Skills Alliance for Industrial Symbiosis:
A Cross-sectoral Blueprint for a Sustainable Process Industry (SPIRE-SAIS)

European Cross-Sectoral Skills Matrix/ Framework

Deliverable D4.2

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CONTENTS

Introduction

The deliverable 4.2 "European Cross-Sectoral Skills Matrix/ Framework" presents our approach towards the European Cross-Sectoral Skills Matrix. This document should be interpreted as a complementary part to the European Cross-Sectoral Skills Matrix database (D4.3) because it provides the background and instructions necessary for understanding and using the Matrix database. This version of the document presents the logic of the Matrix and is accompanied by examples of the Matrix application to cases of individual countries including Germany (North Rhine Westphalia), Italy (Emilia-Romagna region) and Portugal (with a detailed description of the Matrix database, see separate MS Excel file). This document specifically consists of the following three chapters:

- "Matrix approach" explains our approach to developing the Matrix, what aspects are covered by this tool, as well as steps and sources of information that are used for filling in the Matrix.
- "Functions of the Matrix" presents the overall objectives of the Matrix and its usage potential for different stakeholder groups in Energy Intensive Industries (EIIs).
- "Further work on the Matrix" outlines future avenues for additional work that could help to strengthen both internal and external validity of the Matrix.

1. Matrix approach

The overall approach towards the Matrix was inspired by different processes. First of all, aiming to invoke synergies of different Blueprint projects (e.g. automotive, construction) we tried to at least partly adjust our approach to the strategy used in the ESSA Blueprint project. However, only some parts of SPIRE-SAIS and ESSA projects' matrixes are the same because the two projects focus on mostly different sectors[1] and skills. Moreover, we have comprehensively analysed the content of international initiatives relevant for the project (ESCO database, EQF, etc.) aiming to identify their components that might be useful for the purposes of the Matrix. The Matrix idea was further developed during discussions between WP3 and WP4 and improved based on the feedback of different WP4 partners (e.g. representatives of different EII companies, training providers).

Criteria for long-listing and selecting the relevant job profiles

The evidence generated under the Task 4.1 (Mapping of current VET provision for industrial symbiosis (IS) and energy efficiency (EE) skills of the EIIs sectors in selected countries) has been instrumental to the development of a European VET framework for cross-sectoral skills of EIIs. During the WP4 implementation in 2022, we have focussed on providing more detailed guidance to the formal VET providers on strengthening the IS and EE skills in the context of Task 4.1 (see Deliverable 4.1 for details). To ensure feasibility and sustainability of the project we decided to streamline Task 4.2 on limited number of countries and job profiles (see below for details). This change in focus creates several benefits. It makes the deliverables of the task more future-oriented and more sustainable as they would not require as many updates. Moreover, it could help to create complementarities with the self-assessment tool for companies, thus, ensuring a better skills uptake. Furthermore, it will help to address the skills gaps in the existing and future VET provision, also by incorporating the role of European frameworks. Finally, in terms of internal work and organisation, this focus helps to both create better links between Tasks 4.1 and 4.2 as well as to create additional added-value for WP5 and WP6, for example, by providing insights on training methods, materials, and topics.

This approach has also led to streamlining of Task 4.2, with adjustments to the scope of the analytical exercise. Firstly, we have reduced the number of analysed countries from five to three (Germany (North Rhine Westphalia), Italy (Emilia-Romagna region) and Portugal). Secondly, we had to reduce the longlist of job profiles from 20 to ten based on the following criteria:

- Relative importance of the job profile in context of IS & EE in the SPIRE industries.
- Potential added value of the analysis of the job profile for the Blueprint of the project.
- Relative coverage of the job profiles that are differently affected by IS & EE in the future (e.g., operational and management level)
- Need to cover more generic occupational groups (e.g., 'production managers'), which demonstrate different occupational backgrounds and job profiles in the ESCO database.

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[1] Both projects focus on steel sector, but SPIRE-SAIS also focuses on remaining EEIs industries including cement, ceramics, chemicals, engineering, non-ferrous metals, minerals, pulp and paper, refining and water.

- Representative coverage of major ISCO groups (i.e., occupations selected from varying occupational groups of ESCO will increase representativeness).
- A high level of demand for the indicated job.

A longlist of 10 job profiles[2] was used to end up with the limited number (four) of shortlisted job profiles for analysis in the Skills Matrix. Four job profiles were selected to manage the scope of the work on the Skills Matrix. We have based selection of short list of job profiles on two criteria. Firstly, the selected job profiles had to consider both EE and IS aspects. Secondly, we have aimed to strike a balance between operational and management levels of jobs. As the result, the following four job profiles have been selected: Energy Manager, Energy Technician, Waste Manager and Waste Technician.

Key steps in the Matrix filling process

Below we present four main steps of the Matrix filling process that should help present our overall approach towards developing the skills Matrix.

Step I. Filling of the Matrix 'line' begins with the **identification of job profiles and skills** relevant for IS and EE in the EIIs. This part is focused on the 'general and universal' insights and does not take specifics of different countries into account. This information is identified by WP3. More particularly we have:

- Relied on the knowledge of representatives of the industry, WP3 identifies job profiles that are directly involved or can contribute to the processes of IS and EE. WP3 fills both: job profile title (single and the most frequently used name of the job profile), and alternative names used by the representatives of the industry to define this job profile.
- Relied on the WP3 lists of IS and EE-related tasks and skills relevant for each job profile.

More information on how WP3 identifies information relevant for "job profiles and skills" part of the Matrix is presented in the methodology of the WP.

Step II. During the second phase of the Matrix filling process WP3 and WP4 worked together to identify how a particular **job profile is described in the EU frameworks**. In other words, during this part we 'translated' concepts used by the representatives of the industry into more 'universal' and 'official' language, so that the content of the Matrix is more clear and thus accessible to its users. ESCO database was chosen as the main source for the filling of this part of the Matrix because it:

- provides detailed descriptions of occupations
- is referred in a number of national sources (e.g. national qualification systems)
- provides official translations of occupations and relevant skills to the national languages of EU Member States.

More particularly, in the second part of the Matrix we:

- Identified ESCO group occupation label, ESCO occupation label, ESCO alternative labels, and ESCO/ISCO codes related to the particular job profile.

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[2] Management level: Production Manager, Energy Manager, Environmental Manager, Waste Manager/ Responsible, Maintenance Manager/ Supervisor. Operational level: Production/ Processing Line Operator/ Foreman, Energy Technician, Environmental Technician, Waste Management Technician, Maintenance/ Repair Operator/ Foreman.

- Explored what skills listed in the ESCO database next to the particular occupation are directly related to IS and EE.

Step III. WP4 also examined **how particular job profiles and occupations identified during the first two 'phases' of the Matrix filling process are described at the national level.** Skills Matrix prototype that will be created in the scope of SPIRE-SAIS project will explore the situation in the following partner countries: Germany, Italy (Emilia-Romagna region), and Portugal. However, the same logic can be applied, and the Skills Mtrix can be extended by including analyses of other EU countries after the project finalisation.

During the third phase of the Matrix filling process we:

- Filled information on how a particular occupation is described by ESCO in the national language of the country.
- Used Europass database or other search systems to identify the name of national qualification, which is directly related to the particular occupation.
- Filled information on how this qualification is defined in the national frameworks (e.g. code, level, and name used in the national qualification framework).
- Explored how the EU level frameworks are integrated/referred in the certification of a particular occupation (e.g. whether certificates in the Europass format are issued, what kind of EQF level is provided).
- Identified national/regional VET programmes providing particular qualification.

Step IV. WP4 explored how IS and EE-related skills demand relevant for the particular job profile/ occupation/qualification is addressed by the national VET system. For this purpose, we analysed the formal description of relevant qualification (broader level) as well as the content of relevant VET programmes (more specific level). More particularly, we filled information on how each skill is mentioned in the description of qualification and VET programmes. For instance, the programme might mention recommended learning outcome "Sorting, transportation and management of household and construction waste", which is related to skill "Environmental awareness".

Step V. Finally, the Skills Matrix was transferred to the digital version placed within the SKILLS4PLANET platform[3]. The transfer process and well as the guidelines for using the Skills Matrix are described in detail in D4.3.

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[3] Available at: https://hub.skills4planet.eu/catalog/qualifications/

2. Functions of the Matrix and its use

Functions of the Skills Matrix

There are three key interrelated functions of the Matrix:

- Better linking of job profiles, occupations, and qualifications.
- Identification of how well IS and EE-related skills needs are addressed in the relevant VET programmes.
- Analysis of the EU occupational and qualification frameworks integration into the national systems.

Further in this section, we describe these functions one by one in a more comprehensive way.

Linking of job profiles, occupations, and qualifications

One of the key objectives of the Matrix is to "connect" different concepts used in the SPIRE-SAIS project: job profiles, occupations, and qualifications. Jobs that are relevant for the EEIs and skills needs related to IS and EE in each job are the starting point of the Matrix. Information about jobs and skills needs is identified in the WP3 based on the inputs from the industry (i.e. EII companies). This means that WP3 is focused on the concept of the job profile because it reflects the everyday language of the industry.

However, there is no limited and regulated list of job profiles. This makes the concept very flexible, relatively inconsistent, and difficult to systematise or compare with others. For instance, the industry uses close to ten different job profile titles describing the same job – "refractory bricklayer". The concept of job profiles is also not linked to relevant European frameworks. Therefore, WP3 links job profiles to the corresponding occupations that are defined as "a grouping of jobs involving similar tasks and which require a similar skills set" (ESCO). Concept of occupation is used in the ESCO database, which is one of the key tools used for the filling of the Matrix.

Concepts of "job profile" and "occupation" are suitable for the analysis of skills' demand side (needs of the industry). However, they cannot be used as denominators for the analysis of skills supply, which is the main aim of WP4. Qualification is a broad concept that is the most frequently used in international sources and frameworks to describe skills supply. Therefore, our Matrix identifies qualifications that can be linked to each job profile and occupation.

This function of the Matrix is expected to be useful to the representatives of the industry and VET providers. For example, representatives of some company searching for candidates for a particular job profile will know what qualifications are directly linked to this job profile. Moreover, the Matrix will identify relevant national qualifications that exist in different countries. Therefore, representatives of the industry will know whether the qualification acquired by the candidate in a foreign country is relevant for the posted position (job profile) for which they want to find an employee. This is expected to facilitate international mobility of employees.

Identification of how well IS and EE related skills needs are addressed in relevant VET programmes

One of the key functions of the Matrix is to establish how well skills demand is met by the supply. IS and EE-related skills demand will be identified by the representatives of the industry in WP3. WP4 will analyse relevant VET programmes to find out how these specific skills are addressed. We aim to achieve both: to identify how exactly skills in need are mentioned in the VET programmes and to evaluate whether the current attention paid to these skills in the programmes is sufficient. For instance, if WP3 identifies that "environmental awareness" is a

skill relevant to the particular occupation, WP4 will explore how environmental awareness is mentioned in the VET programmes providing qualifications relevant for that occupation. We might find out that in the programme recommended outcome to achieve the learning outcome is "sorting, transportation and management of household and construction waste", which is directly related to environmental awareness. However, if WP3 identifies that high level of this skill is crucial, this mentioning of environmental awareness related outcomes would be interpreted as insufficient. The answer would be that the skill is only "partly addressed" in the particular programme.

This function of the Matrix is expected to be useful for different purposes:

- First, analysis of the Matrix will be invoked as one of the key research methods in WP4 that will help to see the overall picture and answer how well IS and EE-related skills demand is addressed in the partner countries analysed in WP4.
- Second, representatives of the industry will see which qualification programmes meet most of their needs concerning IS and EE-related skills for the particular job profiles. This could help during the new employees' recruitment process (e.g., understanding whether a candidate possesses the required IS and EE-related skills).
- Third, representatives of VET institutions or experts responsible for the development of national qualifications programmes will be able to use the Matrix and identify gaps in their programmes concerning provision of IS and EE related skills – what skills that are in demand of the industry are currently not addressed by the programme.
- Fourth, programmes, which address the IS and EE-related skills needs successfully, can be used as model examples. For instance, experts responsible for the development of qualification programmes might analyse the content of the programmes that integrate IS and EE related skills to the large extent and use it to improve other programmes.
- Fifth, the Matrix can help to identify IS and EE related skills gaps that are likely to remain after formal VET provision.

Analysis of how EU occupational and qualification frameworks are integrated in the national systems

Even though it is not the main focus of the WP4 and SPIRE-SAIS project in general, our Skills Matrix provides a steppingstone to the tracking of the "Europeanisation" of national VET systems. The Matrix can provide an initial overview to which extent skill provision in the case study countries have been affected by European-level initiatives to harmonise VET provisions and VET documentations. The Matrix can be used by international institutions working on the harmonisation of VET systems as well as national institutions responsible for the implementation of such initiatives. It takes into account key international and EU-level programmes and initiatives and cross-checks their availability or implementation in the analysed countries:

- European Qualifications Framework (EQF) is a common European reference framework whose purpose is to make qualifications more readable and understandable across different countries and systems. Covering qualifications at all levels and in all sub-systems of education and training, the EQF provides a comprehensive overview over qualifications in the 39 European countries currently involved in its implementation.

- European Skills, Competences, Qualifications and Occupations (ESCO) database: ESCO works as a dictionary, describing, identifying, and classifying professional occupations, skills, and qualifications relevant to the EU labour market and education and training. The main aim of the system is to support workers' mobility across the EU and a more integrated labour market by offering a common understanding of skills, occupations, and qualifications.
- The International standard classification of occupations (ISCO) is an international classification under the responsibility of the International Labour Organisation (ILO) for organising jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job. ISCO is intended both for use in compiling statistics and for client-oriented uses such as the recruitment of workers through employment offices, the management of migration of workers between countries and the development of vocational training programmes and guidance.
- International Standard Classification of Education (ISCED) is designed to serve as a framework to classify educational activities as defined in programmes and the resulting qualifications into internationally agreed categories. The basic concepts and definitions of ISCED are therefore intended to be internationally valid and comprehensive of the full range of education systems. ISCED classifies education programmes by their content using two main cross-classification variables: levels of education and fields of education. ISCED 2011 presents a revision of the ISCED 1997 levels of education classification. It also introduces a related classification of educational attainment levels based on the recognised educational qualifications.
- Europass: Europass is a portfolio, available in 27 European languages, made up of different tools devised to help individuals to communicate their skills, qualifications and experience using standardised documents templates.

Use of the Skills Matrix

The guidelines for using the Skills Matrix are described in detail in D4.3.

3. Further work on the Skills Matrix

While the Skills Matrix provides a solid foundation a European VET framework for cross-sectoral skills in EIIs, it is also important to underline additional avenues for further work on the Matrix development in the future, after this project. The following avenues could be explored to improve the Matrix:

- Fill the current and future levels for each relevant specific skill that will be needed for the particular job profile (this information was not available from WP3 at the time of finalising the deliverables 4.2 and 4.3). Based on this information and current/ required skill level, it could be assessed whether the skill seems to be addressed sufficiently in relevant VET programme.
- Further strengthening the data and evidence base by filling in the gaps for other countries consider new qualifications, if necessary.
- Carrying out inter-regional validation of our findings. In cases like Italy, where we have focused on one specific region (Emilia-Romagna), additional analyses could be performed for other regions as well to better understand cohesiveness at the broader national level.
- Merging the Matrix with the existing SKILLS4PLANET platform would strengthen the empirical foundation of the Matrix in the context of the project work on WP5. The data generated in the SKILLS4PLANET will allow a better match between occupational profiles (in ESCO) and company demanded skills relevant for IS and EE, beyond the project.
- Piloting the Skills Matrix with the representatives of the EIIs.
- Broadening the analysis of the integration of the EU occupational frameworks into the national systems through the application of the Matrix to the cases of other EU Member States and other job profiles relevant for EIIs. This should be possible following the use of the SKILLS4PLANET platform by other partners and stakeholders beyond the span of this project.