

Education for Digitalization of Energy

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## *Deliverable 3.1*

### *Identification of stakeholders in each area*

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#### **Abstract:**

Desk research to identify institutions, companies, organizations and all other interest groups that are relevant to the energy transformation system in Europe evaluating their influence and interest in the process. The result of the Stakeholder identification is presented in an online Database.

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## Executive Summary

The EDDIE project's main aim is the foundation and establishment of a Sector Skills Alliance, to develop an industry-driven Blueprint Strategy for the education and training in the energy sector which is continuously affected by digitalization. This Blueprint is an industry-driven strategy that will meet and anticipate the skills' demands for the sustainable growth and digitalization for the European Energy sector.

This deliverable addresses the current situation in the Energy Sector and its digital transformation. It aims to Desk research and to identify institutions, companies, organizations and all other interest groups that are relevant to the energy transformation system in Europe evaluating their influence and interest in the process. The result of the Stakeholder identification is presented in a first version of the online database annexed to this deliverable 3.1. Efforts will be made to continue updating and improving the stakeholder identification and the online Database.

This deliverable is comprised of three parts:

1. Deliverable 3.1. Document
2. Online Database
3. Excel Document Annexed

First of all a stakeholder list has been created, identifying all of the relevant stakeholders for the Eddie Project. They have been divided into 5 different categories and then subdivided into subcategories for its analysis. The categorization is as follows:

1. Industry
2. Education
3. Administration
4. Associations and Communities
5. Individuals.

These groups of stakeholders have been described in the document and the List can be found in the excel document annexed.

Furthermore, an online database has been created as a way of sharing and presenting the desk research done for the stakeholder identification process. This database has been developed and updated in order to adapt to future user needs and for it to be a useful source for the members that apply to become part of it.

Research was made to develop both an automated and elegant database, making it visual, efficient and attractive for future users. Future steps for the database have also been identified and described in the document.

Finally future steps have been identified to continue with the Work Package 3 demands.

# 1. Introduction

As society evolves, the way of living changes and therefore the energy sector must adapt to the new challenges that arise as a result. As the global population is growing, so does the demand for energy.

The current health crises caused by the COVID-19 pandemic, has and will continue accelerating the digitalization process in our society. Digitalization has during the pandemic become the indispensable for our economy, becoming the only way that enabled the society to keep with their day-to-day tasks in their jobs.

Digitalization, flexibility, decarbonization, and decentralization are just some examples of changes that are being addressed by the energy sector. The innovation that these trends bring are improving the services that the energy sector is providing such as safety, productivity, sustainability of the systems and improvement in decision making.

The European Commission strongly supports the need to adapt the energy system to the changes and has put in place several initiatives that encourage the energy sector to develop initiatives to tackle these important issues. The clean energy for all Europeans Package is just an example of how the European Commission is comprehensively updating its energy framework to facilitate the transition to an energy efficient and sustainable system.

The Paris agreement states that the EU 2050 target of decarbonisation aims to support and increase the use of renewable, energy storage and demand response management.

Furthermore, Europe has the will and the opportunity of leading the energy transition, shaping the new future for the energy sector. Energy demand is expected to grow by 57% between 2017 and 2050, reaching 38.770 TWh, a result generated by the economic and populations usage of energy.

Changes in the sector will directly affect the jobs and the type of workforce that is needed for the future jobs, digitalization will mean that some jobs will disappear, whilst new needs must be identified and will be essential for the current functioning of the energy system.

The challenge of the Eddie project is to develop a long-driven Blueprint (design plan) for the digitalization of the European Energy sector to enable the matching between the current and future demand of skills necessary for the digitalization of the Energy sector and the supply of improved Vocational Education and Training (VET) systems and beyond.

The main purpose of the project is the foundation and establishment of a Sector Skills Alliance, to develop an industry-driven Blueprint Strategy for the education and training in the energy sector which is continuously affected by digitalization. This Blueprint is an industry-driven strategy that will meet and anticipate the skills' demands for the sustainable growth and digitalization for the European Energy sector.

The main goal of this deliverable 3.1. is to create a Stakeholders' map as a database of stakeholders that will assist in identifying needs in occupations and job profiles leading to the interaction of stakeholders, along with skills content analysis and set the ground for a strategic sectoral cooperation.

In this deliverable 3.1. the following points have been addressed in the next sections of this document:

- A stakeholder Identification process has been conducted and a list has been created.
- A first version of an online Database has been developed.
- A description of how Stakeholders are going to be mapped according to their Influence and Support has been made.
- The next steps of Work Package three have been identified.

## 2. Stakeholder Identification

### 2.1. Overview

The EDDIE project's approach is based on the industry-driven moment, where future skills need to be identified and stakeholders of the sector play a major role.

To identify the future skills need, active research has been done by the EDDIE consortium in order to develop a relevant stakeholder list which covers the needs of the energy sector in as a result of the energy transition.

The main goals of the stakeholder identification is creating a list that will help meeting and anticipating skill's demands for the sustainable growth and digitalisation of the European Energy sector.

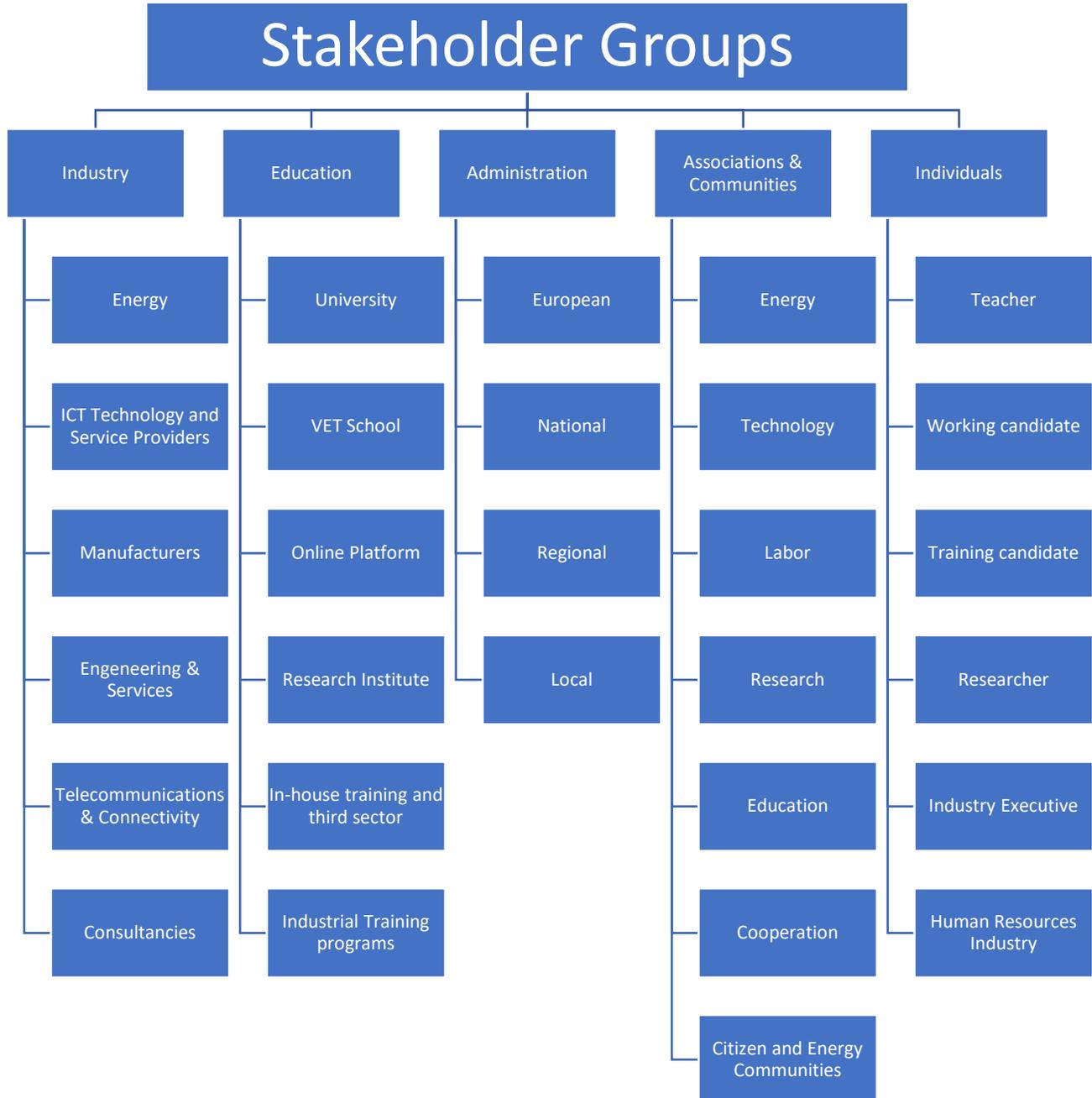
The correct identification and possible membership of the identified stakeholders directly affects the future success of the project as they are the potential users of the Eddie platform.

This Stakeholder list is a first version and will be further elaborated over time, it can be found as an annex to this document.

## 2.2. Methodology

### Description: Processes, tasks and tools used to develop the Stakeholders list.

First of all, in order to create the Stakeholders List, relevant stakeholders groups from all the relevant sectors were identified and categorized as follows:



**Figure 1: Stakeholder Groups**

Secondly, after having identified the Stakeholder groups that were interesting for the Eddie project the following steps were followed:

1. The consortium developed the stakeholders list by carrying out an exhaustive desk research on the entities that would be affected by the creation of the EDDIE project..
2. Considering the expertise in the different sectors, members of the consortium researched and contacted different entities that were potential stakeholders of the EDDIE project.

*The Stakeholder groups have been described and its relevance for the project has been assessed in section 2.3.1. of this deliverable.*

The main benefits of the Stakeholder List were:

1. Having interesting contacts for the members easily accessible.
2. Alignment between the stakeholders to be more efficient to adapting to changes.
3. Synergies between the stakeholders and possible collaborations.

Thirdly, an analysis was conducted to achieve an adequate representation of the whole energy system value chain. The following 6 characteristics were taken into consideration to establish the Initial Stakeholder List:

1. Type of stakeholder
2. Stakeholder Name
3. Business Model
4. Nationality
5. Consortium member that provided the contact
6. Website

This was the main data collected by the members of the consortium but it is intended to enlarge the list after the deadline of this deliverable and to add new characteristics:

1. Size of Company
2. Countries of Operation
3. Continent of Operation
4. Twitter
5. LinkedIn
6. Personal Contact of person applying
7. Personal Email of person applying

*This data will be included in the Online Database.*

## 2.3. Stakeholders List with relevant references

### 2.3.1. Industry

An industry is the economic activity that processes raw materials and manufactures goods in factories. They are a group of companies that are related based on the activities that they perform. Industries can be classified in different sectors, for EDDIE the following industrial sectors have been identified.

The Industry sector has been divided into the following sub-categories:

1. Energy
2. ICT Technology and Service Providers
3. Manufacturers
4. Engineering & Services
5. Telecommunications & Connectivity
6. Consultancies

#### 1. Energy

The following sub-categories have been identified:

1. Electricity System
2. Generation

- **Electricity System**

Digitalization presents an opportunity for transformation in the energy sector, acting as a lever for a more sustainable and decarbonized energy model. **The integration of digital technologies and initiatives will help electricity companies to overcome the current challenges of the sector**, facilitating the development of smart grids, the increase of renewables, decentralized generation and energy efficiency, as well as covering the needs of the new profile of the digital customer, who has taken on a leading role.

To achieve this, it will be essential to promote internal talent and attract external talent. **Organizations in the electricity sector will demand new digital university profiles** with specific training such as programming, cybersecurity, data analytics, among others. In addition, they should mitigate the skill gaps of their employees through re-Skillings, offering industrial training so that the employee is better equipped to do his present job or to mold him to be fit for a higher job involving higher responsibilities. Given the importance of an organization's human capital to business success, aligning training and competency development with business needs has become a key challenge.

In this sense, cooperation between the main actors of the electric sector, universities and/or training centers will be very interesting in order to identify the needs in digital profiles and training gaps, promoting quality education, which will allow the needs of people and society to be understood.

The actors of the electricity system have evolved along time. Traditionally, electric power systems have been centralized structures organized into generation, transmission and distribution, placing customers at the end of the supply chain. This is a unidirectional structure where electricity generated by large power plants is transmitted via transmission and distribution networks to be delivered to customers.

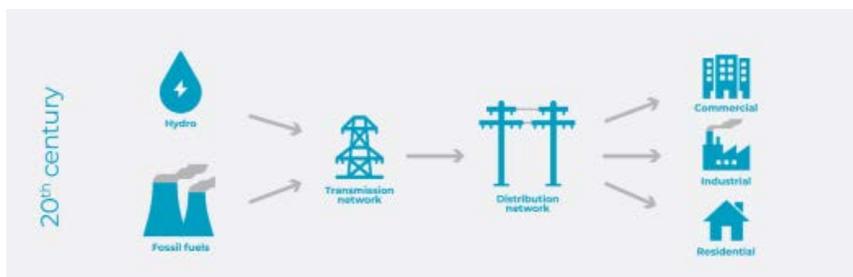
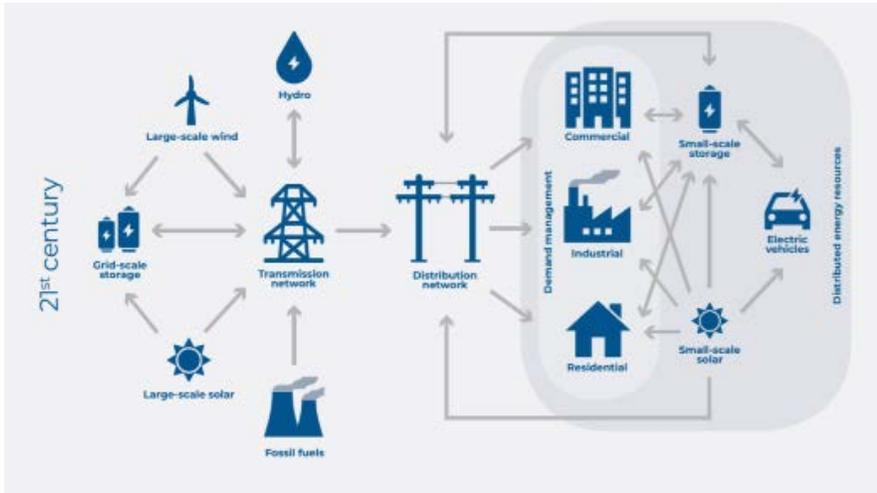


Figure 2

However, recent decades have witnessed the emergence of distributed energy resources (DERs) such as rooftop solar PV installations, micro wind turbines, battery energy storage systems, plug-in electric vehicles and smart home appliances that are becoming active participants in the electricity system. The increasing penetration of decentralized energy resources and the emergence of new market players – such as prosumers, aggregators, and active consumers – will usher in a new era. In addition, to take advantage of these new opportunities and to keep pace with both the transformation of the power sector and changing customer needs, some of the actors in the power sector value chain will have to adjust their current role.



**Figure 3**

The stakeholders that will form part of the EDDIE project are detailed in this section 2.3. of the document, given their transcendental role in the future of the energy sector, as well as in its digitization. Their contribution will be essential to identify the digital profiles that the sector will need in the future.

- **Generation:**

As previously mentioned, today we can distinguish between centralized or distributed generation:

- **Centralised Generation:** “Centralized generation” refers to the large-scale generation of electricity at centralized facilities. These facilities are usually located away from end-users and connected to a network of high-voltage transmission lines. The electricity generated by centralized generation is distributed through the electric power grid to multiple end-users. Centralized generation facilities include fossil-fuel-fired power plants, nuclear power plants, hydroelectric dams, wind farms, and more.
- **Distributed Generation:** Different countries and organisms have different definitions for distributed generation, in terms of range power rating, location, dispatchability, etc. Distributed generation might be defined as a variety of technologies that generate electricity at or near where it will be used, such as solar panels and combined heat and power. Distributed generation may serve a single structure, such as a home or business, or it may be part of a microgrid (a smaller grid that is also tied into the larger electricity delivery system), such as at a major industrial facility, a military base, or a large college campus. When connected to the electric utility’s lower voltage distribution lines, distributed generation can help support delivery of clean, reliable power to additional customers and reduce electricity losses along transmission and distribution lines.

Currently, power from distributed generation covers the following areas of application. First, power is supplied to remote regions like oceanic islands and rural areas to resolve local supply problems. Second, it provides a back-up supply source for customers with high reliability requirements in the event of grid failures. Third, it supports peak shaving by supplying power during peak demand periods to help reduce peak loads. Fourth, it provides diverse energy products through a multigeneration system combining cooling and heating capabilities to meet diversified customer needs and improve integrated utilization efficiency. Fifth, it supports grid voltage readjustment, reduces power loss, and improves power factor. Sixth, distributed generation provides economic benefits that users can enjoy through an investment in grid access. In the future, the development of distributed generation will focus mainly on developing clean energy resources like solar, wind, and small hydropower generation near load centres.

On the other hand, there are different ways to produce electricity:

- From **conventional thermal sources**: coal, fuel, nuclear, combined cycle.
- From **renewable energies**: such as PV, offshore and onshore wind farms, hydro plants or hybrid technologies.

The automatization of the generation of energy will enable to improve asset lifecycle management, real-time remote or predictive control to extend the lifecycle and/or improve the operational efficiency of assets. Appropriate asset management will reduce operating costs and improve standard processes, leading to predictive and intuitive maintenance. It is estimated that 75% of unplanned downtime can be eliminated with this type of maintenance. Remote control will be of particular importance in areas that are difficult to access, improving the safety of operators and their efficiency (reduction of up to 5-8 hours/week). Finally, it is worth highlighting its important contribution to sustainable development, the reduction of resource consumption and the implementation of clean energies (reduction of up to 6,300 billion kg of CO<sub>2</sub>).

## 2. System operators:

The following sub-categories have been identified:

1. Market Operators
2. TSO's
3. Dso's
4. Retailers
5. Utilities
6. Final Customers

- **Market operators: the control of production and the establishment of price (Regulators and Market Operators)**

The operator of the market manages the auction system for purchase and sale of energy in the daily and intraday market.

Participation in the market is usually achieved through an online platform, enabling the participation of multiple agents and the management of large quantities of offers to buy and sell electricity in a short period of time. OMIE also performs the billing and liquidation of the energy that is purchased and sold in the Iberian Peninsula (Spain and Portugal.)

Sellers make sales offers (supply), while buyers make purchase offers (demand). The market accommodates both and obtains a price per MWh common for all of the energy. After the first matching of supply and demand, the system operators (explained in following sections) re-adjust the final price according to the technical constraints, to obtain a viable daily program.

- **Transmission System Operator (TSO):**

Electricity transmission system operators (TSOs) are responsible for the reliable transmission of power from generation plants to regional or local electricity distribution system operators (DSOs) by way of a high voltage electrical grid. Since TSOs are usually a natural monopoly, they are subject to state regulation. TSOs provide grid access to the electricity market players (i.e. generating companies, traders, suppliers, distributors and directly connected customers) according to non-discriminatory and transparent rules. Each European Country typically has one national TSO.

TSOs are tasked with maintaining, operating, planning to keep a robust and cost-efficient network. With safety and reliability in the foreground, their main responsibility is to ensure that the grid remains stable at all times so as to safeguard the security of supply. Security of supply entails meeting the demand for transmission while keeping generation and consumption levels balanced as to avoid any fluctuations in frequency, interruptions in

supply and even grid failure. At times, balancing necessitates making appropriate levels of generation reserve capacity available. In the EU, TSOs are also expected to set the minimum operational rules and obligations on network security and be able to forecast electricity demands for a medium-term period. Moreover, TSOs must inform governments about and provide any information on any intended investments to the network, for both internal lines and cross-border interconnection.

- **Distribution System Operator (DSO):**

Enabling the energy transition and guaranteeing network stability and security in the context of increasing distributed generation make the role of distribution system operators (DSOs) crucial. DSOs are responsible for maintaining stable, safe and reliable distribution electricity to the consumers. They are as well responsible for timely connections of new load to the grid and improving system resilience through appropriate reinforcement.

Secondly, they are required to help transform energy systems by accelerating investment in innovation and digitalisation. This investment allows for an optimisation of the network planning and operations. DSOs are establishing the foundation for smart network monitoring, improved metering, control (including distributed generation) and automation with the roll out of the smart meters. This enable them to best fulfil their security of supply obligations in a changing context made up of distributed generation, self/micro-generation, electric transport, new uses of electricity, more active customers and much smarter distribution grids.

As a result, more data is being produced which must be adequately managed and protected. As a bare minimum, DSOs will interface with smart meters to understand real customer demand/load profiles, thus doing away with estimated ones. By managing their network with more advanced ICT tools, DSOs have begun to deal with certain grid issues such as network congestion or voltage constraints in a smarter way. Flexibility is an important aspect of the new, more active way in which distribution grids will have to be managed. Consequently, new consumption tariffs will be offered, and system price fluctuations will be minimised, generating savings for the consumer, eliminating peak demand and carbon emissions. It will also be possible to adjust the generation power required and reduce technical losses in the transmission and distribution network by up to 50%. National legislation and energy regulation must be adapted to make sure that flexibility develops to its full potential.

DSOs are key players for enabling a successful energy transition while providing a high-quality service to all customers. DSOs must act as neutral market facilitators and guarantee distribution system stability, power quality, technical efficiency and cost effectiveness in the future evolution of energy networks towards a smarter grid concept. DSOs are local or regional operators and, as such, they must work to the benefit of customers.

- **Retailers:**

Power retailers buy electricity directly from generators or in the wholesale market and package it to meet consumer demands.

To build value today and thrive in the future, energy retailers need to maximize the value of their customer base by extending their value proposition from a single product – electricity – to innovating a broad portfolio of products and services that incorporate a green dimension, while creating more value for customers.

Traditionally, the energy consumer has been characterised as a customer oriented in the perception of the service with little power of participation. However, with digitalisation, this situation has been evolving, giving rise to the emergence of a consumer with access to a more diversified offer, with greater freedom in the choice of energy service and with the need to compare different companies before making a decision. The new energy consumer is digital, connected and social. Customer service is a key factor for generating new business opportunities in this sector.

For retailers, taking advantage of the opportunities offered by digitalisation is key to gaining a deeper understanding of the demands of the new digital customer and being able to offer them personalised products. Integrated services that provide customers with the flexibility to control, monitor and select different energy sources will be a determining factor in the energy market. Thus, within this area, different initiatives that allow greater control and cost savings for the user, providing visual information on consumption, generation, energy storage, etc., stand out. Solutions that allow energy storage devices to be integrated into the grid, including those at the household level, will also stand out.

- **Utilities:**

A vertically integrated utility owns all levels of the supply chain: generation, transmission, distribution and sales.

A utility company provides basic services including electricity, natural gas and water. These companies are profitable but they are public services and are substantially regulated. Utilities are seen as long-term investments for investors due to their stability and dividend income.

Some examples of energy utilities can be electricity, natural gas, fuel, oil or any other source of energy that is used for a project purpose, they can be both renewable sources of energy or traditional sources of energy.

- **Final Customers:**

Residential (single-family homes and multi-family housing), commercial (government facilities, service-providing facilities and equipment, and other public and private organizations), and industrial customers each account for roughly one-third of the nation's electricity use. The transportation sector accounts for a small fraction of electricity use, though this fraction could increase as electric vehicles become more widespread.

- **Residential customers:** the biggest single uses of electricity in the residential sector are space heating and cooling (air conditioning), lighting, water heating, space heating, and appliances and electronics. Electricity demand in the residential sector tends to be highest on hot summer afternoons due to increased air conditioning use, followed by evenings, when lights are turned on.
- **Commercial customers:** the biggest single uses of electricity in the commercial sector are lighting and heating, ventilation, and air conditioning. Electricity demand in the commercial sector tends to be highest during operating business hours; it decreases substantially on nights and weekends.
- **Industrial customers:** Half of the electricity used in manufacturing goes to powering various motors (machine drive). Other sizable uses include heating, cooling, and electro-chemical processes in which electricity is used to cause a chemical transformation (for example, the processes that produce aluminium metal and chlorine). Electricity use in the industrial sector tends not to fluctuate through the day or year as in the residential and commercial sectors, particularly at manufacturing facilities that operate around-the-clock.

### 3. ICT Technology and Service Providers

Reliable and efficient solutions are needed to collect and interconnect energy into next generation digital power grids and generation assets. These companies provide solutions that support diverse and complex applications to efficiently connect electricity, such as:

- **Equipment:** transformers, Insulated Switchgear, circuit Breakers, disconnectors (Switches), Instrument Transformers.
- **Protection & Control:** Generator and Transformer Protection, Microgrid Control System, transmission protection, Substation Automation Systems, Substation Gateways & RTUs.
- **Monitoring & Diagnostics:** Switchgear and transformer Monitoring, Metering, SCADA, historical Data Bases, advanced analytics, machine learning, artificial intelligent.
- **Industrial Communication:** Cellular Solutions, Ethernet Switches & Converters and Network Communications Platform, Wireless Solutions, Packet Switched Solutions, Multiplexers, fiber optics.
- **Systems & Services:** Advanced Energy Management, Asset Performance Management, WAMS Grid Stability Solutions, mobility, Geographic Information Systems, Software Services. Electrical Balance of Plant, Energy Storage Solutions, Flexible AC Transmission Systems, High Voltage Direct Current Systems, HV/MV Equipment Services.

- **Cybersecurity:** Firewalls, Network Security Service., DCS, SCADA and PLC cybersecurity. \

## 4. Manufacturers

Many component manufacturers based in different industrial sectors are active along the value chain of the power plant. Either as complete product manufacturer (e.g. gear boxes for wind), as manufacturer under license (e.g. PV-support structures) or even as sub supplier for specific parts (e.g. steel tubes for the absorber tubes of CSP).

- **Wind farms:** turbines with a digital infrastructure that allows you to connect, monitor, predict and optimize unit and wind farm energy performance, wind blades, wind energy converters, WEC components (annular generator, machine house, yaw drive, e-module, hub, rotor blade, tower, foundation, etc.), grid technology, etc.
- **Solar plants:** Solar modules, Energy Storage Converter, PV Inverter, Customised off-grid and on-grid solar PV solutions, etc.
- **Traditional/Nuclear Power Plants:** turbines, generators, boilers, Air Pollution Control, Plant Instrument Control System, Balance of Plant (heat exchanger, transportation equipment), nuclear reactor, moderator, control blades, coolant, etc.

Some of them also provide service offerings ranging from remote monitoring to fully maintaining your plant, as well as a wide range of performance-enhancing upgrades and digital solutions for assets. A suite of apps that leverages data and analytics, in partnership with hardware and services solutions to enhance efficiency, cybersecurity, reliability, and profitability of your assets.

## 5. Engineering & services

These companies are responsible for the engineering, construction, supervision, test, validation and commissioning of the power plants, expanding its capacity, optimizing its performance or meeting new environmental regulations to decommissioning. They might be also responsible for the management of the supply chain and the selection of the manufacturers if the quality and the performance of the plant is their responsibility.

## 6. Telecommunications and Connectivity

The telecommunication infrastructure not only allows operation and coordination within the electrical system, but also the implementation of applications for the secure management of the assets. 'In-plant communication' are used internally in a substation or a power plant. The final solutions should not only consider the compatibility of the applications, but also secure the integration into the overall communication infrastructure.

Telecommunications and connectivity services include telephone systems, Local Radio DECT (extremely important during maintenance activities), MPLS (Multiprotocol Label Switching), LAN (local area network), WAN (Wide Area Network), VSAT (small aperture terminal), 5G, GSM (Global System for Mobile communications), etc.

## 7. Consultancies

Consulting companies enhance performance across the industry value chain, providing expertise in generation, trading and storage, transmission, distribution and retail. They also work with clients to strengthen key capabilities, to optimize the organization, improve operational performance and to refine corporate and customer strategies.

At the corporate level, their experts collaborate to develop a corporate investment strategy, evaluate macro and industry trends and their impact on utilities, implement new business models, such as "smart" energy efficiency services or distributed generation, etc.

At the business-unit level, support clients to optimize future generation mix and fuel sourcing, cope with decarbonization and other regulatory requirements, improve energy trading and develop storage strategies, increase operating performance in transmission and distribution, such as field force optimization and capital project management, implement IT technologies, etc.

## 2.3.2. Education

### 1. University:

Universities' primary role and challenges lie on the organization of an effective academic environment, fulfilling both student and educator stakeholder requirements. In addition, they delegate and direct competitive research initiatives, and thereby provide the requirements of research [1].

Regarding the universities' specific stakeholder interests, these lie in allocating the funds to enable education and research activity, provided by the stakeholders of policy makers, industry and commerce. A sufficient degree of academic and scientific reputation is essential in order to attract students, staff and funding.

Engagement efforts are done through direct sponsorship provided by policy makers, industry, and commerce with regards to research and education. The engagement of University faculties and management offer a more independent alternative when targeted with information campaigns and publications within the academic infrastructure.

Universities are one of the main education providers for the energy sector, therefore the relevance for the Eddie project is high. The bachelors, masters and courses offered in universities must be correctly adapted to the changes in the energy sector in order to be correctly aligned with the jobs that are needed and will be needed in the future.

### 2. VET School

In the vocational and technical (VET) school system that exists in European countries, students are trained in technical fields, engineering, crafts and design. They also receive a general education similar to general secondary education. Just like secondary schools, which are equivalent to high schools, the diploma they receive entitles them to admission to universities and post-secondary colleges. Graduates of a university or technical college teach the technical subjects, and work experience in the field is a common requirement. [2]

VET schools are an applied version of secondary education, often considered by students and parents based on their personal aptitude. Consequently, the consideration and especially the preparation for the real working environment of the selected vocational field is a more relevant concern compared to other secondary school environments. In particular, the presence of technically trained and experienced teachers provides a unique opportunity to introduce new learning and practice methods at a particularly early stage in the students' education. [3]

VET Schools are relevant in the Eddie project as they provide lots of relevant courses that train the potential workforce of the energy sector, they therefore have to be considered in the platform to have the full range of possible education important for the Energy training.

### 3. Online Platforms

Even before their accelerated integration, demanded by the new circumstances introduced by the Corona virus pandemic, online learning environments were increasingly becoming prevalent at all levels of education and economic life. These generally fell into two main categories. One is the expansion of the online presence of existing educational institutions, such as traditional universities and the other is a growing number of distance-learning universities, secondary schools and online courses that have emerged as new competitors in the market and are just based online. [4]

It is therefore mainly the second category of online platforms that constitutes a new stakeholder group. These predominantly commercial websites are created and operated online for the exclusive purpose of providing educational material only online, adapting to the current changes of the market and moving towards digitalization.

They are of vital importance for the Eddie project as more types of courses, bachelors or any type of education will be available for students worldwide, avoiding residential and moving costs and making country borders irrelevant. There will therefore be a wider offer of education, adapting better to user demands.

## 4. Research Institute

In addition to universities, research institutions are organizations that are primarily concerned with research and development. They often combine research and development with its application and are thus often in close exchange with industry, policymakers and others.

Besides, they operate on the borderline between science and non-science. Therefore, they typically have a more direct relationship with industry than universities do. In addition, they take on a mediating position between public and private organizations. Most research institutions operate at national level and are a significant part of the research and development work in this country. [5]

They are of vital importance for the Eddie project as they provide good and adapted information about the current state of the sector. There are many research institutes that investigate the energy sector and that provide essential knowledge for its correct development.

## 5. In-house training

In-house training refers to both the self-training of people in their houses or the hiring of teachers that provide personalized lessons to their pupils. These lessons are usually very focused on what a specific person wants to learn and are therefore efficient. It is vital to provide adequate information to the trainers so that pupils are correctly trained on the new demands of the market.

The third sector is funded mainly by the industry being the main clients and the governments being the employment initiators and means of economic policy. Additional qualified personnel that can adequately provide advanced instruction and retraining is also a requirement of this stakeholder. In addition, guidance to the specific industry and job requirements to determine content and scope of advanced training is essential.

These stakeholders are engaged either through direction of government policy through retraining initiatives or using existing intersectoral partnerships within industry to effects technological trends.

As an example, ABEPRO, the Brazilian Association of Industrial Engineering, is a non-governmental institution that acts as a representative entity of teachers, students and professionals in the field of Industrial Engineering (IE). Since 1990, ABEPRO has been involved in the updating and modernization processes of the curriculum in IE courses, working with other organizations in higher education in Brazil, especially those in IE. ABEPRO acts as a bridge between governmental institutions MEC and INEP - National Institute of Educational Studies and Research - Anísio Teixeira, as well as other third sector organizations like CREA, CONFEA, SBPC - Brazilian Society for the Progress of Science, ABENGE - Brazilian Association of Engineering Education. (S.K, 2011)

This stakeholder group is therefore important for Eddie as it is of the interest of the project to keep all types of education aligned with the current changes in the energy sector. In-house training is used by many individuals when a specific guidance/reinforcement is needed for a specific purpose, meaning that it is essential to take them into consideration as they are a main driver of support for students.

## 6. Industrial Training Programs

Both the in-house training efforts, as well as certification authorities have a strong overlap with the industrial training programs and practices. Just as described for the process of certifying the proficient use of proprietary and/or specialized industrial equipment, manufacturers or cooperating agencies may design and issue courses and certificates to facilitate their use by client companies. Large scale manufacturers like Siemens or General Electric provide this training to employees of client companies to enable the safe operation of their products but also offer a wide range of individual courses and training programs. These serve in similar function to certifications in their benefit both for companies and for the marketability of employees. [6]

While these offers primarily target working employees, another prominent aspect of industrial training is practiced within internship programs. These commonly provide a much more generalized and fundamental training that targets students at earlier stages of their career and education. Industrial internships and trainee programs are in

many cases, and depending on the size of the company, a standardized process and offer a marketable qualification to their attendees. [7]

Compared to established certification processes and courses, industrial training programs can offer more flexible and general content and therefore be more easily used to introduce new practices. Also, unlike later in-house training programs, they can be targeted specifically at students. This allows students to be introduced to and involved in concepts at an early stage, making the training more specific and practical.

Some Examples of Industrial Training Programs have been identified:

1. Siemens power academy TD [8]
2. Iberdrola group's internship programs [9]
3. Schneider Electric's Training and courses [10]
4. EDF's internships and placements [11]
5. Ericsson internships [12]
6. Internships offered at industries by the Delft S.E.A. (study association for the Master Sustainable Energy Technology (SET) at Delft University of Technology, NL) [13]
7. Industrial internships offered at ACS RWTH
8. Digital Opportunity Traineeships – an EU-funded training initiative (Erasmus intern) [14]
9. GE internships [15]

Industrial training programs are a very important stakeholder for Eddie as it directly addresses the objective of aligning education and the workforce needed in the energy sector. They address this problem at an early stage by offering internships/training programs which help the individuals to adapt to the business in a very quick and efficient way. It is important that businesses share their needs in order to have better a prepared workforce which will possibly become eventually potential trainees.

### 2.3.3. Administration

The broad group of the different administrations, whether at the European or national level, frame the action policies for the development of the different areas of EDDIE project, whether at the industry level, as well as education. In that way the Administration group ranges from regulation institutions defining the framework for activities in monopoly (like transmission and distribution) and verifying the correct functioning of activities carried out in competence (e.g. wholesale market), to educational certification authorities dealing with, for instance, the definition and recognition of VET curricula, or the accreditation of professors, institutions or programmes.

For the Administration, EDDIE develops interesting applications. With a multi-sectoral point of view, it is configured as a means to match the different skill needs that energy companies have and the content that educational systems should cover. It will influence both the educational framework and certification, identifying best practices. In this way, appropriate mechanisms can be promoted to facilitate their implementation, from the European context to a national, regional or local context.

Each one operates in a specific domain, ranging from local or regional administrations to others at EU or national level. In general, EDDIE is focused in the last ones, because they cover larger territories and may thus have higher impact. Some examples for each category are provided in the following sub-sections.

#### 1. European

- **Industry** (e.g. European Commission, CEER): At EU level, challenges include issues like the import dependency, the limited diversification, the high and volatile prices, the demand growth, security issues, climate change, decarbonisation, energy efficiency progress, integration of renewables and the interconnection of energy markets. EU's energy policies define a set of measures to address these challenges. Energy is a shared competence to be exerted at EU and national levels with subsidiarity as a general principle. Industry administration institutions, like the Council of European Energy Regulators, are also key to propose recommendations at European level, serving as a framework for national regulators to collaborate and work in the creation of a single, competitive and sustainable internal market for gas and electricity in Europe, and are thus very relevant for the roadmap strategy of EDDIE blueprint.
- **Education** (e.g. ERASMUS). EU policy in education and training is designed to support the Member States, who are responsible for these competences, and helps to address challenges such as the skill deficits and

technological developments at the global level. Erasmus+ is the EU's programme to support education, training, youth and sport in Europe. Erasmus+ offers mobility and cooperation opportunities in all EQF levels, including in addition youth and sport. This kind of programs are key to EDDIE to improve the quality and internationalization of education fostering the collaboration among institutions.

- **Social** (e.g. H2020/Horizon Europe). In certain areas, like employment and social affairs, both the EU and national governments can legislate, the latest in the case that the EU has not already proposed laws or has decided that it will not. Areas of the European Commission devoted to promote youth and green employment, as well as to foster the energy transition, are in this regards relevant to EDDIE. Horizon 2020, from now on Horizon Europe is the EU's key funding program for research and innovation. This kind of programs are key to EDDIE to foster the international collaboration of companies with research institutions and universities, serving to explore the very edge of the frontier of knowledge. It is comprised of a set of calls, each with a specified Technology readiness level (TRL), starting with TRL1 for basic principles observed until TRL9 for Actual system proven in operational environment. This enables to cover a large number of projects with diverse degrees of maturity of the developed concepts, enabling to go through all the stream of research.

The European administration is of high interest for the Eddie project as they financially support the development of the final Blueprint. Horizon 2020 is the main economic driver of the project and therefore the promoter of success of the project. It is in the European interest to create projects such as Eddie which address innovation and development adapting to new technologies and changing lifestyles.

## 2.National

- **Industry** (e.g. Bundesnetzagentur in Germany). This kind of industry-related administrations, like national regulators, are key to cover the national regulatory aspects of the industry both in regulated and non-regulated activities. Activities carried out in a monopoly regime usually require a closer attention of the regulator, while activities in competition usually operate in the framework of markets but still require attention to prevent abusive behaviours.
- **Education** (e.g. ANECA in Spain). This type of administrative stakeholder, and in particular accreditation authorities, are interesting in relation to their capacity to certificate university programs, professor qualifications, and even the institutions themselves. For VET education, there are official administrative stakeholders like INCUAL (in Spain) in charge of defining VET contents for specific job definitions. These stakeholders are key to EDDIE as they are the ones that have the capacity to modify and standardize new educational contents required for the digital transformation of the energy sector.
- **Social.** Governments, though ministries like the Ministry for ecological transition and demographic challenge are key to develop rural regions, upskilling or reskilling people on risk to unemployment, and transitioning regions and society towards a cleaner energy system. Others Ministries, like the Spanish Ministry of Economy, Industry and Competitiveness, define national research programs, setting the national research strategies, being able to propose areas of interest for the respective country. These types of programs have interest in EDDIE to drive the direction in which society needs to be transformed from a national perspective.

The National administration of the European countries is of high interest for the Eddie project as highly support the development of new projects by proposing new strategies to address the areas of interest in their respective countries.

## 3.Regional

- **Industry.** In some countries, regions can have politic and financial autonomy, and therefore attributions to carry out their tasks and legislate on related matters. Therefore, regional administration related to the companies can have competence to regulate certain aspects of the companies within pre-established limits. In this way, they can introduce additional aspects that may differ among regions. These regional administrations can gather at European level, for example with the European Committee of the Regions, being in particular the Commission for the Environment, Climate change and Energy (ENVE) relevant to EDDIE.

- **Education** (e.g. Fundación para el Conocimiento Madri+d). Regional authorities can have competences to further define the national frameworks. For example, in Spain, in the VET context each region has margin to further specify a certain percentage of the competences to be acquired by the students. In the same way, accreditation entities can define processes to certify professor qualifications inside the region.
- **Social** (e.g. STEMadrid). The European Regional Development Funds aim to strengthen economic and social cohesion in the UE among the different territories by providing a priority of investment on specific territorial characteristics in order to reduce economic, environmental and social problems, focusing in innovation and research, digital agenda, support of SMEs and low-carbon economy. Regional administrations can organize workshops, expositions, and promote networks of institutions, provide quality seals, foster start-ups and offer prizes to the recognition of the work of institutions or specific people.

As said before, EDDIE will focus more on the European and national perspectives, aiming to provide a broader view. However, local and regional institutions may provide resources, grants and sponsorship (in general) to specific training initiatives, especially in face-to-face modes and when the initiative is directly related to local development and employment. Nevertheless, regional initiatives may always support and enhance development in specific regions, reaching a wider range of public as regional administrations are closer to the citizens.

## 4. Local

- **Industry.** Local administration can deal with local aspects like public places, traffic, households, local roads, environmental aspects, water and street lighting, cleaning, etc. For example, those aspects related with traffic can be relevant for EDDIE and have impact in the electrification of the transportation sector. Aspects related to the water, gas and power system infrastructure may also be relevant, including dealing with the design of new districts.
- **Education.** Local administration related to the education can define related town hall budgets, run observatories and define the local regulation in districts. Local institutions that manage capacity and training programmes can covers local specific needs related to the profile of local enterprises. It is recognised that EDDIE will focus more on the European and national perspectives, aiming to provide a broader view.\
- **Social.** Local administration can make available information in social media and foster the participation of the citizens.

As said before, EDDIE will focus more on the European and national perspectives, aiming to provide a broader view. However, local and regional institutions may provide resources, grants and sponsorship (in general) to specific training initiatives, especially in face-to-face modes, and when the initiative is directly related to local development and employment. Nevertheless, this kinds of initiatives are important for many individuals/entities and their personal development.

## 2.3.4. Associations & Communities

The Associations and Communities are a very relevant stakeholder group which can significantly impact the development of the EDDIE project, as well as the future implementations of the main outcomes: Sectoral Skills Alliances, Stakeholders Database, and the final Blueprint.

In general, the role of this specific group consists in the exchange of ideas and knowledge around the common subject of education for digitalization of energy, evaluation, and dissemination of EDDIE products. Research institutions, together with industrial companies and developers have been considered the main drivers for innovation, value creation and technological progress, but during this complex process, the support of associations and communities is mandatory.

Bound by the same objective of overcoming the energy transformation system in Europe, the associations and communities can participate in a more connected and stable network for achieving the sustainability target of energy sector.

Notably, the roles of associations and communities for the EDDIE project are the following:

- To identify the potential beneficiaries (end users, stakeholders and experts, decision makers, general public, etc.) of the EDDIE products and the end users: educate entities and training bodies in the energy industry including universities, high schools, energy sector representatives including TSOs, DSOs, specific energy market actors, generators, suppliers, actual end users.
- The transfer of research results in the educational process for developing curricula, training modules, drafting policies recommendations, and shaping learning frameworks.
- To provide useful information from the industry analysis regarding current and future skills needs.
- To deliver feedback from workers and civil society regarding the Blueprint development.
- To help the EDDIE project keep its objective aligned with the EU guidelines through close collaboration with regulatory bodies.
- To adopt the learning tools developed during the project and intensify the impact.
- To ensure that the results are used beyond the lifetime of the project.
- To help build a strategic cooperation network.

Associations and communities can be classified based on their main preoccupations on sub-stakeholder groups as further presented.

## 1. Energy:

An Energy associations and communities sub-stakeholder group is formed by all entities who are addressing topics or different interests from the energy sector, either at local, national, regional or European level.

For the EDDIE project, this sub-stakeholder group is relevant through the permanent contact with the entire sector regarding status, new changes, proposals, and general directions.

Some of the major stakeholders categories within the Energy area based on project research are listed below:

- Consultancies
- Renewable Generation
- Conventional Generation
- DSOs
- TSOs
- Energy Storage:
- Regulators

## 2. Technology

Associations and communities sub-stakeholder group targeting technology is represented by all entities who can contribute with the latest developments in terms of energy technology or benefit from the outcomes of EDDIE project with applicability in the technology field.

After the general context delivered by energy stakeholders, the technology representatives are critical players in the energy transition which demands new ways of doing things. Grid improvements and upgrades, better power electronic devices, technical solutions for the high renewables sources participating in the grid, increase of distributed generation, new storage technologies, new infrastructure, electric mobility developments, as well as ICT and cybersecurity new products require a strong collaboration from each association and community member.

## 3. Labor

The energy sector will go through many changes in the labor market level since the demands for the workers and apprentice's competence will need to keep up with industry needs.

In this area, the associations and communities are entities targeting the employability of the people working in the sector, the shaping of government policies and agenda while learning from the energy industry needs and demands for future employees. This specific sub-stakeholder group is strongly interconnected with education associations.

## 4. Research

The research sub-stakeholder group is represented by all associations and communities who work on finding new approaches or solutions for the challenges of the energy sector and also improving the existing elements of it. Contribution to policy developments can also be coordinated by research institutions.

Some of the major stakeholders categories within the research area based on project research are listed below:

- **Alternative and Renewable Energy**

Within this sub-group from across the clean power sector providing cost-effective solutions to the climate crisis while creating jobs, spurring massive investment in the economy, and driving high-tech innovation across the sector.

- **Conventional Energy**

For this sub-group the importance is for future development of low- and no-carbon solutions to efficiently, affordably, and sustainably meet global energy needs while minimizing environmental impacts, dramatically reducing greenhouse gas emissions, and mitigating climate change.

- **Oil and Gas**

This stakeholder sub-group is of importance to enable competitiveness in a future marketplace conditioned by a CO2 emissions price. Natural gas is finding its place at the heart of the energy discussion as a major fuel for multiple end uses — electricity, industry, heating — and is increasingly discussed as a potential pathway to reduced oil dependence for transportation.

- **Electric Power**

From the point of view of research for electric power, a major drive is for global innovation through broad collaboration and the sharing of knowledge, enhancing public understanding of engineering and technology and to pursue standards for their practical application and to provide opportunities for career and professional development.

- **ICT and cybersecurity**

The ICT profession includes a very wide range of job titles, designations, and descriptions, with a vast array of university programs existing to supply graduates for the underlying roles. The knowledge and skills developed in ICT degrees are ideally determined in consultation with industry and professional associations.

## 5. Education

Associations and communities focusing on education are entities who teach, work on education frameworks, deliver training programs, create educational/training methods/tools, support the improvements of curricula at school, college, or university level.

Some of the major stakeholders' categories within the Education area based on project research are listed below:

- **Higher Education**

Within this sub-group, the aim is to enhance the higher education community's role and actions in advancing societies worldwide underpinning the pursuit, dissemination, and application of knowledge.

- **Centers/Trainers**

The role of centers and trainers are the contribution to supporting the human capital through the reform of education, training, and labor market systems. Through the activities of such stakeholders to develop skills and employment needs analysis, system governance and stakeholder engagement, social dialogue and private sector participation, qualification systems and quality assurance, work-based learning, teacher training, entrepreneurial learning and core competences, and career guidance.

- **Growth Professionals**

Associations and communities from this group represent the organizations directly involved in teaching, adult learning, or lifelong learning. They influence policies, cooperate with European institutions, release publications and other results, facilitate contacts with and between adult education stakeholders and cooperate with research and development institutions, including universities.

## 6. Cooperation between different Independent Energy Entities

The element who is holding all the stakeholders in one place is the cooperation of all different players with the same priorities. In this sub-stakeholder group, the objective is to find and implement guidelines, strategies, and frameworks at any geographical levels for an efficient collaboration between all parts of the energy value chain. A European homogeneous energy sector will be of benefit to each member state.

Some of the major stakeholders' categories within the Cooperation area and based on project research are listed below:

- **EU Institutes & other H2020/ERASMUS**

For this stakeholder group the objective consists in cooperation of different independent entities (for example energy regulators of Europe) who aim to work and contribute to a common goal (for example to create a single, competitive, efficient, and sustainable EU internal energy market). These associations are constantly exchanging information and supporting European members in their work.

## 7. Citizen Energy Communities

The entire energy transition process is aimed at society, the planet, and their wellbeing. Therefore, citizen's opinions, needs and proposals are valuable inputs to be considered. This group is represented by associations and communities who are formed by citizens or support and disseminate the citizen's voice and requirements in the energy sector.

From both a high-level perspective and a granular perspective, all the sub-stakeholders' groups previously addressed are strongly interconnected and difficult to analyze as an independent body. The entire energy ecosystem is changing, from production, transportation, storage, use, education, work, regulations, etc., and as a result the entire range of cells must align and contribute for a smooth transition and a sustainable energy sector.

### 2.3.5. Individuals

The individuals are of high relevance for the Eddie project as they will be one of the main users of the Eddie platform. Individuals must be convinced of the usefulness of the platform in order for the usage of Eddie to be to the best of its abilities.

Individuals will be the ones applying to become members of the Eddie platform, either representing a business/organization or individually.

Their main role in Eddie will be the following:

- Applying to become members of the platform as: teacher, working candidate, training candidate, representative of a business/org etc.
- Identifying the future roles needed in the energy sector, both in industry and education.
- Provide the need and demand of jobs/ education opportunities of the platform.
- Individuals will be the ones to judge the usefulness of the platform and will continue/quit using the platform.

#### 1. Teacher:

A teacher is the figure of a person that is a professional in planning, preparing and delivering lessons. Teachers are an essential figure for the EDDIE project. The quality of the teaching offered and the level that the students obtain depend largely on the teachers and their capacity of transmitting the knowledge in both an efficient and effective way.

The EDDIE project requires the teachers to be updated on the needs that the energy sector brings. They should be able to adapt and teach the correct identified knowledge that is needed for the future jobs arising due to digitalization.

#### 2. Working candidate

The working candidates will be one of the main users of the Eddie platform. It will be the figure of a person that has studied related to the energy sector or that their past working experience is related to it.

Their main objective is working in the energy sector and therefore uses Eddie as a source to find an adequate job for its profile.

The working candidates should be correctly informed and targeted in order to ensure that they suit correctly the user that the Eddie platform is willing to find.

### **3. Training candidate**

The training candidate will also be one of the main users of the Eddie platform. It will be the figure of a person that would like to focus their area of studies in the energy sector and that is therefore looking for the adequate training for their profile.

Their main objective is to end up working in the energy sector and therefore they need a background that prepares them for their future job position.

The training candidate can be of all types: university studies, vet studies, specific courses etc.

### **4. Researcher**

A researcher is the figure of the person that is responsible for collecting and analyzing data in order to solve problems and arrive to conclusions that will help predict trends. Researchers specialized in the energy sector, education sector and Human Resources are of high value for the Eddie project as they can help predict and solve future problems such as the gap that will be found between the education and the workforce demanded in the energy sector.

### **5. Industry Executive**

The industry executives are responsible for the operational and strategic decisions of a business, therefore their figure is of vital importance for the project.

The success of the strategies of a business depend largely on the people that work on them, therefore this is directly linked to the hiring and education processes that the Eddie project intend to address.

The industry executives will analyze the strategies that will be done and look for profiles that are correctly linked with job position and that have the education that they are looking for.

### **6. Human Resources Industry**

The Human resources industry plays an important role in the Eddie project as they are the main drivers for identifying the characteristics that will be needed for the future jobs. It is the department of a business, or a business itself, that takes care of the hiring of the workforce for a business, analyzing the different profiles and focusing on what workforce is needed for the strategic management of the business.

The relevant qualities, characteristics and knowledge needed to work in the sector will be decided by them, taking into consideration what is demanded for the sector in that moment in time.

The final decision of hiring people in the businesses depends on their assessment of the profiles, therefore they are key for the Eddie project.

## **2.4. Conclusions**

Digitalization is slowly taking over all of the sectors, the energy sector will soon be digitalized and therefore research and work has to be done in order to adapt to change. This identification of the stakeholders for the energy and education sector is of vital importance to be able to proceed with the adaptation that the energy sector needs when talking about the workforce and education that will be needed in the near future.

The success of the Eddie project is directly linked to the fact that the stakeholders must work together and create synergies to identify the needs of the energy sector, aligning the demands and offers in the sector.

All of the data collected in the form of a list becomes really relevant to find the education and job descriptions that will be needed for future hiring in businesses, bringing together companies, administrations and individuals to achieve a common goal, adaptation to change. The Initial approach to the Stakeholders list can be found as an annex to the document and will be further developed as the Eddie project advances through time.

## 3. Online Database

### 3.1. Overview

Deliverable 3.1. of the EDDIE project aims to create a Stakeholders' map as a database of energy sector occupations and job profiles, with skills content analysis and set the ground for a strategic sectoral cooperation. Providing a sustainable framework that allows education providers to define and update educational programs responding to industry changes addressing skills gaps within the energy sector to achieve the societal objectives of the European Skills Agenda, the Green Deal and the transition to climate-neutral Europe.

Digitalisation is directly affecting the energy sector, hence the importance of the EDDIE project to help with the adaptation to current changes. Past activities of the project, including the assessments of WP2 as for the identification of current and future skill needs in the Energy Sector, contributed to the interaction with multiple types of stakeholder thus creating the image of EDDIE as an important factor for future blueprint strategy for the digitalisation of the Energy value chain. Starting with this stakeholder list, a database was created to have a digitalised form of storing the information and make it accessible to those who are interested in the actions towards reinforcing the competitiveness of the European energy sector by creating a highly skilled workforce, fostering smart, inclusive and sustainable growth in line with the European objectives and values.

Most of the changes that the professional sector is suffering is due to arising technologies that do not only transform working procedures, but create new jobs and business models. This technological change is very fast and require continuous upskilling and reskilling of professionals and this is one of the main issues the Eddie project aims to address.

Research was made in order to create both an automated and elegant database, making it easy to use for the members but also being visual and attractive for potential users of the platform.

The database aims to share and include all the relevant information for the EDDIE stakeholders, aiming to have contain all the relevant stakeholders which will be the potential users of the final blueprint.

### 3.2. Methodology

In order to create the database, the consortium initiated brainstorming sessions to get oriented on how to collect accurately the relevant information and approach of the key stakeholders.

It was agreed that the main objectives of the Stakeholder Database would be the following:

1. Dynamized and easy to access Database, all relevant stakeholders that could be used as a useful resource to create synergies between the members will be included.
2. Alignment between the stakeholders in order to address future changes in the energy sector/education for the energy sector.

The consortium decided to start with the Industrial stakeholders relevant grouping identified in WP2. The first approach for the identification of stakeholders and grouping for the database is shown on the diagram below:

### 3.3. Initial Version

The main objective of creating the Stakeholders Database is to start a strategic sectoral cooperation with the end aim of developing an effective network, who will allow during the project lifetime the achievement of its goals, but the most important will ensure the continuity of the current work by giving energy companies the tools to engage with EDDIE products and other similar stakeholders.

Therefore, the initial version of the Stakeholders Database of sector occupations and job profiles, with skill content analysis will be focused on finding the optimum design. Categorizing the entire energy value chain in specific stakeholder groups was a challenge since all different sub-sectors are highly interconnected and clear boundaries are hard to be identified.

The structure of the database brought several cornerstones that lead to a series of problems to which we found the convenient solutions.

Problems	Solutions
Importing and exporting the information from the applications of the members to the Database.	Installing an import/export function of the internal platform of the Database that enables the automatization of importing and exporting the information.
Searchable Database: being able to look for information in the Database in both an automated and elegant way	Installation of a plugin that allows to search for specific information in the database.
Security Issues: The link to the application appeared as unsecure website.	Change the hosting planning in order for the data of the users to be secure.

Figure 4: Problems and Solutions of the online Database

### 3.3.1. How to become a Member.

An entity who wants to become part of EDDIE stakeholder’s database must register on EDDIE website as MEMEBERS through a dedicated page that can be accessed using the following link: <https://www.eddie-erasmus.eu/registration-page-members/>. This link can be accessed from several places throughout the website such as the constant header (Figure 5), home page (Figure 6), and dedicated section of the Stakeholders Mapping under “Tools and Deliverables” (Figure 7). The entire website works within the https paradigm, thus ensuring a high security interface for external users when creating an account for becoming part of EDDIE Stakeholders.

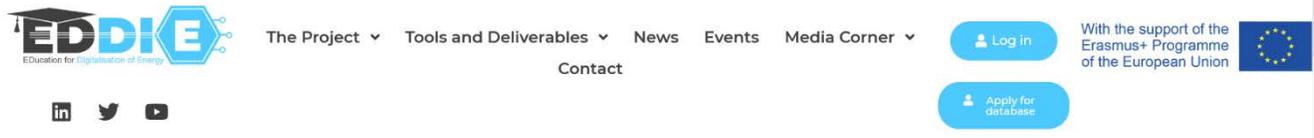


Figure 5: Apply to EDDIE Database button within the header of the website.



Figure 6: Apply to EDDIE Database button within the home page of the website.



### EDDIE Project - Digitization of Energy System - Industrial stakeholders

Stakeholder's map as a database of sector occupations and job profiles, with skill content analysis. This will set ground for a strategic sectoral cooperation in order to design and build a strategic network, in close relation with "Assessment of policies and requirements for VET and beyond". The application to be included to the database can be accessed through the button below and will be verified within the next work days from the consortium.

Apply for database by Creating an Account



### Stakeholder mapping and strategic network building



Figure 7: Apply to EDDIE Database button within the Tools section.

A company has the status of being part of **EDDIE Stakeholders** (or **MEMBER**) after the consortium approves their membership (their registered account), thus a requirements page was created so all the entities agree and understand the conditions. In Figure 6, some parts of the conditions page to become a **MEMBER** within **EDDIE Stakeholders** are presented and a user will have to click "Continue" to proceed with the registration. This page is the next step after clicking on the buttons mentioned above.

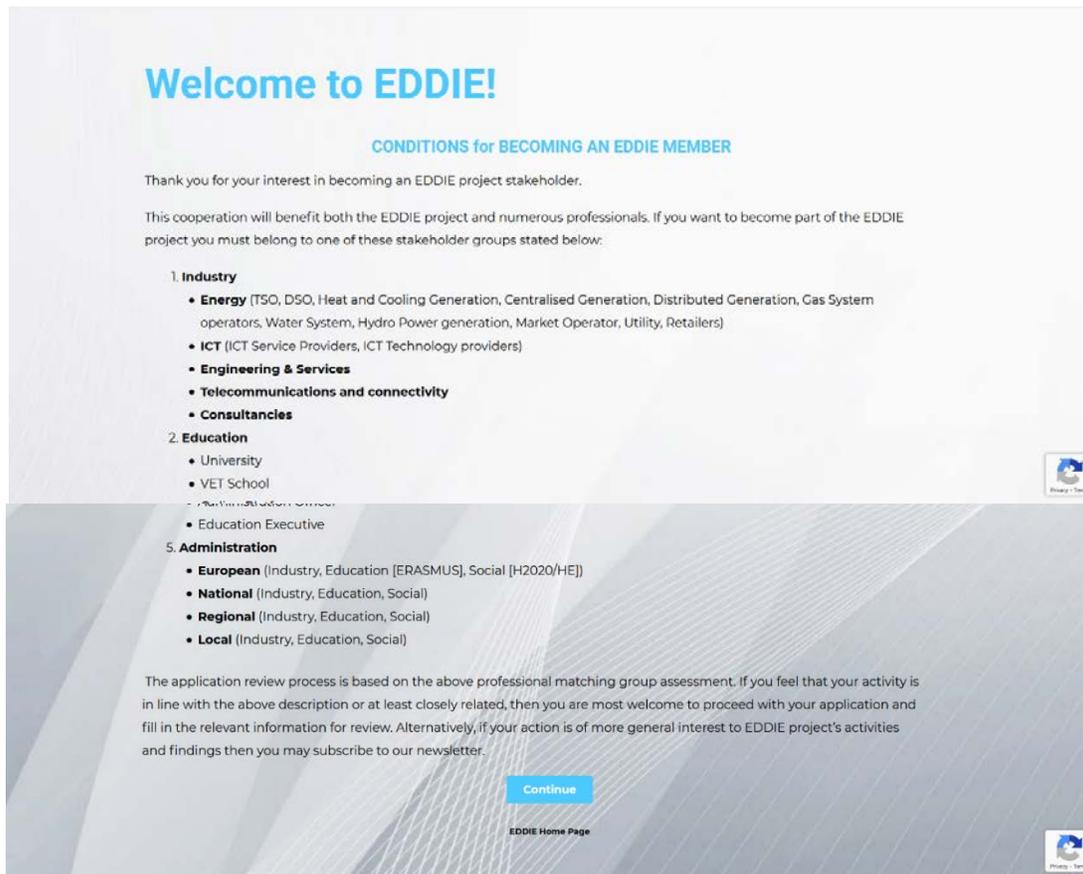
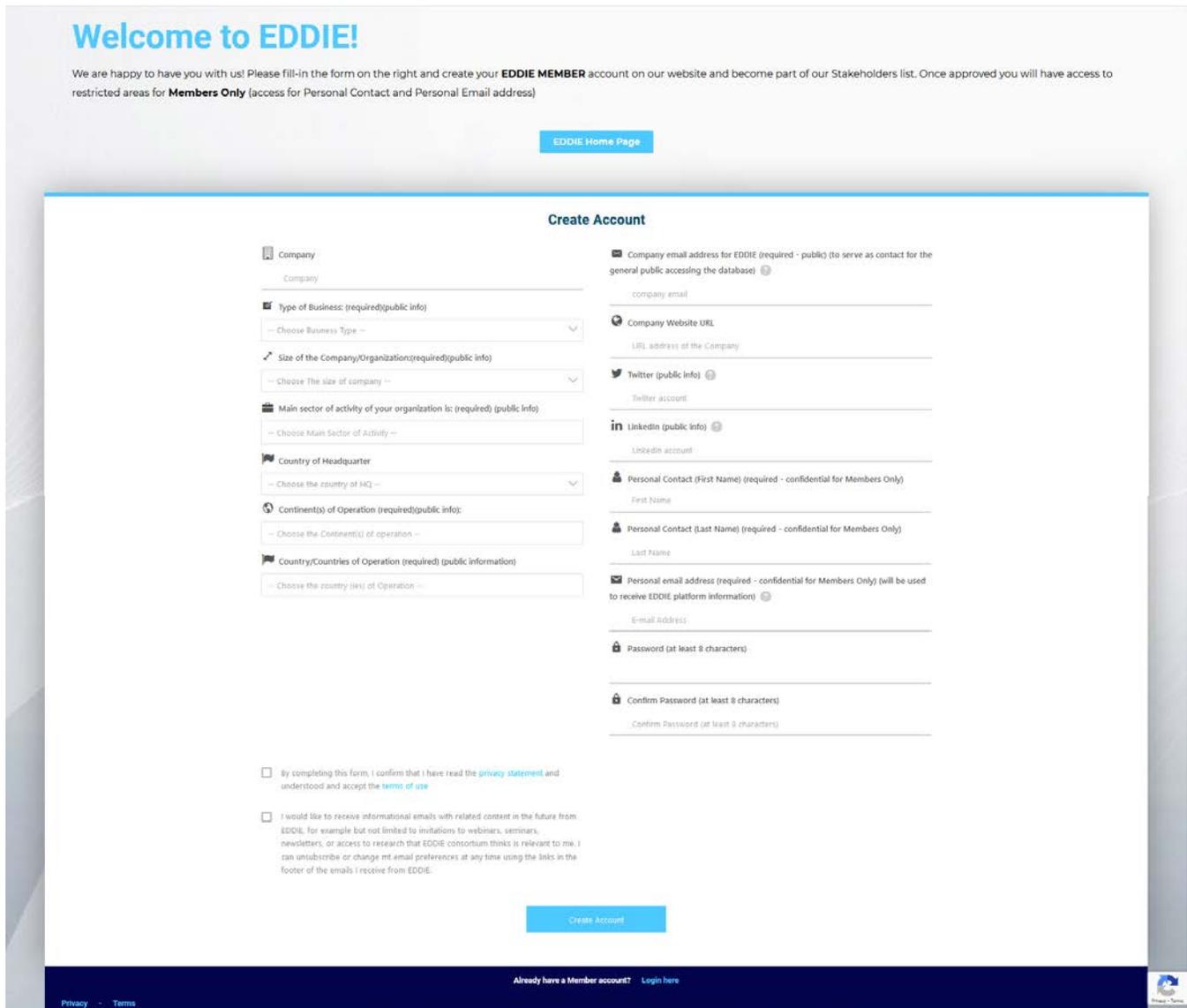


Figure 8: Conditions for Becoming an EDDIE Member page before account registration page (beginning and ending of the page).

### 3.3.2. Registration page and required form.

After choosing the option to create an account (by clicking “Continue” as in Figure 6), the registration page will open, and the application form is the one in Figure 7. Creating an account will involve selecting and filling-in multiple fields (text input or drop-down menu) such as: Name of the Company, Type of Business; Size of the Company/Organization; Main sector of activity of your organization; Country of Headquarter; Continent(s) of Operation; Country/Countries of Operation. Most of the fields required will be publicly available but some of them (such as Personal contact, name, and email address) will only be available for the MEMEBERS approved for EDDIE Stakeholders. Thus, on the right side of the field is mentioned which information will be public and which confidential. The process of registration is further detailed based on the granular categorization of each field.



The screenshot shows the registration page for the EDDIE project website. At the top, it says "Welcome to EDDIE!" and provides a brief introduction. Below this is a "Create Account" form with two columns of fields. The left column contains fields for Company name, Type of Business, Size of the Company/Organization, Main sector of activity, Country of Headquarter, Continent(s) of Operation, and Country/Countries of Operation. The right column contains fields for Company email address, Company Website URL, Twitter account, LinkedIn account, Personal Contact (First Name), Personal Contact (Last Name), and Personal email address. There are also fields for Password and Confirm Password. At the bottom, there are two checkboxes for terms and conditions, and a "Create Account" button. The footer includes links for Privacy, Terms, and Login here.

Figure 9: Registration page for Stakeholder Database on EDDIE project website.

- *Company*

This field requires the name of the company/organization/entity which wants to register in the Stakeholder Database by creating an account. It will appear as in Figure 10 below.

 **Company**

Company

---

**Figure 10: *Company* field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Type of Business*

In this field the entity must choose the company/organization' type of business. According to Figure 7, the options are: Association; Public; Private-Public; Private. The selection is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the selection will be publicly available.

**Type of Business: (required)(public info)**

-- Choose Business Type --

Association

Public

Private-Public

Private

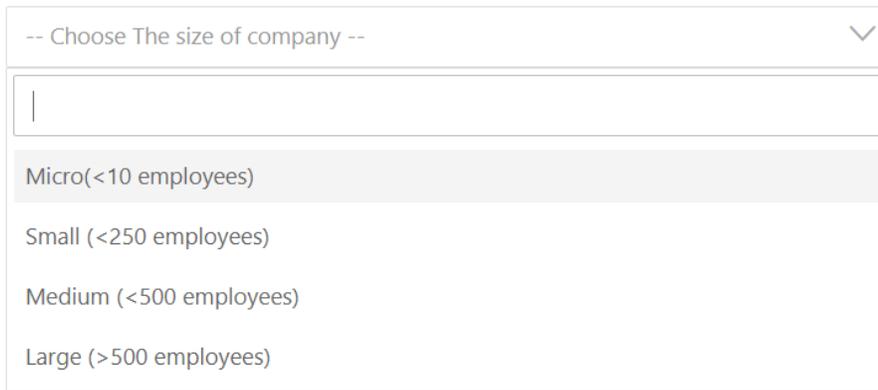
Country of Headquarter

**Figure 11: *Type of Business* field in Create Account page for Stakeholder Database on EDDIE project website**

- *Size of the Company*

In this field the entity must choose the company/organization' size by nominating the number of employees. According with the Figure 12, the options are: Micro; Small; Medium; Large. The selection is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the selection will be publicly available.

↗ Size of the Company/Organization:(required)(public info)



-- Choose The size of company --

Micro (<10 employees)

Small (<250 employees)

Medium (<500 employees)

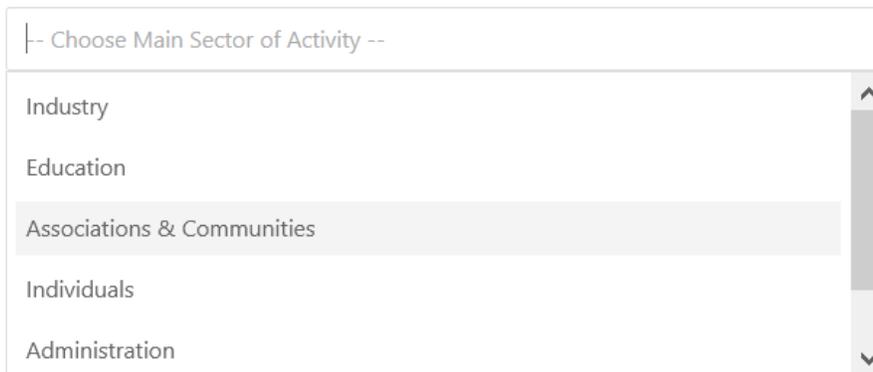
Large (>500 employees)

**Figure 12: Size of the Company field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Main sector of activity of your organization*

In this field the entity must choose the company/organization' main sector of activity by nominating the one central area from the drop-down menu. According with the Figure 13, the options are: Electricity; Oil and Gas, Communications; Heat and Cooling; Lifelong Learning. The selection is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the selection will be publicly available.

📁 Main sector of activity of your organization is: (required) (public info)



|-- Choose Main Sector of Activity --

Industry

Education

Associations & Communities

Individuals

Administration

**Figure 13: Main sector of activity of your organization field in Create Account page for Stakeholder Database on EDDIE project website.**

Selection of the main sector of activity is a conditional field, once a user will select one or more of the options, additional fields will appear, thus increasing the level of details over the company. Such examples are given in Figure 14 and Figure 15.

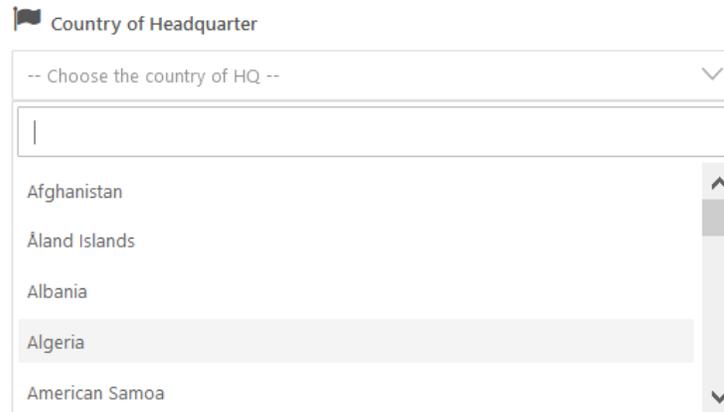
**Figure 14: Examples of choosing one of the options within the Main sector of activity.**

The options chose in the previous step will be now visible due to a top categorization on activity field like Industry, Education, Administration etc. and to other associated columns. In this way a strong and fruitful collaboration will be ensured.

**Figure 15: Examples of choosing multiple options within the Main sector of activity.**

- *Country of Headquarter.*

In this field the entity must choose the company/organization' country of headquarter by nominating one country from the drop-down menu. According with the Figure 16, the options cover all the existing countries in alphabetical order.



**Figure 16: Country of Headquarter field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Continent(s) of Operation*

In this field the entity must choose the company/organization' continent(s) of operation by nominating one or more continents from the drop-down menu. According with the Figure 17, the options cover all the existing continents. The selection is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the selection will be publicly available.



**Figure 17: Continent(s) of Operation field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Country/Countries of Operation*

In this field the entity must choose the company/organization' country/countries of operation by nominating one or more countries from the drop-down menu. According the Figure 18, the options cover all the existing countries in alphabetical order. The selection is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the selection will be publicly available.

 Country/Countries of Operation (required) (public information)

|-- Choose the country (ies) of Operation --

- Afghanistan
- Åland Islands
- Albania
- Algeria
- American Samoa

**Figure 18: Country/Countries of Operation field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Company email address for EDDIE*

In this field the entity must add the company/organization' email address as it can be seen in Figure 19. The information is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the email address will be publicly available.

 Company email address for EDDIE (required - public) (to serve as contact for the general public accessing the database) 

---

company email

**Figure 19: Company email address for EDDIE field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Company Website URL*

In this field the entity must add the company/organization' website URL as it can be seen in Figure 20.

 Company Website URL

---

**Figure 20: Company Website URL field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Personal Contact (First Name)*

In this field the person representing the company (the one creating the account on EDDIE website) must add the personal contacts. The first name is required as it can be seen in Figure 21. The information is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the first name of the contact person will remain a confidential information available only for the members of the database.

 **Personal Contact (First Name) (required - confidential for Members Only)**

---

**Figure 21: *Personal Contact (First Name)* field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Personal Contact (Last Name)*

In this field the person representing the company (the one creating the account on EDDIE website) must add the personal contacts. The last name is required as it can be seen in Figure 22. The information is a required information which will ensure the correct and efficient mapping of the stakeholders. In the end, after the validation and the official enrolment in the Database, the first name of the contact person will remain a confidential information available only for the members of the database.

 **Personal Contact (Last Name) (required - confidential for Members Only)**

---

**Figure 22: *Personal Contact (Last Name)* field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Personal email address*

In this field the person representing the company (the one creating the account on EDDIE website) must add the personal contacts. The email address of the contact person is required as it can be seen in Figure 23. The information is a required information which will ensure the correct and efficient mapping of the stakeholders, as well as for approval purposes. In the end, after the validation and the official enrolment in the Database, the first name of the contact person will remain a confidential information available only for the members of the database.

 **Personal email address (required - confidential for Members Only) (will be used to receive EDDIE platform information) ?**

E-mail Address

---

**Figure 23: *Personal email address* field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Password*

In this field the entity must add a password associated to the company/organization account. It is required a password with at least 8 characters as it can be seen in Figure 24.

 Password (at least 8 characters)

|

**Figure 24: Password field in Create Account page for Stakeholder Database on EDDIE project website.**

- *Confirm Password*

In this field the entity must confirm the password added in the previous step, as it can be seen in Figure 25.

 Confirm Password (at least 8 characters)

Confirm Password (at least 8 characters)

**Figure 25: Confirm Password field in Create Account page for Stakeholder Database on EDDIE project website**

- Privacy statement

At the end of the registration fields, a check box is required for confirming that the entity accepts the terms of use, as it can be seen in the Figure 26. This step is mandatory.

By completing this form, I confirm that I have read the [privacy statement](#) and understood and accept the [terms of use](#)

**Figure 26: Privacy statement check box in Create Account page for Stakeholder Database on EDDIE project website**

- Subscription to EDDIE project

At the end of the registration fields check box is used for choosing the subscription of the entity to the news generated by the EDDIE project, as it can be seen in the Figure 27. This step is optional.

I would like to receive informational emails with related content in the future from EDDIE, for example but not limited to invitations to webinars, seminars, newsletters, or access to research that EDDIE consortium thinks is relevant to me. I can unsubscribe or change mt email preferences at any time using the links in the footer of the emails I receive from EDDIE.

**Figure 27: Subscription to EDDIE project in Create Account page for Stakeholder Database on EDDIE project website.**

- Create the Account. Complete the registration.

The last step of the registration process is to click on the “Create Account” button, verifying all the information previously included, as it can be seen in the Figure 28. If everything is correct, a validation message will be displayed

(Figure 29), and a confirmation email will be sent (as can be seen in Figure 30) to the Personal email address added in the contact field.



Figure 28: Create Account button in Create Account page for Stakeholder Database on EDDIE project website

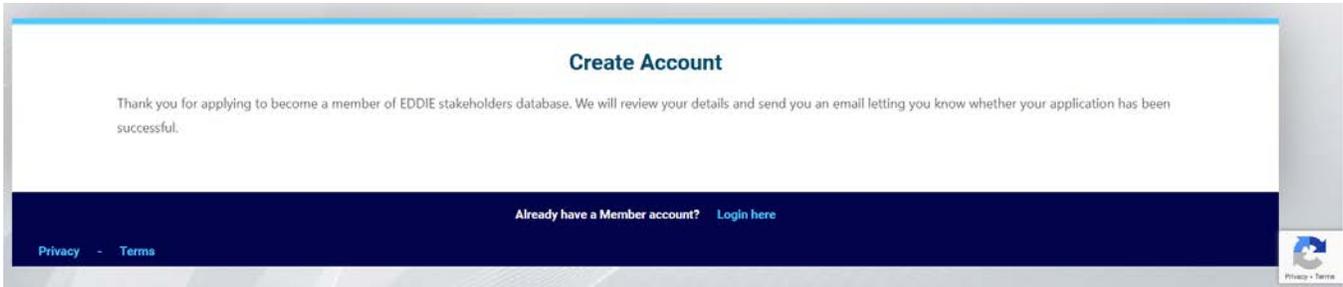


Figure 29: Confirmation message after successfully filling-in the registration form

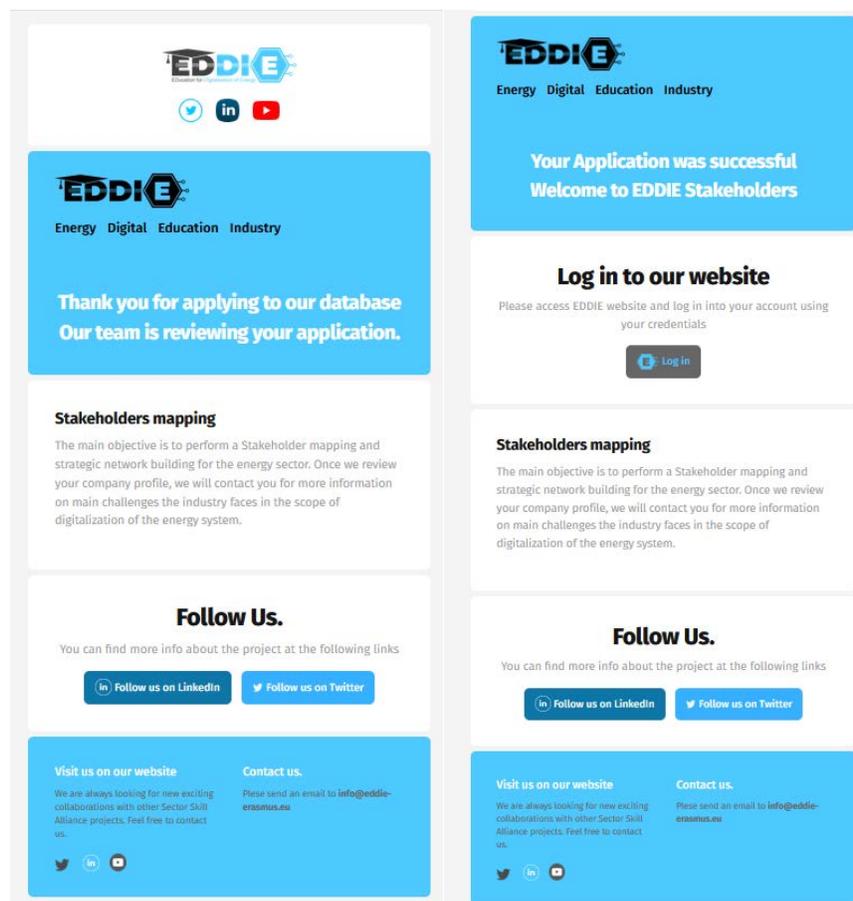
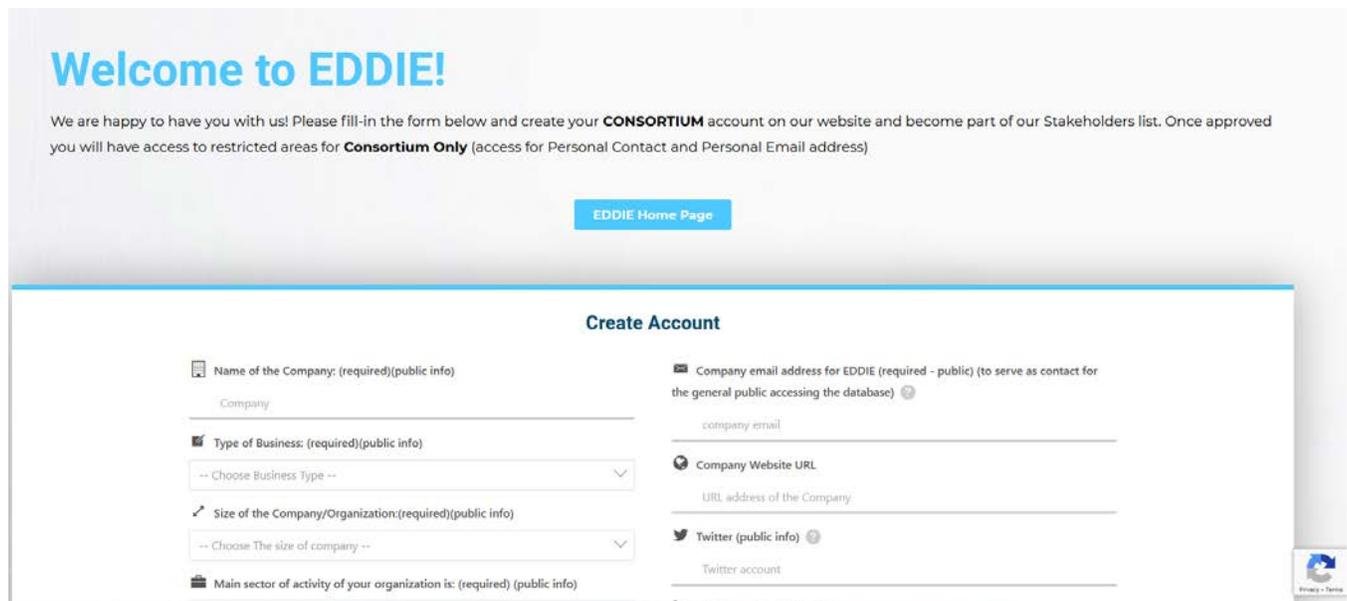


Figure 30: Pending approval email after the registration was made (left side) and Approval email once the application was successful (right side).

An entity will become an EDDIE Stakeholder after the project consortium approves its membership as per the rules and conditions stated in Figure 8. Once this process is complete an “Approval Email” will be sent to the representative of the entity (as the personal email address they have entered in the registration form), a print-screen of this email can be seen in Figure 30 (right side). After registration and approval, the company or organization will be officially part of the Stakeholder Database, and it will be displayed on EDDIE website as part of the dedicated section. As mentioned before and as could be seen in the registration form, some of the information of the company/organization will be publicly available, other only for the. To be noted that, within EDDIE website, there is also a registration form (similar to the one presented above) available for the consortium partners (the form can be seen in Figure 31.)



**Welcome to EDDIE!**

We are happy to have you with us! Please fill-in the form below and create your **CONSORTIUM** account on our website and become part of our Stakeholders list. Once approved you will have access to restricted areas for **Consortium Only** (access for Personal Contact and Personal Email address)

[EDDIE Home Page](#)

### Create Account

Name of the Company: (required)(public info)  
Company

Type of Business: (required)(public info)  
-- Choose Business Type --

Size of the Company/Organization:(required)(public info)  
-- Choose The size of company --

Main sector of activity of your organization is: (required) (public info)

Company email address for EDDIE (required - public) (to serve as contact for the general public accessing the database) ?  
company email

Company Website URL  
URL address of the Company

Twitter (public info) ?  
Twitter account

[Privacy + Terms](#)

**Figure 31: Part of the Registration page for CONSORTIUM partners (the format is same as the one for MEMBERS)**

### 3.3.3. Public and Private sections on the website.

As stated in the previous section, EDDIE Stakeholders database will be displayed on EDDIE website within a section with different privileges as for PUBLIC and MEMBERS (Restricted). Depending on the status of the user accessing the website, the information will be available accordingly and clearly stated during the registration process. The section within the website where the database is available can be found in “Tools and Deliverables – Stakeholder Mapping” as can be seen in Figure 32.

## Tools

### EDDIE Project - Digitization of Energy System - Industrial stakeholders

Stakeholder's map as a database of sector occupations and job profiles, with skill content analysis. This will set ground for a strategic sectoral cooperation in order to design and build a strategic network, in close relation with "Assessment of policies and requirements for VET and beyond". The application to be included to the database can be accessed through the button below and will be verified within the next work days from the consortium.



### Stakeholder mapping and strategic network building

The main objective is to perform Stakeholder mapping and strategic network building. The work involves the creation of a Stakeholders' map as a database of sector occupations and job profiles, with skills content analysis and set the ground for a strategic cooperation. The stakeholder mapping will start by identifying all relevant areas involved in the energy sector and then desk research to identify institutions, companies, organizations and all other interest groups that are relevant to the energy transformation system in Europe.

PUBLIC Area

RESTRICTED Area

Figure 32: EDDIE Stakeholders access page with different privileges

The "PUBLIC Area" button in Figure 32 give access to the page of the database containing only the public information requested during the registration process of a MEMBER. By clicking on "PUBLIC Area", the associated page will open and a print-screen of it can be seen in Figure 33.

### EDDIE Project - Digitization of Energy System - Industrial stakeholders

Stakeholder's map as a database of sector occupations and job profiles, with skill content analysis. This will set ground for a strategic sectoral cooperation in order to design and build a strategic network, in close relation with "Assessment of policies and requirements for VET and beyond". The application to be included to the database can be accessed through the button below and will be verified within the next work days from the consortium.

Apply for database - Become a Member

Organization Name	Type of Business	Size of the Company	Main Sector of Activity	Type of Technology	Country of Headquarter	Continent of Operation	Country(s) of Operation	Organization Email address	Company Website URL	Twitter	LinkedIn
Aalto University	Private Owned		Education	University	Finland	Europe	Finland		https://www.aalto.fi/en		
Adrem	Private Owned		Industry	Engineering & Services	Romania	Europe	Romania		https://adreminvest.ro/en/		
Agency for the Cooperation of Energy Regulators (ACER)	Agency		Administration	European (social)	Slovenia	Europe		info@acer.europa.eu	http://www.acer.europa.eu/en/The_agency/Pages/default.aspx		
All Digital	Association	Small (<250 Employees)	Associations & Communities	Technology	Belgium	Europe		info@all-digital.org	https://all-digital.org/		
Alliander N.V.	Private Owned		System Operators	DSO	Netherlands	Europe	Netherlands		https://www.alliander.com/en/		
Association for Electrical, Electronic and Information Technology (Technical regulator for power grids in Germany) & VDE FNN	Association	Small (<250 Employees)	Associations & Communities	Energy	Germany	Europe			https://www.vde.com/en/fnn		
Association for Teacher Education in Europe (ATEE)	Associations	Small (<250 Employees)	Associations & Communities	Education	Belgium	Europe		secretariat@atee.education	https://atee.education/		
ATOS	Private Owned		Industry	ICT Technology and Service Providers	France	Europe	France		https://atos.net/		

Figure 33: EDDIE Stakeholders database page available for the General Public.

The "RESTRICTED Area" button in Figure 32 give access to the page of the database containing all the information requested during the registration process of a MEMBER. By clicking on "RESTRICTED Area", the page will open and a print-screen of it can be seen in Figure 33.

EDDIE Project - Digitization of Energy System - Industrial stakeholders - Restricted area (for Members and Consortium only)

Stakeholder's map as a database of sector occupations and job profiles, with skill content analysis. This will set ground for a strategic sectoral cooperation in order to design and build a strategic network, in close relation with "Assessment of policies and requirements for VET and beyond". The application to be included to the database can be accessed through the button below and will be verified within the next work days from the consortium.

Organization Name	Type of Business	Size of the Company	Main Sector of Activity	Type	Country of Headquarter	Continent of Operation	Country(s) of Operation	Organization Email address	Company Website URL	Twitter	LinkedIn	Personal Contact (First Name)	Personal Contact (Last Name)	Personal Contact email address
Holistic	Private Owned		Industry	Engineering & Services	Greece	Europe	Greece	zmylona@holisticsa.gr	https://www.holisticsa.gr/			Zoi Mylona	Zoi	Mylona
Ss. Cyril and Methodius University in Skopje (UKIM)	Public	Large (>500 employees)	Education	University	Macedonia, the former Yugoslav Republic of	Europe	Macedonia, the former Yugoslav Republic of	ukim@ukim.edu.mk	http://www.ukim.edu.mk			Vesna	Boroza	vesnab@fekt.ukim.edu.mk
Synelxis Solutions Ltd	Private Owned		Industry	Engineering & Services	Greece	Europe	Greece	zahariad@synelxis.com	https://www.synelxis.com/			Theodore ZAHARIADIS	Theodore	ZAHARIADIS
MicroDERLab Group	Public	Small (<250 employees)	Education	Research, Academic Institution	Romania	Europe	Romania	microderlab@gmail.com	www.microderlab.pub.ro			Radu	Plamanescu	radu.plamanescu@pub.ro
Romanian Energy Center (CRE)	Association	Small (<250 employees)	Associations & Communities	Energy	Romania	Europe	Romania	office@crenerg.org	https://www.crenerg.org/			Radu	Plamanescu	office@crenerg.org
Baum	Private Owned		Industry	Engineering & Services	Germany	Europe	Germany	lkarg@baumgroup.de	https://www.baumgroup.de/			Ludwig Karg	Ludwig	Karg
TeamWare SRL	Private Owned		Industry	Engineering & Services	Italy	Europe	Italy	gianluca.zanetto@teamware.it	https://www.teamware.it			Gianluca Zanetto	Gianluca	Zanetto
KEMA Labs	Private Owned		Industry	Engineering & Services	Netherlands	Europe	Netherlands	ganesh.sauba@divvl.com	https://www.cesl.it			Ganesh Sauba	Ganesh	Sauba
P3 Energy & Storage GmbH	Private Owned		Industry	Engineering & Services	Germany	Europe	Germany	Christian.Hille@p3-group.com	https://www.p3-group.com/			Christian Hille	Christian	Hille

Figure 34: EDDIE Stakeholders database page available for the MEMBERS only.

### 3.3.4. Log-in and update the account.

Once the Membership was approved and the email sent to the entity (Figure 30, right side), the representative can have access to their account, by clicking on "Log in" button that can be found either within the confirmation email (Figure 30 right side) or inside the header of EDDIE website (Figure 5). A print-screen of the log-in page is presented in Figure 36. The user will have to input their email address and the password to have access to their account.

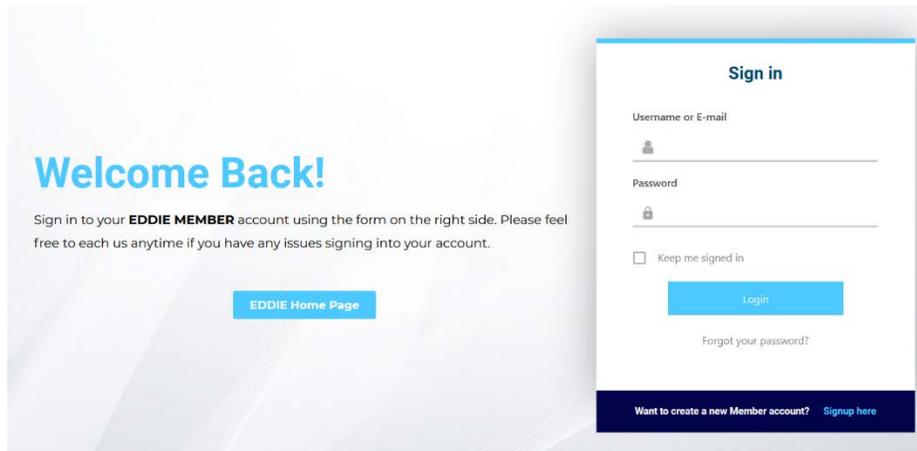
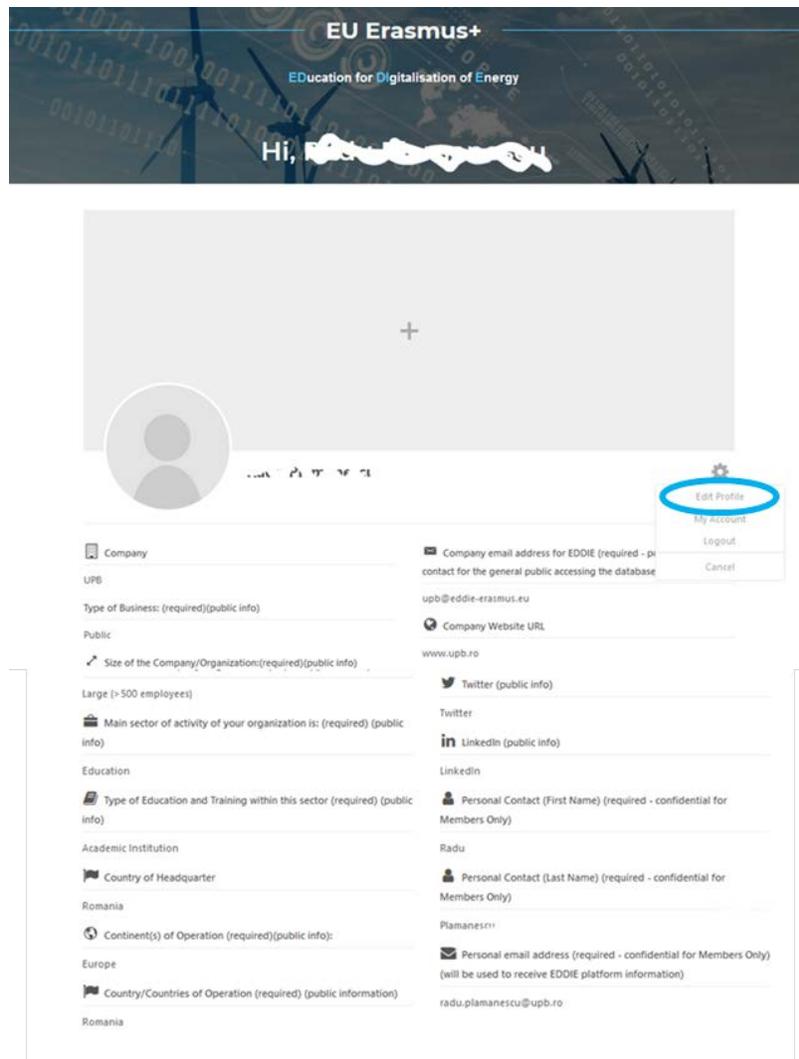


Figure 35: Log-in page for MEMEBERS

Once logged-in, the entity's representative, can have access to their account, edit their profile, etc., as can be seen in Figure 36 below.



**Figure 36: Account profile page for each MEMBER**

### 3.3.5. Future Benefits of becoming an Eddie member.

The main aim of the Eddie Platform is to create value for it's members, the following benefits have been identified:

1. Creating synergies between the members, helping them align with the needs of the market (what workforce is needed) and the education provided.
2. Creating education for the energy sector that has a real value for the job applicants.
3. Creating Job descriptions that are correctly in line with the education offered.
4. Sharing with individuals interested in the energy sector the characteristics needed to work in the sector, helping applicants become more efficient and valuable.
5. Improve and facilitate the marketing and communication of RRHH of business and education entities by providing an optimum space were they can find potential students/workforce.

## 3.4. Conclusions

The Database is a very useful tool that enables the stakeholder list that has been created for this deliverable to be dynamic. It is a way of bringing together all of the stakeholders in the energy and education sector creating synergies between them.

It is essential for the stakeholders of the energy sector to be able to establish contact between themselves to work more efficiently towards the digitalized future. Information must be amalgamated between the stakeholders to identify the jobs that will be needed and therefore what education must be provided in order to train for the specific jobs.

It is an important approach considering the innovations that digitalization will bring and the speedy adjustments adaptation that the energy sector will have to make, including changes in the education for the energy sector and the workforce, in order to manage the future challenging tasks that it will bring.

### 3.5. Next steps

The following steps in the database design and implementation are related to the following topics:

#### 1. Separate organization registration from personal registration

Currently registration of organizations and people is done at the same time. In future, these two registrations should be separated to avoid redundancies in the database and prevent issues like the request of two emails (institutional and personal) for a single registration.

The implementation of this approach is not decided. It has to be evaluated whether this approach should rely on the use of relational databases or can be implemented using pre-designed tables.

#### 2. Mapping of stakeholder support and interest

Requesting this information directly to the stakeholders could provide inaccurate results. Therefore, it is intended to replace this by questions that indirectly can be used to map the stakeholders, for example in terms of a quantitative evaluation (1-10) of the potential application of the EDDIE results or platforms in their respective institution.

#### 3. Enlarge Stakeholder List

The members of the consortium will come up with more examples of Stakeholders that should be included in the List.

#### 4. Enlarge Database + Contact members included in the Database.

Include more members to the Database and contact those already included and ask them to become part of the Eddie project.

#### 5. Implement changes related to additional feedback.

The database platform was been tested by the EDDIE partners, this leading to modifications that are going to be implemented. They refer, among others, to aesthetic improvements, field clarifications and the subscription and subscription process.

### 3.6. Specification of the future Database

The stakeholder analysis –and therefore the final database of stakeholders- must be defined for the Blueprint. The way to store, update and access the information about stakeholders must of course be efficient and compatible with data protection standards. With respect to the contents and structure of that information, it must be designed to address the following issues:

- **What information may and should be public, i.e.:**
  - Useful for the rest of stakeholders
  - Information provided by the stakeholder itself (and easily verifiable), or already public.
  - Useful for the functionality of the Blueprint.
- **What information should be stored in private sections (if any):**
  - Only for “members” (premium networking features)
  - Only for the managers of the ENTITY (commercial needs and agreements)
- **What attributes of a stakeholder are relevant to define its specific profile:**
  - Base options according to the “type” of stakeholder (see classification criteria, possible roles and functions in the Blueprint, and other objective criteria)

- Self-configurable options according to temporary interests: subscription to news, subscription to services, direct uploading of contents
- **Structured information –as far as possible and as far as practical:**
  - Only English language when possible + local identifiers when useful
  - Fixed menu of options + “others” option with free input text available if required.
  - Templates for database entries, enabling queries and easy uploading. This is applicable to stakeholders’ info, and will be applied also to training programmes, job profiles, events, tools, systems, or any other entity handled.
  - Links to additional information whenever the level of detail exceeds the database needs or the practical possibilities. Two examples: (1) beyond the basic attributes describing a company, a link to the WEB page of the company will be included as a standard attribute, and (2) beyond the basic attributes of a candidate to hiring or recruiting processes, a link to a CV document will be provided as a standard attribute.

### 1. Classification of stakeholders: database design

- Except the first breakdown (organisation vs. individual), the rest are non-exclusive categories, so profiles should be described by attributes.
- The options to select attributes may be linked in a hierarchical way (dropdown menus)
- Multiple options must be possible in general, to cope with the wide variety of entities and profiles.
- Relational info among stakeholders may be included, but only those critical for practical applications. For instance;
  - Individuals that work for organisations.
  - Entity is member of an association. For instance, a company is member of an association of companies, or an individual is member of an association of individuals.
  - Hierarchical info: “A belongs to B”. Company belongs to Group, or Institute belongs to University are clear examples. It has to be decided the criteria to appear as separate entities.

### 2. Classification of stakeholders: database contents and attributes

#### 2.1. Organizations:

- Acronym, Name, Private/Public/Others, WEB(s), institutional mail for EDDIE, options/services-subscriptions
- Base country + other countries, languages
- Relational links and info (if any)
- Hierarchical options (but multiple, not exclusive):
  - Industry:
    - Energy, ICT, engineering & services
    - Sectors, activities, technologies
  - Education
    - University, VET school, on-line platform, research institute, others
    - Base country + other countries, languages
  - Administration
    - Coverage: European, national, regional, local
    - Functions: industry, education, social
  - Associations and communities
    - Made of: individuals, organizations
    - Association topic: technology, sector, labour, research, education, cooperation
- Self-configurable options: subscription to news, subscription to services

#### 2.2. Individuals:

- Full name, title, Ms/Mr, email(s), options/services-subscriptions. Learning from register information and profile creation in existing platforms such as LinkedIn, ResearchGate,...
- Relational links and info (if any)
- Multiple –not exclusive- options:

- Teacher
- Candidate (training, work)
- Researcher
- Industry executive
- Administration officer
- Education executive
- Self-configurable options: subscription to news, subscription to services

### **3. Use of the database for dissemination (publications, news and events) and feedback (through short questionnaires)**

The level of response and the specific opinions could be used to measure PARTICIPATION OF STAKEHOLDERS, MOTIVATIONS, interest and support (including specific MEMBERSHIP for premium services), and to evaluate different services and business models:

Type of tasks, motivation, cost/benefit analysis:

- Research, consulting, training, sponsorship, validation, certification, dissemination, hiring, etc.

Detailed analysis according to potential activity and business model: Marketplaces for: research and events, jobs, training programmes, training contents, resources, services, tools and systems, etc.

## 4. Stakeholder Influence and Support Mapping Description

### 4.1. Approach

The stakeholders are to be mapped in terms of their potential support and their influence. According to these two dimensions, shown in Figure 1, we can distinguish the following categories of stakeholders:

1. **Negative support and low influence.** These stakeholders cannot invest much time in the collaboration and do not have a significant influence. In this case, the directive is to plan on them, but not take actions yet.
2. **Positive support and low influence.** These will be stakeholders willing to participate but that do not have much influence. In this case, the directive is to maintain them motivated and active.
3. **Negative support and moderate influence.** These stakeholders will not invest much time in the collaboration, but they have a moderate influence. In this case, the directive is to invest resources in engaging them.
4. **Positive support and moderate influence.** These will be stakeholders willing to participate and have moderate influence. In this case, the directive is to plan on them, but not take actions yet.
5. **Negative support and high influence.** These stakeholders will not invest much time in the collaboration, but they have a high influence. In this case, the directive is to commit them as much as possible in the project without overwhelming them with tasks and work.
6. **Positive support and high influence.** These are the stakeholders willing to participate and having high influence. This is the most valuable type of stakeholders. In this case, the directive is to leverage on them, making the most of their collaboration capabilities.

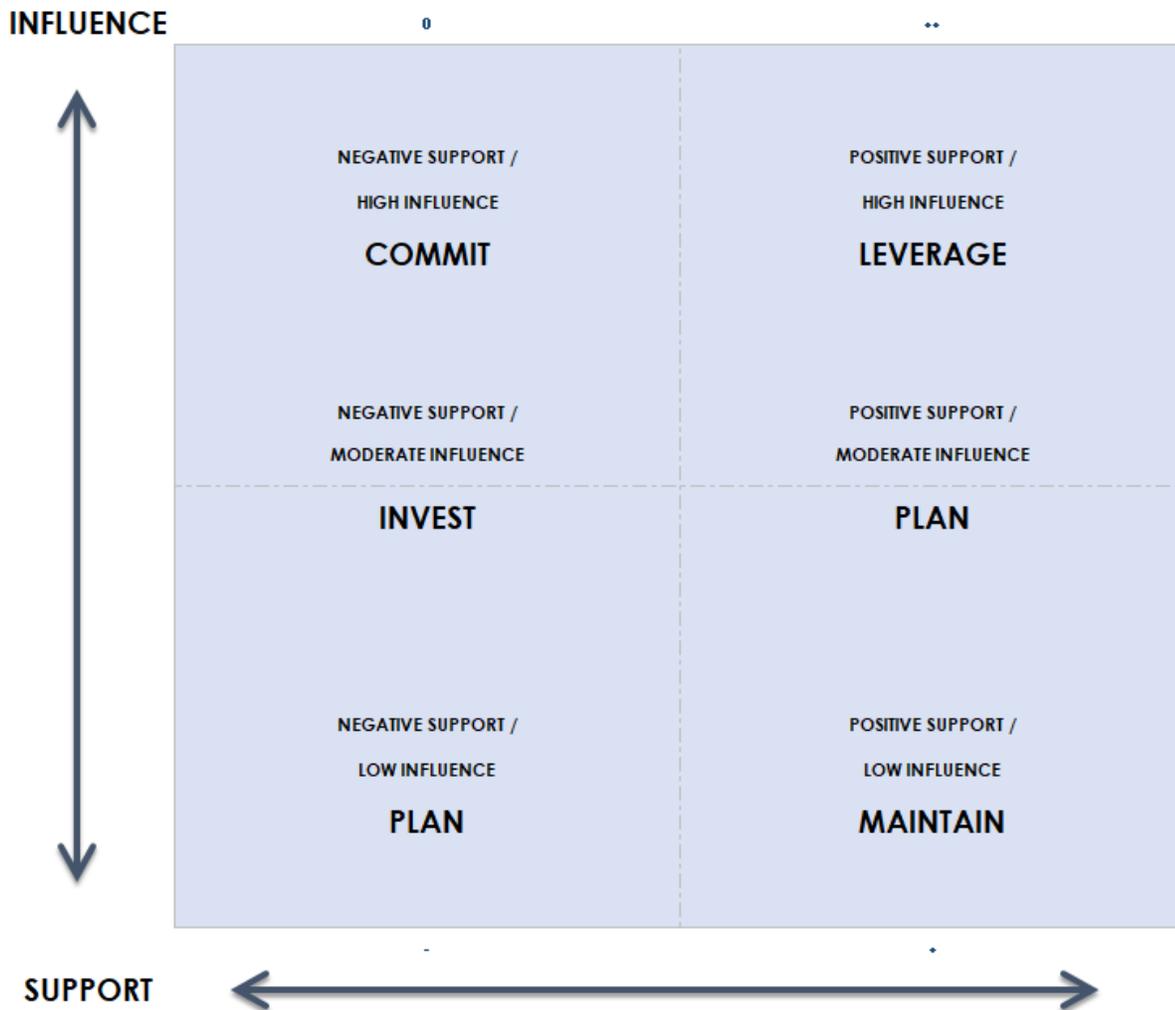


Figure 37: Stakeholder Mapping Matrix

The definition of the matrix for all the identified stakeholders could be very time consuming and complex. To simplify it and make it feasible, the proposed approach uses the concept of representatives of the stakeholder categories. The representatives will be selected for each stakeholder category, and mapped to the matrix, results being applied to all the stakeholders belonging to the same category. Using this concept of stakeholder representatives, it is feasible to extend the concept of stakeholder mapping to a broader set of stakeholders.

Alternatively, the consortium is preparing an initial mapping of the matrix manually. For the scalability an application to a larger set of stakeholders, the database and related API have been developed, so that stakeholders applying to the database can contribute identifying by themselves this kind of attributes, that could be reviewed and modified if necessary by the EDDIE consortium. The hybridization of this approach with the previous ones is possible, each entity providing specific information about their institution, which is reviewed and consolidated by EDDIE using the concept of stakeholder representatives.

It must be highlighted that the stakeholder mapping matrix may be dependent on the activity/topic (business model) being addressed. For example, for VET education certification, administrative stakeholders related to education may play a major role and have high influence, while their influence in industry related topics may be low. Therefore, this matrix could be built to address several activities, resulting in a different matrix for each of them, depending for example on whether the analysed activity is more industry focused, or more related to the education.

## 4.1.1. Next steps

Next steps are required to further develop the concept of stakeholder mapping.

**1. Contact Consortium members to map their entities:**

Consortium members have already proposed a list of entities/institutions that may be relevant to EDDIE. In a first step, there needs to be a map of these institutions' potential support and influence. In this very first stage, this could be performed by the consortium members having proposed these institutions.

**2. Identify the missing stakeholders that must be mapped + find representatives outside the consortium:**

The current database has a somewhat unbalanced list of stakeholders, where some specific stakeholder types, like administrations, may be under-represented. This stage will require to identify the missing stakeholders. Representatives outside the consortium may be needed to fill in this gap. In this regards, we will consider the consortium with a broad perspective, taking also into account for example the members of the International Advisory Board.

**3. Develop and disseminate a questionnaire in order to identify the influence and interest of the stakeholder representatives in the project:**

Once the representative stakeholders are identified, a questionnaire will be applied to identify and map their potential support and interest. This will be key, as with the proposed approach, the proposed mapping will be used for other stakeholders belonging to the categories of the representatives.

**4. Mapping of the stakeholders:**

Once the above mentioned steps are completed, the final mapping of stakeholders will be performed. This will leverage on the initial mapping, on the selected representatives and on the questionnaires to map the representatives.

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## 6. Annex 1: Stakeholder List

See Excel Document attached.

## 7. Annex 2: Eddie Database

To access the Database click [here](#).