooling systems. **Financial agents:** Swift availibility of financial KPIs based on reliable simulations.
	Pain relievers: **Buildings owners and communities** H4C Retrosim offers immediate estimated KPIs for decision making. **Architects engineers and ESCOS:** Tool consolidates all the gathered building data and offers tried solutions based on this data with no need for extensive assessments and research on part of architects or ESCOs. **Financial agents:** KPIs based on tried systems for the building configuration means quick information with lessened performance gaps or unexpected results at earlier negotiation stages of the project when loan or financial support is being discussed.

Customer profile	
Gains: **Buildings owners and communities** - Fast, flexible and easy to use solution with low commitment at initial evaluation stages. - Little to no capital outlay for evaluating retrofit potential. - Tools they are capable fo using despite technical content. - Diversity of options explored in order to obtain most adapted framework with minimized potential for performance gaps and thus minimized ROIs. **Architects engineers and ESCOS:** - Faster less time and ressource consuming solutions for preliminary assessments. **Financial agents:** - Financial KPIs available early and with satisfying levels of reliability in order to calculate better risk profiles for investments.	**Customer Jobs:** **Buildings owners and communities** Obtain preliminary idea on the possible retrofit approaches and their potential benefits, savings and costs. **Architects engineers and ESCOS:** - Project Initiation: Evaluate client needs and user requirements. Compile available information covering regulatory, infrastructure and geotechnical conditions. Identify additional site investigations required including surveys of existing buildings and structures. If necessary, carry out measured surveys and condition surveys of existing structures or buildings on site. - Feasibility Study: Set out basic planning principles and possible strategies. Examine how the project can meet stated requirements and aspirations. Inform the client of technical and statutory constraints the project has to satisfy. Investigate and evaluate expected budget requirements. - Definition: Undertake Investigation and determination of client and user requirements and expectations. Set out a project brief, produce a room and function schedule. **Financial agents:** Evaluate project capital expenditures in comparison to energy savings in order to grant support for realisation of the retrofit.
Pains: **Buildings owners and communities** - Difficult to obtain reliable and detailed information at initial evaluation stages. - Need to commit time and ressources only for pre-assessment. **Architects engineers and ESCOS:** - Seperation of cost analysis and design - Difficult integration of semantic information from grouped documents and data in designs - Difficulty of finding optimal solutions given contraints and estimating the related impacts, savings etc at a superficial level. **Financial agents:** - Potential for performance gaps - Uncertainty involved in operations especially for markets with no precedence making it difficult to calculate decisive KPIs such as the return of the project.	

Work completed T7.2 M37-M54

Business model canvas



Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.2 M37-M54

Retrofitting design planner tool

Innovative HEX, cleaning methods, connecting screen

Solar PV assisted Heat Pump connected to advanced PCM heat energy storage

Solar assisted Thermal driven Adsorption heat Pump

Initial phase of the project

Construction, installation phase

Building use / Operational Phase

SCI BEMS

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.2 M37-M54

Retrofitting design planner tool

Innovative HEX, cleaning methods, connecting screen

Solar PV assisted Heat Pump connected to advanced PCM heat energy storage

Solar assisted Thermal driven Adsorption heat Pump

SCI BEMS

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Retrofit design planner tool

Main features:

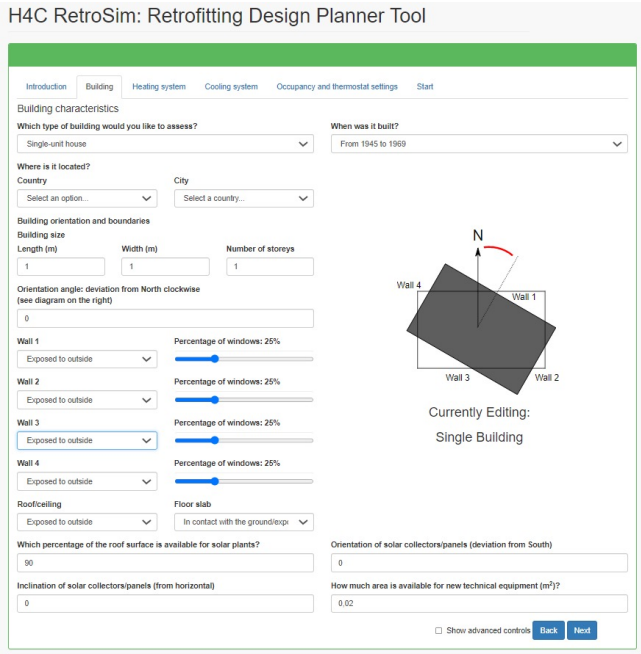
- Calculates main heating and cooling systems and alternatives
- Key performance indicators are estimated for current systems and alternatives suggested by the tool at the pre-design phase.
- Acceleration of assessments on retrofit approaches.
- Fast simulations.

The retrofit design planner tool, as a Key Exploitable Result concentrates on the needs of:

- AEC professionals
- Financial entities
- Building owners and communities

Unique selling point and fulfilled market needs as identified in value map:

- Accelerate initial solutions assessments with virtually no capital outlay and lesser need for qualifications.
- Addresses the issue of performance gaps or unexpected results and perceived risks for financing



KER ownership:

tecnalia

POLITECNICO MILANO 1863

Lucerne University of Applied Sciences and Arts
HOCHSCHULE LUZERN

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Retrofit design planner tool

Exploitation approach:

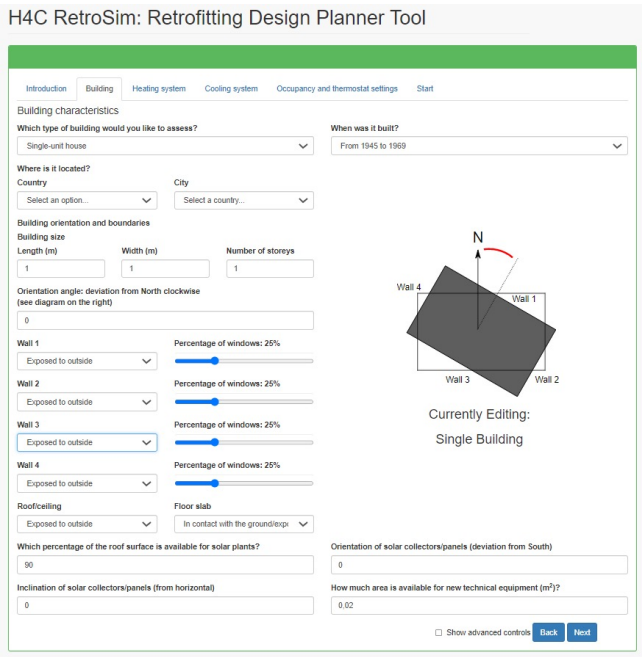
The basic product for free, adaption on customer's product and consulting services as a paid service.

KER ownership:

tecnalia

POLITECNICO MILANO 1863

Lucerne University of Applied Sciences and Arts
HOCHSCHULE LUZERN



Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.2 M37-M54

Retrofitting design planner tool

Innovative HEX, cleaning methods, connecting screen

Solar PV assisted Heat Pump connected to advanced PCM heat energy storage

Solar assisted Thermal driven Adsorption heat Pump

SCI BEMS

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Innovative HEX, cleaning methods, connecting screen

Main features (of the system improvement):

- increasing system-operation safety and simplicity
- more efficient cleaning and avoidance of sludge accumulation

The Innovative HEX, as a Key Exploitable Result concentrates on the needs of:

- AEC professionals
- Municipalities, public institution or commercial building owners

Unique selling point and fulfilled market needs (of the complete system):

- Alternative energy source (green energy).
- Very efficient in constant high load and demanding weather conditions settings
- High energy efficiency for large system size (over 1MW)
- Flexible installation.
- Better heat exchanger efficiency maintenance due to the cleaning control

KER ownership:

THERMOWATT

Exploitation approach:

Direct sale of improved Heat exchanger on already existing technology.

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Solar PV assisted Heat Pump connected to advanced PCM heat energy storage

Main features:

- The system will allow the combination of generation and storage in a way that results in a greater percentage of harvested energy being used for the end demand than is currently possible.

This Key Exploitable Result concentrates on the needs of:

- AEC professionals
- Building owners and communities

KER ownership:

Sunamp
Heat Batteries™

Unique selling point and fulfilled market needs:

- Small, modular and versatility
- Lower heat losses than conventional water tanks
- Higher thermal energy production efficiency
- Primary energy consumption savings - better renewable energy percentage.
- Independence from the grid.

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Solar PV assisted Heat Pump connected to advanced PCM heat energy storage

Exploitation approach:

Sunamp: Direct sale of PCM storage for connection with PV assisted heat pump systems/ distribution of complete heat pump systems with Sunamp heat batteries to projects globally or to other OEMs.

AES Solar: Potential for integration with in house PV systems and in projects

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Solar assisted Thermal driven Adsorption heat Pump

Main features:

Generation of cooling thermal energy from solar energy, achieving high electrical efficiencies as well as the possibility to increase the solar collector surface and thus the heating production.

This Key Exploitable Result concentrates on the needs of:

- AEC professionals
- Building owners and communities

Unique selling point and fulfilled market needs:

- Higher cooling energy production efficiency.
- Renewable heating energy production and thus primary energy consumption savings.
- High cooling capacity at high outdoor temperatures compared to state-of-the-art technologies.
- Compact design and fast adsorption characteristics.

KER ownership:

FAHRENHEIT
Cooling Innovation.

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Solar assisted Thermal driven Adsorption heat Pump

Exploitation approach:

Fahrenheit: Direct sale of adsorption heat pump for connection with solar thermal systems.

AES Solar: Potential for integration with in-house solar thermal systems and in projects

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.2 M37-M54

Retrofitting design planner tool

Innovative HEX, cleaning methods, connecting screen

Solar PV assisted Heat Pump connected to advanced PCM heat energy storage

Solar assisted Thermal driven Adsorption heat Pump

SCI BEMS

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

SCI BEMS

Main features:

SCI-BEMS is an integrated energy management platform for optimizing the operation of HVAC equipment in the building and district level.

- A lightweight and cost-effective system
- An energy efficiency module that enables optimal handling of HVAC operation
- A cost efficiency framework, which incorporates retail pricing information
- A comfort preserving framework, which integrates building occupants comfort/discomfort boundaries

KER ownership:

WATT+VOLT
ELECTRICITY | NATURAL GAS

The SCI-BEMS, as a Key Exploitable Result concentrates on the needs of:

- Energy service companies (ESCO) or aggregators/ AEC stakeholders
- Facility Managers or dwelling occupants/end users

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

SCI BEMS

Unique selling point and fulfilled market needs:

Profitable interaction between the energy systems balancing user comfort, energy efficiency and services to the grid thanks to profiling mechanism.

- Use as basis open API communication standards and automation software
- Allow for flexible realization and customization of the system functionalities according to the infrastructure available
- Utilize off-the-self monitoring and control devices that are affordable and widely available
- Employ custom developed cloud services for data analysis and remote energy management.

Exploitation approach:

Commercialization in the WATT + VOLT product portfolio through installation fees and license fees for cloud service.
Integration of SCI BEMS features in existing app portfolio offering.

KER ownership:

WATT+VOLT
ELECTRICITY | NATURAL GAS

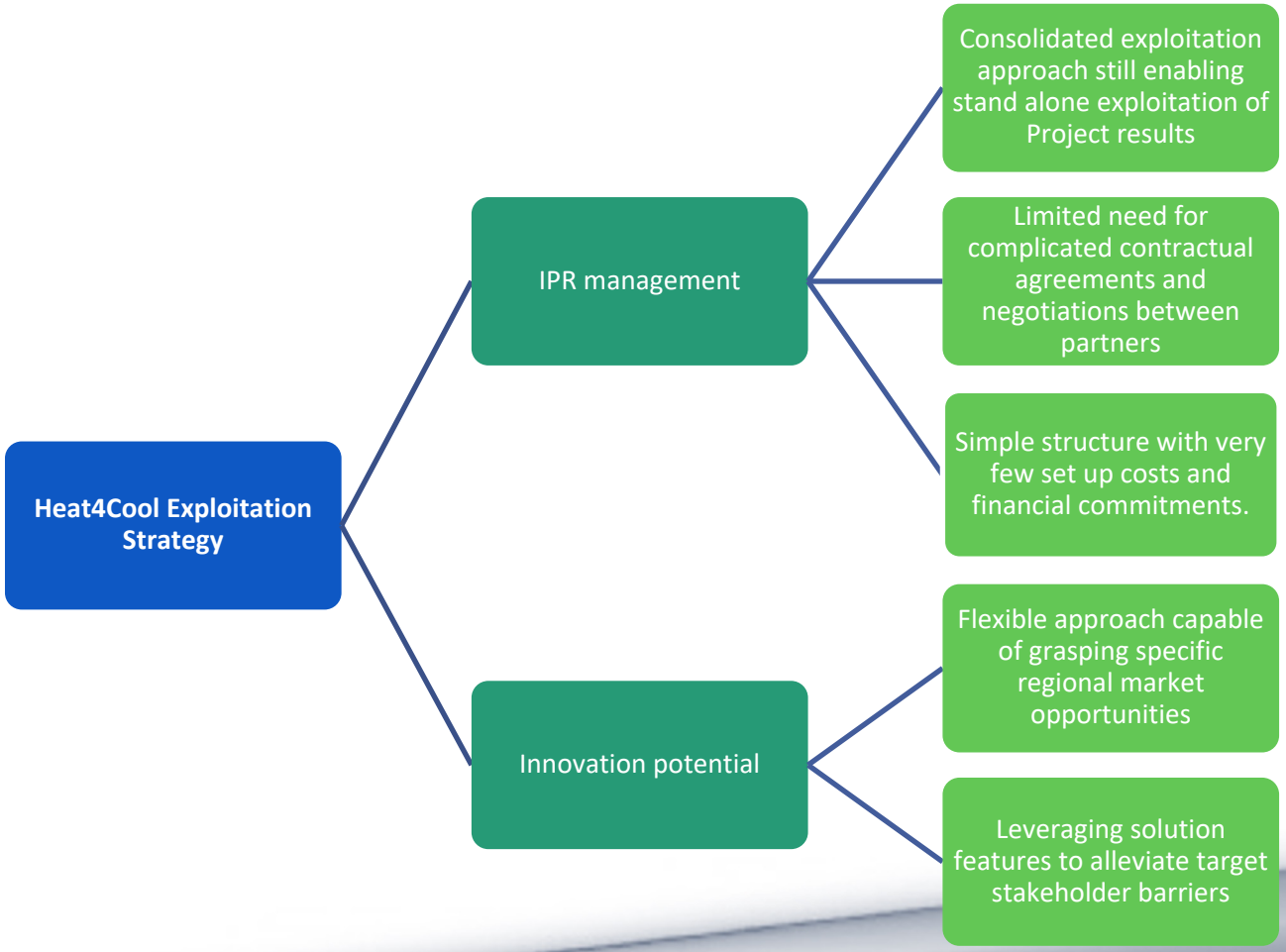
KER contributors:

tecnalia

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Heat4Cool Retrofit Solution

Specific challenges and necessities of the Heat4Cool project

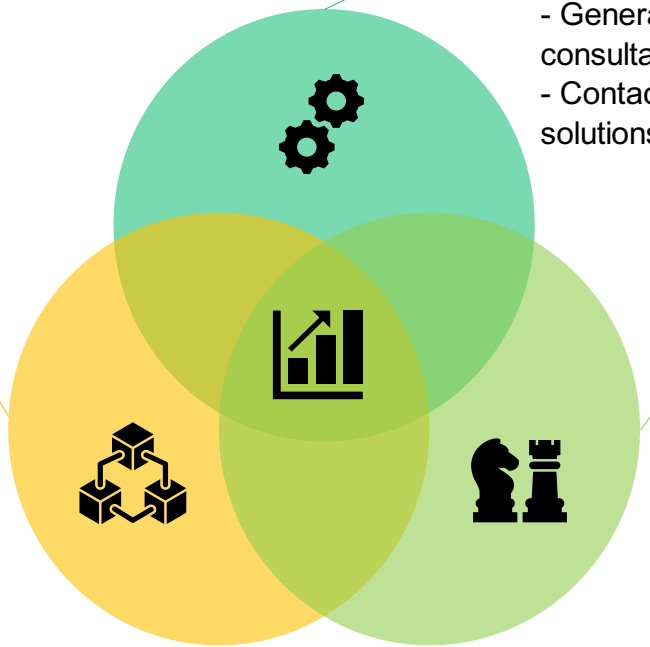


Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

The Heat4Cool Retrofit Solution business approach

Operations

Key activities: - Product specialists
- General contact points and retrofit solution consultants
- Contact points and potential installers distributing solutions in their regional markets.



Structure

The Heat4Cool Retrofit approach assessed in the project will be a **non-equity strategic alliance** where partners retain independance and relationships, committments and rights are contractually defined.

Strategy

Hybrid heating and cooling virtual one stop shop approach.
- All inclusive model for markets with the required partner coverage
- A coordination model with contractors in uncovered regional markets

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

The Heat4Cool Retrofit Solution business approach

Services:
- Retrofit planning and assessments
- Installation
- Consulting

Revenue:
- Direct sale of systems and consulting for product owners according to scheme in following slide.
- Consulting fees for the coordination model.
- Consulting and contracting fees for the inclusive model.

Customers:
- Homeowners, public bodies
- Architects, engineers and consutrction stakeholders

Competencies:
- Product owners
- Contractor, contruction, engineering
- Contact point/ Consultants

Two types of cost:
- The ones that pertain to individual partner activities such as production of their individual systems and solutions or shipping are covered independently.
- Costs pertaining directly to Heat4Cool based elements (web-platform and infrastructure and marketing) are collectivized

Management
- General assembly of partners in strategic alliance codified by contractual agreements of the strategic alliance.

Product
Listed KERs as demonstrated in following

Distribution and capturing customers
- Web platform
- Partner networks
- Regional clusters and integration in existing One Stop Shop intiatives
- Use of H4C Retrosim as initial hook (more specific and prescriptive then many current One Stop Shop ICT entry tools)

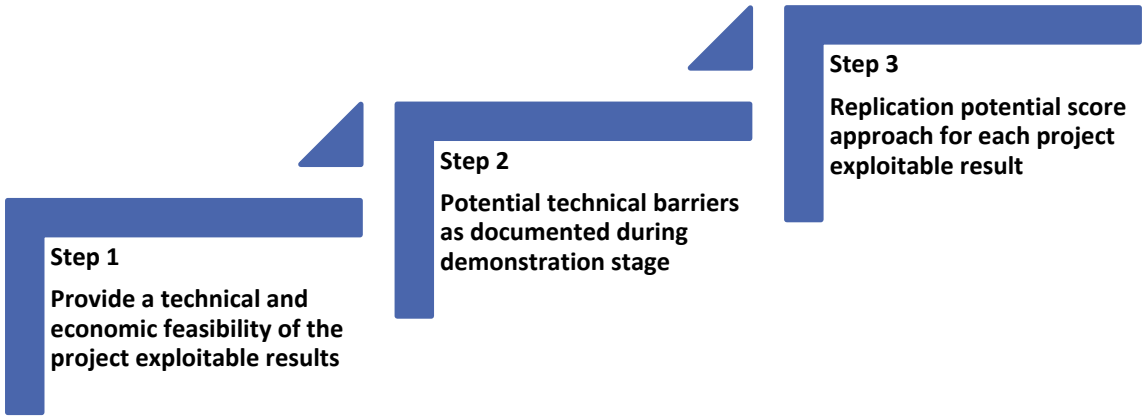
Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.3

T7.3 “Industrial viability of technologies and replication potential analysis” (M28 – M54)

Task leader Symelec, Participants: Polimi, Sortech, Themowatt, Tecnalia, Sunamp, AES Solar

T7.3 task description and main elements:



Deliverables and milestones:

D7.1 Industrial viability of technologies and replication potential analysis M54

Heat4COOL project has received funding from the European Union’s Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.3 M37-M54

Evaluating the replication potential of project KERs

Dimension	Roll-out potential evaluation criteria
Technology	• Is the technology well-established? • Is the technology standardised and/or interoperable with different IT systems? • How big and complex is the netting support required to sustain the project from a technological perspective?
Socio-cultural	• How relevant is the involvement of the society for the solution to work? • Is the solution responding to a pressing need (general perspective)? • Would the solutionrequire a radical change in the users' habit?
Political-institutional	• Is the project requiring strong political commitment to be developed (general perspective)? • Would the administration need to be directly involved?
Economic / Business	• Is the project able to achive economies of scale if its size is increased? • Can the project benefit economically from international implementation (e.g. standardisation of technology / equipment / solutions, etc.)? • Is the business model flexible to changes?

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.3 M37-M54

Evaluating the replication potential of project KERs

Criterion	Scoring				
	1	2	3	4	5
Increasing energy efficiency	Slight reduction of energy / fuel consumption (<10%)	Moderate reduction of energy / fuel consumption (10-50%)	Significant reduction of energy / fuel consumption (>50%)	Zero energy performance (nearly zero energy building)	Excess energy returned to the energy system (positive energy building)
Economic viability (period for return of capital)	Over 20 years	Up to 20 years	Up to 15 years	Up to 10 years	Up to 5 years
Ease of integration into the existing facilities and infrastructures	No possibility to integrate with existing facilities and infrastructures	Significant problems to integrate with existing facilities and infrastructures	Moderate problems to integrate with existing facilities and infrastructures	Some problems to integrate with existing facilities and infrastructures	No problems to integrate with existing facilities and infrastructures
Potential for scale-up and replication	No modularity and applicability in a very specific context	No modularity and applicability in a specific context	Modularity and applicability in a specific context	Modularity and wide applicability	Modularity and applicability in any context
Barriers to market entry (e.g. vendor lock-in or non-interoperable protocols and rules)	No demand and new business models required	Low demand and no possibility to apply existing business models	Low demand and possibility to apply existing business models	Moderate demand and possibility to apply existing business models	High demand and possibility to apply existing business models
Regulatory requirements	Regulatory requirements that imply significant costs	Regulatory requirements that imply bearable costs	Regulatory requirements which with slight complexity of implementation	Regulatory requirements which are easy to implement	No requirements from regulation
Time to market and full scale production and commercialization	Less than 5 years post project estimated until production and commercialization and standards compliance	Less than 3 years post project estimated until production and commercialization and standards compliance	Less than 1 year post project estimated until production and commercialization and standards compliance	Ready for production and commercialization and complies with relevant standards	Already being offered commercially and complies with relevant standards

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.3 M37-M54

Evaluating the replication potential of project KERs

H4C RetroSim	
Increasing energy efficiency	2
Economic viability (period for return of capital)	5
Ease of integration into the existing facilities and infrastructures	5
Potential for scale-up and replication	4
Barriers to market entry (e.g. vendor lock-in or non-interoperable protocols and rules)	3,5
Regulatory requirements	3
Time to market and full scale production and commercialization	2
Total Replication Potential Score	**3,5**
Innovative HEX	
Increasing energy efficiency	2
Economic viability (period for return of capital)	3,5
Ease of integration into the existing facilities and infrastructures	3
Potential for scale-up and replication	3
Barriers to market entry (e.g. vendor lock-in or non-interoperable protocols and rules)	2
Regulatory requirements	3
Time to market and full scale production and commercialization	5
Total Replication Potential Score	**3,1**
PV assisted heat pump and PCM storage	
Increasing energy efficiency	2
Economic viability (period for return of capital)	3
Ease of integration into the existing facilities and infrastructures	5
Potential for scale-up and replication	4
Barriers to market entry (e.g. vendor lock-in or non-interoperable protocols and rules)	4
Regulatory requirements	3
Time to market and full scale production and commercialization	5
Total Replication Potential Score	**3,7**

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Work completed T7.3 M37-M54

Evaluating the replication potential of project KERs

Solar assisted thermal driven adsoprtion heat pump	
Increasing energy efficiency	3
Economic viability (period for return of capital)	4
Ease of integration into the existing facilities and infrastructures	5
Potential for scale-up and replication	3
Barriers to market entry (e.g. vendor lock-in or non-interoperable protocols and rules)	4
Regulatory requirements	3
Time to market and full scale production and commercialization	3
Total Replication Potential Score	**3,6**

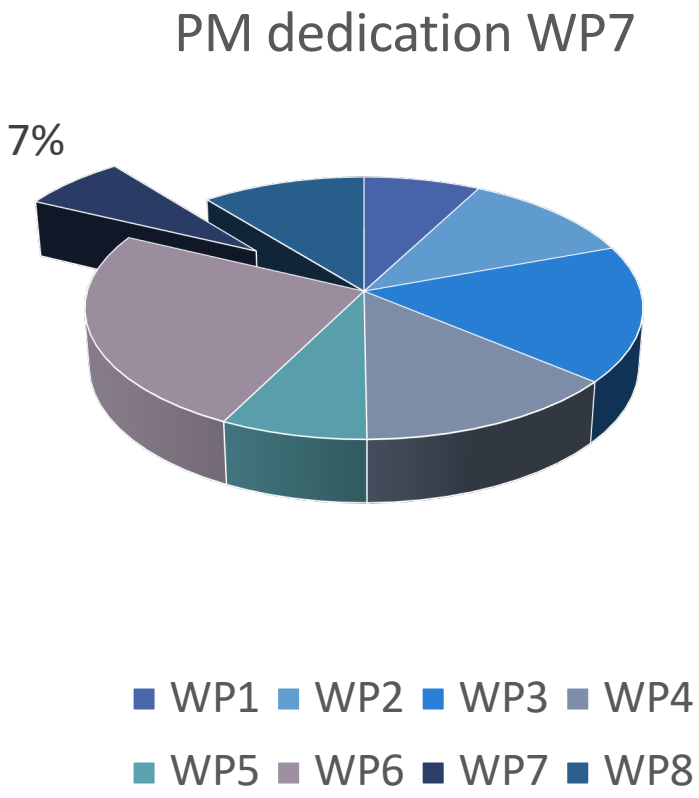
SCI BEMS	
Increasing energy efficiency	2
Economic viability (period for return of capital)	5
Ease of integration into the existing facilities and infrastructures	5
Potential for scale-up and replication	4
Barriers to market entry (e.g. vendor lock-in or non-interoperable protocols and rules)	5
Regulatory requirements	4
Time to market and full scale production and commercialization	2
Total Replication Potential Score	**3,9**

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Use of budget

WP1	68,66	8%
WP2	105,2	12%
WP3	151,53	17%
WP4	123,2	14%
WP5	67,9	8%
WP6	223,58	25%
WP7	63,31	7%
WP8	96,49	11%
Total	899,87	100%

Tot PMs planned	**73**
Tot PMs used	**63,31**



Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Achievements and Lessons Learnt

- Develop markets and marketing strategies including identifying target groups;
  - Value maps identifying market needs of stakeholders and how they are answered by KERs
  - Establishing unique selling propositions, application cases, product benefits for target groups
  - Competitive assessments
  - Geographic market analysis
- Generate business models for the manufacturers of the products identified in Heat4Cool project;
  - Business model canvases for all KERs
  - Replication templates
- Development of a Business Plan for exploitation of results after the project;
  - Definition of Exploitation strategies and ownership
  - Establishment of key variables and financials when relevant (new product rather than simply a significant product improvement)
  - Potential consolidated approaches towards exploiting the Heat4Cool retrofit solution as a whole

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Achievements and Lessons Learnt

- Ensure the maximum replication potential by a continuous monitoring of Heat4Cool development and mitigations of barriers.
  - Replication potential assessment
  - Reporting on barriers

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Achievements and Lessons Learnt

- Challenges
  - Difficulty in obtaining information on sensitive economic and competitive data.
  - Isolating potential savings figures for each solution as a stand alone product required feedback from partners

- Lessons learnt
  - Overall a competitive set of products with easy integration and modularity for most KERs
  - Some lower foreseen savings by certain KERs but this is offset by lower investment costs shortening payback periods

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Thank you

Hugo Grasset (Solintel)
hugo.grasset@solintel.eu

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925