WATT ELSE

NETWORK FOR A DYNAMIC ACTORS INVOLVED IN THE TRANSITION OF COMPETENCES IN THE ENERGY FIELD FACING LEARNING CHALLENGES IN EUROPE

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1. OBJECTIVES OF THE SURVEY PROCES

From autumn 2019 and for the next two years, 12 European partners (public authorities, firms, universities and training organizations) started an important project: **to support their respective territories in the transformation of their local industrial sector of energy production, services and building insulation, specifically in terms of human resources, employment and training offer.** The main objective of the project is to compare respective professional practices to enrich and support teritories in this challenge.

The stakes of this unique partnership are to:

- Spin off a method of territorial action and cooperation
- Update needs of recruitment and training paths
- Assist an industrial energy branch mutating

2. METHODOLOGY OF THE SURVEY PROCESS

As a tool of gathering information on the project we used a set of questionnaires, which were send to three group of respondents throughout countries involved in this project. These groups consisted of:

- training organizations and universities,
- firms,
- public authorities and organizations.

To help us on this collect, we prepared three interview guides. The requirement for number and type of compulsory respondents are shown in a table below:

Firms	Training organizations and Universities organisations	Local public authorities and employment strutures
Including at least	*Including at least*	*Including at least*
2 international firms which have a local branch	2 High schools	2 State representatives
3 SMEs	2 professional schools	2 Region and metropolitan area 2 elected politicians + 2 local public authority directors
1 chamber of commerce or handicraft	2 Universities	2 Municipalities or Community of municipalities: 2 elected politicians + 2 directors
1 professional branch / 1 cluster	2 Training organisations	2 local employment agencies
1 trade union		
1 association of employers		

3. RESPONDENTS

This chapter describes number and variety of respondents who answered the questionnaire.

3.1 Slovakia

There were 14 organizations who answered to questionnaires:

- 4 Training organizations :
  - TUKE - Technical University of Košice, TUKE has the status of a research university awarded by the Ministry of Education
  - UNIZA - University of Žilina, the main domain of university is transport
  - Spojená škola Martin – High school specializing in mechanical, electrical engineering and automotive

- SOŠE Trnava – Vocational energy school founded originally for the needs of nuclear power plants

- 4 Public authorities:
  - Ministry of Economy of the Slovak Republic - central state administration body for nuclear fuel management and radioactive waste storage and energy efficiency, heating and gas industry and others
  - Nitra region - one from the eight Slovak regions
  - Local authority of Prievidza – minicipality in which the energy sector is being transformed
  - Office of Labour, Social Affairs and Family Malacky – local employment agency

- 6 Firms or firm representatives:
  - TEKO – Producer of electricity and heat energy using CHP technology (SME company)
  - Žilinská Teplárenská a.s. – Producer of electricity and heat energy. Local distributor of heat energy (SME company)
  - COM-therm spol. s r.o. – Producer and distributor of heat and domestic hot water (SME company)
  - SBaA – Industrial cluster in the fields of strategy, legislation and communication to build a comprehensive battery chain in Slovakia
  - SZVT – Association of employers of district heating systems in Slovakia
  - ECHOZ – Trade union dedicated the energy field of activity

3.2 France

11 Organizations answered to the questionnaires:

- 1 Training organization:

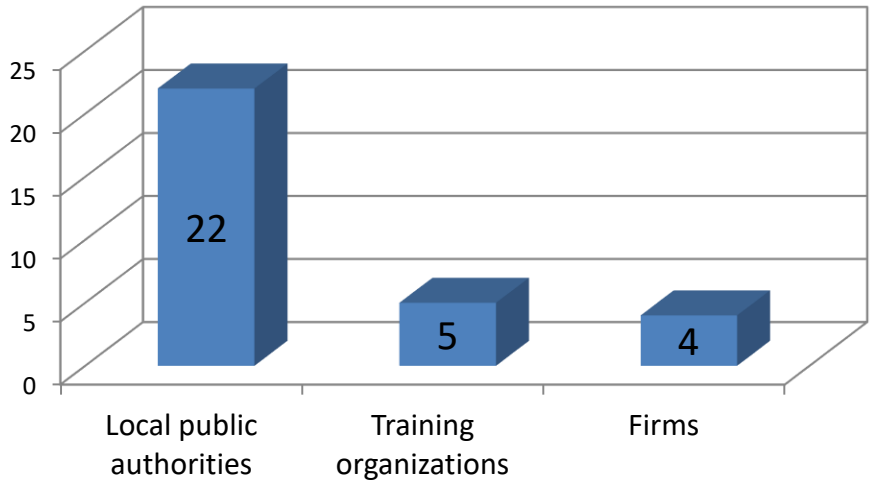
- UTBM (as a University being part of this Erasmus+ Watt else partnership)

- 3 Public Authorities:
  - Préfecture de Belfort
  - DIRECCTE (State representative of the ministry of Labour)
  - Regional Council from Bourgogne-Franche-Comté

- 7 Firms or firm representatives:
  - JUSTY Ingénierie Energies – Design office specialized in hydrogen technology, maintenance of wind turbine and training organization.
  - ADNFC – Structure aiming at supporting firms in the North Franche-Comté region to attract new investors
  - EDF – Délégation régionale Bourgogne Franche-Comté – Major national actor in the electricity firld (production, transport, distribution,…) as well in many other European areas (United Kingdom, Italy, Belgium). Conceptor of elements for nuclear reactors (supported by Framatome) – 40 million customers worldwide
  - ENEDIS – Distributor of electricity and dealer of distribution networks
  - MGR – Monnier Energies – Machining wide dimension – Mecanic welding and fine metalry
  - MILGRED – Machining of turbine pieces in super(alloy)
  - Vallée de l'Energie – Cluster dedicated the energy field of activity

3.3 Spain

The stakeholders answering the questionnaires circulated by are show below:



In total there 31 answers classified as follows: 22 local authorities, 5 training organizations and 4 companies. Below you will observe the respondents features:

	Name of the organization	Classification
1	FVMP - Association of municipalities in Valencian Autonomous Region	Local public authorities
2	Valencia Regional government. Department of Climate Change, responsible for the adaptation and mitigation policies on climate change	Local public authorities
3	Consorci de la Ribera	Local public authorities
4	Consorci de la Ribera - Educational Environment Department	Local public authorities
5	Conselleria d'agricultura GVA	Local public authorities
6	Municipality of Xilxes	Local public authorities
7	Municipality of Polinyà de Xúquer	Local public authorities
8	Ribera Alta association of municipalities / Municipality of Sumacàrcer	Local public authorities
9	Consorci de la Ribera – Tourism department	Local public authorities

	Name of the organization	Classification
10	Consorci de la Ribera -employment department	Local public authorities
11	City of Alzira – Employment department	Local public authorities
12	Promotion of energy efficiency and renewable energies in the Valencia Region.	Local public authorities
13	City of Alzira – City Environmental department	Local public authorities
14	Municipality of Alfarp	Local public authorities
15	Municipality of Guadassuar	Local public authorities
16	IVACE Energy Department. Generalitat Valenciana	Local public authorities
17	Municipality of Gavarda	Local public authorities
18	Valencia Provincial Government	Local public authorities
19	Ribera Baixa association of municipalities / Municipality of Sueca	Local public authorities
20	Municipality of Corbera	Local public authorities
21	Municipality of Antella	Local public authorities
22	Municipality of Catadau	Local public authorities
23	Polytechnical University of Valencia - UPV	Training organizations
24	Valencia Regional Government – Agriculture knowledge transfer department	Training organizations
25	University of Valencia - UV	Training organizations
26	environmental education department of a public administration	Training organizations
27	La Malvesia VET School	Training organizations
28	Cooperativa Eléctrica d'Alginet	Firms
29	Coworking Alzira. SME association	Firms
30	3Epsilon Solutions SL	Firms
31	Electrical cooperatives of Alginet	Firms

3.4 Sweden

4 organizations answered the questionnaire:

- 1 Training Organization
  - - KTH (as a partner of the project, with feedback from ITM School Energy department

- 2 Public Authorities:
  - Stockholm Stad (Stockholm Municipality)
  - Swedish Energy Agency (The Swedish Energy Agency is leading society's transition to a sustainable energy system. The Agency contribute with facts, knowledge, and analysis of supply and use of energy in the society, as well as work towards security of energy supply.

- 1 Firm
  - Vattenfall- is energy company that is wholly owned by the Swedish state. The company is a producer of electrical energy, a district heating supplier and electricity network owner through the subsidiary Vattenfall Eldistribution AB.

3.5 Greece

The survey took place in January 2020 mainly in Western Greece, and a total of 9 interviews via questionnaire were gathered. The stakeholders that participated are categorized as follows:

- 4 Training institutions:
  - Hellenic Open University, University of Patras, Ionian Univ. and Panteion Univ.

- 2 Public Authorities:
  - Prefecture of Achaia, Municipality of Nafpaktos

- 3 Firms:
  - three companies answered (no more information)

3.6 Italy

12 Organizations replies to the questionnaire :

- 5 Training Organizations
  - IIS AMALDI SRAFFA in Orbassano (TO), IIS NATTA in Rivoli (TO), EnAIP Piemonte, CFIQ, Fondazione ITS
- 2 Public Authorities
  - Regione Piemonte - Sviluppo energetico sostenibile (sustainable energy development); Polo MESAP (Smart Products and Manufacturing)
- 5 Firms (1 out of 5 in anonymous modality)
  - Vass Technologies (energy efficient prefabricated wooden houses), Studio SUN-MO (solar thermal and photovoltaic systems), BigMat (sale of construction materials), Eodelis (LED lighting systems).

3.7 Romania

- 8 Training organizations:
  - Professional School Scheia,
  - Professional School Gropnita,
  - Technological High School of Electronics and Telecommunications “Gheorghe Marzescu” Iasi,
  - The “Emil Racoviță“ National College Iasi,
  - Alexandru Ioan Cuza University – Faculty of Biology,
  - The EDINFO Foundation,

- Technical University of Iasi – Faculty of Electrical, Energy and Applied Informatics Engineering.

- 3 Public authorities:
  - Iasi City Hall,
  - Palace of children Iasi,
  - Agency for Environmental Protection Iasi,

- 5 Firms:
  - Gemite Ro SRL,
  - S. C. VEOLIA ENERGIE IASI S. A.,
  - SALUBRIS S. A. Iasi,
  - ECOTIC MOLDOVA,
  - Folieri Design Iasi.

4. MAIN ISSUES AND CHALLENGES

Next chapter of this document deals with main issues and challenges of respective countries in project.

4.1 Main issues and challenges is Slovakia

Energy sector is a key sector of the national economy of the Slovak Republic, which is focused on the production, transformation and use of individual forms of energy.

From a long-term perspective until 2030, the Energy sector, in connection with the National Investment Plan of the Slovak Republic for the years 2018 – 2030 and National energy and climate plan for the period 2021 - 2030, has the following main goals:

- Ensuring energy security
- Construction of cross-border interconnections and ensuring an integrated energy market within the EU
- Energy efficiency
- Climate measures - decarbonizing the economy.

In particular, climate measures and the decarbonization of the economy, the impact of digitization and the development of regulation are the main contributors to the transformation of the energy sector.

Renewable sources

The Slovak Republic defines itself as a country that is one of the leading EU countries in the use of low-carbon sources for electricity generation. This fact is caused by a combination of the use of nuclear energy and water resources. However, the development of meeting the targets for the implementation of renewable energy sources (RES) has stagnated slightly due to the increasing final energy consumption in recent years, caused mainly by new investments in industry.

That´s why Ministry of Economy reformed the law on the promotion of RES re-evaluated and determined anew the sources to be supported, including a new institute of local source. Another change was in place market-oriented auctions in line with the best foreign practices and European requirements in order to ensure the lowest possible cost of achieving targets for renewables-based electricity generation.

To sum up this changes - installations with an output of 0.5 to 10 MW (in the case of solar energy from 0.1 to 2 MW) will be supported with support in the form of a surcharge paid for a period of 15 years.

Energy efficiency

The greatest potential in increasing the energy efficiency of the country was identified in the construction of buildings.

According to the EU Action Plan 20/20/20, only buildings with nearly zero energy demand will be built after 2020, which represents a new phenomenon in terms of design, construction itself and, last but not least, the operation of buildings. These are not only the buildings with almost zero energy demand, but above all the philosophy of sustainable architecture and construction with the overall intention to design, implement and operate buildings in the future that will be energy active, environmentally safe and economically efficient.

Transformation of the Upper Nitra region

Slovakia plans to suspend state dotation for the production of electricity from coal in 2023, which will dampen its mining with the most significant impact on the Upper Nitra region. In 2019, the government approved an Action Plan for the Transformation of the Upper Nitra Coal Region. As part of the preparation of the action plan, the collection of indicative project intentions was also carried out, within which more than 200 proposals with the potential to create approximately 10,000 jobs were submitted.

The questionnaire was addressed to a representative of the affected region (Upper Nitra) and municipality (Prievidza). They both answered that the most important for their development is strategic document with updating of the concept of territorial development.

Smart grids and cross-border interconnections

In 2019, Grant of over EUR 91 million for construction works was allocated to a cross-border smart grid project ACON (Again COnnected Network) between Slovakia and the Czech Republic under a funding instrument of Connecting Europe Facility (CEF) Energy. This project will yield remarkable innovative

and smart solutions with Smart Technologies (IMS, AMM, remote controls, new technology TS's, installation of cables) and a supporting conventional part.

According respondents in questionnaire there is a particular interest in this new energy segment, but there are no real experts.

Nuclear power

Nuclear power plants have been in operation in Slovakia for more than 50 years and belong to the so-called low-carbon technologies, during their operation no greenhouse gases are emitted into the air. In the Slovak energy sector, nuclear power plants supply the largest share of electricity.

The completion of Units 3 and 4 of the nuclear power plant in Mochovce (MO34) is unique not only in Slovakia. The output of each unit will be 471 MWe - one reactor will cover 13% of electricity consumption in Slovakia. The annual production of completed units will save more than 7 million tons of CO2 emissions.

At present, nuclear power plants employ about 2,350 people, including a high percentage of highly specified professionals who are not available (freely available) on the market.

4.2 Main issues and challenges in France

Various challenges are interconnected in France, but the emphasis is rather placed on technical and financial aspects in a short term not taking into account medium- or long-term aspects dealing with anticipation of human resources (jobs, training and competences).

- **ACCOMPANY the MIX ENERGY** in France based on a diversity of energies between traditional ones (nuclear, gas, thermal, hydroelectricity, wind), and modern ones such as renewable energies, energy efficiency, electric energy storage, hydrogen energy
- **ACHIEVE A CONVERSION OF ENTREPRISES** taking into account the socio-economical failures from industrial firms which are implemented in our region (221 companies in the energy sector, employing 18 650 employees in the region) so as to mitigate the impact on jobs. In Belfort, more than 2000 contracts are threated.
- **SUPPORT THE DEVELOPMENT** of local university centers working for the energy sector (UTBM, Research Federation FC LAB, FEMTO ST with its energy department) as well as the cluster called "Vallée de l'Energie" (VDE) led by the directly major industrial firms, in July 2011. This cluster, which includes some 30 member companies, works to generate synergies between the companies themselves (whether they are prime contractors or sub-contractors), work on training and skills and encourage "business networking" through "Connecteam" evenings or "Work'In Sessions" meetings to foster the emergence of new projects.
- **SUSTAIN TRAINING, TECHNOCOLOGICAL CHANGE AND ANTICIPATE NEEDS** at a large scale among firms, private spheres, and public authorities to bring energy transition to the territories. For instance, the issue is the connection between new producers and energy storers (**car battery, self-production, solar panels on rooftops, private wind..**.) with consumers whatever they are
- **IMPLEMENT ANOTHER CHALLENGE** : regional policy aiming to go towards a region with **positive energy** in 2050 thanks to 1/ a decrease in final energy consumption of 49% (including fossil -99%) compared to 2014 and 2/ 98% of ENR in regional consumption, with 74% of local production (approx. 15% in 2018). For EDF, this challenge translates into a need to support the territories in the implementation of this policy, in accordance with the Group's guidelines (**wind/photovoltaic development/heat grids; renovation and energy efficiency of buildings and processes; transport and decarbonized mobility, including hydrogen**)

4.3 Main issues and challenges in Spain

Main issues and challenges identified with the questionnaires are summarized below:

- RES implementation, which has been discouraged during years due to previous discouraging legal regulations (feed-in tariff).
- Reducing energy consumption at building and transport sector. Electric vehicle charging network as well.
- Sustainable mobility, forest fire prevention (biomass) and natural areas protection with a high ecological value.
- Local energy communities' promotion.
- Accelerate the activity licenses for renewable energy installations, avoiding conflicts with biodiversity
- Promote RES among Tourism sector.
- Low availability of economic funds and poor planning in the cities.
- Lack of skilled energy related workers.
- Rural depopulation and high unemployment rates in certain sectors based on unskilled labour market.
- Agroindustry promotion based on high added value products.
- Based on tertiary and agriculture sector. Tourism sector is the most promising job creation sector in the next years.
- Most challenging issues small towns are the ageing of the population and the loss of population.
- To shift from a centralized electricity and conventional energy sources based on fossil fuels to decentralized renewable energy production.
- Energy quality of service and clean energy.
- Energy efficiency promotion.
- Political, economic, and legislative barriers.

- Reducing energy consumption at building and transport sectors.

4.4 Main issues and challenges in Sweden

Stockholm Region is one of fastest-growing metropolitan regions in Europe ah facing the following challenges:

- Implement Energy policy encompasses the production, distribution and use of energy reconcile ecological sustainability, competitiveness, and security of supply.
- Sustainable the regional growth
- Reducing climate impact in the transport sectors
- Sustain and Securing the energy supply
- Adapt energy changing impacts and global conditions
- Foster green technology related to electricity, heating markets, energy efficiency and implement renewable energy such as bioenergy, solar energy, and wind and hydropower.

4.5 Main issues and challenges in Greece

Public Authorities also have begun to recognize the need for a skilled workforce in the energy field and the need for up-skilling existing personnel. The ever-increasing importance of renewable energy sources and energy management has led to new investment, most of them are coordinated by the National Government and local authorities are not able to intervene. Dissemination and awareness actions are also being realized in the fields of green energy and renewable energy sources.

In the private sector, there are few but quite active private companies that deal directly with the energy sector (besides fuel provision). All of them are SMEs. There is an ever-increasing number of start-ups that deal with bioenergy, energy management and monitoring, fossil Energy, solar and wind energy.

In summary, the main issues in the field is the need to fain knowledge on new trends such as energy management, green energy, and the need for more funding for training and new equipment for energy management. The private sector needs to be strengthened since firms are struggling with finding skilled and/experienced personnel. The latter is a major issue because firms can easier to find VET graduates but it is more difficult to recruit University graduates with skills related to real market needs.

It is promising that the ample availability of renewable energy potential (wind, hydro, biomass, geothermal, solar & solar thermal) combined with ongoing large-scale infrastructure projects involving Greece (TAP-IGB-EastMedGas Pipelines, oil exploration) show that Greece will be a key player in the formulation of the EU energy mix. This promises significant investment opportunities in all energy industries, a move that is however not yet realized.

Some recent efforts to the end to improve energy efficiency and reduce cost driven by such technologies as smart metering, smart grid technologies, LED lighting, energy efficient buildings etc. have been realized by the government.

In this context, there are promising new opportunities for private companies such as the liberalization of the electricity and natural gas markets and the further separation of production and supply from transmission networks. This gives the opportunity to many new firms to flourish in a sector monopolized by the state.

4.6 Main issues and challenges in Italy

5 main challenges will guide investments in energy transition in the coming years.

- **LOCAL COMMUNITIES SOCIAL INNOVATION**: foster energy transition through innovation in production and consumption practices. The main challenge is to develop Energy communities which means a flexible network of active producers and users. In this direction, a great

opportunity is given by new technologies, especially regarding SMART GRIDS (management of energy surplus from green production).

- **BUILDING EFFICIENCY**: build or restructure private, public and industrial buildings making them more efficiently (envelope and systems).
- **GREEN MOBILITY AND MICROMOBILITY**: increase of the use of renewables and reduction of energy in transport (sustainable mobility both from a technical point of view and from behaviors)
- **ENERGY EFFICIENCY IN INDUSTRIAL PRODUCTION PROCESSES**: efficiency in production systems
- **ENERGY EFFICIENSY AND GREEN JOBS**: train to increase green competences to support energy transition and increase innovation to increase green jobs

4.7 Main issues and challenges in Romania

For training organizations and schools, the main issue lies in renewable energies, energy efficient future trends, wasting of energy and environmental damage. Harnessing and utilization of energy causes an immense amount of environmental damage, but there are environmental problems associated with the use of almost any form of energy. Another problems related to energy are: high costs of energy, the lack of investments in the transport network, and in general lack of use of alternative energy sources.

According to Public authorities the main challenge on energy sector from the municipal point of due is to rehabilitate the public buildings (large consumers with high losses) and the district heating network and to modernize public lighting with new technologies, based on green and renewables energies.

Firms in Romania say that electrical energy is expensive and is not produced in the necessary quantity to satisfy the industrial and household necessities, and natural gas is not accessible in all areas.

5. MAIN STRATEGIES REGARDING ENERGY TRANSITION

This chapter deals with main strategies, developments, and changes in the energy sector in partner countries.

5.1 Main strategies regarding energy transition in Slovakia

Developments and changes in the energy sector are characterized by the main strategic documents of Slovak republic and European Union

- Strategy of the Environmental Policy of the Slovak Republic until 2030,
- Vision and Development Strategy of Slovakia by 2030,
- Strategy of the Digital Transformation of Slovakia 2030,
- Slovak Republic towards green economy,
- Voluntary National Review of the Slovak Republic on the Implementation of the 2030 Agenda for Sustainable Development

In Slovakia, the main strategy of respondents lays in the fact to:

- permanent updating of lectures and seminars, inviting experts from practice to the teaching process, practical and application-oriented bachelor, diploma and doctoral theses
- participation in science and research in the field of intelligent transport systems (e-mobility), intelligent networks and the use of renewable energy sources
- introducing a new field of study on universities necessary for the energy industry (e.g. a Power Mechanical Engineering, a Technician of Building Energy Equipment) which could enhance cooperation with the energy sector

5.2 Main strategies regarding energy transition in France

In France, the main strategy lays in the fact to:

- support companies and promote hydrogen in the department. Since January 2016, the Region has invested more than €12M in this sector. It obtained the label **"Territoire Hydrogène"** the same year and will mobilize €90M additional between 2020 and 2030 to help research and innovation, the development of training on hydrogen… knowing that the Region will only support green hydrogen and, in some cases, low carbon projects.
- Find direct application of the energy with the involvement of the **"Pôle Véhicule du futur" which** helps to boost this emerging sector.
- It should also be noted that the FC LAB/FEMTO-ST was entrusted in December 2017 with the organization of the international conference IEEE VPPC'2017 (Vehicular Power Propulsion Conference), one of the largest international conferences in the field of electric and hydrogen vehicles. With an experimentation platform and tests in Belfort, the FC-LAB focuses its research on hydrogen-energy and fuel cell systems.
- The Bourgogne Franche-Comté Region is therefore at the forefront of the hydrogen sector, which will continue to benefit from significant public support, especially in the framework of the project **«Territory of innovation»** winner of the national funding from the gouvernement. This project proposes to experiment several mobility solutions, H2 distribution stations, low consumption housing... In 2020, one of the first hydrogen-heated buildings will be built in Belfort. Thanks to the partnership with the Femto-ST laboratory, this building will not emit CO2 at reduced heating loads compared to a traditional solution.
- To take into account the energy management and energy efficiency in the Energy systems, future industry and future mobility together with the fact to maintain close **links with training bodies and schools**.

5.3 Main strategies regarding energy transition in Spain

- A commission of experts has been created at University of Valencia to design a strategy for energy transition.
- EMAS certificate and reach 20-20-20 targets (Polytechnical University of Valencia - UPV).
- Promotion of new employment in environmental issues and reduce impact on everyday life in citizens.
- Training at local level with multiplier stakeholders (Local policy actors, associations, ...) to show the advantages of setting a local energy community and establish incentive for the creation of these communities
- Create common and clear criteria for city licenses and optimize the authorization process (administrative barriers).
- At municipal level, raising the awareness about climate change and sustainable energy promotion.
- Training municipal technical and political stakeholders (municipalities association).
- Promotion of sustainable tourism activities (ex. design of cycle routes).
- Improvement of urban green infrastructure, building renovation and sustainable mobility promotion.
- Upgrading of energy efficiency of local/municipal public services. Covenant of Mayors adhesion.
- At regional level exists: Valencian Sustainable energy plan 2020 and Climate Change and Energy Strategy 2030.
- At provincial level: Provide economic support to small cities and training.
- RES promotion. High socio-environmental impact based on solar projects.
- Energy efficiency and innovative products: studies and projects to reduce energy bill of SME.
- End-user empowerment.

5.4 Main strategies regarding energy transition in Sweden

Regional development plan for the Stockholm region is in the place. The energy study is closely linked to the Regional development plan for the Stockholm region – RUFS 2010. Within the scope of RUFS 2010, planning targets for 2030 were prepared that have a direct bearing on the energy study.

The planning targets are related to the region affecting the climate significantly less and urban environments and transport systems being energy efficient. The technical systems for energy, water and waste should be effective, robust, and flexible, at the same time that they have minimum climate impact and are based on ecocycle thinking. Furthermore, facilities for supply, goods handling and buffer stock should be in place at logistically beneficial locations.

RUFS's planning targets will be achieved by:

- Stimulating more energy and resource efficient transports and domestic sector.
- Limiting the negative impact of transports
- Enhancing the efficiency of the energy supply and transitioning to renewable energy sources.
- Expanding, strengthening and linking together the supply systems.
- Developing small-scale solutions for energy, water and sanitation for sparsely populated parts of the region.
- Reducing the amounts of waste and using waste as a resource.
- Securing places for facilities in logistically good locations.

5.5 Main strategies regarding energy transition in Greece

For training Organizations, the main strategy relies on cooperation with the private sector to gain real-market insights of which skills are needed by the future workforce. Joint curricula with EU institutions,

recently encouraged by the Ministry of Education are another way of reinforcing the training offers of Greek Universities.

The private sector relies on establishing cooperation with foreign big players for knowledge transfer. Since Greek SMEs do not have the resources for training or up-skilling their personnel, knowledge on the subject is gained by participating in cooperation with Higher Education Institutions and foreign firms.

Public authorities devise plans for managing green energy based largely on National and European funds. These plans call for a close cooperation with tertiary education research institutions.

In summary, the transition in Greece is taking its first steps. From being a subject that has received only academic attention it has progressed to an issue of National priority.

5.6 Main strategies regarding energy transition in Italy

In order to face the challenges, respondents suggest to increase investments both in developing innovation (new processes, technologies and products) and in increasing awareness and sensitivity in communities (adoption of energy saving behaviours, promotion of a sustainable development attitude, consumptions oriented towards specific processes, technologies and products).

A strategic role is played by EDUCATION and TRAINING system regarding:

1. Train/inform on responsible behaviors in order to increase awareness and to affect the energy consumption (energy correct use) → work environment and training environment
2. Innovation in educational/training paths: specific and transversal competences in order to increase energy transition skills

Two other strategies are suggested by respondents. On one side to adopt NETWORKING strategies (energy transition challenges require to act in networks) and on the other side to present and design PROJECTS to support innovation and networking through funds.

5.7 Main strategies regarding energy transition in Romania

According to training organizations and schools in Romania electricity must come from renewable sources and they must give up energy supply from fossil and nuclear fuels. They need a new, sustainable energy system with almost zero CO2 emissions. Also, the measures envisaged in the organization's strategy on energy issues aim to reduce energy consumption by - monthly monitoring of the consumption and analyzing the causes. Schools propose to use the energy (lightbulbs, computers, videoprojectors and other electric materials) as little as possible, by shutting down the lights and the computers when we do not need them and assembling energy savers and solar panels.

Public authorities are really pre preoccupied to energy transition, to smart city solutions and energy efficiency in public buildings and public lightening. Moreover, Iasi Municipality has already promoted a Local Council decision to stimulate “green buildings” standards for private and public sector, tax reduction for private persons who renovate or construct “green houses”. A new project to completely renew the public lightening of the city using new technologies energy efficient become effective this year and will be implemented during next in 3 years. Moreover, this year, an Energetic Manager for the city have been contracted to work on energy efficiency issues and energy transition.

Firms in Romania are in a work to abandon coal consumption. For example S. C. VEOLIA ENERGIE IASI S. A are implementing the purchase of two 70 MW generators that function with methane gas fuel so that they will give up the two 50 MW generators from CET Holboca that operate on energy produced from coal.

6. MAIN TRAINING OVERVIEW ON THE TRAINING OFFER IN THE ENERGY EDUCATIONAL AND TRAINING PATHS

This chapter deals with different possible training offers in partner countries.

6.1 Main training overview in Slovakia

In most regions there is missing secondary school providing adequate training, therefore companies must train workforce on their own which means increases employee costs.

On level of secondary school is missing study program dedicated to operation of boilers, turbines, plumping equipment.

Most respondents agreed that there is a poor links between education and practice which has improved in recent years with the introduction of dual education system.

The professional competence of the workforce is being updated every 5 years and the Ministry of Economy has not yet registered any suggestions from employers in the case of insufficient preparation for energy business.

6.2 Main training overview in France

Nowadays in French territory:

- The renewable Energy storage is one of the most identified future challenges. Innovation in batteries and hydrogen technologies are competences required by companies. Nevertheless, the training offer is currently too **focused on the power energy industry and not enough**

(despite the important research) on H2 and all the derivative trades of tomorrow. Not enough about the smart territories and trades of tomorrow that will cross producers and consumers of energy yc big data and block chain.

- There is a high-tension occupations: good level but not enough young people attracted by these courses.
- No specific training for BT and HTA despite partnerships with national education and vocational training bodies: pro and training contracts.
- The existing training paths are adequate as a whole, for instance for traditional energies but not yet for **for hydrogen** for maintenance jobs, even though engineering courses were successfully developed in Belfort.
- Still too little training in energy efficiency

The means to anticipate needs in firms used by training and education are: start-up spirit, hiring young engineers out of schools, implementing a Human Resource Planning (HRP), Organization of forums, promoting trades and industry (such as initial Watt else) and Networking Business Schools

The subject of the energy transition is not yet defined as a priority in the company's strategy, due to a lack of information and knowledge of the subject.

6.3 Main training overview in Spain

ENERGY TRAINING IN THE RIBERA DE XÚQUER AND THE COMUNITAT VALENCIANA

The training offered in the field of renewable energies and energy transition is gaining prominence in the Valencian Community, at a regulated level both public and private universities offer Masters and Specialty Courses, in addition to the offer of Training Cycles. With regard to training for the unemployed, the list of certificates of professionalism extends throughout the community but it is not

a professional qualification that predominates, in fact in the Ribera de Xúquer there is no plan to teach any certificate of this professional standard in 2020.

The offer of continuous training is very widespread, as the specialized Associations and Federations, as well as trade unions and private academies offer specific courses.

OFFER OF TRAINING CYCLES:

Throughout the Valencian Community, higher degree training courses in Energy Efficiency and Solar Thermal Energy, and Renewable Energies are taught, as well as the intermediate level training cycle in Water Treatment Networks and Stations. In the Ribera de Xúquer, only the higher degree of renewable energies is taught at the CIPFP LUIS SUÑER SANCHIS in Alzira.

OFFER OF PUBLIC AND PRIVATE UNIVERSITIES:

Polytechnic University of Valencia

1. Degrees:
   - Degree in Energy Engineering
2. Postgraduate studies
   a. Masters:
   - Master's Degree in Energy Technology for Sustainable Development.

   b. Own titles:
   - University extension diploma in photovoltaic solar energy
   - University expert in energy rehabilitation in buildings

University of Valencia (ADEIT):

1. Own titles:

   - Specialization diploma in legal, economic and financial aspects of energy efficiency and sustainable energies

2. Own master's degree in power electronics energy transformation

University of Alicante:

- LEQA Applied Electrochemistry and Electro Catalysis Group
- Electricity storage systems.

Jaume I University of Castellón

- Master's Degrees: Energy efficiency and sustainability

Miguel Hernández University of Elche

- University Masters
- Solar and renewable energy
- Thermal installations and energy efficiency
-

UNED:

- Own postgraduate degrees:
- Wind energy: fundamentals and technology (University Expert Diploma, Specialization Diploma and Master's Degree).
- Energy and the environment (Master's degree)
- Environmental management and energy economics (Master's degree)

CEU San Pablo

- University Masters
- Management of projects and energy facilities
- Management of energy facilities and internationalization of projects

Offer of Technological Institutes:

- REDIT (Technological Institutes of the Valencian Community):
  - Webinar New Decree-Law 14/20: Advantages, promotion and streamlining of renewable energies 28-09-20.

- ITE (Energy Technology Institute)

1. Masters:
   - Official master's degree in project management and electrical installations.
   - Official online master's degree in electrical installation management and internationalization of projects.
   - Official part-time master's degree in environmental management

2. Professional specialization courses:
   - Self-consumption of electricity and renewable certification.

Certificates of Professionalism scheduled for 2020

- Província de Castelló
- Comarca: La PLana Baixa
- Província de València
- Comarca: La Vall d'Albaida
- Comarca: l'Horta Oest:
- Comarca: València
- Província d'Alacant

- Comarca: El Baix Segura
- Comarca: El Baix Vinalopó
- Comarca: EL VInalopó Mitjà
- Comarca: La Marina Alta
- Comarca: La Marina Baixa
- Comarca: l'Alacantí

OFFER IN FEDERATIONS AND ASSOCIATIONS

Although the websites of these entities do not always find courses related to energy, for the purpose of the same throughout the year and according to the relevance in society of this matter and the demand for part of the companies, the training offer will expand.

Construction Labour Foundation:

- Rehabilitation and sustainable construction: CTE-HE 2013 Compliance with the basic document of energy saving and energy certification of buildings.

OFFER IN PRIVATE ACADEMIES:

Private academies given their versatility can quickly adapt to market demand. They can also offer the management of the subsidised training to which all companies have access. In internet search engines we can find a wide range of centres, especially with online training, such as:

- Professional promotion
- AIDICO (Construction Technology Institute)

- Installation and maintenance of photovoltaic solar installations.

6.4 Main training overview in Sweden

There are many connections between the various sectors in society that use energy and convert material that can be used for energy production.

Within the Stockholm region, synergy effects are well utilised in the energy system, but there is also additional potential to utilise. There is a clear relationship between waste and district heating production as well as sanitation and biogas production for the transport sector.

The Swedish Energy Agency is leading the energy transition into a modern and sustainable, fossil free welfare society - applying our credibility, a comprehensive approach and courage.

Research on new and renewable energy technologies, smart grids, as well as vehicles and transport fuels of the future receives funding from us. We also support business development that allows commercialisation of energy related innovations and ensure that promising cleantech solutions can be exported.

Leading in sustainable consumption by strengthening customer centering, building up one strong position in decentralized energy and work for an electrified and climate smart Society.

Leading in sustainable production by growing within renewable and implementing ours carbon dioxide roadmap to enable fossil-free living within a generation.

Create an efficient business by improving the efficiency of the business, accelerate digitalisation and take environmental and social responsibility throughout the value chain have motivated and engaged

employees by being an attractive employer, develop an engaging and inclusive corporate culture and ensure access to necessary skills through recruitment and continuous learning.

6.5 Main training overview in Greece

The analysis of the results of the survey indicated that in the education sector there are already several undergraduate courses related to Energy especially focusing on classic trends such as energy systems in Mechanical/Electric Engineering and new ones such as hydrocarbon exploration and exploitation and energy building design. Greek students have started to show an increased interest in following jobs in the Energy sector the last few years.

6.6 Main training overview in Italy

Currently in Piedmont Region:

- The training offers seems to be very wide and good
- In building efficiency there is the difficulty in linking together the aspects of energy saving with a «comfort» issue
- Public schools (technical high schools) need more specialization paths to meet the business needs
- Vocational training offers courses more in line with business needs but in a patchworked way on the whole regional area
- ITS Courses (high technical courses post diploma) provide good offer with a possibility to adapt - each year - courses following business needs
- University courses are wide and good but → Lack of practical activities and lack of experience on the field

The means to anticipate needs in firms used by training and education are: developing need analysis, promoting partnerships in the energy transition field, activating stable business relationships, networking, promoting training on the job opportunities.

6.7 Main training overview in Romania

- **The Technological High School „Dimitrie Leonida“**
  - The high school issues only qualification certificates of level 3, 4 and 5 for the school qualifications: electrician low voltage operation, electrician in electric and energy appliances and equipment, technician in electrical installations

- **Technical University of Iasi- Faculty of Electrical, Energy and Applied Informatics Engineering**
  - Undergraduate studies – Engineer diploma,
  - Master studies – Master diploma,
  - Doctoral studies – PhD. Diploma.

7. MAIN COOPERATION EXAMPLES WITH STAKEHOLDERS

The last chapter of this document deals with prime examples of cooperation with stakeholders.

7.1 Main cooperation examples with stakeholders in Slovakia

In most regions there is missing secondary school providing adequate training, therefore companies have to train workforce on their own which means increases employee costs.

On level of secondary school is missing study program dedicated to operation of boilers, turbines, plumping equipment.

Most respondents agreed that there is a poor links between education and practice which has improved in recent years with the introduction of dual education system.

The professional competence of the workforce is being updated every 5 years and the Ministry of Economy has not yet registered any suggestions from employers in the case of insufficient preparation for energy business.

7.2 Main cooperation examples with stakeholders in France

- Networking with:
  - Industrialists or clusters (Wind for Future (regional) for wind, and hydrogen, Nuclear Valley, Energy Valley in Belfort territory, Vitagora, Pôle Véhicule du Futur, BFC Numérique, AER + ADEME
  - Public authorities : Dijon Metropol, Regional Council,
  - Professional branches: CGPME, MEDEF, UIMM, W4F,.
  - Job centers and employment agencies: MIFE,….
  - Education and training organizations such as UTBM or high school Eiffel of Dijon and even school of the second chance and Production School of Chalon. But there is a **necessity of an international partnership in hydrogen** Partnerships with universities

- Emphasis has been given to 2 projects:
  - Mobypost project (http://mobypost-project.eu). Thanks to its new technology that can be summarized as a solar-to-wheel concept, MobyPost enables a significant progress of actual state-of-the-art
  - BZEE certificate: training as a service technician for wind farms (BZEE = Bildungszentrum für Erneuerbare Energien - certifying body that groups together a hundred companies and organizations from the wind world).

7.3 Main cooperation examples with stakeholders in Spain

At regional level this is the most relevant activities known:

- **PATER, Territorial Pact for Employment in La Ribera.**

It is an agreement signed by public administrations (Mancomunitat de la Ribera Alta, Mancomunitat de la Ribera Baixa), trade unions and business associations most representative of the territory.

This agreement was signed in 2005 and renewed in 2018 with the aim of promoting the region of La Ribera socio-economically and achieving sustainable economic development. Some of the actions to be carried out are: to promote the use of efficient and renewable energies at all levels and in all socioeconomic areas.

- **AVAESEN – Asociación Valenciana de Empresas de Servicios Energéticos.**

The Valencian Cluster of Energy Industries – AVAESEN – is a non-profit association of energy-related companies focusing on renewable energies, the circular economy, the water cycle, waste treatment and smart cities, which was established in the Valencian region of Spain. AVAESEN encompasses 80% of the companies of the Valencian renewable energies sector, as well as more than 6,000 jobs.

Established back in 2006, the Cluster represents and advocates for the clean energy sector, offering tailor-made services to its members based on a joint plan , aiming at boosting their competitiveness, innovation and growth.

AVAESEN was been recognized by the European Union for its 'Cluster Management Excellence', and currently coordinates the Climate-KIC Accelerator, the largest entrepreneurship clean-tech program of

the European Union, as well as the main European cluster of water and energy, ESCP 4-i Energy in Water.

- **EIT Climate-Kic**

EIT Climate-KIC is a Knowledge and Innovation Community (KIC), working to accelerate the transition to a zero-carbon, climate-resilient society.

Supported by the European Institute of Innovation and Technology, we identify and support innovation that helps society mitigate and adapt to climate change. We believe that a decarbonised, sustainable economy is not only necessary to prevent catastrophic climate change, but presents a wealth of opportunities for business and society.

Climate-Kic brings together partners in the worlds of business, academia, and the public and non-profit sectors to create networks of expertise, through which innovative products, services and systems can be developed, brought to market and scaled-up for impact.

Through our convening power, EIT Climate-KIC brings together the most effective groups to create the innovation that can lead to systemic change.

- **CECV – Cluster de la Energía de la Comunitat Valenciana**

The Energy Cluster of the Valencia Region is a non-profit association constituted in 2010 with the aim of boosting the energy sector in the Valencia Region and promoted by the main companies in the sector.

The Cluster has companies of different size and nature, present in the energy value chain: generators, operators, marketers, engineers, installers, computer and cross-sectional services, power electronics, equipment and component manufacturers, technological institutes, universities and public administration bodies with responsibilities in the field of energy.

The Energy Cluster of the Valencia Region wants to be considered by its partners as the place where to develop its business potential in search of innovation and competitive differentiation to achieve recognition of the sector at regional, national and international level.

- **Las Naves**

A public entity that depends on the Valencia City Council that promotes urban innovation with a clear commitment to people. Putting them at the centre of innovative action.

Las Naves works in innovation processes that always have the active involvement of actors from the so-called “four helixes”: public sector, private sector, academic / researcher sector and civil society.

Las Naves works on innovation in these 5 strategic sectors:

- - mobility
- - energy and water
- - agri-food
- - health and healthy city
- - creative industry and culture

7.4 Main cooperation examples with stakeholders in Sweden

- **Eco Smart City project run by Stockholm Stad and involved several firms**

To achieve the City's environmental goals, an efficient cooperation between inhabitants, the private industry, the public sector, and many other players is crucial. Environmental and information technology are both key priorities in developing a sustainable society.

- **Slussen**

Slussen has served the Stockholmers for over 70 years and has become one of the most historically important junctures in the City. It now needs reconstruction to become a vibrant meeting place with modern traffic solutions.

- **Hagastaden**

Hagastaden is one of Stockholm's largest and most important urban development projects. By 2025, the area between the city of Stockholm and Solna, will be built and developed into an entirely new neighbourhood with a mixture of apartments, workplaces, cultural attractions, green areas, world-leading research and highly specialized medical care.

- **The Stockholm Royal Seaport**

Stockholm Royal Seaport is one of the largest urban development areas in northern Europe with 12,000 new homes and 35,000 workplaces. Planning work started in the early 2000s and the new city district will be fully developed around 2030.

- **Vinnova**

Vinnova is a fund agency supporting research call for applications and involve all stakeholders from education organizations, firms, and governmental organizations like Stockholm municipality.

- **Energy Agency**

The Swedish Energy Agency supports research and development about the supply, conversion, distribution and use of energy. Assistance is also provided to development of new technologies.

The Agency is involved in broader international energy research cooperations, which among other things, is about the increased use of renewable energy sources and development of new technologies and systems for energy supply.

The Swedish Energy Agency also provides practical assistance and, in some cases, support for the applications to the various energy programmes in EU. The Swedish Energy Agency is actively involved in:

- Meeting the Swedish Kyoto commitment through the use of international mechanisms such as emissions trading and CDM/JI, including capacity building on this
- International negotiations on climate change
- The International Energy Agency
- The International Renewable Energy Agency
- The Clean Energy Ministerial
- The European Energy Network, EnR (a voluntary network for National Energy Agencies in Europe)

7.5 Main cooperation examples with stakeholders in Greece

The analysis of the results of the survey indicated that in the education sector there are already several undergraduate courses related to Energy especially focusing on classic trends such as energy systems

in Mechanical/Electric Engineering and new ones such as hydrocarbon exploration and exploitation and energy building design. Greek students have started to show an increased interest in following jobs in the Energy sector the last few years.

7.6 Main cooperation examples with stakeholders in Italy

- Clusters of firms: POLO CLEVER, POLO MESAP
- Research centers
- Partnerships with firms, Public authorities, VET organizations (For example: projects financed by Alcontra or other Interreg Programs or Erasmus+)
- Partnerships with universities
- Cooperation with Chambers of commerce and companies' associations (For example: Industrial Union)

7.7 Main cooperation examples with stakeholders in Romania

- **The Technological High School "Dimitrie Leonida" Iasi**

  has practice partners for conducting practical training courses in the electrical field of high school students and vocational schools, but not in the field of exploiting new energies. The degree of development of these companies in the local community is quite low.

  The high school has won an ERASMUS + 2019 project -1-RO01 KA102-062647 which aims to carry out the practical training stages for 14 students of the 10th grade and the professional school in companies setting up photovoltaic installations in Granada-Spain. The flow targeting this area is scheduled for October 2020.
- **Technical University of Iasi- Faculty of Electrical, Energy and Applied Informatics Engineering**

  has signed a partnership with most relevant countries in the field.
- **Gemite Ro SRL**

has cooperation in the field of licence transfer, fundamental research and technology with the Canadian companies Gemite Products Inc., Twin I, Globe Equip Corporation.