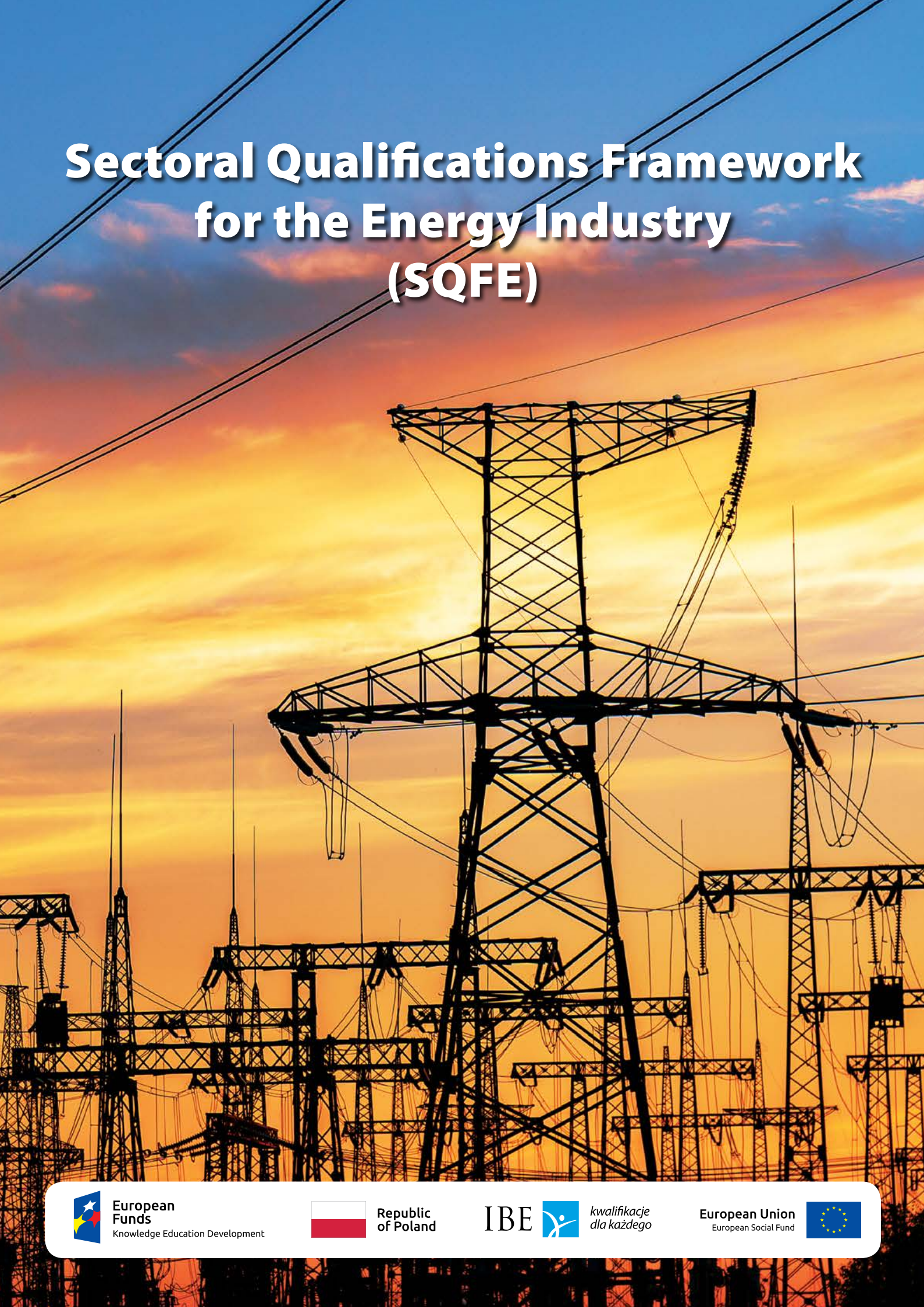
Sectoral Qualifications Framework for the Energy Industry (SQFE)



European Funds
Knowledge Education Development

Republic of Poland

IBE kwalifikacje dla każdego

European Union
European Social Fund

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Warsaw 2020

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Table of Contents

Introduction

An essential condition for modern socio-economic development is the continuous improvement and adaptation of workers' skills for a dynamically changing labour market. School and university education are not enough to keep up with the pace of change in the economy. With increasing frequency, being employed is determined by both education and the ability to quickly change professions or acquire the competences currently needed by employers. The concept of lifewide lifelong learning (LLL) is gaining greater importance. Its main principles include, among others, placing a value on learning in various forms and places at every stage of life; confirming learning outcomes regardless of the way, place and time of their achievement; as well as investing effectively in learning and making this a universal endeavour (Interdepartmental Task Force on Lifelong Learning, 2013).

It is in this context that the Integrated Qualifications System (IQS) is being implemented in Poland, whose functioning is regulated by law.[1]

One of the main tools of the Integrated Qualifications System (IQS) is the Polish Qualifications Framework (PQF). The PQF, like the European Qualifications Framework (EQF), distinguishes eight levels. Each PQF level has been referenced to the levels of the EQF and designated with the same number. Each PQF level has also been described with the use of level descriptors. PQF level descriptors are sets of general statements (components of the PQF level description) in the categories of knowledge, skills and social competence. The descriptors of successive PQF levels reflect the progression of the requirements in those categories (Chłoń-Domińczak, 2017).

In determining the PQF level of a person's competences, it doesn't matter if they were acquired in formally organised education, work experience or in courses and training sessions.

A unique solution used in Poland is the introduction of first stage and second stage PQF descriptors:

- first stage descriptors are universal and pertain to all types of qualifications,
- second stage descriptors are typical for qualifications attained in:
  - general education,
  - higher education,
  - vocational education and training.

Second stage PQF descriptors typical for vocational qualifications can be further elaborated by developing sectoral qualifications frameworks (SQF), which take into account the specificity of a given industry or sector. SQF levels correspond to PQF levels.

[1] Act of 22 December 2015 on the Integrated Qualifications System (Journal of Laws of 2020, item 226).

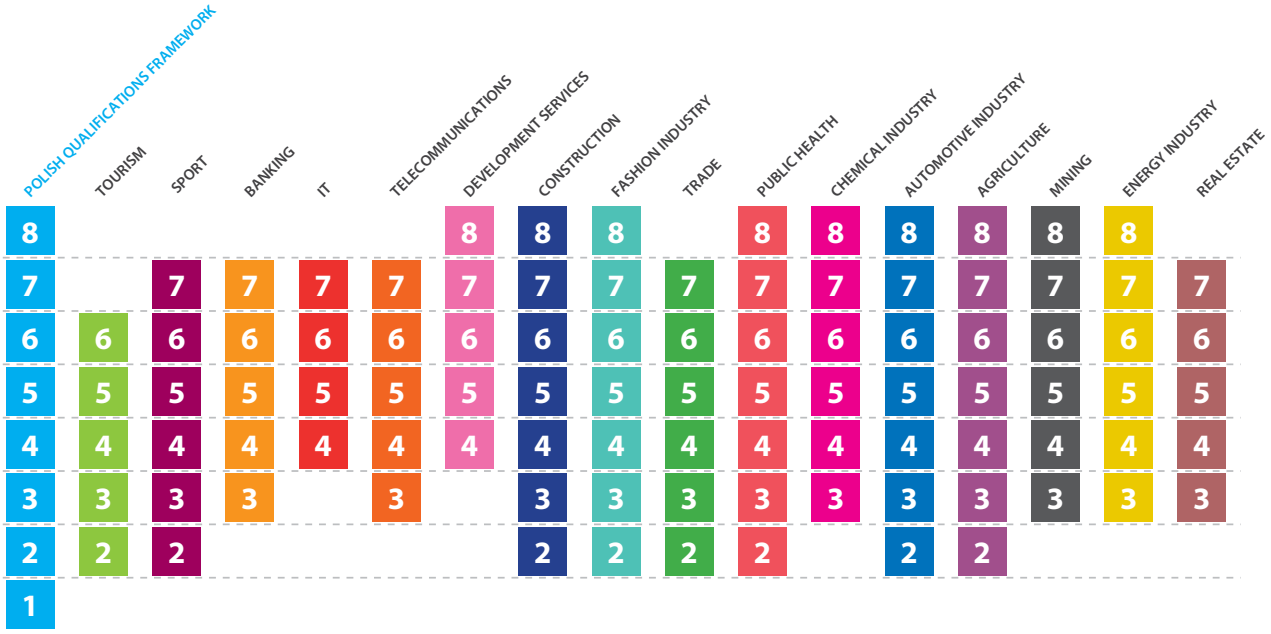
The essence of a sectoral qualifications framework is that in taking the specificity of a given sector or industry into account, the framework is described using its terminology and language. It therefore is easier for market entities to understand.

The Integrated Qualifications System makes it possible to collect and systematise various qualifications functioning in our country. Until now, because qualifications had been awarded by different bodies, institutions and organisations on the basis of various regulations and laws, it was difficult to compare them using uniform criteria. The IQS is especially valuable in its ability to include qualifications operating in the free market, describe them in the language of learning outcomes and have them guaranteed by the state (based on the general principles regulating the inclusion and functioning of qualifications in the system) through the rules on validation and quality assurance. The functioning of the IQS should therefore intensify the processes of Poland's lifelong learning policy and thus facilitate the development of competences in line with a person's interests or labour market demand.

The main idea adopted in developing sectoral frameworks is that they are created by the sector for the sector. This means that the widest possible range of stakeholders representing various types of activity in the sector is involved in the process of developing the framework. They include representatives of companies active in a given sector, chambers and industry organisations, higher education, vocational education and training as well as regulatory institutions. SQFs are developed for those areas of activity when such a need arises. Developing a framework starts with discussions about the competences, qualifications and standards in a given sector, allows for an exchange of information between representatives of different branches of the sector, and the adoption of resolutions in disputed areas. Industry stakeholders are therefore both the creators as well as the recipients of the solutions in the resulting sectoral framework.

A team of experts from a specific industry creates a draft SQF, which is then consulted within the sector. One of the most important elements of the work on an SQF is defining the sectoral determinants, i.e. the key areas of activity in a given sector. This then helps in determining the descriptors of particular levels, which (as in the PQF) can be organised in series. SQF levels must correspond to defined PQF levels, but the components of their description should reflect the characteristics of the given sector. Though it is theoretically possible for an SQF to include all the levels of the PQF, past work shows that the number of described levels depends on the sector. To date, work has been completed on 16 proposed SQFs in: banking, IT, sport, tourism, telecommunications, construction, development services, public health, the fashion industry, the automotive industry, the chemical industry, trade, agriculture, the energy industry, mining and real estate.

Figure 1. SQFs developed to date with the number of their levels.



Sectoral qualifications frameworks are included in the IQS by means of a regulation issued by the minister coordinator of the IQS – the minister of national education. The SQF inclusion process is begun by the minister with jurisdiction over the sector, either at his/her initiative or at the request of an interested party. The sectoral qualifications frameworks for development services, construction, tourism and sport have been included in the Integrated Qualifications System, while the process is currently ongoing for trade, banking, as well as telecommunications.

There are many benefits to developing a sectoral qualifications framework. The most important is the fact that the framework is the result of dialogue among a given sector's representatives, who come to agreement on establishing a common vision for their area of activity and the qualifications it needs. Working together allows them to develop many universal solutions. The framework also improves the ability to describe and include qualifications in the IQS, as the SQF translates the language of the PQF into one specific to the industry. The SQF also makes it easier to understand how to relate PQF descriptors to a particular sector, which in turn facilitates the accurate assignment of a PQF level to a given qualification.

Work is currently underway at the Educational Research Institute (IBE) to develop the next sectoral frameworks. SQFs may soon become a showcase for Polish industry in the European market. This publication presents information on the project to develop the proposed Sectoral Qualifications Framework for the Energy Industry (SQFE). Its sections present: the general premises of SQFE, a description of the project's implementation and methodology of the work, the presentation of the framework together with instructions for its use and a glossary explaining the terms used. SQFE level descriptors are presented in the annex.

1. The Context of Developing the Sectoral Qualifications Framework for the Energy Industry

1.1. The Energy Sector in Poland

The energy sector is a broadly understood branch of the economy, consisting of such areas as power engineering, heating and the gas industry. The main legal act regulating the energy sector in Poland is the Energy Law. The documents shaping current and future legal regulations are: "The Energy Policy of Poland to 2030", an updated and expanded draft of the document "The Energy Policy of Poland to 2040 – a strategy for the development of the fuel and energy sector" (PEP2040) and the announced "National Energy and Climate Plan 2021–2030", which is currently being prepared.

The energy sector accounts for about 8% of the gross value added of Poland's GDP (including 4.1% in the energy sector itself, 4.2% in related sectors) (GNI Bank Polska, Deloittle, 2014).

Poland consumes about 4,400 PJ of primary energy (Ministerstwo Aktywów Państwowych, 2019b), most of which is obtained from bituminous coal and oil, followed by natural gas, lignite and renewable sources. A key role in end-user energy consumption is still played by households and transport, but the relationship between them is gradually changing – improvements in the energy efficiency of buildings is reducing demand in housing, while the increase in transport consumption is related to the growth of its share in the GDP.

The demand for electricity (nearly 170 TWh per year) is supplied by national power plants (mainly commercial), and the import–export relationship has only regulatory significance (Polskie Sieci Energetyczne, 2019). The main raw materials used are bituminous coal and lignite, but the share of renewable energy sources (RES) and natural gas is growing in importance. The share of RES in the energy balance is expected to increase further due to Poland's compliance with international obligations. Power and combined heat and power plants using bituminous coal and lignite (49.3% and 26.1%) will remain the dominant facilities in the structure of electricity generation in Poland (Polskie Sieci Energetyczne, 2019). Due to the need for Poland to meet EU climate policy objectives, the segment of energy generation from renewable energy sources (RES) has experienced dynamic development in recent years.

As stated in the strategic document "The Energy Policy of Poland to 2030", as well as in Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009, the share of the RES subsector in energy generation will gradually increase to reach 15% in 2020. In addition, it is forecast to reach 21% in 2030 (Główny Urząd Statystyczny, 2019). With additional financial support from EU funds, it is estimated that this share could reach 23% in 2030 (Ministerstwo

Aktywów Państwowych, 2019a). At the same time, the production of energy from fossil sources (bituminous coal and lignite) will not be abandoned, but only gradually reduced.

Due to the fact that demand for heat is met locally, there is no national heat market, so regulations in this area have a different character. Heating needs in Poland are met by system heating or with the use of individual installations, and the main fuel in both cases is bituminous coal. The energy renovations of buildings and the new standards of building energy performance have improved energy efficiency and reduced heat demand. However, individual sources of heating buildings, next to vehicle emissions, are a significant factor affecting air quality.

1.2. Structure of the Energy Sector

The Polish energy market includes companies that:

a) generate electricity (e.g. commercial power plants, municipal and industrial combined heat and power plants, independent energy producers),

b) manage the national power system – Polskie Sieci Elektroenergetyczne SA – a State Treasury company managing the National Power System – transmission of electricity through extra-high voltage networks,

c) operate distribution systems,

d) trade electricity.

Continuity and stability of the electricity supply is guaranteed by a group of entities constituting subsystems within the National Power System (NPS). These entities are discrete organisations subject to separate institutions and regulations. The subsystems forming the NPS are:

a) generating subsystems,

b) transmission network,

c) distribution network.

Generating subsystems include commercial power plants, industrial power plants, combined heat and power plants, local power plants and hydro, wind, solar, biomass and biogas fired power plants.

The distribution of electricity is based on a **transmission network** owned and supervised by PSE Operator in Poland. PSE performs the tasks of a transmission system operator on the basis of its extra-high voltage transmission grid consisting of:

- 269 lines with a total length of 14 692 km, which includes:
  - 104 400 kV lines with a total length of 7 008 km,
  - 164 220 kV lines with a total length of 7 570 km,
  - 1 750 kV line with a total length of 114 km (that is not used),
- 107 extra-high voltage (HV) stations,

- a 450 kV DC Poland–Sweden submarine connection with a total length of 254 km (of which 127 km is owned by PSE S.A.) (Polskie Sieci Elektroenergetyczne, n.d.).

The end users (i.e. households and companies) of the distribution market are customers purchasing electricity for their own use, as well as companies managing the **distribution network**, known as "distributors", including distribution system operators (DSOs) and electricity sellers (trading companies).

The legal separation of the transmission system operator and distribution system operators (unbundling), the termination of long-term contracts for electricity producers and the simultaneous introduction of a compensation system, as well as the deregulation of energy prices, with the exception of tariff group G covering households, has significantly changed the energy market in Poland. The current shape of the market environment is the result of changes that were initiated in April 1997, when the Energy Law entered into force and electricity began being treated as a commodity. As a result, consumers have the right to freely choose their electricity supplier. The so-called power exchange obligation, in force since 2010, which requires (with some exceptions) electricity producers to sell their electricity on competitive terms via a commodity exchange or other trading platform, completes the current profile of the power sector market environment in Poland.

The liberalisation begun in the mid-1990s changed the functioning of the energy sector and, at the same time, led to more competitive energy pricing. Global trends, as well as the transformations introduced by EU regulations, are forcing further changes in the energy market. Apart from freeing up prices and allowing various entities to operate in the market, the position of the consumer, also as an energy producer, is strengthening.

The energy sector is subject to dynamic changes, both in the technologies used and in its legal and economic environment. The team developing the proposed SQFE adopted the principle that the developed product will reflect both the actual state of affairs and the development perspective of the sector. In beginning the work on the project, the energy sector was defined as companies, which produce, transmit and supply energy, as well as those storing electricity and heat. The gas transmission and distribution subsector was also included in the sector. However, extraction and fuel management, which is treated as a separate part of the country's economic system, was excluded from the definition of the energy sector for the purposes of the framework.

1.3. Identifying the Competences and Qualifications for SQFE

When considering the qualifications and competences of people employed in the energy sector, crucial for other sectors and the entire Polish economy, it is worth mentioning that it employed 124 300 people at the end of 2019 (Główny Urząd Statystyczny, 2020). The data obtained in the study "Analysis of competences and qualifications in the energy sector" showed that many employees are just before retirement age. Representatives of the energy sector draw attention to the challenges faced by employers. Companies are experiencing a "generation gap" problem and the need to replenish their workforce once current employees retire. They are looking for people with specialised competences, very often people who are not trained in the formal education system because of the rapid pace of change and the introduction of new technologies. The development of employees' competences must therefore be a continuous process, taking into account not only learning in the workplace, but also participation in courses or training. Given this situation, the Sectoral Qualifications Framework for the Energy Industry can become a tool allowing industry stakeholders to communicate in a common language when describing the competences of people working in the sector. Employers will be able to precisely define the requirements for employees, education providers will be able to adapt their offer to the expectations of the labour market, and those interested in working in the energy sector will be able to plan their educational and professional paths more effectively.

The Sectoral Qualifications Framework for Energy is a tool supporting the referencing of qualifications operating in the energy sector to particular levels of the PQF, which, in turn, makes it possible to compare qualifications, creates conditions for the professional mobility of employees in the sector, and allows for a deliberate and individualised approach to career development. In addition, SQFE facilitates the development and integration of market qualifications into the Integrated Qualifications System, opening opportunities for the formal confirmation of competences obtained through training and professional experience. Thus, it is a response to education realised both in the workplace and through non-formal, course-based forms.

1.4. Premises and Aim of SQFE

The aim of the Sectoral Qualifications Framework for the Energy Industry project was to develop a universal tool encompassing a range of organised competences required to implement the processes of the production, conversion, transmission, storage, distribution and use of energy from both conventional sources as well as renewable ones. SQFE therefore includes the competences required to plan and implement activities in the sector, with particular emphasis on the needs of energy consumers, environmental protection, energy security and the safety of employees, bystanders and property. In order to create a current and universal tool that can be included in the Integrated Qualifications

System in the future, the conditions of the IQS Act had to be fulfilled, which were defined in the following two premises:

1. The draft SQFE is in line with the assumptions of the PQF, presented in the Polish Referencing Report, and the assumptions of the Integrated Qualifications System (IQS),

2. The proposed SQFE responds to the needs of the energy sector and was created "by the sector for the sector".

Implementation of the first premise means that:

- SQFE descriptors further elaborate the PQF and will enable partial qualifications to be referenced to SQFE,

- SQFE descriptors are formulated in the language of learning outcomes, categorised by knowledge, skills and social competence,

- SQFE descriptors illustrate the progression of the key energy sector requirements for knowledge, skills and social competence,

- individual components of the level descriptors are structured so as to define the minimum level of required competences and contain only verifiable competences necessary to perform tasks of a certain degree of difficulty in the sector.

The implementation of the second assumption guarantees that:

- the proposed SQFE is developed by a team of experts with specialised knowledge of the energy sector (e.g. the structure of its companies and the relations between them, the competences required from employees, key qualifications), as well as knowledge of developing qualifications, education and training programmes for the energy sector in Poland and abroad,

- work on the proposed SQFE takes place with the participation of representatives of the most important stakeholder groups in the industry (including entrepreneurs, employees, representatives of industry organisations, training institutions, trade unions, etc.), who participate in the verification of the solutions developed by experts at each stage of work on the framework,

- the preliminary draft of SQFE is verified during consultations with the broad industry community,

- the SQFE level descriptors adequately represent the specificity of the energy sector, result from the analysis of competences and take into account, among others, the key groups of competences required to work in the energy sector,

- the SQFE level descriptors take into account sector-specific and key competences as well as the specificities of the energy sector.

1.5. Persons and Institutions Responsible for Developing SQFE

Consortium Members

Work on developing the proposed SQF for the Energy Industry was conducted by a consortium of the EPRD Office for Economic Policy & Regional Development Ltd. (*Biuro Polityki Gospodarczej i Rozwoju Regionalnego Sp. z o.o.*) and the Clean Air Cluster Foundation (*Fundacja Klaster Czyste Powietrze*).

EPRD Office for Economic Policy & Regional Development Ltd.

EPRD Office for Economic Policy & Regional Development Ltd. has been providing consulting and training services to the public sector, multinational corporations, SME-sector companies and NGOs for over 20 years, using the industry knowledge of several hundred cooperating experts. It works for the development of broadly understood entrepreneurship in Poland and abroad. Its team of permanent employees – specialists in consulting and project management is supplemented by experienced experts – outstanding professionals, scientists and practitioners. International cooperation allows for the transfer of knowledge and best practices among implemented projects.

The company has been implementing energy sector projects for many years. On the national level, among the projects implemented so far, worth mentioning are the development of a number of energy audits and related investment feasibility studies for public and private entities. International projects worth highlighting include an assessment of the European Commission's cooperation under the European Union Energy Initiative (EIEU), an expert assessment of compliance by key investment projects in the energy and environment sector in Romania with EU directives under the JASPERS initiative, as well as a thematic study on energy efficiency and renewable energy sources in the context of climate change in Latin America.

As leader of the consortium, EPRD was responsible for the proper implementation of the entire project. The main tasks of the leader included ongoing coordination of the conducted activities and ensuring methodological expertise on the Integrated Qualifications System.

Clean Air Cluster Foundation

Since 2018, the Clean Air Cluster Foundation has been operating on the basis of horizontal cooperation between scientific and research institutions, public authorities and businesses. It makes use of the synergy of these parties, which enables know-how to be implemented faster, an openness to innovation, as well as new resources to be attracted and developed. The main objective of the Foundation is to promote the use of clean, low-carbon energy with an emphasis on the protection of air and the natural environment. The Foundation is also involved in disseminating the solutions of the Integrated Qualifications System in professional communities. It has submitted five applications for the inclusion in the Integrated Qualifications Register of market qualifications on the operation of

energy equipment and energy efficiency issues. At the same time, it applied to become an awarding body for the submitted qualifications.

The Clean Air Cluster Foundation was represented in the project by Jan Ratajczak and Marek Bednarz, who were responsible for providing substantive support from the sector for the whole process of project implementation by recruiting industry experts and organising consultation seminars. The activities they undertook ensured the involvement of a wide and diverse group of experts with specialised knowledge of energy, as well as the collection of information on education and training programmes conducted for the needs of the sector. At each stage, Foundation representatives declared their willingness to clarify issues pertaining to the energy sector and mediated contacts with the industry community.

Team of Experts

The draft Sectoral Qualifications Framework for the Energy Industry was developed by a team of experts with specialised knowledge about the energy sector, the entities operating within it and the relations between them, their responsibilities and the most important qualifications awarded. The work of the expert team was led by Dr. Leszek Kurcz, Deputy Dean for Education of the Faculty of Energy and Fuels at the AGH University of Science and Technology in Kraków, who together with representatives of the Clean Air Cluster Foundation moderated meetings and consultations.

In forming the expert team, care was taken to ensure that the persons invited to the team represented the different branches of the sector, i.e. both conventional energy and renewable energy, as well as all the key processes in the sector, i.e. energy production, storage and supply. The group of experts included representatives of companies, industry organisations and institutions providing education for the energy sector.

Persons specialising in the methods and issues of implementing the Integrated Qualifications System also participated in the work, especially those with experience in developing sectoral qualifications frameworks for other sectors.

Table 1 presents the list of experts and the groups they represent.

Table 1. Members of the team of experts who developed the proposed SQFE

SCOPE		NAME
energy operators	1	Dariusz Łapiński CEZ Skawina S.A. [CEZ Skawina Inc.]
	2	Adrian Pason Energetyka Solarna ENSOL Sp. z o.o. [ENSOL Solar Energy Ltd.]
	3	Robert Sekuła ABB Sp. z o.o. [ABB Ltd.]
	4	Sebastian Walerysiak Viessmann Sp. z o.o. [Viessmann Ltd.]
	5	Jakub Sitek RAFAKO S.A. [RAFAKO Inc.]
	6	Agnieszka Paszek Tauron S.A. [Tauron Inc.]
organisations operating in the energy community and working on behalf of the energy sector	1	Bogusław Regulski Izba Gospodarcza Ciepłownictwo Polskie [Chamber of Commerce Polish District Heating]
	2	Andrzej Lipko Stowarzyszenie Energii Odnawialnej (SEO) [Renewable Energy Association]
	3	Marek Kulesa Towarzystwo Obrotu Energią [Association of Energy Trading]
	4	Henryk Kaliś Izba Energetyki Przemysłowej i Odbiorców Energii [Polish Chamber of Industrial Energetics and Energy Customers]
	5	Piotr Serafin Ogólnokrajowe Zrzeszenie Związków Zawodowych Pracowników Ruchu Ciągłego [National Association of Trade Unions for Continuous Work Employees]

SCOPE		NAME
institutions providing formal education for the energy sector	1	Prof. Wojciech Nowak, D.Sc. Eng. Akademia Górniczo-Hutnicza w Krakowie [AGH University of Science and Technology in Kraków]
	2	Dr. Leszek Remiorz, D.Sc. Eng. Politechnika Śląska [Silesian University of Technology]
	3	Mariusz Zyngier Zespół Szkół w Połańcu [Complex of Schools in Połaniec]
institutions providing non-formal education in the energy field or conferring certification in the energy sector	1	Artur Kaczmarczyk Polska Organizacja Rozwoju Technologii Pomp Ciepła [Polish Organisation of Heat Pump Technology Development]
	2	Bogdan Szczepański Centralny Ośrodek Chłodnictwa COCH sp. z o.o. [Refrigeration Centre COCH Ltd.]
experts with knowledge and experience in implementing the IQS	1	Magdalena Słocińska
	2	Anna Araminowicz

The ministry responsible for the energy sector (Ministry of State Assets, formerly the Ministry of Energy) was invited to join the expert team. Representatives of the ministry, Igor Lange and Janusz Pilitowski, took an active part in the inaugural meeting, the expert team's workshops and joined in the work on developing the SQFE. Moreover, they attended one of the consultation seminars, directly conveying their observations and suggestions concerning the draft SQFE.

The expert team was tasked with the development of the proposed SQFE. After becoming acquainted with the materials prepared by the representatives of the sector implementing the SQFE project and provided by the staff of the Educational Research Institute, in particular the "Analysis of competences and qualifications in the energy sector", the work of the team focused on developing a preliminary draft of SQFE. After its verification in the industry community, the expert team analysed the comments collected during the consultations and made decisions about introducing necessary modifications.

The contractor worked on the draft SQFE using its own methods, which consisted of doing part of the work in workshops and facilitating expert discussions (of the whole team or smaller groups), while the remaining part the activities were inspired by the Delphi method. The developed materials, including the necessary premises for further work, as well as part or all of the individual products, were sent for consultation to the expert group, who had a specified period of time to

respond. The experts were asked for their opinions on specific aspects of the submitted material using standardised tools (questions), which facilitated their quick analysis. If no agreement was reached on an issue, it was consulted again and then analysed by the director responsible for substantive issues. He made a decision about how to proceed further, which consisted of an in-depth discussion on the given issue, analysis of additional sources or the consultation of a specialist from outside the team.

The experts worked on the areas in which they were most experienced. Those representing entrepreneurs and entities working for the sector were asked to particularly analyse and present individual processes and the professional tasks specific to the sector. Experts representing formal education institutions were asked to analyse core curricula and education programmes in order to identify possible areas of competence that should be included in the SQFE that did not emerge directly from the industry analysis made from the point of view of employers' expectations.

Representatives of the Sector

The draft SQFE was consulted with a broad range of representatives of the dominant and key entities in the sector as well as with its key stakeholder groups. The selection of participants in the consultations ensured representation of all areas of the industry and the participation of entities from the entire country. Expert team members preparing the draft SQFE were excluded from this group. Six consultation seminars were held with a total of 46 participants. In accordance with the premises, the majority of participants represented enterprises. Moreover, the consultations were attended by representatives of industry organisations as well as universities and schools providing education for the energy sector. The group was supplemented by representatives of other stakeholders, e.g. central government administration, local government administration, scientific units. Such a selection of participants allowed various points of view to be taken into account during the discussions. Seminar participants included:

Large enterprises:
ABB Ltd., ANWIL Inc., CEZ Poland Inc., Energetyka Solarna ENSOL Sp. z o.o. [Solar Energy ENSOL Ltd.], GALMET Ltd., Krakowski Holding Komunalny S.A. [Communal Holding of Kraków Inc.], Polska Grupa Energetyczna EC S.A. [Polish Energy Group EC Inc.], Polska Grupa Górnicza S.A. [Polish Mining Group Inc.], Polskie Górnictwo Naftowe i Gazownictwo S.A. [PGNiG Group Inc.], Polskie Sieci Elektroenergetyczne S.A. [PSE Inc.], RAFAKO Inc., Regionalne Centrum Gospodarki Wodno-Ściekowej S.A. [Regional Center of Water and Sewage SA], Tauron Ciepło Sp. z o.o. [Tauron Heating Ltd.], Tauron Dystrybucja S.A. [Tauron Distribution Inc.], TECH STEROWNIKI Ltd., Viessmann Ltd.

Micro-, small and medium-sized enterprises (MSE):
Instytut Certyfikacji Emisji Budynków Sp. o.o. [Building Emission Certification Institute Ltd.], Instytut Zrównoważonej Energii „Miękinia" Sp. z o.o. [Institute for Sustainable Energy "Miękinia"], Planergia Ltd., Termodom Igor Kornaś, ZMK SAS Ltd.

Higher Education Institutions:
Akademia Górniczo-Hutnicza w Krakowie [AGH University of Science and Technology in Kraków], Politechnika Gdańska [Gdańsk University of Technology], Politechnika Śląska [Silesian University of Technology]

Sectoral schools:

Zespół Szkół Budowlanych w Krakowie [Complex of Schools in Construction in Kraków], Zespół Szkół Energetycznych w Gdańsku [Complex of Schools in Energy in Gdańsk]

Sectoral organisations:
Izba Gospodarcza Energetyki i Ochrony Środowiska [Polish Chamber of Power Industry and Environment Protection], Polskie Towarzystwo Morskiej Energetyki Wiatrowej [Polish Association of Maritime Wind Energy], Polskie Zrzeszenie Inżynierów i Techników Sanitarnych Katowice [Polish Association of Sanitary Engineers and Technicians Katowice], Stowarzyszenie Certyfikatorów i Audytorów Energetycznych [Association of Energy Certifiers and Auditors]

Other energy sector stakeholders:

Ministerstwo Aktywów Państwowych [Ministry of State Assets], Urząd Miasta i Gminy w Skawinie [City and Township Office in Skawina], Instytut Maszyn Przepływowych Polskiej Akademii Nauk, [Institute of Fluid-Flow Machinery of the Polish Academy of Sciences], Centralny Ośrodek Chłodnictwa „COCH" w Krakowie Sp. z o.o. [Refrigeration Centre COCH Ltd.]

The structure of the seminar participants is shown in the following chart.

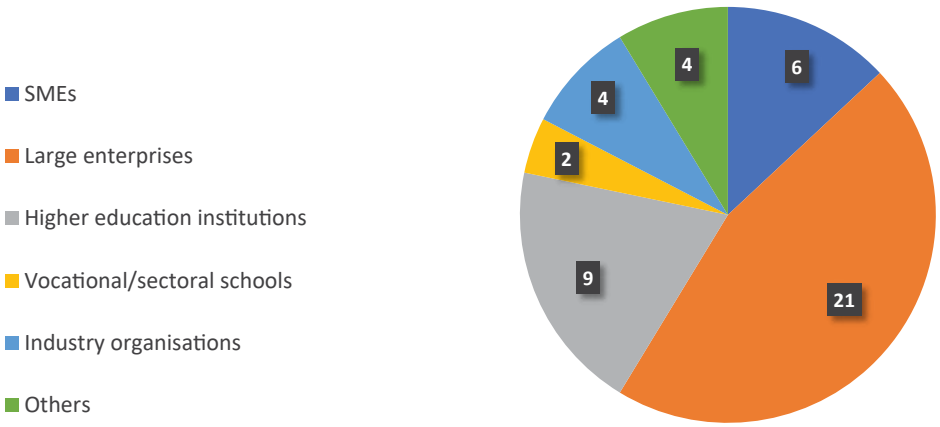


Figure 2. Structure of the participants in the consultation seminars

Source: Final report on developing the SQF for the Energy Industry "Implementation of the Sectoral Qualifications Framework for the Energy Sector (SQFE) Project", Kielce, April 2020.

Respondents of individual in-depth interviews
In the consultation process, 15 individual in-depth interviews (IDI) were also conducted with respondents representing a total of 11 entities. They included enterprises (Polska Spółka Gazownictwa S.A. [Polish Gas Company Inc.], PGE Energia

Ciepła S.A. [PGE Heating Inc.], Tauron Ciepło Sp. z o.o. [Tauron Heating Ltd.), formal and non-formal education providers (Wrocław University of Technology, Warsaw University of Technology, Polish Association of Chemical Engineers SITPChem), industry organisations (Polskie Towarzystwo Przesyłu i Rozdziału Energii Elektrycznej [Polish Power Transmission and Distribution Association], Izba Energetyki Przemysłowej i Odbiorców Energii [Chamber of Industrial Energetics and Energy Customers]) and trade unions (Międzyzakładowy Związek Zawodowy Pracowników Energetyki „Kadra" ["Kadra" Inter-Enterprise Trade Union of Power Industry Employees] and NSZZ Solidarność Organizacja Podzakładowa Tauron Dystrybucja o/ Wrocław [ISTU Solidarity Sub-company Organisation of Tauron Distribution, Wrocław Branch]). The group was also joined by a representative of the trade press, MEDIUM Group Ltd.

The structure of the IDI respondents is presented in the following chart.

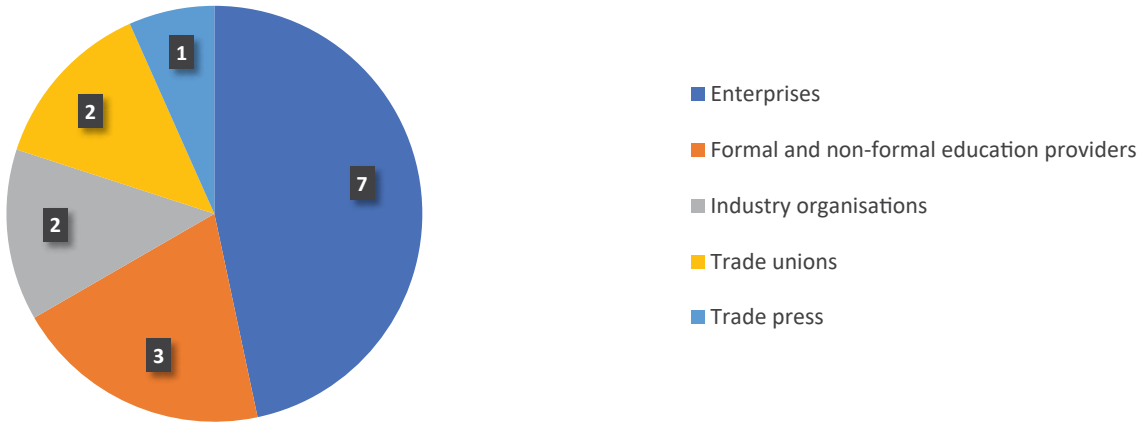


Figure 3. Structure of the IDI respondents

Source: Final report on developing the SQF for the Energy Industry "Implementation of the Sectoral Qualifications Framework for the Energy Sector (SQFE) Project", Kielce, April 2020.

2. Course of the Work on SQFE

2.1. Definition of the Sector

The starting point for defining the scope of SQFE was to clarify the definition of the energy sector, which was adopted as follows:

The energy sector is an area of industry encompassing all activities relating to the processes of the production, conversion, transmission, distribution, storage and supply of electricity and heat. It includes all the activities between the entities producing and/or trading electricity and heat and associated activities relating to the processes occurring between producers and distributors and consumers and users. The sector includes energy production (either by conventional methods or with renewable energy sources) from the production facility where the electricity or heat is generated to all stages of the product's conversion, transmission, transport and storage.

The processes indicated in the definition were analysed, and at the same time, attention was drawn to other issues that emerged during the discussion. Processes not included in the definition were identified and analysed, as well as those that did not evoke unanimous agreement among the experts about their inclusion in SQFE. Issues such as the preparation of raw materials/fuels were considered. The experts agreed, for example, that the process of coal mining does not fall within the scope of the energy sector, but the tasks of coal storage and its preparation for energy production should perhaps be included in SQFE.

The fact that the gas distribution subsector operates in the energy sector was similarly considered. A team of experts consulted the scope and areas of the energy sector with representatives of *Polska Spółka Gazownictwa* [Polish Gas Company], who expressed their readiness to work on the project. Their involvement was not previously planned, but resulted from their identification as part of the sector and functioning within the framework of some of the same legal regulations.

Another entity that decided to become involved in the project was *Izba Gospodarcza Energetyki i Ochrony Środowiska* [Polish Chamber of Power Industry and Environment Protection]. The representatives of this entity were involved in the conceptual work on the project, participated in the technical discussions on the details of the public procurement for the design of the Sectoral Qualifications Framework for the Energy Industry, and later consulted the preliminary SQFE draft.

2.2. Developing SQFE

The Sectoral Qualifications Framework for the Energy Industry is a set of competences categorised by knowledge, skills and social competence and systematised by their degree of complexity. In order to ensure that the components describing the levels guarantee completeness and complementarity, the definition of the scope of SQFE, ensuing from the previously adopted definition of the sector, was used in their formulation.

The SQF for the Energy Industry includes the competences needed to perform tasks in the processes of the production, conversion, transmission, storage, distribution and use of energy generated by conventional methods and renewable energy sources. The SQFE encompasses the competences needed to plan and implement activities in the sector, with particular emphasis on the needs of energy consumers, environmental protection, energy security and the safety of employees, bystanders and property.

Initial Draft of SQFE and Its Consultation

The initial SQFE draft was developed by industry experts during seminar meetings. In the first stage of work, the experts were given material on the Integrated Qualifications System and a report summarising the research conducted among energy sector employees. The report *Analiza kompetencji i kwalifikacji w sektorze energetyki* [Analysis of Competences and Qualifications in the Energy Sector] turned out to be crucial in conducting the work, and the table of competences included in its appendix made it possible to verify solutions proposed by industry experts.

On the basis of the definitions developed, significant areas of the sector's activity were determined – preliminary sectoral determinants – and processes were distinguished within these determinants. This allowed for potential series of competences to be prepared. In order for the framework to be developed and to meet the expectations of various stakeholder groups, an initial SQFE draft was consulted with the industry community. The adopted definition of the sector, its scope, adequacy of the sectoral determinants, the SQFE level descriptors and their correspondence with the expectations of the sector's stakeholders were among the issues consulted. The correctness of the terminology used as well as the transparency and understanding of individual entries were also verified.

The consultations were conducted using a variety of methods in order to reach the widest possible range of stakeholders in the sector and to obtain reliable feedback on all the issues involved. The consultation was conducted in two ways: six one-day seminars were held in Poland and a qualitative study (IDI – individual in-depth interviews) was conducted. Representatives of the industry participating in the consultation seminars as well as the group of experts working on the initial SQFE draft were excluded from the IDI study, which consisted of 14 in-depth interviews. Its main objective was to verify the scope of SQFE, the adequacy of the sectoral determinants and SQFE level descriptors, and the extent to which they meet the expectations of the sector's stakeholders. Moreover, the respondents were asked

to present their opinion on the possibility of implementing SQFE and to present recommendations for its use.

The following are the issues that were consulted during the seminars, together with some examples of questions. The questions served as the topics of discussion, exercises and reflections on disputed issues. Once the major issues were agreed to, the second set of questions were among those used in consultations to verify the proposed solutions.

Table 2. Areas to be discussed during the consultations

Area discussed	Examples of topics/questions
definition of the sector	Are there some areas of activity characteristic for the energy sector that are not included in the definition?
sectoral determinants	Can any competence areas specific to the energy sector be identified that are not included in the proposed sectoral determinants?
level descriptors	Based on the SQFE entries, can all the key tasks specific to the sector be described?
terminology used	Are the concepts used universal and flexible enough? That is, do they reflect current and future technologies?

Table 3. Solutions consulted

Issue	Examples of questions
definition of the sector	In your opinion, does this definition cover all the key tasks in the energy sector?
sectoral determinants	In your opinion, are the sectoral determinants formulated in an understandable way?
level descriptors	Does the distribution of the entries in the draft SQFE reflect the increasing complexity of competences?
terminology used	Are the concepts used in line with the terminology adopted in the sector?

The participants of the consultations pointed out that the processes of energy storage are equally important as energy production and supply. As a result, SQFE was supplemented with provisions in this area. The participants of the consultations also indicated that few competences specific to the energy sector exist at PQF level 2. During the consultations, much attention was paid to ensure that the final entries of the draft SQFE were understandable and unambiguous. Discussions were held about the terms "simple", "complex", "untypical", etc. (energy devices and installations). It was finally decided to add the terms typical and untypical energy devices and installations into the glossary. This allowed ambiguous framework entries to be avoided.

The consultation participants were unanimous on the importance of social competences in the energy sector. They remarked on this when asked directly, but also commented spontaneously, pointing out the competences needed to implement individual tasks and emphasising the importance of people having the appropriate

attitude and a readiness to work. The consultation process confirmed that representatives of the energy sector perceive a need for a sectoral framework. They also believe that such a framework can be used by both small companies working in the area of e.g. renewable energy sources, which need highly specialised employees, and large enterprises facing the challenges of a generational change and replacing retiring workers.

Differences and Similarities Reflected in the Draft SQFE

The last stage of formulating the level descriptors was an analysis of the correspondence between SQFE and the Polish Qualifications Framework. For this purpose, each of the provisions of SQFE was assigned an appropriate entry from the second stage PQF descriptors typical for vocational qualifications. The assignment of appropriate PQF levels was often preceded by a discussion and detailed analysis of the complexity of individual competences. Therefore, in several cases, SQFE descriptors for similar types of competences but used in different areas of the sector were assigned different PQF levels.

For example, it was agreed that the activities of estimating the energy demand of residential and public buildings require less complex skills than the same estimates made for industrial plants. This is reflected in the SQFE entries and their assigned levels.

Table 4. Comparison of selected SQFE entries with PQF entries

PQF level	Code and PQF descriptor	Series: energy demand of residential and public buildings	Series: energy demand of industrial plants
	Is able to:	Is able to:	Is able to:
3	L3V_SI[2] perform not very complex calculations relating to occupational tasks	perform calculations to estimate energy demand	
4	L4V_SI process quantitative data relating to moderately complex occupational tasks	estimate the energy demand of single-family homes	

[2] Translator's note: L3V_SI – level 3, second stage descriptors typical for vocational qualifications, category of skills, descriptive category of information

PQF level	Code and PQF descriptor	Series: energy demand of residential and public buildings	Series: energy demand of industrial plants
	Is able to:	Is able to:	Is able to:
5	L5V_SI analyse the performed occupation based on available quantitative data	estimate the energy demand of multi-family residential buildings, public buildings and buildings equipped with intelligent automation systems	estimate the energy demand of individual production processes
6	L6V_SI diagnose the performed occupation based on available data about the internal situation and external environment	forecast the energy demand of multi-family residential and public buildings	estimate the energy demand of complex production processes
7	L7V_SI predict the development of the situation in the field of the occupation		forecast the energy demand of industrial plants

Similarly, a distinction was made between the complexity of skills needed for the assembly, start up and disassembly of commonly used energy installations and devices as opposed to industrial installations and devices. The very size of the devices in question, as well as their complicated construction and operation indicate the need to include this in a different SQFE series.

Table 5. Comparison of selected SQFE entries with PQF entries

PQF level	Code and PQF entry	Series: assembly and disassembly of commonly used energy devices and installations	Series: assembly and disassembly of industrial energy devices and installations
	Is able to:	Is able to:	Is able to:
3	L3V_SO[3] perform activities comprising not very complex occupational tasks	perform activities to assemble and disassemble commonly used energy devices and equipment	
4	L4V_SO perform moderately complex occupational tasks, often under variable, predictable conditions	assemble, start up and disassemble commonly used energy devices and installations	perform activities relating to the assembly and disassembly of industrial energy installations and devices
5	L5V_SO perform moderately complex occupational tasks under variable, not fully predictable conditions	assemble, start up and disassemble commonly used energy devices and installations under non-routine or particularly dangerous conditions	assemble, start up and disassemble industrial energy devices and installations
6	L6V_SO perform complex occupational tasks under variable and not fully predictable conditions		assemble, start up and disassemble industrial energy devices and installations under non-routine or especially dangerous conditions

The analysis of correspondence conducted at the stage of modifying the draft version of SQFE showed that particular entries in a series of competences were referenced to different PQF descriptive categories. This is due to the fact that the competence series are arranged by topic, in a way that is understandable and intuitive for sectoral representatives, in some cases referring to various categories. Bearing in mind that the tool, which is a sectoral qualifications framework, is to be useful to the industry, the adopted layout of the competence series was left in place. The series were not laid out in accordance with their corresponding PQF descriptive categories, as this would have negatively impacted the readability of the document. The key premise was to assign the competences contained in SQFE to the appropriate PQF levels, which was accomplished. Referencing the SQFE entries to specific PQF

[3] Translator's note: L3V_SO – level 3, second stage descriptors typical for vocational qualifications, category of skills, descriptive category of organising work

provisions was done to help with this task and the presence of different descriptive categories in one competence series is not a mistake.

It is also worth noting here that the preliminary draft sectoral framework proposed a new category – the name of the series. For this reason, the final SQFE draft has an additional column with the competence series name. This indicates the thematic connection among the competences it contains (as mentioned above), regulates the different descriptive categories[4] and shows how they are linked.

For example, the series "preparing energy carriers and working fluids" encompasses various competences, but directly relates to preparing energy carriers and working fluids for energy production, storage and supply. They are referenced to the relevant PQF descriptors in Table 6.

Table 6. Comparison of selected SQFE entries with PQF entries (analysis of correspondence)

Draft SQF for the Energy Industry					
Level 3	**Level 4**	**Level 5**	**Level 6**	**Level 7**	**Level 8**
Is able to:	Is able to:	Is able to:	Is able to:	Is able to:	Is able to:
read the documentation to determine the parameters and method of preparing energy carriers and working fluids for energy production, storage and supply processes	prepare energy carriers and working fluids for energy production, storage and supply processes	select the technologies to prepare energy carriers and working fluids intended for energy production, storage and supply processes	adapt the methods of preparing energy carriers and working fluids for energy production, storage and supply processes	modify the methods of preparing energy carriers and working fluids to improve the efficiency of energy production, storage and supply processes	develop new methods of preparing energy carriers and working fluids
PQF (second stage descriptors typical for vocational qualifications)					
Level 3	**Level 4**	**Level 5**	**Level 6**	**Level 7**	**Level 8**
Is able to:	Is able to:	Is able to:	Is able to:	Is able to:	Is able to:
L3V_SI use documentation relating to not very complex occupational tasks	L4V_SO perform moderately complex occupational tasks, often under variable, predictable conditions	L5V_SM select the methods, technologies, procedures and materials required for the performed occupation	L6V_SM adapt simple methods and technologies as well as simple procedures in the performed occupation	L7V_SM modify methods and technologies as well as procedures for the occupation	L8V_SM develop new methods and technologies for the occupation

[4] Translator's note: See Chłoń-Domińczak et. al (2017) for the list of descriptive categories in the second stage PQF descriptors typical for vocational qualifications for knowledge, skills and social competence.

The analysis of correspondence completed the verification of agreement between the SQFE draft and PQF descriptors, conducted in cooperation with experts from the Educational Research Institute. At this stage, in several cases, the PQF code assigned to particular SQFE entries was changed. The change did not concern the level, but required editing the draft SQFE entries. An example of the analysis of correspondence is shown in Table 7.

Table 7. Comparison of selected SQFE entries with PQF entries (analysis of correspondence)

Level Category/Series of SQFE	SQFE entry	Proposed PQF code and entry	Finally agreed PQF code and entry
Knows and understands:	Knows and understands:	Knows and understands:	Knows and understands:
Level 3 Series: functioning of energy markets	the terminology of the functioning of energy markets	L3V_KP phenomena and processes relating to the occupational tasks being performed	L3V_KT basic concepts and terminology relating to the occupational tasks being performed

The Sectoral Qualifications Framework for the Energy Industry – After the Consultations

The Sectoral Qualifications Framework for the Energy Industry consists of:

- the scope of the SQF for the Energy Industry,
- level descriptors of the SQF for the Energy Industry,
- description of the sectoral determinants of the SQF for the Energy Industry,
- glossary of terms in the SQF for the Energy Industry.

The scope of the Sectoral Qualifications Framework for the Energy Industry (definition of the energy sector for the purposes of the sectoral qualifications framework) indicates the competences it includes. This scope is defined by indicating the key processes and tasks performed in the sector, which require a person to have the competences included in the SQFE.

It should be mentioned that the table of competences contained in the aforementioned report "Analysis of competences and qualifications in the energy sector" was constructed from forty overarching categories, within which 733 competences were grouped and entered. The 34 most important categories were included in the draft SQFE as a result of the final work on the framework. Their names (literally or synonymously) are in line with the name of the determinant, and more often with the name of the competence series in the final version of the proposed Sectoral Qualifications Framework for the Energy Industry.

The final draft of SQFE includes competences described at five levels corresponding to levels 3–8 of the Polish Qualifications Framework. In order to structure the competences, the SQFE level descriptors are presented by means of named competence series, which are arranged in the sectoral determinants defining the key aspects of the sector.

Organising the competences (description components) comprising the SQFE level descriptors by series and determinants creates a clear structure that facilitates using the framework. The structure of the framework is shown in the figure below.

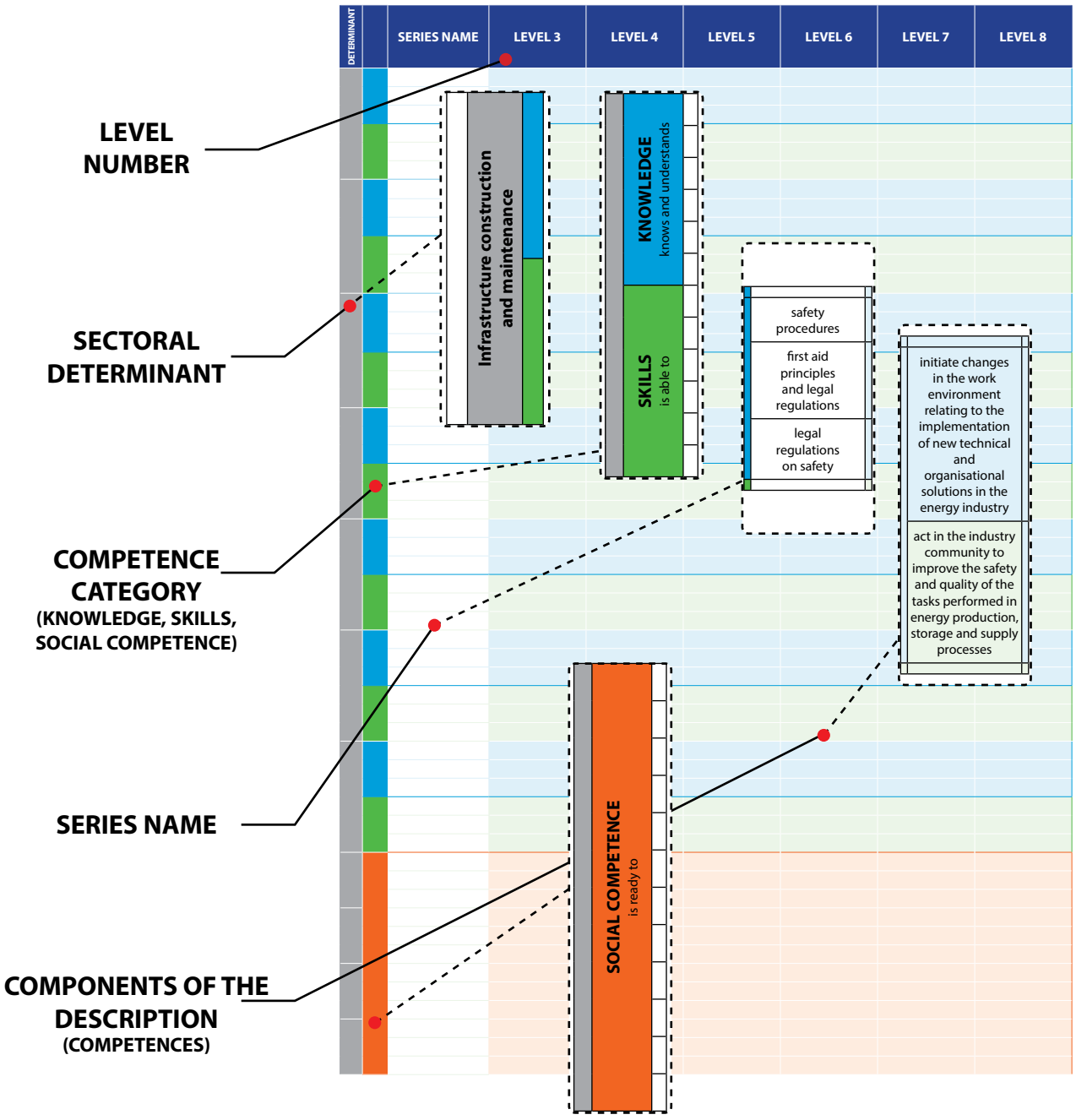


Figure 4. Structure of the SQF for the Energy Industry

Source: Final report on developing the SQF for the Energy Industry "Implementation of the Sectoral Qualifications Framework for the Energy Sector (SQFE) Project", Kielce, April 2020.

3. Detailed Presentation of the Framework

The Sectoral Qualifications Framework for the Energy Industry is a set of competences categorised by knowledge, skills and social competence and systematised by their level of complexity.

The definition of the energy sector developed for the sectoral qualifications framework indicates its scope of competences. This scope is defined by indicating the key processes and tasks implemented in the sector, which require possession of the competences included in the framework to be able to perform them. In accordance with the principles of developing a sectoral qualifications framework, the Sectoral Qualifications Framework for the Energy Industry contains only those competences that are specific to the energy sector. However, implementing the processes and tasks indicated in the definition may also involve competences other than those included in SQFE.

3.1. SQFE Level Descriptors

The SQFE describes competences for five levels, corresponding to levels 3–8 of the Polish Qualifications Framework. The SQFE level descriptors were developed in such a way that the entries for knowledge, skills and social competence do not duplicate the same information, but complement each other. As a result, SQFE covers the whole spectrum of specific competences required to implement key processes in the energy sector. In order to organise the competences, the SQFE level descriptors are presented in competence series, which are then arranged in sectoral determinants.

3.2. Sectoral Determinants

The purpose of the sectoral determinants is to identify key aspects of activities in the sector. The selection of the determinants optimally describing the energy sector was based on a competence analysis. The following sectoral determinants for the categories of knowledge and skills were formulated:

- Designing and planning
- Infrastructure construction and maintenance
- Energy production, storage and supply
- Customer needs, the energy market
- Energy carriers and working fluids
- Environment
- Protection

The formulation of the sectoral determinants was guided by the key aspects of the sector's activities that distinguish it from other sectors. The above mentioned determinants were used to organise the competences relating to knowledge and skills. These competence categories cover the same thematic areas and can be grouped together under the same headings. Knowledge and skills have series that directly relate thematically (e.g. computer software-related knowledge and skills) and complement each other, relate to the same subject matter (e.g. safety) or are needed to perform the same process (e.g. energy supply).

DESIGNING AND PLANNING

The determinant includes the competences of:

- designing, prototyping and testing energy devices and installations,
- designing automated protection and telemetry systems,
- designing power grids,
- selecting energy devices and installations, equipment as well as the conditions and technologies of assembly,
- managing power grids and balancing energy,
- planning energy production, storage and supply processes,
- directing system operations and developing energy protection plans.

INFRASTRUCTURE CONSTRUCTION AND MAINTENANCE

The determinant includes the competences of:

- assembling, starting up and disassembling energy devices, installations and networks,
- renovating, modernising and maintaining energy devices, installations and networks,
- diagnosing, locating and removing malfunctions in energy devices, installations and networks.

ENERGY PRODUCTION, STORAGE AND SUPPLY

The determinant includes the competences of:

- operating energy devices, installations and networks,
- monitoring the processes of energy production, storage and supply.

CUSTOMER NEEDS, THE ENERGY MARKET

The determinant includes the competences of:

- identifying the demand and needs of energy customers,
- estimating the demand for energy,
- calculating energy costs,
- developing tariffs, price lists and trade strategies,

- informing and educating customers on, among others, the principles of the operation and safe use of energy devices and systems, the parameters of supplied energy, the principles of connecting to the network and settling energy consumption accounts,
- shaping energy policies.

ENERGY CARRIERS AND WORKING FLUIDS

The determinant includes the competences of:

- analysing data on the accessibility and conditions of using energy carriers,
- determining the parameters of energy carriers and working fluids,
- taking measurements of energy carriers and working fluids,
- testing the energy efficiency of renewable energy sources,
- storing, registering, transporting and determining the doses of energy carriers and working fluids,
- preparing energy carriers and working fluids for energy production, storage and supply processes.

ENVIRONMENT

The determinant includes the competences of:

- assessing the impact of energy production, storage and supply processes on the environment,
- applying technologies limiting the impact of energy production, storage and supply processes on the environment,
- managing natural resources,
- managing the waste generated by energy production, storage and supply processes as well as by the disassembly of energy devices and installations,
- using energy recovery technologies and the technologies of producing energy from renewable sources.

PROTECTION

The determinant includes the competences of:

- identifying potential threats and assessing the risk of emergencies in energy production, storage and supply processes,
- using personal and collective safety measures,
- selecting and using measures limiting the risk of emergencies as well as developing procedures and contingency plans,
- ensuring the safety of workers, bystanders and property, conducting rescue operations,
- providing instructions and training.

Social competences, which are cross-cutting and universal for all areas of energy, were treated separately. They are grouped in separate sectoral determinants, which better reflect the character of this category. The following sectoral determinants were distinguished for social competence:

- Communication
- Ethics
- Decision making
- Responsibility for quality and safety
- Responsibility for the environment

COMMUNICATION

The determinant includes the competences of:

- being ready to communicate with the community, that is, energy customers and users as well as suppliers, consulting-research firms, administration, rescue services and other entities, as well as being ready to formulate and convey instructions,
- being ready to establish and maintain essential relationships and cooperate with the immediate professional community and other entities involved in energy production and supply as well as to initiate and develop cooperation in the industry community,
- attentiveness to the technical culture, including a readiness to communicate using technical language and the industry's terminology.

ETHICS

The determinant includes the competences of:

- being ready to comply with professional secrecy, regulations on the use of intellectual property, legal regulations on, among others, construction and energy, as well as the principles of honesty, reliability and confidentiality, promoting ethical principles, responsibly conducting research and implementing new technical and organisational solutions in the energy industry.

DECISION MAKING

The determinant includes the competences of:

- being ready to perform professional tasks under variable conditions and under time pressure as well as to make decisions in high risk situations directly threatening people's lives and health or the environment, being ready to adapt to changes in one's work environment relating to the introduction of new technical and organisational solutions in the energy industry.

RESPONSIBILITY FOR QUALITY AND PROTECTION

The determinant includes the competences of:

- being ready to care for one's own occupational health and safety and that of subordinate workers,
- being ready to perform one's tasks reliably and accurately, to care about the quality of the work performed and to critically assess the results of one's own work and that of the team one directs,
- being ready to anticipate the consequences of actions.

RESPONSIBILITY FOR THE ENVIRONMENT

The determinant includes the competences of:

- attentiveness to the protection of energy users and consumers as well as of the environment,
- promoting attitudes of attentiveness to environmental protection, including the optimisation of energy consumption and a readiness to perform professional tasks with respect for natural resources and environmental protection.

Sectoral determinants ensure coherence and completeness within a sectoral qualifications framework. They group competences from a given area, making it easier to search for them in the SQFE. The description of the determinants serves as a legend, allowing people to quickly find the entries they are looking for.

3.3. Competence Series

The SQF for the Energy Industry groups competences into series within the sectoral determinants. The competence series is a set of thematically linked competences, forming a logical sequence of entries that increase in complexity. The competences belonging to one series in the framework are always in the same row so that the progression of requirements can be traced. Examples of competence series in SQFE are shown below.

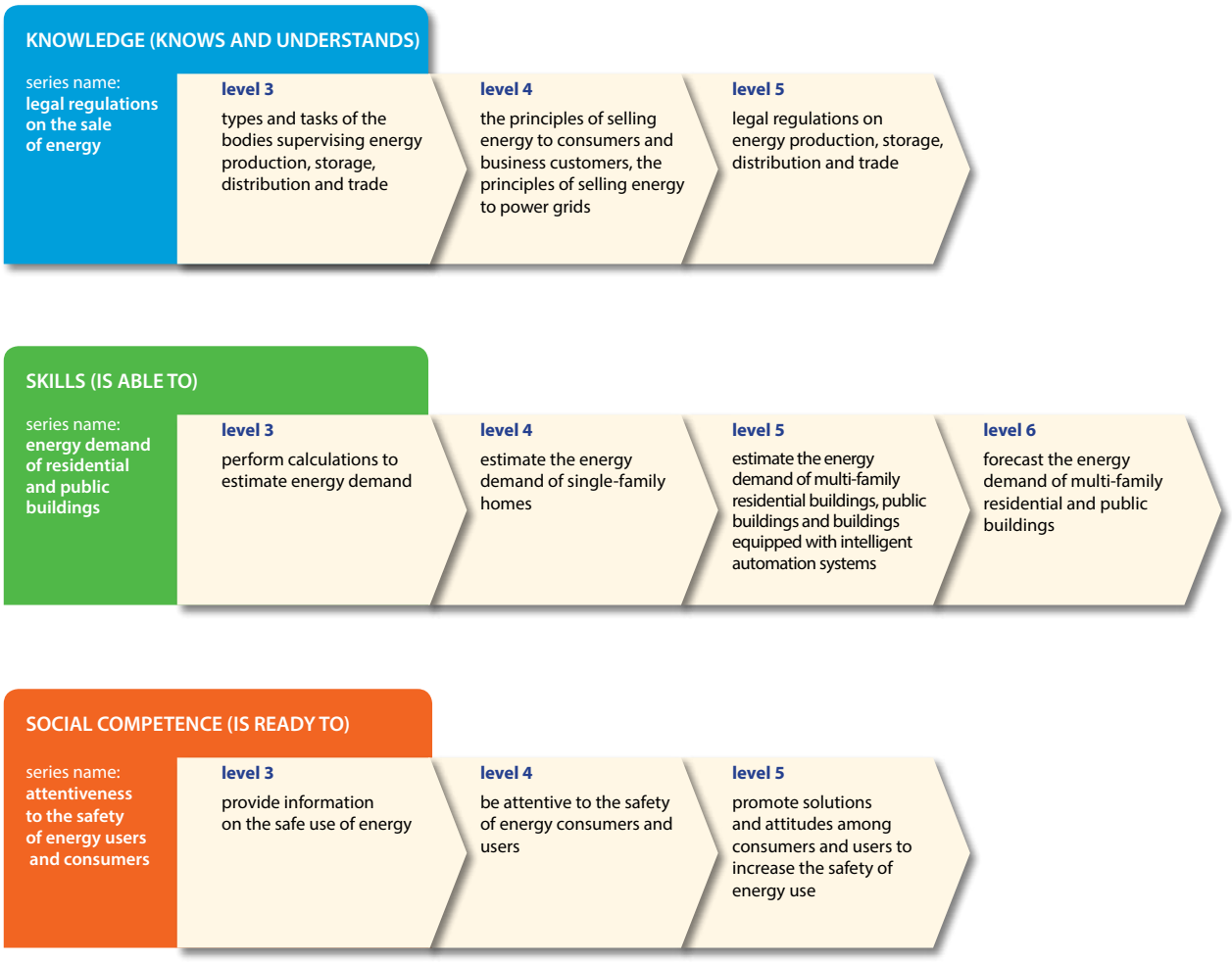


Figure 5. Examples of competence series in the SQF for the Energy Industry

Source: Final report on developing the SQF for the Energy Industry "Implementation of the Sectoral Qualifications Framework for the Energy Sector (SQFE) Project", Kielce, April 2020.

Organising the competences (components of the description) forming the SQFE level descriptors within series and determinants facilitates the use of the framework and ensures its utility and functionality.

4. Recommendations on Implementing and Using SQFE

The consultation process described above allowed opinions to be gathered, which reflect the point of view of various stakeholder groups in the sector. The recommendations presented in this section have been structured and divided into particular aspects of the use, implementation and development of SQFE.

4.1. Potential Application of SQFE by Specific Stakeholder Groups

Sectoral qualifications frameworks further detail the Polish Qualifications Framework and take into account the specificity of a given sector. They can be a useful tool for various groups of sectoral representatives, such as employers, educational institutions, learners or those planning to seek employment in a given sector. SQFE, properly implemented and periodically updated, can become a tool that will allow the sector's stakeholders to communicate in a common language with regard to the competences of the people working in the industry. Employers will be able to precisely define the requirements for employees, educational providers will be able to adapt their offer to market expectations, while those interested in working in the energy sector will be able to plan their educational and professional path more effectively. Below are the areas where the SQFE can be used as indicated by the representatives of the energy sector:

- **Human resources processes in companies in the sector** – SQFE reflects the key competences used in the sector and can be used in job descriptions, recruitment and evaluation processes. Using it will facilitate recruitment processes, as well as the migration of employees within the structures of large companies. The implementation of SQFE will contribute to systematising the requirements for employees on the scale of the whole sector, benefitting both employers and employees.

- **Learners and persons planning to work in the sector** – according to sectoral representatives, it is important that learners and persons planning to work in the energy sector know the expectations of employers. Systematising the competences used in the sector and standardising the nomenclature will make it easier for people to assess their competences, to choose an additional course or training or to decide to apply for a specific job position.

- **Education and training**
  a) SQFE level descriptors and sectoral determinants can be used to diagnose new qualifications required in the sector. This is needed due to the fact that the energy sector is dynamically changing at the technological, legal and economic levels, directly impacting workers' qualifications.

  b) The learning outcomes developed in SQFE can be used to build a full description of the competences needed for new and changing professional tasks. This will be particularly helpful in systematising the requirements for

employees in the sector, positively contributing to the quality of job descriptions, company recruitment processes and employee assessments.

c) The use of the language of learning outcomes prepared under SQFE will be helpful in developing training programmes, which is of great importance in the context of the dynamically changing energy market and the related demand for training services. Constant technological changes require employees to continuously develop and acquire new competences in order to meet the tasks they face.

d) The SQFE, by providing a clear overview of the competences in the sector and their interaction, will help modify and update curricula. It will be particularly useful in adapting curricula to local conditions resulting from the operation of the energy sector in specific areas of the country.

e) Training institutions must be flexible in adapting their offer to current and future requirements of employers. The use of SQFE will make it easier to define the objectives of training and then to evaluate it, allowing the training to better respond to the specific needs of the employer and employee. It will encourage the use of training as a form of professional development.

f) SQFE will help to identify and design traineeships, internships, courses to acquire additional occupational skills for vocational school students, and professional training for vocational education teachers. SQFE entries can be used in the communication processes between employers and the education sector, which will translate into the organisation of effective internships and traineeships and their subsequent evaluation. SQFE can help to define the range of competences that a learner, student or teacher of a profession should acquire during the internship and apprenticeship and to guide employers in this area.

- **Public procurement – SQFE can also be a useful tool for public administration.** SQFE entries can be used in public procurement procedures when formulating the competence requirements of a contractor. Attention was also drawn to the possibilities in this area that could be offered by including market qualifications from the energy sector in the Integrated Qualifications System. The requirement to have certificates confirming appropriate qualifications would be a simple and effective way to ensure the quality of services financed from public funds.

- **In developing tools to identify competences** – the opportunities ensuing from the introduction and use of the SQFE for many sectors were also recognised. There are many of the same or very similar competences used in different sectors. Sectoral qualifications frameworks could provide a basis for developing tools to identify such competences and to facilitate the use of the skills acquired for work in one sector for employment in another. This is important for both jobseekers and job changers, as it will allow them to re-qualify more quickly. At the same time, it can be an opportunity for employers who need to hire workers. Sectoral qualifications frameworks could also provide the basis for developing tools to diagnose the competences of

job seekers who do not have documents confirming their qualifications, e.g. foreigners.

- **In describing and including market qualifications into the IQS** – the need to describe market qualifications in the energy sector was repeatedly indicated. Professionals who developed skills in the course of their work experience could confirm the acquired competences and then demonstrate the relevant certificate to a potential employer. The introduction of mechanisms ensuring the reliable assessment of knowledge and skills would have a positive impact on the quality of the services offered in the sector. At the same time, it has been stressed that there are a number of positions for which employers would first expect a person to have the appropriate certificate rather than a specific formal education. Access to and extensive knowledge of market qualifications would also allow individuals to make informed choices about the professionals providing services. SQFE could facilitate and accelerate the process of describing and including market qualifications in the IQS. Thanks to the use of sector-specific entries, SQFE can assist in properly describing market qualifications, which require, among other things, a descriptive synthesis of their learning outcomes. Sectoral qualifications frameworks are also a tool that can be used in the validation process by awarding bodies and validation institutions. Above all, a sectoral qualifications framework can be used at the stages of diagnosing and identifying competences. Based on SQFE, it is possible to develop tools to support the work of validation counsellors in conducting skills audits of potential validation candidates. In particular, SQFE can be useful for people interested in an energy qualification who have not yet achieved the required learning outcomes listed in the qualification's description. In such cases, SQFE can help to identify areas that need to be developed and to plan the pathway to a qualification.

4.2. Recommended Ways of Implementing SQFE and the Entities that Should Be Involved in Its Implementation and Promotion

The proposed sectoral framework itself – although important – does not complete the work on the tool. The value of SQFE for the potential user – the sectoral stakeholder – will be demonstrated by its dissemination, ease of use and updating. Making the Sectoral Qualifications Framework for the Energy Industry known in every field of activity of the sector, among key institutions and organisations, as well as popularising examples of its implementation can be a challenge in the absence of the patronage of an institution covering the whole sector. Therefore, it is recommended that the SQFE be implemented under the patronage of the Ministry of Energy. Further, promotional activities on the level of local governments is necessary. Several experts and consultation participants emphasised the need to establish a Sector Skills Council for the energy sector, which could also oversee activities relating to the SQFE. Moreover, the Council, as an institution influencing educational services and involved in monitoring entrepreneurs' competence needs, could initiate the process of including SQFE into the IQS, and then take responsibility for its updating. If, on the other hand, the process of inclusion were

to start at the request of another entity, the opinion of the Sector Skills Council would be a valuable voice of the industry community at the stage of providing an opinion on the advisability of including SQFE in the IQS. Many people pointed out that entities such as universities or scientific institutes should be involved in the process of implementing and promoting the SQFE, but also stressed the need to involve employers and business organisations in these activities. SQFE should also be disseminated in schools and universities. This would support the process of designing educational and professional paths and ensure their continuity at subsequent stages of education, linking the school education system and higher education.

It was pointed out that the quality and form of communication will be very important in the process of disseminating SQFE. All types of guides and informational materials used for this purpose should have a clear, easy-to-understand form, adapted to specific groups of recipients (e.g. pupils, students, career advisors, training institutions). Access to such materials should be provided in an electronic, possibly interactive, version. Social media, among others, should be used in its promotion. Several people recommended a pilot implementation of SQFE in selected institutions/enterprises. Conclusions from such a pilot could be used to plan activities to promote the use of SQFE.

A number of experts and consultation participants also stressed that the success of the implementation of SQFE will depend on maintaining the high quality of qualifications in the energy sector that will be included in the IQS.

4.3. Perspectives for the Development of SQFE

The Sectoral Qualifications Framework for the Energy Industry should respond flexibly to changes in the national energy system and to development trends and innovations in the energy sector. The progressive computerisation and automation of numerous energy processes and the development of distributed, low-power electrical generation systems, often based on renewable energy sources, will certainly be important. It is recommended that the SQFE entries be reviewed in 3–5 years. The review and possible update of SQFE should always be preceded by a discussion in the energy industry with the participation of representatives of central government administration, schools and higher education institutions and entrepreneurs.

5. Instructions for Using SQFE

5.1. Determining the Level of Competences

Determining the level of competences can be helpful in:

- comparing courses and training programmes,
- planning further development,
- determining salary ranges based on competence criteria,
- creating employee development programmes and validating employees' competences.

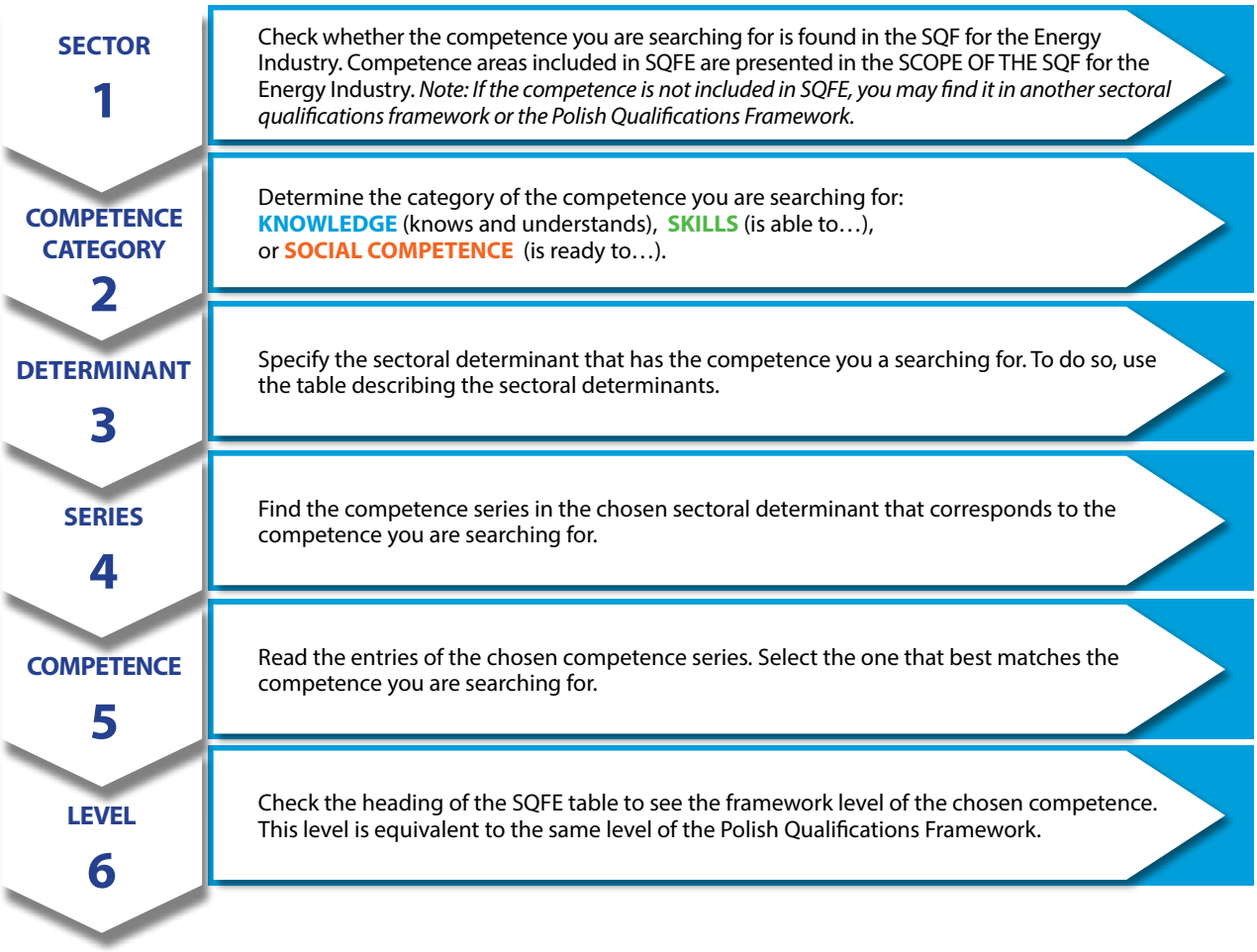


Figure 6. Diagram of assigning a PQF level to a competence using SQFE

Source: Final report on developing the SQF for the Energy Industry "Implementation of the Sectoral Qualifications Framework for the Energy Sector (SQFE) Project", Kielce, April 2020.

5.2. Developing Sets of Competences

Because SQFE entries are adapted to the specificity of the sector, it is a tool for developing sets of competences, which can be used for:

- describing market qualifications – SQFE allows sets of competences to be developed that can be the basis for developing the required learning outcomes for a qualification;
- job descriptions – SQFE allows the knowledge, skills and social competences needed to perform specific professional tasks to be defined, which can constitute the requirements for a given job position;
- developing training programmes – based on the SQFE level descriptors, it is possible to develop training programmes described in the language of learning outcomes;
- developing programmes and tools for the validation of competences and tools for diagnosing competences and performing skills audits.

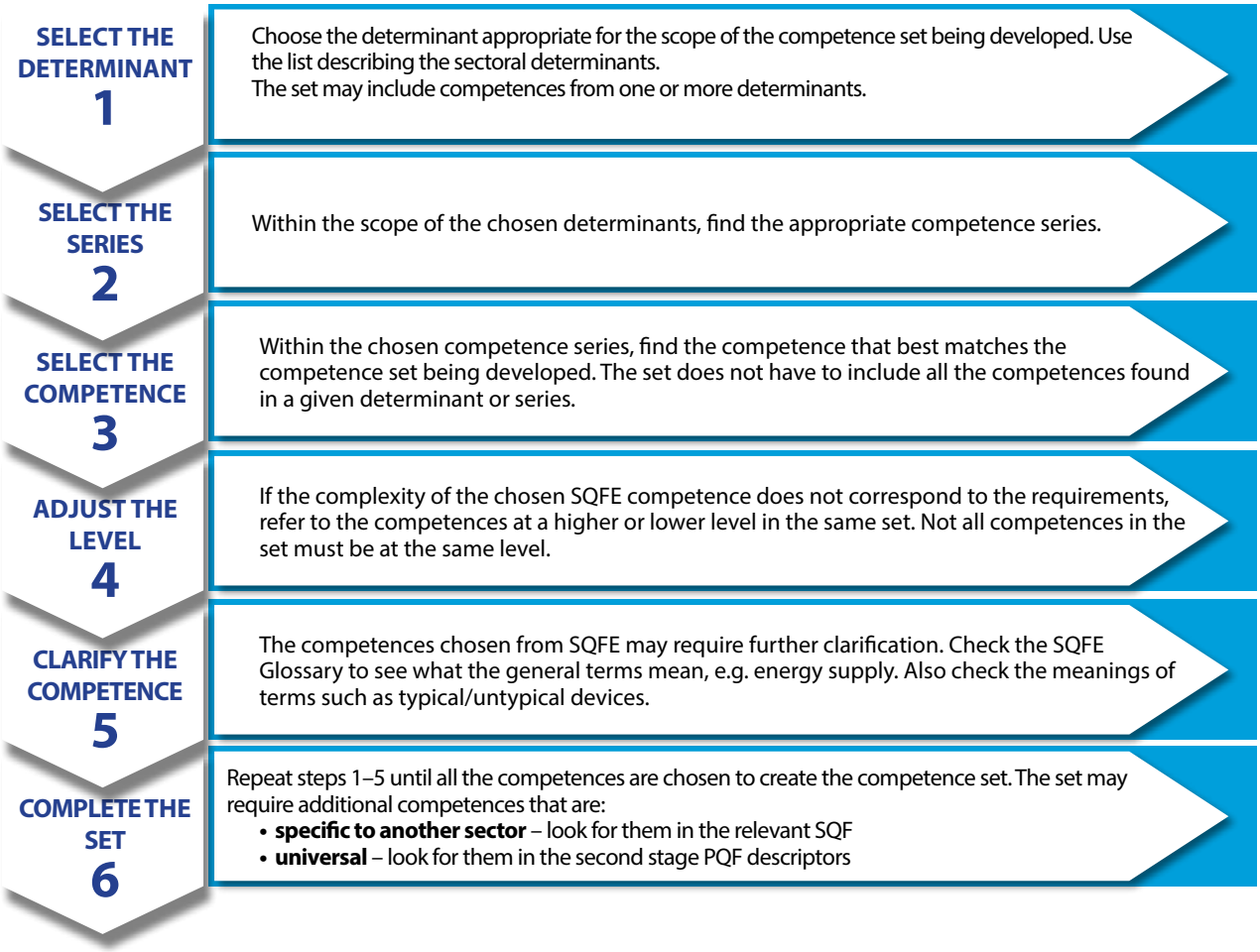


Figure 7. The steps of describing sets of competences using SQFE

Source: Final report on developing the SQF for the Energy Industry "Implementation of the Sectoral Qualifications Framework for the Energy Sector (SQFE) Project", Kielce, April 2020.

6. Glossary of SQFE Terms

In the course of the work on SQFE, a "Glossary of SQFE Terms" was also produced, containing definitions of selected concepts used in SQFE. These definitions concur with current legal regulations and additionally clarify or further develop certain concepts and apply exclusively to the SQFE. The glossary was developed to explain the context of the terms used, such as, for example, commonly used energy equipment. The "Glossary of SQFE Terms" also includes words that have been replaced by extensive, often repeated descriptions (e.g. the processes of transmitting, distributing and trading energy have been collectively called "energy supply") in the level descriptors. This made it possible to improve the readability of SQFE by not having to include extensive descriptions. The "Glossary of SQFE Terms", together with the entire SQFE draft, was consulted with the energy industry. It was assessed in terms of the correctness of its content and completeness. Consultation participants did not comment on the glossary entries, however, in order to ensure its completeness, all the entries of the SQFE were analysed during the consultations to ensure that they were not ambiguous. As a result of these consultations, the terms "typical energy equipment/installations" and "untypical energy equipment/installations" were added to the glossary. Additionally, such terms as: energy carriers, repair, modernisation and others, whose meaning ensues directly from current legal regulations, were defined.

ENERGY – energy carriers in the form of electricity, heat and gas fuels supplied through the gas network.

ENERGY CARRIERS – materials able to transmit energy and includes primary and secondary (derivative) energy carriers.

ENERGY DEVICES – devices and machinery producing, storing or transforming energy or being part of an installation/network as well as the measuring devices used in the energy sector.

ENERGY INSTALLATION – the set of energy devices and its interconnecting systems.

ENERGY PRODUCTION – the processes of producing and transforming energy for the purpose of generating electricity and heat. This concept does not include the production (extraction) of gas.

ENERGY STORAGE – the processes of capturing energy in energy stores (i.e. separate devices or groups of devices used to store energy in any form).

ENERGY SUPPLY – the processes of the transmission, distribution and trading of energy (electricity, heat and gas), including system services.

COMMONLY USED ENERGY DEVICES/INSTALLATIONS – energy devices/installations intended for the individual or household use of people.

INDUSTRIAL ENERGY EQUIPMENT/INSTALLATIONS – energy equipment/installations used in the professional energy industry, including those that are part of power grids.

MAINTENANCE – activities performed to maintain the proper technical condition of energy devices, installations and networks, i.e. inspecting, maintaining, repairing, renovating, modernising energy devices, installations and networks.

MODERNISATION – the set of activities, other than the manufacture of a new technical device, altering the characteristics of a technical device, which may include its construction, the materials used, its technical parameters, automated safety system or its components without significantly altering its characteristics or intended use and without increasing the risk associated with its operation.

POWER GRID – interconnected network of installations working together to transmit or distribute energy.

RENOVATION – the set of activities aimed at restoring something to its original state and not constituting ongoing maintenance or modernisation.

REPAIR – the set of activities aimed at restoring the operational state of a technical device, including repairs performed using chemical methods, without changing the device's structure or technical parameters.

SERVICING – the set of activities performed to keep a technical device in working order, performed in accordance with an operating manual; servicing is not the repair of a technical device.

SPECIALISED – dedicated and specific to the energy industry, in accordance with industry standards.

TYPICAL ENERGY DEVICES/INSTALLATIONS – mass-produced or widely used energy devices/installations acknowledged as commonly used, current technological solutions.

UNTYPICAL ENERGY DEVICES/INSTALLATIONS – energy devices/installations manufactured on an individual basis, for individual orders or based on new or previously unused technological solutions.

WORKING FLUIDS – the substances or mixtures thereof with specific physical and chemical parameters required for energy processes and equipment

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Annex.
Sectoral Qualifications Framework for the Energy Industry

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Design and planning	KNOWLEDGE – knows and understands:	design and prototyping methods	the methods of planning and selecting energy devices and installations	the methods of designing and prototyping energy devices, installations and power grids	a broad scope of the methods of designing and prototyping energy devices, installations and power grids	complex methods of designing and prototyping energy devices, installations and power grids	the directions of development in the methods of designing and prototyping energy devices, installations and power grids	the latest methods used worldwide of designing and prototyping energy devices, installations and power grids
		principles of designing protection		the principles of the operation and servicing of automated protection devices	the methods of selecting setpoints, the principles of selecting automated protection devices	the principles of designing automated protection systems	the principles of designing complex automated protection systems	
		automated protection devices and systems	the basic components of a protection system and automated protection terminology	the construction, operating principles and application of automated protection devices	the construction, operating principles and application of complex automated protection systems	the construction, operating principles and application of specialised automated protection systems	advanced automated protection systems and the elements of advanced automated protection systems	
		power grid management and energy balancing		the methods and procedures of energy balancing in energy devices, installations and industrial processes	the methods and procedures of energy balancing in power grids	the principles of power grid management	the principles of strategic planning for the functioning of power grids	
		software		the software used to make energy installation and power grid diagrams and to document the activities performed in energy production, storage and supply processes	the software used in designing and simulating the operation of energy devices, installations and power grids			
		legal regulations on designing	the principles of selecting energy devices, installations and power grids ensuing from legal regulations	the legal regulations on designing energy devices and installations	the legal regulations on designing power grids			
	SKILLS – is able to:	designing and selecting energy devices, installations	select the type of energy device to meet defined assumptions	select energy devices from those available in the market	define the parameters of energy devices and installations, formulate design assumptions	design energy devices and installations	design energy devices and installations using new solutions that improve the efficiency of energy production, storage and supply processes	develop new solutions to improve the efficiency and protection of energy devices and installations
		designing power grids			design installations that are part of power grids	design power grids	design power grids using new solutions that improve the efficiency of energy production, storage and supply processes	develop new solutions to improve the efficiency and protection of power grids

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Design and planning	SKILLS – is able to:	designing automated protection			select automated protection setpoints and devices	design automated protection systems	design advanced automated protection systems	develop new solutions for automated protection systems
		designing telemetric systems			select the components of systems remotely monitoring the operating parameters of energy devices, installations and power grids	design systems remotely monitoring the operating parameters of energy devices, installations and power grids		
		selecting materials and equipment	select materials and equipment for assembling typical energy devices and installations	select materials and equipment for assembling typical energy devices and installations under difficult and non-routine conditions	select materials and equipment for assembling untypical energy devices and installations	select materials and equipment for assembling untypical energy devices and installations under difficult and non-routine conditions		
		selecting the conditions and technologies for assembly and construction			define the conditions and technology for assembling energy devices and installations as well as the conditions and technology for the construction of distribution power grids	define the conditions and technology for assembling untypical energy devices and installations as well as the conditions and technology for constructing power transmission grids	develop new technologies for assembling and constructing energy devices, installations and power grids	develop new technologies for assembling and constructing untypical energy devices, installations and power grids
		designing devices – prototyping			make prototypes of energy devices and installations in accordance with the design	develop the assumptions for making prototypes	design the process of prototyping energy devices and installations	
		designing devices – testing prototypes		test the prototypes of energy devices and installations in accordance with instructions	develop the assumptions for testing the prototypes of energy devices and installations	analyse the test results of the prototypes of energy devices and installations		
		managing power grids			develop plans and procedures for energy production, storage and supply, including plans of cooperation with the grid	develop plans to ensure the continuity of energy production and supply in situations of planned inspections, renovations, maintenance and modernisation of energy devices and installations	develop and validate plans and procedures to ensure the continuity of energy production and supply in emergency situations	
		energy protection			develop plans to ensure energy protection in public buildings and production plants	develop plans to ensure energy protection in power grids	develop plans to ensure energy protection in the country	develop long-term strategies and plans to ensure energy protection in the country

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Design and planning	SKILLS – is able to:	using computer software		use computer software to select and configure energy devices and installations, as well as to document activities performed in energy production, storage and supply processes	use computer software to make diagrams of energy installations and power grids	use the basic functions of computer software to design and simulate the operation of energy devices, installations and power grids	use advanced computer software functions to design and simulate the operation of energy devices, installations and power grids	
		developing software		program devices and systems controlling the operation of energy devices and installations	program the operational algorithms for the automated systems of intelligent buildings	develop programs for the operation of automated systems controlling and monitoring the functioning of energy devices, installations and power grids	develop programs based on artificial intelligence for the operation of automated systems controlling and monitoring the functioning of energy devices, installations and power grids	develop new solutions, including those based on artificial intelligence, for the computer analysis of energy devices, installations and power grids
		preparing technical documentation		prepare diagrams of energy devices and installations	prepare technical drawings of energy devices and installations and other technical documentation of energy devices, installations and power grids	verify the accuracy of the prepared technical documentation of energy devices, installations and power grids		
		preparing other documentation	maintain inventory documentation	maintain the documentation of the activities performed in energy production, storage and supply processes	prepare instructions for work stations and reporting documentation	prepare company procedures, regulations and standards on implementing energy production, storage and supply processes		
Infrastructure construction and maintenance	KNOWLEDGE – knows and understands:	theoretical knowledge on infrastructure construction and maintenance	energy conversion terminology	the general theoretical foundations of energy conversion and the basics of electronics, electrical engineering, automation required to assemble, start up, disassemble and maintain typical energy devices, installations and power grids	a broad scope of the issues in thermodynamics, electronics, electrical engineering, automation required to assemble, start up, disassemble and maintain typical energy devices, installations and power grids	at an in-depth level, thermodynamics, electronics, electrical engineering, automation required to assemble, start up, disassemble and maintain typical energy devices, installations and power grids	the directions of development in electronics, electrical engineering and automation affecting the energy sector in the area of infrastructure construction and maintenance	the latest developments in electronics, electrical engineering and automation that can be implemented and applied in infrastructure construction and maintenance
		methods and technologies of assembly, start up and disassembly	the basic methods, technologies and conditions for the assembly, start up and disassembly of energy devices, installations and power grids	the methods, technologies and conditions for the assembly, start up and disassembly of energy devices, installations and power grids	a broad scope of the methods, technologies and conditions for the assembly, start up and disassembly of energy devices, installations and power grids	complex methods, technologies and conditions for the assembly, start up and disassembly of energy devices, installations and power grids	the directions of development in the methods and technologies for the assembly, start up and disassembly of energy devices, installations and power grids	new methods and technologies for the assembly, start up and disassembly of energy devices, installations and power grids

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Infrastructure construction and maintenance	KNOWLEDGE – knows and understands:	energy devices, installations and power grids	the terminology relating to energy devices, installations and power grids	the classification and purpose of energy devices, installations and power grids	the construction and modes of operation of typical energy devices and installations, as well as individual installations included in power grids	the construction and modes of operation of untypical energy devices and installations as well as power grids	the directions of development and research relating to energy devices, installations and power grids	the latest developments in energy devices, installations and power grids
		principles of the operation and use of tools	the principles of operating and applying manual and power tools in the assembly, disassembly and maintaince of energy devices, installations and power grids	the principles of operating and applying construction and assembly equipment for the assembly, disassembly and maintenance of energy devices, installations and power grids				
		legal regulations, standards and principles of infrastructure construction and maintenance	the principles of renovation economics as well as the principles ensuing from legal regulations on the utilisation of energy devices, installations and power grids.	the legal standards and regulations on the assembly and disassembly of energy devices and installations as well as on the utilisation of energy devices, installations and power grids	standards and legal regulations on the construction of energy installations and power grids as well as the operation of the energy system	planned changes in the standards and legal regulations on the construction, assembly, disassembly and utilisation of energy devices, installations and power grids as well as the operation of the energy system		
	SKILLS – is able to:	assembly and disassembly of commonly used energy devices and installations	perform activities to assemble and disassemble commonly used energy devices and equipment	assemble, start up and disassemble commonly used energy devices and installations	assemble, start up and disassemble commonly used energy devices and installations under non-routine or particularly dangerous conditions			
		assembly and disassembly of industrial energy devices and installations		perform activities to assemble and disassemble industrial energy installations and devices	assemble, start up and disassemble industrial energy devices and installations	assemble, start up and disassemble industrial energy devices and installations under non-routine or particularly dangerous conditions		
		diagnostics	perform an organoleptic assessment to determine that energy devices, installations and power grids are operating correctly	read data from monitoring devices and systems and locate failures and disturbances in the operation of energy devices, installations and power grids	analyse data from monitoring devices and systems and diagnose the causes of malfunctions, failures and disturbances in the operation of energy devices, installations and power grids; determine how to repair energy devices, installations and power grids	use information technology to diagnose the causes of malfunctions, failures and disturbances in the operation of energy devices, installations and power grids		

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Infrastructure construction and maintenance	SKILLS – is able to:	maintenance, renovations, repairs, modernisation	perform activities to regularly maintain devices, installations and power grids as well as perform simple repairs and renovations of energy devices, installations and power grids	modernise and perform complex repairs and renovations of energy devices, installations and power grids	perform complex repairs and renovations of energy devices, installations and power grids under non-routine or particularly dangerous conditions	modernise energy devices, installations and power grids	modernise energy devices, installations and power grids using new solutions	
		planning inspections, renovations, repairs, modernisation		plan inspections, renovations, repairs and the modernisation of energy devices and installations	plan inspections, renovations, repairs and the modernisation of power distribution grids	plan inspections, renovations, repairs and the modernisation of power transmission grids	develop plans for operating power grids	prepare development plans for power grids
		development of methods and technologies				verify that work is performed correctly and evaluate the methods used in the assembly, start up, disassembly and maintenance of energy devices, installations and power grids	implement new methods and technologies in the assembly, start up, disassembly, diagnostics and maintenance of energy devices, installations and power grids	develop new methods and technologies for the assembly, disassembly, start up, diagnostics and maintenance of energy devices, installations and power grids
Energy production, storage and supply	KNOWLEDGE – knows and understands:	theoretical knowledge on energy production, storage and supply	the terminology of power engineering, thermal engineering, heating technology and the gas industry as well as the terminology of energy devices and installations	general theory on energy conversion and the basics of electrical engineering, electronics and automation at the level required to operate typical energy installations and devices	a broad scope of issues in thermodynamics, electrical engineering, electronics and automation at the level required to operate untypical energy installations and devices	in depth, thermodynamics, electrical engineering, electronics, automation and other fields at the level required to operate untypical energy installations and devices	the directions of development in electrical engineering, electronics, automation and other fields relating to energy production, storage and supply	the latest developments in electrical engineering, electronics, automation and other fields relating to energy production, storage and supply processes
		methods and technologies of energy production	basic energy production methods	energy production methods and technologies	a broad scope of energy production methods and technologies	complex energy production methods and technologies	the directions of development of energy production methods and technologies	the latest energy production methods and technologies
		methods and technologies of energy storage and supply	basic energy storage and supply technologies	energy storage and supply methods and technologies	a broad scope of energy storage and supply methods and technologies	complex energy storage and supply methods and technologies, including methods of working with a grid dominated by unstable energy sources	the directions of development of energy storage and supply methods and technologies	the latest energy storage and supply methods and technologies
		instruments and devices, energy installations and power grids	the principles of the operation and utilisation of instruments used in energy production, storage and supply processes	the principles of the operation, servicing and regular maintenance of typical energy devices and installations	the principles of the operation, servicing and regular maintenance of untypical energy devices and installations as well as power grids			
		computer software	the principles of using software to document and monitor the work of electrical devices and control their operation	the principles of the operation and utilisation of software used in energy production, storage and supply processes	the principles of the operation and utilisation of specialised computer software used in energy production, storage and supply processes			

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Energy production, storage and supply	SKILLS – is able to:	implementing procedures and plans	implement energy production, storage and supply procedures	implement plans to ensure the continuity of energy production and supply in situations of planned inspections, renovations, maintenance and modernisation of energy devices and installations	implement plans to ensure the continuity of energy production and supply in emergency situations	verify that work relating to energy production, storage and supply is performed correctly		
		operating energy devices and installations	perform activities to operate individual energy devices (preparation, start up, adjustments, setting parameters in accordance with the instructions, monitoring parameters, switching off, securing the devices after completing the work)	perform the tasks of supervising the work of individual energy devices (monitor parameters, adjust parameters depending on the course of the energy production, storage and supply processes, take remedial actions in emergency situations)	perform moderately complex tasks in operating energy installations and device assemblies (preparation, start up, adjustments, setting parameters in accordance with the instructions, monitoring parameters, switching off, securing the installations and device assemblies after completing the work)	perform complex tasks in supervising the work of energy installations and device assemblies (monitor parameters, adjust parameters depending on the course of the energy production, storage and supply processes, take remedial actions in emergency situations)		
		process monitoring	measure the parameters of produced, stored and supplied energy	monitor energy production and supply processes, analyse the parameters of produced, stored and supplied energy	diagnose irregularities in energy production, storage and supply processes	analyse the causes of irregularities in energy production, storage and supply processes		
		telemetry systems for operating energy devices, installations and power grids	take readings from telemetry systems	run systems remotely monitoring the operating parameters of energy devices, installations and power grids	analyse and interpret remote monitoring system readings of the operating parameters of energy devices, installations and power grids			
		using databases	search and obtain information from databases, maps and satellite images required to perform professional tasks in energy production, storage and supply processes	generate datasets and reports from databases and update data in databases	select data sources and the data required to perform professional tasks in energy production, storage and supply processes			
		using documentation	use work station instructions and other documentation to obtain the information required to perform professional tasks in energy production, storage and supply processes	use the technical and technological documentation required to perform and supervise tasks in energy production, storage and supply processes				

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Customer needs and the energy market	KNOWLEDGE – knows and understands:	functioning of energy markets	the terminology of the functioning of energy markets	the basic assumptions of the functioning of energy markets	the principles of the functioning of the domestic energy market	the principles of the functioning of European and global energy markets	the directions of development of energy markets	
		structure of energy production and supply		the types of entities operating in the energy market	the structure of energy production and supply on a regional scale	the structure of energy production and supply on a national scale	the directions of change in the structure of energy production and supply	
		energy demand	the basic factors affecting the energy demand of buildings	the factors affecting the energy demand of buildings and production processes	the factors affecting the energy demand of the region and country	the complex factors affecting the energy demand of the region and country	the long-term socio-economic trends affecting energy demand	
		demand estimation methods	the basic principles of estimating the energy demand of residential buildings	the methods of estimating the energy demand of residential buildings	the methods of estimating the energy demand of public buildings and production plants	the methods of estimating the energy demand of the region and country	the methods of forecasting the energy demand of the region and country	the methods of strategic energy demand planning for the country and the European Union
		principles and regulations on tariffs	the types of tariffs, tasks of the tariff approval body and tasks of the energy companies setting tariffs	procedures for establishing tariffs based on legal regulations	legal regulations on tariffs	the principles of developing tariffs and price lists		
		legal regulations on the sale of energy	types and tasks of the bodies supervising energy production, storage, distribution and trade	the principles of selling energy to consumers and business customers, the principles of selling energy to power grids	the legal regulations on energy production, storage, distribution and trade			
	SKILLS – is able to:	energy demand of residential and public buildings	perform calculations to estimate energy demand	estimate the energy demand of single-family homes	estimate the energy demand of multi-family residential buildings, public buildings and buildings equipped with intelligent automation systems	forecast the energy demand of multi-family residential and public buildings		
		energy demand of industrial plants			estimate the energy demand of individual production processes	estimate the energy demand of complex production processes	forecast the energy demand of industrial plants	
		energy demand of the region, country			estimate current energy demand on a regional scale	estimate current energy demand on a national scale	forecast the short and long term energy demand on the regional scale	forecast the short and long term energy demand on the national scale

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Customer needs and the energy market	SKILLS – is able to:	customer/market needs		research the needs of energy customers and investors (including individual investors)	identify the requirements and needs of customers and individual investors on the basis of data on e.g. lifestyle, building use as well as the aim, budget and anticipated results of the investment	identify the needs of energy customer groups	implement new solutions, including those based on artificial intelligence, to identify the needs of energy customers	develop new solutions, including those based on artificial intelligence, to identify the needs of energy customers
		informing and educating customers	provide the customer with basic information about energy devices and installations, the parameters of produced, stored and supplied energy as well as the principles of connecting to the grid and settling the cost of energy consumption	inform and explain the parameters and operating principles of energy devices and installations as well as the parameters of produced, stored and supplied energy to the customer	instruct the customer on safe and efficient operations, the regular maintenance of energy devices and installations, and explain the environmental impact of energy production, storage and supply processes	educate energy customers about solutions to limit pollution and efficiently manage energy		
		preparing offers			prepare an energy sales offer to individual and industrial customers	prepare tariffs and price lists for individual and industrial customers	develop commercial strategies on the sale of energy and additional services	
		settling energy costs for individual customers	perform energy consumption calculations	calculate the costs of consumed energy	estimate the costs of consuming energy over a given period of time	optimise the costs of consuming energy over a given period of time		
		settling energy costs between licensed entities			perform calculations to settle the accounts among energy companies	settle the accounts among the operators of national distribution and transmission systems	settle the accounts among the operators of cross-border distribution and transmission systems	
		shaping energy policies				analyse the effects of legislative changes relating to energy policies	formulate guidelines for legislative changes relating to national energy policies	formulate guidelines for legislative changes relating to international energy policies

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Energy carriers and working fluids	KNOWLEDGE – knows and understands:	energy carriers and working fluids	the terminology of energy carriers and working fluids as well as their types	the methods of obtaining and using energy carriers, including renewable energy sources and working fluids				
		parameters of energy carriers and working fluids		the parameters characterising energy carriers and working fluids	the factors affecting the parameters of energy carriers and working fluids	the impact of the parameters of energy carriers and working fluids on the efficiency of energy production, storage and supply processes		
		principles of handling energy carriers and working fluids	the terms and conditions of the storage, transport and handling of energy carriers and working fluids	the terms and conditions of the storage, transport and handling of energy carriers and working fluids containing hazardous substances				
		methods of testing energy carriers and working fluids	the principles of the organoleptic assessment of the parameters of energy carriers and working fluids used in energy production, storage and supply processes	the methods for testing the parameters of energy carriers and working fluids used in energy production, storage and supply processes	a broad scope of methods for testing the parameters of energy carriers and working fluids used in energy production, storage and supply processes			
		methods of preparing energy carriers and working fluids	the basic technologies of preparing energy carriers and working fluids for energy production, storage and supply processes	the methods and technologies of preparing energy carriers and working fluids for energy production, storage and supply processes	a broad scope of methods and technologies of preparing energy carriers and working fluids for energy production, storage and supply processes	the complex methods and technologies of preparing energy carriers and working fluids for energy production, storage and supply processes	the directions of development of the methods and technologies of preparing energy carriers and working fluids for energy production, storage and supply processes	the latest methods and technologies of preparing energy carriers and working fluids for energy production, storage and supply processes
		availability of energy carriers	basic data on the availability of energy carriers in a given area	data on the local availability of energy carriers on a regional/national scale and the conditions for using them	data on the availability of energy carriers on a global scale and the conditions for using them	the local conditions affecting the availability of energy carriers	the global conditions affecting the availability of energy carriers	
		the market of energy carriers and working fluids	the types of certificates functioning in the market confirming the origin and quality of energy carriers and working fluids	the basic principles of the market for energy carriers and working fluids	a broad scope of the principles of the market for energy carriers and working fluids	the conditions affecting the functioning of local markets for energy carriers and working fluids	the conditions affecting the functioning of the global market for energy carriers and working fluids	

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Energy carriers and working fluids	SKILLS – is able to:	handling energy carriers and working fluids	perform activities to store, document, transport and determine the dose of energy carriers and working fluids	perform activities to store, document, transport and determine the dose of energy carriers and working fluids that are hazardous substances	in accordance with procedures, select the conditions and methods of storing, transporting and determining the dose of energy carriers and working fluids	formulate guidelines and define the conditions for the storage and transport of energy carriers and working fluids		
		determining the properties of energy carriers and working fluids	read the instructions and documentation of the production devices to determine the required parameters of energy carriers and working fluids	measure the parameters of energy carriers and working fluids	select the parameters of energy carriers and working fluids	study the impact of the parameters of energy carriers and working fluids on the efficiency of energy production, storage and supply processes	validate the methods of testing the parameters of energy carriers and working fluids	develop new methods of testing the parameters of energy carriers and working fluids
		analysing the energy efficiency of RES		perform measurements to determine the energy efficiency of renewable energy sources	analyse the parameters affecting the energy efficiency of renewable energy sources	analyse the energy efficiency of individual technologies for obtaining energy from renewable energy sources		
		preparing energy carriers and working fluids	read the documentation to determine the parameters and method of preparing energy carriers and working fluids for energy production, storage and supply processes	prepare energy carriers and working fluids for energy production, storage and supply processes	select the technologies to prepare energy carriers and working fluids intended for energy production, storage and supply processes	adapt the methods of preparing energy carriers and working fluids for energy production, storage and supply processes	modify the methods of preparing energy carriers and working fluids to improve the efficiency of energy production, storage and supply processes	develop new methods of preparing energy carriers and working fluids
Environment	KNOWLEDGE – knows and understands:	impact of energy production, storage and supply processes on the environment	the types and sources of emitted hazardous, harmful or nuisance agents and other threats to the environment from energy production, storage and supply processes	the volume of emitted hazardous, harmful or nuisance agents from energy production, storage and supply processes	the conditions affecting the volume of emitted hazardous, harmful or nuisance agents and other environmental hazards from energy production, storage and supply processes	the impact of energy production, storage and supply processes on the environment	the long-term effects of emitted harmful and nuisance agents from energy production, storage and supply processes	
		methods of testing the hazards associated with energy production and conversion		the methods for testing the occurrence and parameters of hazardous, harmful and nuisance agents in the environment	the methods for testing the impact of hazardous, harmful and nuisance agents on the environment	the methods of forecasting the impact of energy production, storage and supply processes on the environment		

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Environment	KNOWLEDGE – knows and understands:	impact limiting technologies	the basic methods of reducing hazardous, harmful and nuisance agents in the environment	the technologies and devices limiting the emission of hazardous, harmful and nuisance agents into the environment	the methods and technologies for limiting the impact of energy production, storage and supply processes on the environment	the principles of developing and implementing emission reduction programmes of hazardous, harmful and nuisance agents into the environment	the directions of development of technologies limiting the impact of energy production, storage and supply processes on the environment	the latest technologies limiting the impact of energy production, storage and supply processes on the environment
		impact of using renewable energy sources (RES) on the environment and economy	RES terminology	the possibilities of using RES in various sectors of the economy	the benefits to the natural environment of using RES	the impact of using RES on environmental conditions	the long-term results of increasing the share of RES in the structure of energy production	the latest developments in the use of RES
		energy recovery systems		the basic systems of energy recovery in commonly used energy devices and installations	complex systems of energy recovery in commonly used energy devices and installations	the technologies and solutions used to recover energy in industrial processes	the directions of development of energy recovery technologies	the latest energy recovery technologies
		impact of energy recovery			the benefits of using energy recovery solutions and technologies	the impact on the environment of using energy recovery solutions and technologies	the long-term results of implementing and using energy recovery solutions and technologies	
		legal regulations and environmental policies	the principles ensuing from the legal regulations on handling hazardous, harmful and nuisance agents occurring in energy production, storage and supply processes	the legal regulations on waste management, dismantled energy devices and installations as well as on handling hazardous, harmful and nuisance agents occurring in energy production, storage and supply processes	the legal regulations and environmental standards on energy installations and devices, emission standards	the assumptions of the country's environmental policies on energy production, storage and supply processes	the assumptions of European and global environmental policies on energy production, storage and supply processes	
	SKILLS – is able to:	assessing the impact of energy production, storage and supply processes on the environment		measure the emission volume and the impact of hazardous, harmful and nuisance agents on the environment	study the nuisance of energy production, storage and supply processes to the environment	analyse and evaluate the impact of energy production, storage and supply processes on the environment		
		impact limiting technologies			select technologies and devices that minimise the impact of energy production, storage and supply processes on the environment	select energy supply technologies, operating parameters of energy devices, installations and power grids in a way that minimises the negative impact of energy production, storage and supply processes on the environment	implement technologies that minimise the negative impact of energy production, storage and supply processes on the environment	develop new technological solutions that minimise the negative impact of energy production, storage and supply processes

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Environment	SKILLS – is able to:	managing natural resources			select energy carriers for energy production processes in accordance with the principles of environmental protection and sustainable development	plan the use of natural resources in energy production processes in accordance with the principles of environmental protection and sustainable development	develop programmes to minimise the consumption of natural resources in energy production, storage and supply processes	develop long-term strategies for managing natural resources used in energy production, storage and supply processes
		using energy efficiently, including RES			optimise the consumption of energy produced from renewable and non-renewable energy sources in commonly used energy installations	optimise the consumption of energy produced from renewable and non-renewable energy sources in industrial processes	develop plans and strategies to increase the share of energy produced from RES on a regional scale	develop plans and strategies for increasing the share of energy produced from RES in the national structure of energy production
		energy recovery			design energy recovery systems for residential and public buildings	design energy recovery systems for industrial processes	implement new solutions and technologies for energy recovery	develop new solutions and technologies for energy recovery
		using energy installations and devices as well as working fluids	perform activities to dispose of dismantled energy installations and devices as well as working fluids	perform activities to dispose of dismantled energy installations and devices as well as working fluids that are hazardous substances	in accordance with procedures, select the methods of handling dismantled installations, energy devices and working fluids	formulate guidelines for handling dismantled energy installations and devices as well as working fluids		
		managing waste	dispose of, store and treat the waste occurring in energy production, storage and supply processes in accordance with procedures and instructions	dispose of, store and treat waste containing hazardous substances present in energy production, storage and supply processes in accordance with procedures and instructions	select the ways and methods of handling waste and hazardous waste substances present in energy production, storage and supply processes in accordance with procedures	formulate guidelines for the management of waste and hazardous waste substances occurring in energy production, storage and supply processes		
Protection	KNOWLEDGE – knows and understands:	risk analysis	the types of threats relating to the performance of professional tasks	the threats relating to the implementation of energy production, storage and supply processes	the factors and situations affecting the possibility of threats in energy production, storage and supply processes	the effects of emergencies during energy production, storage and supply processes		
		personal and collective protection measures	the types, purpose and principles of using basic safety measures while performing professional tasks	the principles of the operation and selection of protection measures, including the technical protection of energy devices, installations and power grids in the event of a breakdown or disruption in work	the principles of the operation of complex protection systems for energy devices, installations and power grids	the principles of designing protective measures for work zones in energy production, storage and supply processes		

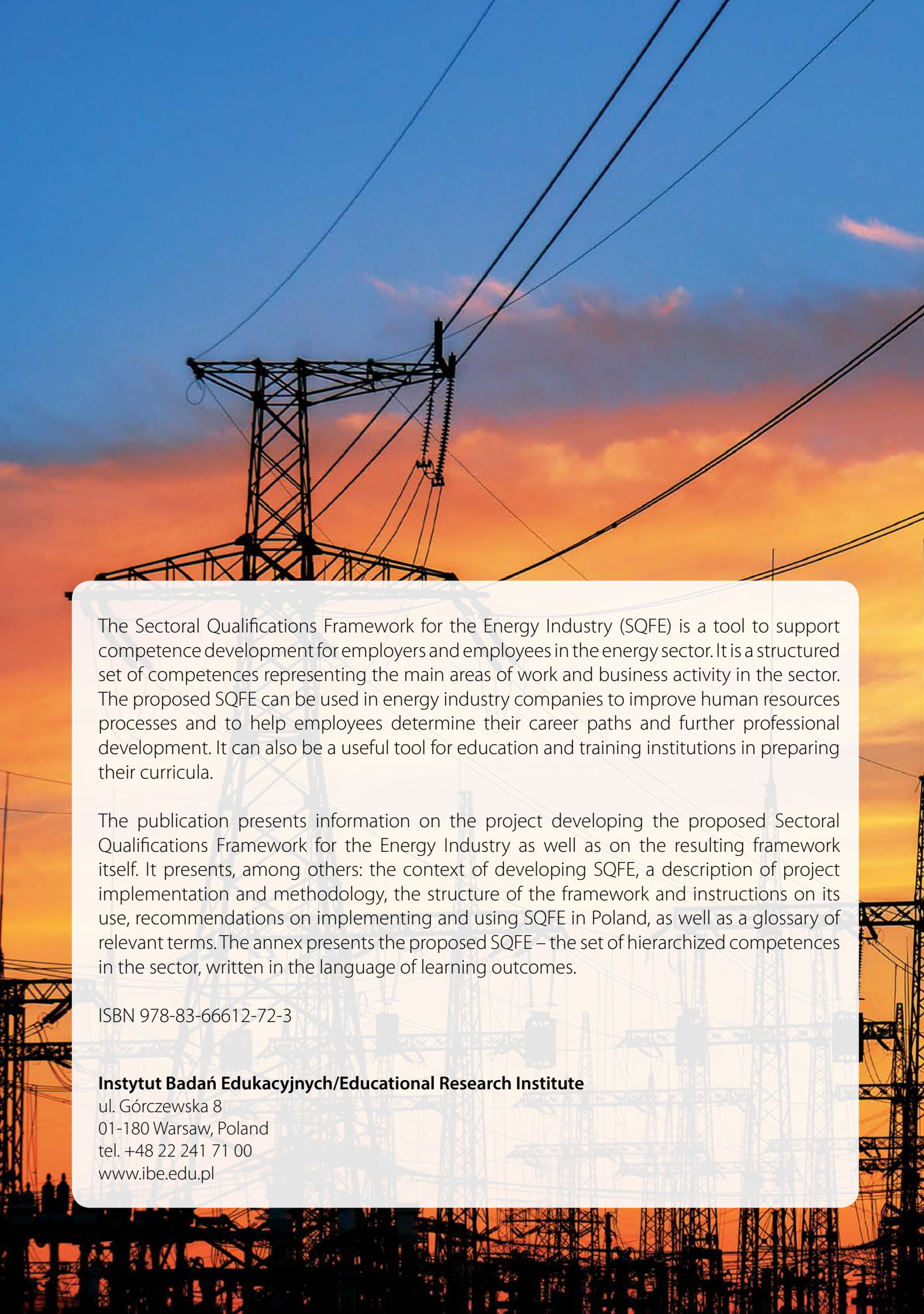
SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Protection	KNOWLEDGE – knows and understands:	safety procedures	the procedures of performing live-line work	the procedures to implement in emergencies not posing a particular threat to human health and life	the procedures to implement in emergencies posing a particular threat to human health and life			
		first aid principles and legal regulations	the basic principles of first aid for people injured in accidents at work	the principles and legal regulations on first aid in cases of electric shock, falling from heights and other events occurring in the energy production, storage and supply processes	the principles and legal regulations on the evacuation of people injured in accidents occurring during energy production, storage and supply processes			
		legal regulations on safety and protection	the principles and regulations on occupational health and safety, fire prevention, ergonomics and environmental protection relating to the professional tasks being performed	the qualifications required by legal regulations to perform and supervise professional tasks in energy production, storage and supply processes	the legal regulations and other requirements on process safety			
	SKILLS – is able to:	risk analysis	recognise anomalies in energy production, storage and supply processes threatening process safety	identify possible threats in energy production, storage and supply processes	assess the risk of emergencies occurring in energy production, storage and supply processes	assess the degree of risk and implement remedial actions in emergency situations not covered by the procedures in force		
		personal and collective safety measures	implement procedures and apply personal and collective safety measures for work performed under typical conditions	implement procedures and apply personal and collective safety measures in cases of work performed under conditions posing a particular threat to human health or life	secure the workplace and implement activities to ensure the safety of employees, bystanders and property in the event of an emergency not posing a particular threat to human health or life	secure the workplace and implement activities to ensure the safety of employees, bystanders and property in the event of emergencies posing a particular threat to human health or life		
		protection systems	apply measures limiting the risk of emergencies in energy production, storage and supply processes	monitor the security systems of energy devices, installations and power grids	select measures to reduce the risk of emergency situations in energy production, storage and supply processes	develop measures to reduce the risk of emergencies in energy supply processes and develop contingency procedures and plans in the event of a threat to people, property or the environment	implement technologies to improve protection in energy production, storage and supply processes	develop new technological solutions to improve protection in energy production, storage and supply processes

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Protection	SKILLS – is able to:	rescue operations	provide first aid to persons injured during the performance of tasks relating to energy production, storage and supply processes	perform activities to evacuate persons from the location of an emergency not posing a particular threat to human health or life	perform activities to evacuate persons from the location of an emergency posing a particular threat to human health or life, as well as from places that are difficult to access	direct activities to evacuate persons from the locations of emergencies posing a particular threat to human health or life	coordinate the activities of many teams in situations of particular threat to human health or life	
		training		conduct training on safety, the topography of the plant and the procedures in force	introduce newly hired persons to the work of energy production, storage and supply processes	conduct training and verify the competences of implementing activities to ensure the safety of employees, bystanders and property		
Communication	SOCIAL COMPETENCE – is ready to:	communication in the work environment	communicate with colleagues in small work teams using technical language and energy terminology	communicate with colleagues and superiors in work teams and with other teams using technical language and energy terminology	be attentive to correctly using technical language and energy terminology in the work environment	communicate and maintain relationships in the broad industry community		
		relations in the industry community	establish and maintain the necessary relationships with colleagues and supervisors enabling the performance of tasks in energy production, storage and supply processes	establish and maintain relationships with entities involved in energy production, storage and supply processes as well as with local communities and organisations working to promote responsible energy production and use	establish long-term cooperation to promote responsible energy production, storage and supply, including the development of energy cooperatives	promote and develop the conditions for cooperation between local energy producers and customers	build relationships and cooperation in the industry community to promote good practices and implement new technical and organisational solutions in supplying energy	initiate and develop cooperation in the sector, including the scientific community, to transfer new solutions in the energy industry
		communication and relations with the community		communicate with energy customers and users, adapting the form and content of the message to the recipient	communicate and maintain relationships with the immediate market community, including suppliers of energy resources and working fluids, research and consulting firms, construction firms, public administration and emergency services	communicate and maintain relationships in the broad socio-economic community, including with representatives of the education, science, research and development and media sectors		

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Communication	SOCIAL COMPETENCE – is ready to:	cooperation	cooperate with the immediate professional community (colleagues, supervisor) on not very complex professional tasks, demonstrating a pragmatic attitude while performing professional tasks in the team	cooperate within the team and with other teams in a way that enables the implementation of various tasks in energy production, storage and supply processes	cooperate with various teams within and outside the enterprise, including customers, contractors, and emergency services	cooperate in interdisciplinary teams and with the broad industrial and scientific communities, including representatives of the education, science, research and development sectors	shape the conditions for energy companies to cooperate within capital groups and maintain and promote a culture of cooperation in the industry community	cooperate in the implementation of cross-border energy transmission and maintain and promote a culture of cooperation within the European energy market
Ethics		compliance with the law	act in accordance with the legal regulations on energy, construction and labour	comply with professional secrecy and the regulations on the use of intellectual property				
		compliance with ethical principles		act in accordance with the principles of honesty, reliability, impartiality and confidentiality in the implementation of professional tasks in energy production, storage and supply processes	promote the principles of the ethical, responsible, reliable and honest implementation of tasks in energy production, storage and supply processes	promote the principles of ethical and responsible research and implementation in the energy sector	require of oneself and others respect for professional secrecy and the principles of using intellectual property, in particular the results of research and development in the energy sector; require of oneself and others the observance of a culture of cooperation and competition in energy production, storage and supply processes	develop models of ethical behaviour in respecting intellectual property, a culture of cooperation and competition in energy production, storage and supply processes
Decision making		operating under variable conditions and time pressure	act and make decisions partly independently on the performance of professional tasks in energy production, storage and supply processes	perform professional tasks in energy production, storage and supply processes under changing circumstances and time pressure	perform professional tasks in energy production, storage and supply processes in situations posing a particular threat to human health or life, property and the environment	make decisions during energy production, storage and supply processes under changing circumstances and time pressure	make decisions on energy production, storage and supply processes under time pressure and in situations posing a particular threat to human health or life, property and the environment	

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Decision making	SOCIAL COMPETENCE – is ready to:	openness to change		adapt to changes in the work environment relating to the implementation of new technical and organisational solutions in the energy industry	demonstrate openness to changes in the work environment and the industry relating to the implementation of new technical and organisational solutions in the energy industry	initiate changes in the work environment relating to the implementation of new technical and organisational solutions in the energy industry	initiate changes in the industry community relating to the implementation of new technical and organisational solutions in the energy industry	
Responsibility for quality and protection		attentiveness to occupational safety	comply with instructions, principles and regulations on work safety and ergonomics in energy production, storage and supply processes	be attentive to the safety and hygiene of one's work and that of co-workers and subordinate employees while performing tasks in energy production, storage and supply processes	act in one's work environment to increase the safety of performing tasks in energy production, storage and supply processes	act in the industry community to improve the safety and quality of the tasks performed in energy production, storage and supply processes	develop and implement best practices, organisational culture and safety in the industry community relating to the performance of tasks in energy production, storage and supply processes	
		attentiveness to quality	reliably and accurately perform professional tasks, assess the quality and diligence of one's work	be attentive to the quality of one's work and that of the team one directs, assess the quality and diligence of one's work and that of a subordinate team	take actions in the industry community to promote the performance of professional tasks in a manner that ensures the high quality of products and provided services	take actions to improve the quality of manufactured products and provided services in the energy industry	promote a culture of quality in the energy industry	initiate activities to improve the quality of manufactured products and provided services in the energy industry
		assessing the effects of work	take into account the impact of the reliability and accuracy of one's work on the effects of the work of one's team in performing tasks in energy production, storage and supply processes	take into account the impact of one's actions and decisions and those of a subordinate team on the efficiency of energy production, storage and supply processes, the safety of energy customers and users as well as the environment	critically assess the results of one's work and that of the teams one directs, forecast the short and long-term consequences of one's actions and decisions on energy production, storage and supply processes	implement standards and principles on the reliability and accuracy of performing tasks in energy production, storage and supply processes	promote the principles of maintaining a high level of reliability and accuracy in performing tasks in energy production, storage and supply processes	shape standards and principles on maintaining a high level of reliability and accuracy in performing tasks in energy production, storage and supply processes
		taking responsibility for quality and safety	take responsibility for performing professional tasks correctly, accurately and safely in energy production, storage and supply processes	take responsibility for the reliability, accuracy and safety of one's work and that of a subordinate team in performing tasks in energy production, storage and supply processes	take responsibility for the results of one's work and that of a subordinate team in performing tasks in energy production, storage and supply processes	take responsibility for energy production, storage and supply processes, including the safety of performed operations and impact on the environment	take responsibility for actions to ensure the country's energy security	take responsibility for achieving the goals set by international energy policies

SECTORAL DETERMINANT		SERIES	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6	LEVEL 7	LEVEL 8
Responsibility for the environment	SOCIAL COMPETENCE – is ready to:	attentiveness to the safety of energy users and consumers	provide information on the safe use of energy	be attentive to the safety of energy customers and users	promote solutions and attitudes among customers and users to increase the safety of energy use			
		attentiveness to the environment	comply with instructions, principles and regulations on environmental protection in energy production, storage and supply processes	perform professional tasks with respect for natural resources and attentiveness to environmental protection	promote environmental protection attitudes in the workplace, including the concept of sustainable development and the use of renewable energy sources	promote environmental protection attitudes in the industry community, including the concept of sustainable development and the use of renewable energy sources	promote environmental protection activities, including the use of renewable energy sources and minimising the impact of the sector's activities on the environment	develop standards to protect the environment in the implementation of energy production, storage and supply processes
		optimisation of energy consumption	provide information on the possibilities of optimising energy consumption	perform professional tasks in a manner that optimises energy consumption	promote environmental protection attitudes through the reduction and optimisation of energy consumption	promote environmental protection attitudes in society through the reduction and optimisation of energy consumption		



The Sectoral Qualifications Framework for the Energy Industry (SQFE) is a tool to support competence development for employers and employees in the energy sector. It is a structured set of competences representing the main areas of work and business activity in the sector. The proposed SQFE can be used in energy industry companies to improve human resources processes and to help employees determine their career paths and further professional development. It can also be a useful tool for education and training institutions in preparing their curricula.

The publication presents information on the project developing the proposed Sectoral Qualifications Framework for the Energy Industry as well as on the resulting framework itself. It presents, among others: the context of developing SQFE, a description of project implementation and methodology, the structure of the framework and instructions on its use, recommendations on implementing and using SQFE in Poland, as well as a glossary of relevant terms. The annex presents the proposed SQFE – the set of hierarchized competences in the sector, written in the language of learning outcomes.

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