Title: D6.10. Final Scientific Workshop Report and Interest group Setup and Activities

Project Number: 649849  
Project Acronym: ENTROPY  
Project Title: Design of an Innovative Energy-Aware IT Ecosystem for Motivating Behavioural Changes Towards the Adoption of Energy Efficient Lifestyles

Contractual Delivery Date: 30/09/2018  
Actual Delivery Date: 30/09/2018  
Deliverable Type*: R – PU  
Security**: PU- Public, PP – Restricted to other programme participants (including the Commission), RE – Restricted to a group defined by the consortium (including the Commission), CO – Confidential, only for members of the consortium (including the Commission)

Responsible and Editor/Author: Norma Zanetti  
Organization: Hyperborea  
Contributing WP: WP6

Authors (organizations): Norma Zanetti (Hyperborea) - Antonio Skarmeta and Alfonso Ramallo (UMU) - Anastasios Zafeiropoulos and Eleni Fotopoulou (UBITECH) - Giulia Gori and Piera Iorio (POLO) - Dominique Genoud (HESSO) - Cleopatra Bardaki (AUEB)

Abstract:
This document outlines the results achieved by the Consortium in the following main tasks:
• workshops organised by Entropy consortium
• events which partners of the Entropy project participated
• Interest group set up & activities at the three project's pilots, namely: UMU, Polo and Hesso.

Keywords: Communication, social media, marketing, dissemination, energy-efficient technologies.

Disclaimer: The present report reflects only the authors' view. The European Commission is not responsible for any use that may be made of the information it contains.
Revision History

The following table describes the main changes done in the document since created.

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description</th>
<th>Author (Organization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>v0.1</td>
<td>02/07/2018</td>
<td>Toc of the Document</td>
<td>Norma Zanetti (Hyper)</td>
</tr>
<tr>
<td>V0.2</td>
<td>10/09/2018</td>
<td>Contribution by UBITECH</td>
<td>Anastasios Zafeiropoulos, Eleni Fotopoulou (UBITECH)</td>
</tr>
<tr>
<td>V0.3</td>
<td>11/09/2018</td>
<td>Contribution C. Bardaki (AUEB)</td>
<td>Cleopatra Bardaki (AUEB)</td>
</tr>
<tr>
<td>V0.4</td>
<td>21/09/2018</td>
<td>Contribution POLO</td>
<td>Giulia Gori - Piera Iorio (POLO)</td>
</tr>
<tr>
<td>V0.5</td>
<td>24/09/2018</td>
<td>Contribution A. Ramallo</td>
<td>Alfonso Ramallo (UMU)</td>
</tr>
<tr>
<td>V0.6</td>
<td>24/09/2018</td>
<td>Contribution D. Genoud</td>
<td>Dominique Genoud (HESSO)</td>
</tr>
<tr>
<td>V0.7</td>
<td>27/09/2018</td>
<td>Version for internal review</td>
<td>Norma Zanetti (Hyper)</td>
</tr>
<tr>
<td>V0.8</td>
<td>2018/09/28</td>
<td>Internal review comments</td>
<td>Vassilis Nikolopoulos (Intelen), Anastasios Zafeiropoulos (UBITECH), Alfonso Ramallo (UMU)</td>
</tr>
<tr>
<td>V1.0</td>
<td>2018/09/28</td>
<td>Final version</td>
<td>Norma Zanetti (Hyper)</td>
</tr>
</tbody>
</table>
Executive Summary

The document outlines the activities performed by ENTROPY Consortium in preparing and holding the project Final Scientific Workshop Report and in setting-up and maintaining active groups interested on energy efficiency topic and related enabling new technologies.

In particular, the project partners followed the strategy outlined in the D6.1 "Communication Roadmap" (submitted on M3, namely end of December 2015) to:

- organise, hold and manage workshops at EU/global level
- participate to conferences and events relevant to disseminate the project main aims
- set up and contribute to motivate the creation of interested User Group for ENTROPY especially involving partners of the project Pilot sites, namely: Murcia (Spain), POLO and Hyperborea (Italy), HES-SO (Switzerland).

Disclaimer

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 649849, but this document only reflects the consortium’s view. The European Commission is not responsible for any use that may be made of the information it contains.
Table of Contents

1. Introduction ........................................................................................................................................ 6

2. Workshops and events organised by Entropy .................................................................................. 7
   2.1 EUSEW 4-8 June 2018 - Brussels (Belgium) ................................................................................... 7
   2.2 2nd Workshop on Energy Efficient solutions based on IoT EESIoT 2018 Theme — Smart Cities & Nations ......................................................................................................................... 7
   2.3 Global IoT Summit 4-7 June 2018 - Bilbao (Spain) ................................................................. 9

3. Workshops and events attended by Entropy ..................................................................................... 11
   3.1 Athens Innovation Festival - 20-22 November 2017 - Athens (Greece) .............................. 11
   3.1 Innovative strategies for smart buildings and citizens - 24th of January 2018 – Madrid (Spain) ................................................................................................................................................. 11
   3.2 Research and Innovation Workshop in the area of Building Energy Efficiency 19 June 2018 - Athens (Greece) .............................................................................................................................. 12
   3.3 Smartcomp 2018 - 18-20 June 2018 - Taormina (Italy) ....................................................... 13
   3.4 1st International Conference on Data for Low Energy Buildings 28-29 June 2018 - Murcia (Spain) ................................................................................................................................................. 14
   3.5 Behave 2018 - 5-7 September 2018 - Zurich (Switzerland) ............................................... 15
   3.6 Energy Analytics Course at INESC TEC, Porto University, FEUP Portugal (September 4-6, 2018) ................................................................................................................................................. 15

4. Interest group set up & activities ........................................................................................................ 18
   4.1 UMU Pilot ..................................................................................................................................... 18
      4.1.1 Public consultation for definition of innervations to achieve climate change adaptation 29th June 2017 – Murcia Spain ................................................................................................................. 18
      4.1.2 Energy Efficient Buildings talk at the Institution of Chartered Architects of Murcia 20 April 2018 - Murcia, Spain ................................................................................................................................................. 18
      4.1.3 IV Encuentro de Ingeniería de la Energía del Campus Mare Nostrum 19 Sept 2018. Murcia, Spain ................................................................................................................................................. 19
   4.2 POLO Pilot .................................................................................................................................... 20
      4.2.1 Workshop "Supporting development through innovation and technology transfer: a new model of competitiveness for companies" 12 June 2018 Florence - APSTI ........................................ 22
      4.2.2 Twinning project between Tecnopoio dell'Aquila and Polo Navacchio 2017-2018 22
      4.2.3 Wake Up Event - Polo Auditorium ....................................................................................... 22
      4.2.4 Periodic Events 2017-2018 "Regional support platform for companies implementing the regional strategy on Industry 4.0" ........................................................................................................ 23
   4.3 HESSO Pilot .................................................................................................................................... 24
      4.3.1 Swiss Energy tour event ........................................................................................................... 24
      4.3.2 HES-SO pilot presentation at ICWMC conference in Nice .................................................. 24
      4.3.3 Public national radio interview ............................................................................................... 25
      4.3.3.1 Press review ....................................................................................................................... 25
      4.3.4 Energy efficiency sensibilization event at HES-SO, Sept 2018 ........................................ 25

5. Conclusions ....................................................................................................................................... 26
List of Figures

Figure 1 - ENTROPY Booth at EUSEW 2018 ................................................................. 7
Figure 2 - ENTROPY at WF-IoT 2018 ........................................................................ 9
Figure 3 - ENTROPY at GIOTS 2018 ........................................................................ 10
Figure 4 - ENTROPY at Athens Innovation Festival 2017 ........................................ 11
Figure 5 - ENTROPY at Innovative strategies for smart buildings and citizens .... 12
Figure 6 - ENTROPY at Research and Innovation Workshop .................................. 13
Figure 7 - ENTROPY at Smartcomp 2018 ................................................................. 13
Figure 7: DATALEB18 .......................................................................................... 14
Figure 8. Summary session BEHAVE MOBISTYLE .................................................. 15
Figure 9 – Flyer of the event ................................................................................... 18
Figure 10 – Flyer of the event .................................................................................. 19
Figure 11 – Tuscany coastal Poles main technological fields .................................. 21
Figure 12 - Wake Up event - Polo Auditorium ............................................................ 23
Figure 13: Swiss Energy Tour event 2017-2019 ........................................................ 24
Figure 14: ICWMC International Conference - Nice .................................................. 24
Figure 15: Sensors interaction with the Apps. Polaris meeting room HES-SO pilot .... 25
1. **INTRODUCTION**

This document provides the ENTROPY Project outcomes related to the activities performed in organising and managing the Project Scientific Workshops and in setting up and maintaining groups interested on energy efficiency topic and on the project main aims.

The first paragraph includes details on the Workshops which were directly organised by the project’s consortium and the relevant events where Entropy results were presented and promoted.

The second main paragraph includes the activities performed in each country of the project hosting the related pilots.

Finally the conclusions section completes this deliverable.
2. **Workshops and Events Organised by Entropy**

2.1 **EUSEW 4-8 June 2018 - Brussels (Belgium)**

The ENTROPY project participated in the EU Sustainable Energy Week (EUSEW 2018). The project presented its current findings and status along with live demos of the platform and the developed applications for the adoption of energy efficient practices in the workplace.

The Entropy booth was located at the Residence Palace (Rue de la Loi, 155): ENTROPY solutions were first handed experienced.

Participants were invited to join us and experience ENTROPY first handed at the Networking Village where we had our booth on Tuesday 5 June 2018.

![Figure 1 - ENTROPY Booth at EUSEW 2018](image)

2.2 **2nd Workshop on Energy Efficient solutions based on IoT EESIoT 2018 Theme — Smart Cities & Nations**

**4th IEEE World Forum on Internet of Things (WF-IoT 2018)**

Entropy Consortium led by Antonio Skarmeta (UMU) and Anastasios Zafeiropoulos (UBITECH), organised this workshop which was held 5-8 February 2018 — Singapore in conjunction with WF-IoT 2018. Below more details are provided: Organising Committee, Technical Program Committee, Call for Papers.
Workshop Chairs:
- Antonio Skarmeta, Universidad de Murcia, Spain
- Anastasios Zafeiropoulos (UBITECH, Greece)
- ENTROPY consortium

Technical Program Committee
- Elias Kosmatopoulos (ITI, Greece)
- Ioannis Chatzigiannakis (Università di Roma La Sapienza, Italy)
- Fernando Terroso (Universidad de Murcia, Spain)
- Aurora Gonzalez (Universidad de Murcia, Spain)
- Alfonso Ramallo (Universidad de Murcia, Spain)
- Thanassis Bouras (UBITECH, Greece)
- Eleni Fotopoulou (UBITECH, Greece)
- Anna Fensel (Semantic Technology Institute-Innsbruck, Austria)
- Miquel Casals, (Technological University of Catalonia-UPC, Spain)
- Marta Gangolells (Technological University of Catalonia-UPC, Spain)
- Jérémie Jean (Egreen, France)
- Tamas Csoknyai (Budapest University of Technology and Economics, Hungary)
- Gabor Szedro Budapest University of Technology and Economics, Hungary)
- Cleopatra Bardaki (ELTRUN-AUEB, Greece)
- George Bouladakis CHARGED consortium
- Guillaume Pelcé and Jérémy Legardeur GreenPlay consortium
- Piero Fraternali enCompass consortium
- Johannes Reichl PEAKapp consortium
- Giorgos Mylonas GAIA consortium
- Javier Royo OrbEEt project
- Gianni Minetti (Paradox Engineering, Switzerland)

Call for Papers
Energy saving is based heavily on the design and development of novel energy efficient solutions. Information and Communication Technologies (ICT) and Internet of Things (IoT) could be instrumental in the use of abatement technologies that address energy consumption inefficiencies. On the one hand, integration with ICT technologies is one of the main drivers for the buildings’ industry to meet the 2050 long term goals for achieving the decarbonisation goal for the European economy. On the other hand, Internet of Things (IoT) can bring direct efficiency gains and can enable behavioural change based on measuring, monitoring, intelligent management and control of energy consumption data, as well as through providing reliable data to citizens, industries and governments about energy consumption / carbon emissions.

In order to exploit this potential, innovative solutions have to be implemented upon properly understanding the main energy consuming factors, as well as energy consuming trends, including the citizens’ behaviour with regards to energy efficiency. However, it should be noted that even with full-scale deployment of novel and energy efficient ICT solutions, without the right incentives or motivation to change, behaviour can be a major barrier to adoption. Thus, the deployment of energy efficient ICT solutions has to be accompanied with active engagement of the buildings’ occupants towards the goal to increase the overall environmental friendliness of the buildings. This can be achieved by increasing the overall awareness of consumers regarding the main causes of energy consumption, the impact on the environment, the potential for energy and cost savings, as well as providing the proper motives for changing their daily lifestyle in order to achieve better life quality.

This workshop aspires to be a forum of discussion between different stakeholders, researchers, industries etc., in order to present the most recent advances in the area of ICT- and IoT-based Energy Efficiency solutions. It will also promote the collaboration and mutual exchange of experiences between researchers. The presence of researchers from EU funded projects will be promoted although it is open to all kind of contributions.

The technical topics of interest include, but are not limited to:
- Data management, fusion and knowledge extraction, including semantic models
- Open/Linked Data Production and Consumption for energy efficient ICT services
- Behavioural and Energy Consumption Analytics
- Novel network infrastructures
- Smart metering infrastructures
- Wide area management and monitoring systems
- Networking protocols for low-power devices
- Methodologies for studying and analyzing smart buildings’ performance
- Pilot applications and experiences in both public and private buildings
- IoT-based gamification services for behavioral change towards energy efficiency
- Design guidelines for IoT-based energy efficient services
- IoT-based personalized services towards energy efficient lifestyle
- IoT for Energy-related issues in Education
- Mobile CrowdSensing Mechanisms for energy efficiency
- IoT and Smart Data-based intervention services for energy-efficient lifestyle and behavioural change
- Energy efficient electrical appliances: data exchange standards, interoperability, security
- Societal impact of Big Data on energy efficiency, sustainability and environment
2.3 Global IoT Summit 4-7 June 2018 - Bilbao (Spain)

The scientific paper entitled “Detaching the design, development and execution of big data analysis processes: A case study based on energy and behavioral analytics” which has been co-authored by University of Murcia and UBITECH, was presented at the Global IoT Summit 2018 (GIOTS 2018), held June 4-7, 2018, at Bilbao, Spain\(^1\). This paper proposes an approach for detaching the design, development and execution of big data analysis processes, focusing on the realization of energy and behavioral analytics, targeted to supporting the increase of energy efficiency in smart buildings through behavioral change of the citizens.

In particular, the proposed approach is realized over the ENTROPY platform (http://entropy-project.eu). ENTROPY regards an innovative energy-aware information technology ecosystem, aiming to support the design and development of novel personalized energy management and awareness services that can lead to occupants’ behavioral change towards actions that can have a positive impact on energy efficiency. A set of data analytic processes are designed, developed and supported through the implemented analysis toolkit. Separation of concerns among the related stakeholders is implemented based on the adoption and integration of the OpenCPU open source tool for supporting embedded scientific computing and reproducible research. OpenCPU provides a reliable and interoperable HTTP API for data analysis. Based on the provided API, appropriate customization is realized for supporting the design, development and execution of energy and behavioral analytics over the ENTROPY platform in an independent way.

\(^1\) Source: http://www.globalsiotsummit.org/program
Software developers are able to develop their analysis scripts without any restriction in the programming language (e.g. R, Python, Java) and make it available in the platform. Data scientists are able to design analytic workflows, consisting of set of processes and related input and output parameters in a user friendly and intuitive way. Decision makers are able to define the timeline for execution of the analysis processes and acquire access to the provided results. The overall analytics toolkit is applied in the energy domain, however it is designed and implemented in a generic fashion, making it suitable for various application domains.

Figure 3 - ENTROPY at GIOTS 2018
3. **WORKSHOPS AND EVENTS ATTENDED BY ENTROPY**

3.1 **Athens Innovation Festival - 20-22 November 2017 - Athens (Greece)**

The ENTROPY project was presented by the ELTRUN E-Business Research Center in the context of a specialized workshop held at the Athens Innovation Festival 2017.

The Athens Innovation Festival 2017 was a three-day festival of innovation held in Athens, Greece between 20th –22nd November 2017. In the context of the festival a number of innovative solutions were presented in a specialized workshop, where major EU research activities were presented to a large audience. Additionally, in a dedicated stand, participants had the opportunity to interact with the ENTROPY project partners and learn more regarding the ENTROPY solution and its potential benefits.

![Figure 4 - ENTROPY at Athens Innovation Festival 2017](image)

3.1 **Innovative strategies for smart buildings and citizens - 24th of January 2018 – Madrid (Spain)**

The project coordinator CIRCE, under the umbrella of the TRIBE and NEED4B projects, organized an international event last 24th of January in Madrid, to gather the latest innovations in the field of ENERGY EFFICIENCY in buildings. Covering the whole life cycle of a building (design, construction, operation, user behavior, etc.), the goal of the conference was to present the developments of up to 8 European projects and exchange points of view and ideas for the establishment of new initiatives.

Entropy project was invited to join and to disseminate the results achieved.
3.2 Research and Innovation Workshop in the area of Building Energy Efficiency 19 June 2018 - Athens (Greece)

The National Documentation Centre, together with seven research projects in the building energy efficiency field funded under the EU commission research topic "Reducing energy consumption and carbon footprint by smart and sustainable use", organised a Research & Innovation Workshop in the area of Building Energy Efficiency. The workshop was be held on June 19th 2018 at the National Hellenic Research Foundation in Athens.

During the workshop, apart from networking and knowledge sharing sessions and roundtables, the consortia, Entropy one included, had the chance to present and share their project findings on behavioral change aimed at energy efficiency, discuss and propose innovative business models to stimulate and sustain energy efficiency, as well as exchange views on future opportunities in the upcoming research and innovation call for proposals in the context of the Horizon 2020 framework.

The workshop was an official "Energy Day", part of the Sustainable Energy Week initiative of the European Commission of activities and events, which promote clean energy transition.
3.3 Smartcomp 2018 - 18-20 June 2018 - Taormina (Italy)

SMARTCOMP 2018 is the 4th edition of the conference and will be held in Taormina, Sicily after the success of the previous editions. SMARTCOMP 2018 will include smart computing innovations in all different technology aspects including pervasive/ubiquitous computing, cloud computing, sensor networks, internet of things, big data analytics, security and privacy, social computing, cognitive computing, cyber-physical systems with their validation within smart computing environments, and applications such as smart buildings, smart cities, smart grids, precision agriculture and other societal applications contributing to smart living.

A member of ENTROPY’s team presented a publication about the modelling of the behaviours that have been done in ENTROPY and presented the project to the audience.
3.4 1st International Conference on Data for Low Energy Buildings 28-29 June 2018 - Murcia (Spain)

The conference Data for Low-Energy Buildings 2018 aimed to facilitate the exchange and share of ideas in the fields of energy use in buildings and data science. The event had representation from industry and academia and covered the common ground of these two important disciplines. With this, it was intended to facilitate an interdisciplinary arena in which the participants were able to discuss their most recent findings, the recent innovations, and the trends that this field of study has shown in the last years.

One of the members of ENTROPY-UMU team gave a presentation about some of the findings of ENTROPY, providing also with this an overview of the project.

The audience of this event was merely academics on the field of building physics and building energy performance evaluation. But also some professionals from architectural firms.

It was the desired of the organiser to create an event in which academia and industry are together, and in which communication between the two parts is encouraged. For this, we invited three architectural firms that came to give talks about their previous works on the topic of low energy buildings and how they have used data for verification and testing.

Here are the firms that participated with talks in the event:

- **Luis Vidal Arquitectos** – Presenting their Castellana 77 project
- **Bere Architects** – Presenting the first net-positive home in UK Lark Rise
- **Clavel Arquitectos** – Presenting his project Car Park BBVA Avenida de la Libertad
3.5  **Behave 2018 - 5-7 September 2018 - Zurich (Switzerland)**

Behave 2018 brought together researchers, policy makers and practitioners to discuss problems and measures in the field of behaviours related to end-use energy efficiency and sufficiency and the adoption of low-carbon technologies. As such, it focused on various fields of research, innovation and knowledge transfer. The ENTROPY UMU team was invited to the pre-conference event MOBISTYLE.

**Pre-Conference Event on “MOBISTYLE and H2020 sister projects: Behavioural change toward energy efficiency through ICT” 5 Sept 2018 from 9:00-12:00**

Under the H2020 funding schemes, EU is supporting projects having the common objective to demonstrate that ICT-based solutions can contribute to saving energy by motivating and supporting behavioral change of energy end-users.

Through facilitating open discussions, the workshop will adopt a user-centric approach to exchange ideas, share the projects’ lessons learned so far, brainstorm on current and future challenges in the area of ICT solutions encouraging behaviour change, and document actionable new ideas that could help improve the projects’ progress and maximize the European replication impacts. Entropy team proactively took part to this event opportunity.

![Figure 9. Summary session BEHAVE MOBISTYLE](image)

3.6  **Energy Analytics Course at INESC TEC, Porto University, FEUP Portugal (September 4-6, 2018)**

The technological revolution in the electric power system sector is producing large volumes of data with relevant impact in the business and functional processes of system operators, energy utilities and grid users. This course aims to cover different theoretical and practical aspects of data analytics in energy systems, according to the following viewpoint:

1. The future generation of big data functions will combine spatial-temporal information and distributed learning techniques that exploit recent advances in high performance and distributed computing.

2. The output should be probabilistic (uncertainty) information and with high value for integration in decision-aid methods under risk.

3. Deep learning techniques represent an added value for automatic feature extraction and reduction, but manual feature engineering using domain (expert) knowledge cannot be abandoned.

4. Machine learning algorithms can be used to control grid assets, for instance embedded in reinforcement learning techniques or to create proxy models for complex physical systems.

5. Creation of new business models for knowledge extraction from data is also expected in a near future. Some examples are data analytics for consumer engagement in demand response, big data pre-processing from grid sensors, electricity markets modelling and predictive maintenance of electrical assets.

Intelen’s CEO, Dr. Vassilis Nikolopoulos was lecturing at the above course and presented various analytics algorithms and deliverables from the Entropy Project and gamification methodologies.
4. INTEREST GROUP SET UP & ACTIVITIES

4.1 UMU Pilot

To motivate the creation of a User Group for ENTROPY we have been involved on a variety of events that helped to make people aware of the work that was carried out in project ENTROPY. These events extended from public consultations, to professional events, and scientific local seminars.

4.1.1 Public consultation for definition of innervations to achieve climate change adaptation 29th June 2017 – Murcia Spain

The department of urban planning, the environment and gardens of the city of Murcia is working on the elaboration of a PLAN of adaptation to the changing climate in the municipality of MURCIA. After a first phase of consultation professional, expert, and municipal employees have been defined adaptation measures best suited to our town in the vulnerable sectors: agriculture and garden, water, environment, health and urban planning. We need the contribution and participation that will help us to contrast these proposed measures. The ENTROPY team participated in this event to make aware the local authorities and interested professionals of the work that was being carried out in ENTROPY and how that could help mitigation and adaptation to climate change.

![Figure 10 – Flyer of the event.](image)

4.1.2 Energy Efficient Buildings talk at the Institution of Chartered Architects of Murcia 20 April 2018 - Murcia, Spain

This event consisted on a talk given to an audience of circa 80 professionals of the field of architecture being the large majority of them chartered architects in charge of architectural (buildings) projects. With this we wanted to focus our speech to the very specific audience of professional involved in the design construction and commissioning of buildings.
4.1.3 IV Encuentro de Ingeniería de la Energía del Campus Mare Nostrum 19 Sept 2018. Murcia, Spain

TOWARDS a transition energy sustainable and of access UNIVERSAL this new edition of the meeting of energy engineering is intended to serve as a meeting point to people in the academic and professional field as well as institutions and companies that work in the vast field of the energy applications perspectives provide solutions to the major challenges that society has in this area. In particular, the meeting aims to bring together groups of research, faculty and staff research, particularly the youngest, as well as professionals in the field of industrial and services, working in the different facets in what is called Energy engineering. And all this within the framework of the Campus of excellence international Mare Nostrum (Universidad Politécnica de Cartagena and Murcia University), open to national and international participation of official institutions, companies, universities, centres of research etc.

Presenting ENTROPY in this event we wanted to reach a more scientific audience, but yet within the local scope of project ENTROPY. The talk showed an overview of ENTROPY and preliminary results that were received with interest by the audience.

Figure 11 – Flyer of the event
4.2 **POLO Pilot**

Polo Navacchio has facilitated the knowledge of the potentiality offered by the Entropy project, thanks to the role and the function that it performs daily in the region where it is located and to the network of contacts in which it operates.

Polo is an innovation brokerage platform, HUB of a network of relationships and connections, which fosters the exchange of skills, knowledge, information, services and tools between established companies and other systems (local SMEs, large companies, investors), with the aim of helping the growth of competitiveness of a new generation of entrepreneurs, who are already changing the economy and the world of work, through a bottom-up approach, with a silent revolution that must be encouraged and supported through:

- interaction and collaboration between different subjects, enhancing the effect-system of the innovative process in its economic, technological, financial, institutional and sociological components;
- the dissemination of knowledge and the use of innovative technologies / services, through open innovation practices and services;
- the offer of services to facilitate not only the entrepreneurial set up, but also the growth, in order to facilitate their start and success on the market;
- facilitating interaction between the world of education and the business world, in line with the latest trends at national and international level (School-Work Alternation, Digital Ateliers, etc.).
- the dissemination of skills on digital manufacturing and interaction with digital fabrication laboratories (Fab Lab), as places of contamination that promote, starting from the school environment, the culture of entrepreneurship, innovation and new models of learning.
- the concentration of capital for innovation, favoring the meeting between business angel \ venture capitalists and start-ups or companies looking for capital.
- greater contamination and sharing of knowledge, ideas, business practices, in order to facilitate opportunities for exchanges and collaborations for the development of new projects / products / services.

In this context, POLO is member of IASP "International Association of Science Parks and Areas of Innovation" (https://www.iasp.ws/), APSTI "Italian network of Scientific and technological Poles" and Italia Start Up "Italian start ups association" (http://www.italiastartup.it/en/). These cooperation resulted as strategic to disseminate the project results and stimulate awareness around hi-tech innovation ecosystems, like the ENTROPY one, towards the adoption of energy efficient lifestyles to be achieved through motivations devoted to behavioral changes.

POLO is also part of the Technological Network of Technological Poles of the coastal Tuscany, which periodically meets at the headquarters of Polo Navacchio, aimed at involving the Technological Poles, the Incubators, the Centers of scientific-technological expertise of the provinces of Livorno, Lucca and Pisa, in order to facilitate technological and market exchanges between companies in different contexts, the creation of start-ups in emerging sectors and the sharing of laboratories and specialized technological centers.

In particular, the ENTROPY project was made known to the following Technological Poles, with which POLO has continuous collaboration relationships:

- Polo Magona, Cecina (Livorno)
- Pont - Tech - Pontedera (Pisa)
- Lucca Intech - Lucca Technical Center (Lucca)
The main technological fields in which the 100 hi-tech companies based in the coastal Tuscany Poli work are the following:

![Diagram of Tuscany coastal Poles main technological fields](image)

**Figure 12 – Tuscany coastal Poles main technological fields**

POLO has also always been engaged in promoting and spreading the culture of doing (innovating), sharing and digital manufacturing (Factory 4.0) and is a qualifying node of the Fab Lab network, through the Coordination, from November 2018, of the Regional Network of digital manufacturing.

In 2018 POLO launched a collaboration agreement with TechItalia_Lab, the first incubator of Italian startups in London, equity free, and led by mentor, in order to host the start-ups of the Navacchio Technological Pole system for free at the London coworking, to deal with their consultants how to start a hi-tech company in London and compare with other companies, be guided to enter the British market, in emerging sectors.

Also in 2018 POLO started the agreement with Cinitaly with the aim of facilitating the meeting between "demand and supply" of technologies between Italian and Chinese companies, thanks to the transfer of knowledge and the sharing of good practices, particularly in clean tech and green.
In particular, some events have been considered as strategic to achieve these goals, as documented in the following sections:

**4.2.1 Workshop "Supporting development through innovation and technology transfer: a new model of competitiveness for companies" 12 June 2018 Florence - APSTI**

APSTI is the Italian network of Scientific and Technological Parks, to which 25 subjects belong, namely: science and technology parks, incubators of companies and innovative startups, organizations that aim to promote entrepreneurial development and the competitiveness of the territories through innovation. APSTI works to systematize the functions of the many subjects that interact in the field of innovation and technology transfer through an integration activity between the needs of innovative growth of companies and the wealth of knowledge expressed by the poles of technological and scientific excellence, from universities and research centers.

The topics discussed:
- Role of technology transfer, also in the energy efficiency ecosystem, for territories and science parks.
- The widespread factory project and the industry model 4.0
- Training and new skills in the field of innovation
- Risk capital and investments in innovative startups

**4.2.2 Twinning project between Tecnopolo dell'Aquila and Polo Navacchio 2017-2018**

Tecnopolo d'Abruzzo and the Navacchio Technological Center held meetings which started in December 2017 and continued in the spring of 2018. In particular, the project aimed at building a collaboration platform based on some strategic focus for business development for the two Poles in their respective territories: Open Innovation, Incubation and development of new opportunities for hi-tech companies. This is the aim of the meetings between

The topics of the project are: comparing the skills and specificities of the two Poles, the Pisan one characterized by startups and hi-tech SMEs, and the Aquila one, with large companies, to start building a platform for collaboration and exchanges, with the purpose of encouraging on one hand the growth of an innovation ecosystem in the Abruzzi territory, and on the other hand the diffusion of know-how produced by the Pisan territory in terms of technological and organizational skills to support innovation processes.

Entropy main aims and results were considered as important for transferring the knowledge and outcomes from Polo Navacchio to Tecnopolo dell'Aquila.

**4.2.3 Wake Up Event - Polo Auditorium**

This event took place the 21st of June 2018, at Polo Tecnologico di Navacchio. Challenge was to combine three domains, namely: Energy Efficiency, Industry 4.0 and Greentech. Big players participated to the event to promote the adoption of the paradigm leveraging the interest of SMEs and start-up to become main actors and drivers in these topics.

Tuscany region, the municipality of Cascina (which Navacchio is part of) and Polo Navacchio opened the event.
Conad, which is an organization that operates through eight large cooperative groups, purchasing and distribution centers, was one of the main sponsor.

Besides Conad, many investors took part to the event along with SMEs and Start-ups.

![Wake Up event - Polo Auditorium](image)

**Figure 13 - Wake Up event - Polo Auditorium**

### 4.2.4 Periodic Events 2017-2018 "Regional support platform for companies implementing the regional strategy on Industry 4.0"

Besides the events described above, periodic events were organised during the 2017-2018 biennium within the "Regional support platform for companies implementing the regional strategy on Industry 4.0". The main aims are:

- promote the technological, organizational and socio-economic contents of the topics of the new Industry 4.0 paradigm with regard energy efficiency ecosystem, also;

- propose the technical contents of regional actions and interventions aimed at the introduction of digital technologies in companies;

- analyze the problems of specialized skills, technical and vocational training and higher education; examine the impacts on the organization of work.
4.3 HESSO Pilot

To motivate the creation of a User Group for ENTROPY we have been involved in the following main events

4.3.1 Swiss Energy tour event

Figure 14: Swiss Energy Tour event 2017-2019

Swiss Energy Tour project aims to educate people to take actions toward energy savings. The project has a stand on several social exhibitions across Switzerland the goal is to educate as many people as possible in the energy savings. The event will be linked to all the major popular exhibitions (fairs) in Switzerland and will be held from January 2017 to October 2019 in 17 different fairs (http://www.swissenergytour.ch/fr). HES-SO participated to some of these events suggested actions to assess how much human behaviour can impact energy savings. HES-SO also helped to develop a Web app that will deliver energy recommendations to the general public.

4.3.2 HES-SO pilot presentation at ICWMC conference in Nice

Figure 15: ICWMC International Conference - Nice

ICWMC is the International Conference on Wireless and Mobile Communications for which our paper called “A Sensor Networking Architecture for ENTROPY - Energy-Aware
Information and Communication Technologies Infrastructure Enabling Smart Building Solutions” have been accepted and published by IARIA XPS Press. The Conference held in Nice in 2017 was an opportunity to share our project and raise concerns about energy savings and human behaviour.

4.3.3 Public national radio interview

4.3.3.1 Press review

The implementation of the entropy project into our local pilot has been presented several times to national information providers. Those actions have resulted in press articles, radio interview and TV interview. Links for press review below:

- Nouvelliste: [https://www.hevs.ch/fr/nes-so-valais-wallis/actualites/projet-europeen-dans-le-domaine-de-l-energy-10848](https://www.hevs.ch/fr/nes-so-valais-wallis/actualites/projet-europeen-dans-le-domaine-de-l-energy-10848)
- Radio Chablais - 10.04.2018 - Economiser de l’énergie grâce à une application et des capteurs-
- RTS, la Première - 11.04.2018 - Le Journal de 8h, intervention du Prof. Dominique Genoud

4.3.4 Energy efficiency sensibilization event at HES-SO, Sept 2018

To enrol as many people as possible for the last campaign, the applications and pilot infrastructure and the objectives of the project have been presented during the General Meeting of the Information system institute of the HES-SO//Valais. 80 people have been asked to participate to the last campaign and to follow the actions and information provided by the apps.
5. CONCLUSIONS

This report documents the activities performed by ENTROPY Consortium in disseminating the project aims and in establishing initial communities of interest about energy efficiency aspects.

Scientific and technical committee of the project was deeply involved in organising and managing scientific workshops at EU/global level.

Furthermore, the three project pilots were deeply involved in their own countries (namely: Spain, Italy and Switzerland) in creating and maintaining group of interest about energy efficiency ecosystem.

All these actions were planned and carried out following the strategy outlined and documented in the D6.1 "Communication Roadmap" report led by DNET and delivered at month 3 of the project (end of December 2015).
BIBLIOGRAPHY