WATTer Skills

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Water Efficiency and Water-Energy Nexus in Building Construction and Retrofit

- IO4. Accreditation system based on EQF and ECVET

Training Courses Validation, Market Recognition and Accreditation system for water efficiency technicians and experts

REPORT

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This IO4 report is accompanied by the supplementary document: Memorandum of Understanding.

Content

WATTer Skills definitions

Alphabetical order

- **Black water**. Black wastewater refers to domestic wastewater only in some extent (excludes greywater), including the sewage that produced from toilets or urinals.
- **Drinking water installations, efficient irrigation systems and sanitary network design**. Public water networks used for water transport and supply and building plumbing systems. Sanitary design should encompass strategies and systems for reducing water consumption, as well as recycling rainwater and grey water may be key elements to save water in buildings.
- **Energy and water efficient home appliances.** Equipment and devices with good energy efficiency performance, that can save water and energy in different aspects of the construction and use of the building, especially those that are related to hydraulic and thermal installations.
- **Greywater**. Greywater refers to domestic wastewater only in some extent (excludes black wastewater), also addressed as soap water, including that produced from e.g. baths, showers, faucets, dishwashers or laundry.
- **Heat, cooling and hot water installations and renewable energy systems**. The energy performance of installations is directly associated to water use in the case of hot water production and indirectly to heat control in summer. Air conditioning and heating installations often uses water as a heat transfer fluid, which requires no leaks.
- **Rainwater harvesting**. Rainwater harvesting refers to water that result from the rainfall occurring locally or in the surrounding area and that represent, in general, low pollutant content, and collected in dedicated systems.
- **Regenerated water.** Regenerated water refers to grey water that is treated for reuse purposes, in compliance with the quality standards established for the destination uses.
- **Site conditions**. Site conditions, e.g. climate, orientation, the influence of “heat island” effect, that can be used to enhance energy efficiency related to water efficiency (use and water consumption reduction).
- **Wastewater**. Domestic wastewater refers to the general house effluent coming from the toilets, kitchens, laundry and similar uses (includes backwater and greywater).
- **Water efficiency in green areas and site based passive measures**. Buildings with gardens and green areas, especially single dwellings, can have an intense water consumption and ecological footprint if the climate is not taken into consideration. For instance, it is very important that green areas are composed of native plants and a combination of other materials, such as wood, sand or rock, which minimize the water use. It also needs to be taken into account that trees, vertical gardens, and green roofs can also provide thermo-regulation for the building (envelope and interior).
- **Water efficiency**. Efficient use of the water which is supplied to a building (including alternative sources other than drinking water), considering water conservation measures and the continuous valorisation of the water as a natural resource, also integrating the water-energy nexus. Water efficiency measures in buildings may include water use audits, water-efficient products and smart technologies or recirculation systems (e.g., for hot water). Other measures could refer to greywater reuse, rainwater harvesting, landscape redesign and efficient irrigation systems.
- **Water-energy nexus**. Strong interrelation and interdependence between energy and water consumption. The inefficient management of water corresponds to energy waste and vice-versa, owing that water is critical for energy production while energy is critical for water production and use.

WATTer Skills acronyms

Alphabetical order

ECVET	European Credit system for Vocational Education and Training
EQF	European Qualification Framework
KSC	Knowledge - Skills - Competences
MoU	Memorandum of Understanding
NQC	National Qualifications Catalogue
NQF	National Qualifications Framework
NQS	National Qualification System
VET	Vocational Education and Training
WEE	Water Efficiency Expert
WET	Water Efficiency Technician

1 Introduction

WATTer Skills (Water Efficiency and Water-Energy Nexus in Building Construction and Retrofit, http://watterskills.eu/) is a European project, funded within the ERASMUS+ programme, which aims to develop and implement a common curriculum for training and skills upgrading of construction and green professionals on water efficiency and water-energy nexus for building construction and retrofit. Likewise, the project focusses on establishing a common qualification framework and recognition and certification scheme at the European level.

Therefore, WATTer Skills will:

- Set the perimeter and the WATTer skills map at a European Union (EU) level;
- Develop a common qualification framework based on training and learning outcomes designed for water skills, in line with the European Qualifications Framework (EQF) provisions, able to be adopted and adapted (nationally) for training and qualification of the different types of professionals targeted;
- Develop the training courses curricula and contents for the two professional profiles identified: Water Efficiency Technician (WET) and Water Efficiency Expert (WEE);
- Develop and propose a common certification system based on the European Credit system for Vocational Education and Training (ECVET) training credits capable of being used in all EU countries, fostering mobility and recognition of professionals in the European market

2 Objectives

This document refers to the fourth step of the project: the Intellectual Output IV (IO4), which intends to develop a proposal of recognition and accreditation system for the qualifications of Water Efficiency Technician (WET) and Water Efficiency Expert (WEE) opening the possibility for their long term integration into National and European qualification frameworks of the partners countries. The accreditation system should ease the European mobility of the learners and professionals of the sector by pledging the transferability of the learning outcomes of the training programmes developed.

The first stage towards accreditation will be undertaken through the drafting of a **Memorandum of Understanding (MoU)**. The MOU should constitute the formalised agreement between participants of the WATTer Skills project, *i.e.*, the members of the partnership, supporting organizations and stakeholders. The MoU will serve as an understanding on the application of ECVET principles, namely the framework for credit transfer to the learning programme derived from WATTer Skills. It will constitute a proposal of a recognition system for the different types of professionals at national and European levels.

This document will also describe a long term **recognition and certification roadmap** setting the future milestones for the inclusion of the learning programmes/training curricula developed into each countries national qualification framework.

3 Water efficiency technician and water efficiency expert: two qualifications with a European scope

The WATTer Skills seeks to develop and propose two professional qualifications, the water efficiency technician (WET) and the water efficiency expert (WEE). The WET is the person certified to install, maintain and repair water systems in buildings in compliance with water efficiency requirements, addressing the water efficiency and water-energy nexus measures in buildings, and the WEE the one to design, select, propose and inspect water systems in buildings considering water efficiency requirements, addressing the water efficiency and water-energy nexus measures in buildings.

3.1 The project outputs and scope

When defining WATTer Skills scope three main components intersect: 1) the target groups of the training programmes considered, 2) the prevalence of the project results (national, regional and European) and 3) the sustainability of these results.

Throughout its implementation, WATTer Skills has identified the relevant target groups among **construction and green professionals** and developed tailored and transparent curricula to advance sustainable and sound practices for water efficiency. Likewise, the project indents to contribute to the recognition and transparency of professional qualifications at a **European level** and provide an innovative model for competence acquisition in the water efficiency sector, from building constructions to maintenance and refurbishment. In doing so, it will equip **Vocational and Educational Training (VET) institutions** with the necessary tools to enhance the set of skills required in the various disciplines associated with the water efficiency.

Concerning sustainability of WATTer Skills results, after the project's completion its results will carry on as an **online resource** accessible through the partner's and supporting organizations e-learning platforms for training and information purposes of water efficiency professionals.

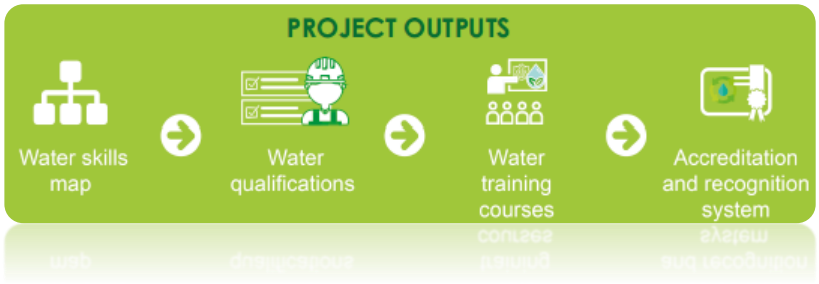

Figure 3-1 – The WATTer Skills project main results.

This ambition to broaden the project's scope and ensure its sustainability has guided the methodological choices throughout the project. In the previous intellectual outputs (IO1, IO2 and IO3), an iterative process was set in motion to lay the groundwork necessary to define the areas of competence of the WET and WEE profiles matching existing upskilling needs.

This process consisted firstly on identifying and describing the actions and functions performed within the context of professions related to water efficiency. Then, these actions and functions were translated into the **Water skill maps** which conformed the **Water qualifications** specifying areas of competences and desired learning outcomes. Finally, the process led to the development of the **Training Course** curricula, structured in modules and units corresponding to each area of competence identified. To guarantee the alignment and European scope of the Intellectual Outputs, the national advisory boards of each country have been engaged from the start in providing feedback throughout the content development and WATTer Skills training program design.

Following the thorough methodology previously exposed in IO2: "Qualification Framework" two water efficiency profiles – WET and WEE, were developed under a similar approach and with similarities in the defined areas of competence/ training as evidenced in figure 2.

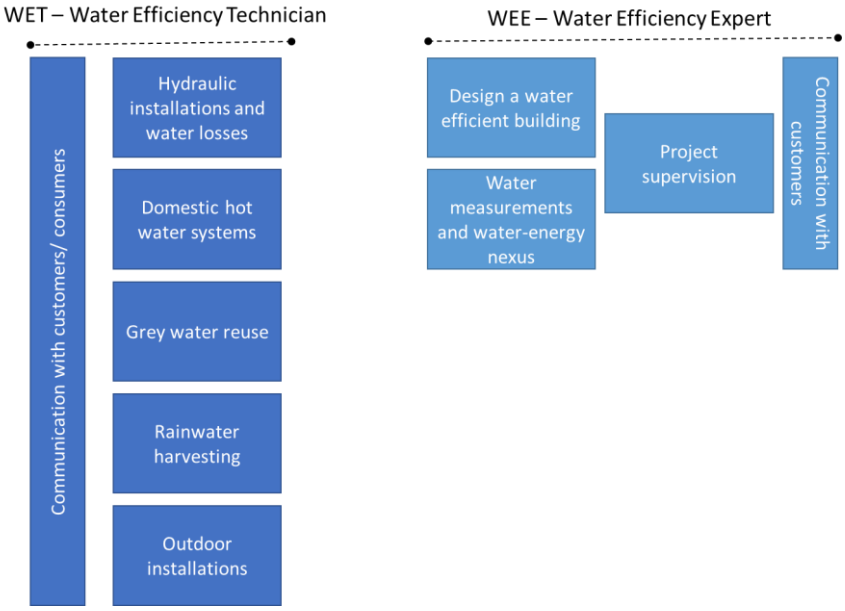

Figure 3-2 – The WATTer Skills modules and the two proposed profiles.

Overall, the WATTer Skills training courses are foreseen to be around 100 hours (for all WET modules) and 50 hours (for all WEE modules) for the two qualifications, respectively. Alike in other qualification topics, the WET professional is more focused in some key functions that may be more practical, while the WEE professional may have a broader scope, with key functions more related with project dimensioning and design. Schematically, the two profiles are linked as demonstrated schematically in the Figure 3-2, with sets of independent modules that may be taken separately or as whole. Regarding the "communication with customers" modules, they are more transversal to the other subjects as presenting ways to communicate some of the solutions addressed in the other modules.

3.2 EQF: the guiding scheme for WATTer Skills development

For the development of the qualifications WET and WEE the WATTer Skills consortium has applied the European Qualification Framework (EQF) definitions and standards. This framework has been broadly adopted in most European countries in the past 10 years both in training practices and policies as a means of shifting the focus from the providers (trainers) to the users (learners), introducing a common language in all educational sectors and favouring international cooperation between educational and training organizations. [1][2]

The EQF establishes a set of tools for common understanding between practitioners in the field of education like the European Credit Transfer and Accumulation System (ECTS) or the European Credit system for Vocational Education and Training (ECVET). These tools rely upon the use of commonly agreed upon **learning outcome descriptors.** These **descriptors**, which reflect both the levels and the learning domains of the qualification, are defined in terms of Knowledge Skills and Responsibility & Autonomy according to the latest E.U. guidelines[3].

[1] Cedefop (2009) The shift to learning outcomes. Policies and practices in Europe. 2009. ISBN 978-92-896-0576-2.
[2] Cedefop. Analysis and overview of NQF level descriptors in European countries, Cedefop Research Paper, ISBN: 978-92-896-2668-2.
[3] EU Commission Education DG (2018), The European Qualifications Framework: supporting learning, work and cross-border mobility, Luxembourg: Publications Office of the European Union, ISBN 978-92-79-80383-3

Thus, to ensure a European dimension to the training system, the two qualifications include the identification of the areas of knowledge, skills and competences (or responsibility & autonomy) as presented below:

WATER EFFICIENCY TECHNICIAN – EQF 4

The learning outcomes relevant to **level 4** are defined by the following set of descriptors (KSC's):

- ***Knowledge***: factual and theoretical knowledge in broad contexts within a field of work or study, including current applicable legislation, standards and norms;
- ***Skills***: range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study;
- ***Competences***: exercise self-management within the guidelines of work or study contexts that are usually predictable but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities.

WATER EFFICIENCY EXPERT – EQF 6

The learning outcomes relevant to **level 6** are defined by the following set of descriptors (KSC's):

- ***Knowledge***: advanced knowledge of a field of work or study, involving a critical understanding of theories and principles
- ***Skills***: advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study
- ***Competences***: manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups

The several aspects intervene in the qualification design using an EQF. In the case of WEE and WET these include defining work functions within each construction stage and identifying the associated areas of competence and derived KSC's as represented in Figure 3-3. Moreover, trainers and trainee profiles have to be taken into account in order to assess the training and evaluation method most suited for both qualifications.

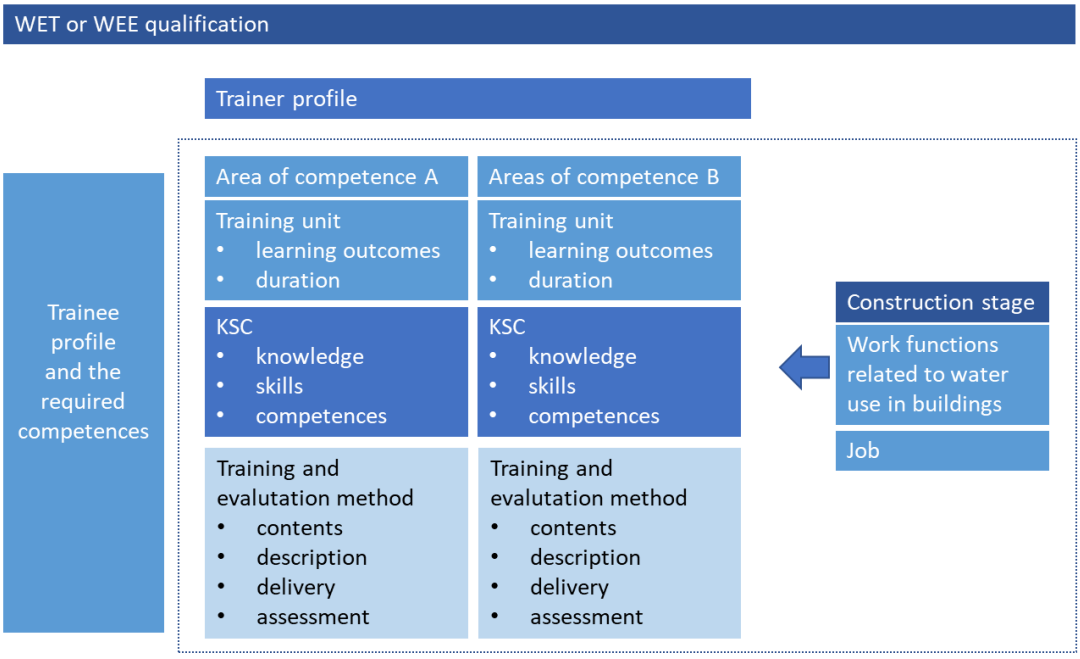

Figure 3-3 – Trainee profile and required competences; trainer profile and areas of competences framework

The final description of all the areas of competence has been stipulated in Intellectual Output 2 "Qualification framework" regarding each learning outcome identified for both qualifications. Figure 3-4 shows one of the learning outcomes description which will translate into a unit in the learning programme including an estimated duration and associated KSC's.

Module (areas of competence)	Training units		KSC
	Learning Outcomes	Duration	
A. Hydraulic installations and losses	LO A.1: Effective implementation of the thermo-hydraulic installations design	2 hrs	**Knowledge:** • Knowledge of the operational characteristics of thermo-hydraulic systems components • Knowledge of the functioning of fittings and other parts of the thermo-hydraulic system • Knowledge of the methods and/or techniques that may be applied to secure good performance of the thermo-hydraulic system, • Knowledge of the regulations and standards (local, national, international) applicable to thermo-hydraulic systems, considering water-energy efficiency requirements **Skills:** • Ability to interpret the thermo-hydraulic system project (and related available manuals) and dimensioning characteristics, considering water-energy efficiency requirements • Ability to establish the sequence of pipe installations and the corresponding components • Ability to limit obstructions and improve the piping network layout, e.g., in respect to reduce pipes lengths • Ability to provide an estimation of the work to be carried out for the system implementation **Competences:** • Good technical skills (for effective comprehension of the project layout) • Good organisational and planning skills (for effective implementation of the thermo-hydraulic system, including pipe insulation) • Good and effective communication skills with the client and co-workers • Responsibility and autonomy

Figure 3-4 - Learning Outcome "Effective implementation of the thermo-hydraulic installations design" from the WET qualification defined in terms of KSC's in IO2

3.3 European accreditation system based on European Credit system for Vocational Education and Training

The European Credit system for Vocational Education and Training (ECVET) has been applied to the project outputs to ensure their transferability between partner countries. This system is a technical framework for the allocation of ECVET points to hours of training for the transfer, recognition and, where appropriate, accumulation of individual learning outcomes with a view to achieving a qualification. ECVET points are a numerical representation of the overall weight of learning outcomes in a qualification and of the relative weight of units in relation to the complete qualification.[4]

[4] Cedefop (2016). ECVET in Europe: monitoring report 2015. Luxembourg: Publications Office. Cedefop research paper; No 56.

Together with units, description of learning outcomes and information about the EQF level, the ECVET system supports the understanding of a qualification. Thereby, the number of ECVET points allocated to a qualification, together with other specifications, indicate, for example, if the scope of the qualification is narrow or broad.

Following the ECVET Recommendation[5] to enable a common approach for the use of ECVET points for a given qualification, the allocation of ECVET points should be based on:

- The use of the convention according to which **60 points** are allocated to the learning outcomes expected to be achieved in **one year of a formal full time VET course**.
- The **selection** of one **formal learning programme as a point of reference**. It is up to the competent institutions in charge of designing qualifications to decide which specific programme will be chosen as a point of reference (*e.g.*, the initial VET or the most common programme). For qualifications which do not have a formal learning pathway reference, ECVET credit points can be allocated through estimation by comparison with another qualification which has a formal reference context.

As detailed in IO3 "Training Courses Curricula, Contents and e-Learning Platform", taking into account the widely accepted approach of 1 ECVET point (credit) = 25 hours of total learning, which corresponds to an average of 1500 hours for 1 year full VET, the "WATER EFFICIENCY TECHNICIAN" curriculum can be given the allocation of **4 ECVET credit points**, while the "WATER EFFICIENCY EXPERT" curriculum can be given the allocation of **2 ECVET credit points**. Still, small changes in the number of learning hours might occur according to the national needs as well as the organizational frameworks of mentors, trainers, teachers and counsellors involved in the sector. In the tables, the whole course ECVET points are presented, with the possible ECVET points addressed to each dimension, only to show the ECVET distribution per module.

The final ECVET points distribution is listed in the following tables (Table 3-1 and Table 3-2):

Table 3-1 – Water efficiency technician (WET) modules and contact, hands-on, self-study and contact hours.

WATER EFFICIENCY TECHNICIAN – EQF 4						
Modules description	**WET modules and contact hours**	**Hands-on hours**	**Self-study hours**	**Assessment hours**	**TOTAL**	**ECVET**
Module 1: Hydraulic installations and losses	12	6	11	1	30	1,2
Module 2: Domestic hot water (DHW) systems	8	4	7	1	20	0,8
Module 3: Grey water reuse	6	3	5	1	15	0,6
Module 4: Rainwater harvesting	6	3	5	1	15	0,6
Module 5: Outdoor installations	4	2	3	1	10	0,4

[5] Recommendation of the European Parliament and of the Council of 18 June 2009 on the establishment of a European Credit system for Vocational Education and Training (ECVET).

Module 6: Communication with customers / consumers	4	2	4	0	10	0,4
TOTAL:	**40**	**20**	**35**	**5**	**100**	**4**

Table 3-2 - Water efficiency expert (WEE) modules and contact, hands-on, self-study and contact hours.

WATER EFFICIENCY EXPERT – EQF 6						
Modules description	**WEE modules and contact hours**	**Hands-on hours**	**Self-study hours**	**Assessment hours**	**TOTAL**	**ECVET**
Module 1: Design of water efficient buildings	8	4	7	1	20	0,8
Module 2: Supervision during construction, commissioning and operation of a project	4	2	3	1	10	0,4
Module 3: Water measurements and water-energy nexus	4	2	3	1	10	0,4
Module 4: Communication with customers/consumers	4	2	4	0	10	0,4
TOTAL:	**20**	**10**	**17**	**3**	**50**	**2**

The ultimate stage of ECVET arrangements is the **recognition and validation** of the learning outcomes achieved **through crediting** by way of the assessment. It can be considered as part of a quality assurance process. Credit transfer and accumulation process is reinforced by ECVET documents like the **Memorandum of understanding** (in a separate document), which will be key for the present project results recognition among partners and may be further presented in the next section of this report. Other documents more suited for mobility purposes include the Learning Agreement and the Personal Transcript.

4 Memorandum of understanding

The Memorandum of Understanding (MoU) should constitute the formalised agreement between participants of the WATTer Skills project including members of the partnership, supporting organizations and stakeholders. The MoU will serve as an understanding on the application of ECVET principles, namely the framework for credit transfer to the learning programme derived from WATTer Skills. It will constitute a proposal of a recognition system for the different types of professionals at national and European levels.

4.1 Purpose of the MoU

The MoU is one of the key European Credit system for Vocational Education and Training (ECVET) documents that will help put into force the new skills, previously developed and consolidated in IO1, IO2 and IO3 reports, and provide ECVET credits to participants to improve mobility and recognition in all EU Member States.

Vocational and Educational Training (VET) organisations may decide to apply the ECVET in the framework of their mobility activities. In these cases, a precondition for using ECVET is the setting up of an ECVET partnership. This partnership needs to bring together the competent organisations involved in:

- identifying the suitable learning outcomes during mobility activities;
- delivering VET programmes that are apt at satisfying these needs;
- assessing the extent to which learning outcomes have been achieved by learners; and
- validating and recognising learners' credits on their return to the home institution.

The partnership for ECVET learning activities can be formalised through a MoU, which is an agreement between competent organisations which sets the framework for credit transfer. It formalises the ECVET partnership by stating the mutual acceptance of the status and procedures of competent organisations and institutions involved. It also establishes partnerships' procedures for cooperation.

MoUs can be developed by networks of competent organisation/institutions from several countries/systems, but they can also be bilateral, depending on the partnership needs and ambitions. For more information and guidance on the establishment of a MoU please refer to the ECVET User's Guide available on the website of the ECVET secretariat.

For applying ECVET in the participating countries to learning outcomes achieved in formal, non-formal and informal learning context particularly for the professional qualifications of "Water Efficiency Technician" and "Water Efficiency Expert" this MoU establishes that each participant:

- accepts each other's status as interested actors and/or competent institutions;
- accepts each other's quality assurance, assessment, validation and recognition criteria and procedures as satisfactory for the purposes of credit transfer;
- agrees the conditions for the operation of the partnership, such as objectives, duration and arrangements for review of the MoU;
- agrees on the comparability of qualification concerned for the purposes of credit transfer, using EQF to establish the reference levels;
- identifies other actors and competent institutions that may be involved in the process concerned and their functions;

The ECVET framework is based on the development of learning outcomes, to promote the validation of informal and non-formal learning. For each qualification, the National Qualification Catalogue (NQC) provides an occupational profile, a training national qualification framework (NQF) and a standard for the recognition, validation and certification of (educational and professional) competences. The courses may be divided in areas of competence and in short duration training units with variable length, but that can vary from country to country. The network of national qualification system includes the entities that may provide the courses with

the corresponding units that, when completed, contribute to obtain a certified qualification (*e.g.*, diploma, certificate of qualification, certificate of competence).

4.2 Procedures for the accreditation and recognition within the European Credit system for Vocational Education and Training partnership

Credit transfer based on ECVET and applied to learning outcomes achieved in formal learning contexts should be facilitated by establishing partnerships and networks involving competent institutions, each of which is empowered, in their own administrative context, to award qualifications or units or to give credit for achieved learning outcomes for transfer and validation.

The transfer and accumulation of learning outcomes in ECVET partnerships is conducted as follows: units of learning outcomes achieved in one setting are assessed and then, after successful assessment, transferred to another setting. In this second context, they are validated and recognised by the competent institution as part of the requirements for the qualification that the person is aiming to achieve. Units of learning outcomes can then be then accumulated towards this qualification, in accordance with national or regional rules.

Official procedures and guidelines for the assessment, validation, accumulation and recognition of units of learning outcomes are designed by the relevant competent institutions and partners involved in the training process. The training and evaluation method, including the contents, description, delivery and assessment are stated in the intellectual output 3 of the project. Moreover, the Learning Outcomes (LO) description and KSC scheme associated to each area of competence, for the Water Efficiency Technician (WET) and the Water Efficiency Expert (WEE) are clearly defined in the MoU.

Finally, the establishment of the ECVET partnership provides a general framework of cooperation and networking between the partners. This partnership is set out in MoU through which a climate of mutual trust is established and guidance to the partners in the design of specific arrangements for credit transfer for learners is provided.

A proposal of the MoU produced by the partnership is presented in a separate document. The signing of the MoU materialises the expression of interest of all signees for the purpose of undertaking the tasks that will foster the common accreditation of the learning outcomes of the two professional profiles developed by the WATTer Skills partnership. Still, all partners have freedom to follow-up in the extent of their financial and resource capabilities and in relation to the regulatory and procedural conditions in each country.

5 Proposal for a recognition and accreditation system

The recognition and certification roadmap aims to set the future milestones for the inclusion of the learning programmes developed into each countries national qualification framework.

5.1 Accreditation procedures: commonalities and specificities among partner countries

To ensure accreditation of the qualifications ensuing from WATTer Skills, all partners must follow their own specific national procedure to be officially recognized by the relevant bodies in charge of qualification schemes.

In the second intellectual output of this project "Qualification framework", the training and qualification certification scheme requirements were identified taking into consideration the European Qualification Framework (EQF) provisions for each country qualification circumstances. Upon a comparative analysis of all partner countries' qualification recognition procedures, three main stages have been identified:

1) qualification inclusion demand,

2) qualification design and

3) regulatory procedure,

as presented in Figure 5-1. Stages 1 and 2 may be conducted simultaneously or in different order (i.e., qualification design achieved before qualification inclusion demand) and in some cases only partially achieved before engaging in the following stage. Stage 3 will start after project completion, as preparation to the inclusion of the WET and WEE qualification into the national qualification systems (NQS).

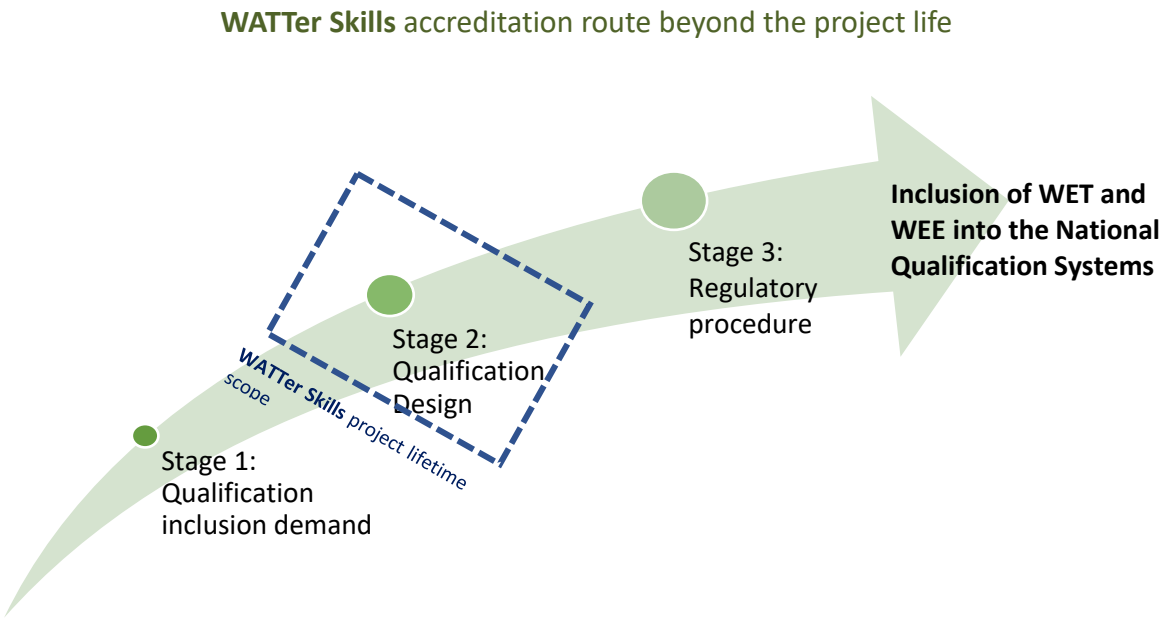

Figure 5-1 - Qualification recognition stages.

All countries refer well established National Qualification Frameworks[6] which rely on National Catalogues or repertoires of qualifications and National and/or regional bodies dedicated to qualification certification for referencing qualifications. To be able to include these new qualifications into official national frameworks, from

[6] Cedefop. Analysis and overview of NQF level descriptors in European countries, Cedefop Research Paper, ISBN: 978-92-896-2668-2.

a technical perspective, all certification bodies require a thorough description of the qualifications and their division into units of competence as well as a preliminary needs analysis.

Although three broad stages have been identified, each partner's country has its own specificities concerning qualification approval and different routes for their inclusion on their national system.

In the case of **Portugal** the qualification must include: title definition; description of the actions; description of knowledge, skills and attitudes; description of performance criteria; context conditions; identification of products / outputs (expected outcomes); revision of the actions/outcomes and performance criteria; assignment of a level to the unit of competence. In **Spain** the technical components of a qualification approval process also include an associated training programme defined in terms of competencies with all the assessment criteria specifying learning contents and parameters of the learning environment. In **Italy** the qualifications proposed must be declined in knowledge, skills and competences and depending on the paths, the total number of learning hours may differ depending on the region of reference as the first qualification status passes through a single region and then at a national level. In **Greece** the prevailing model is that of the Occupational Profile (OP), which must also be described in terms of KSC's and include a description of the relevant legislative framework for the OP.

The most challenging stage in all countries is the regulatory procedures that are highly standardized and, in some cases, involve public consultations, like in the case of **Spain**, or the involvement of tripartite associations in the design process like in **Greece**. In other countries, like in **Italy**, qualifications may have a regional scope before being included in the national catalogue (the regional qualification will be reported in the National Atlas of Labour and Qualifications drawn up by INAPP). In both **Spain** and **Portugal** national councils for VET depending on government groups have the last word concerning the approval of new qualifications after long processes including internal and external reviews.

The following table recapitulates the legislative framework and pertaining bodies for qualification accreditation in each partner country (Table 5-1).

Table 5-1 – Qualification accreditation provision levels, accreditation bodies and national catalogues.

Country	Name of the national law governing qualifications	Accreditation provision level	Accreditation bodies involved in the final approval	National Catalogue
Italy	Regional laws apply	National and regional	Regions	"The Atlas of Work and Qualifications" drawn up by INAPP
Portugal	Decree-Law n.º 396/2007 - Establishes the legal framework of the National System of Qualifications and defines the structures that regulate its functioning.	National	National Agency for Qualification and Vocational Education and Training	Portuguese National Catalogue of Qualifications
Spain	Organic Act 5/2002, of 19th June, on Qualifications and Vocational Training.	National	INCUAL: National Institute for qualifications General Council for Vocational Training	National Catalogue of Qualifications
Greece	Law 3879/2010 Law 4115/2013 (as amended and in force)	National	EOPPEP National Organization for the Certification of Qualifications & Vocational Guidance	Greek Qualifications Register (established in 2015)

Taking this into account, other than following all the required steps from stage 1 to stage 3 to include both qualifications into national systems, different official accreditation routes are achievable for partners involved in WATTer Skills:

- The inclusion of some of the competence units of the developed WET and WEE qualifications into already pre-existing qualifications at national and regional levels.
- In the case of Italy for instance, qualifications at VET level (under EQF 4) can be admitted more easily into the regional qualification system instead of the national system.

Likewise, since certification not only comes with the completion of training programmes (non-formal education and work experience recognition routes also exist), other option for the certification of interested professionals are possible, as presented in IO2 by following the scheme 1- identification of the entry level requirements, 2- complementary training attendance or competence validation and 3- qualification recognition by the national qualification entity.

5.2 Milestones and supporting mechanisms for future accreditation

Among the partnership common milestones in the accreditation route for WET and WEE some have already been achieved as a preparation for the project implementation or in the framework of the project, some have been planned as long term sustainability mechanisms and some others derive from the project activities. All of them are reflected in the Accreditation Roadmap for WATTer Skills which you can find as an annex of the present document (annex 2).

Most of the activities related to the **qualification design** have been reached during the project lifetime, like the Identification of target groups, the drafting of a water skills map and the definition of learning outcomes and knowledge, skills and competences (KSC) framework. Also relevant for the qualification design is the curricula development which entailed piloting activities, content structuring and development including training hours estimates and assessment tools as well as the drafting of trainers' handbooks.

Other supporting mechanisms and activities which will facilitate the road for accreditation are those activities related to sustainability and dissemination which are ongoing and go beyond the lifetime of the project, like the identification and association with relevant stakeholders, carrying out Info days and dissemination events, and social media and on-line dissemination activities as well as ensuring the accessibility to training content through partners and supporting organizations online platforms.

Finally, also to be achieved in the framework of the project, as the main mechanism for recognition there will be the signing of the previously presented MoU by partner organizations which will be reinforced with existing accreditation tools like Europass supplement for mobility[7]. Both mechanisms work upon agreement between institutions involved in the training and don't necessarily entail the pre-existence of a legal inclusion of said training courses in national qualification systems. This mechanisms will be greatly enhanced by the development of the Europass Digital Credentials Infrastructure (EDCI)[8], which will support authentication services for any digital documents or representations of information on skills and qualifications and describe a wide variety of learning achievements beyond a qualification like skills developed, projects, classes attended, and professional entitlements.

However the other two major milestones for official accreditation, which are the issuing of a **qualification inclusion demand** to pertinent national bodies and setting in motion the **regulatory procedure**, require supplementary actions which have been partially tackled within the frame-work of the project but go beyond its life time which are the following:

[7] https://europa.eu/europass/en/europass-mobility-0

[8] Article 4 (6) of the Europass Decision: decision (eu) 2018/646 of the European Parliament and of the Council of 18 April 2018 on a common framework for the provision of better services for skills and qualifications (Europass) and repealing Decision No 2241/2004/EC

- Viability and market analysis study of WET and WEE profiles;
- Establishing hard-wearing contact with official qualification bodies and relevant supporting stakeholders;
- Sustainability strategy for the on-line platforms;
- Dissemination actions for WET and WEE training programmes.

To summarise, the roadmap for WATTer Skills accreditation (as presented in the MoU separate document and in Figure 5-2) has some country-specific successions and transcends the timeframe of the currently approved Erasmus+ project. Nevertheless, an estimated timeframe for the execution of these four actions by all countries will be discussed and agreed among partners during the final project meeting, the minutes of which will be annexed to his intellectual output.

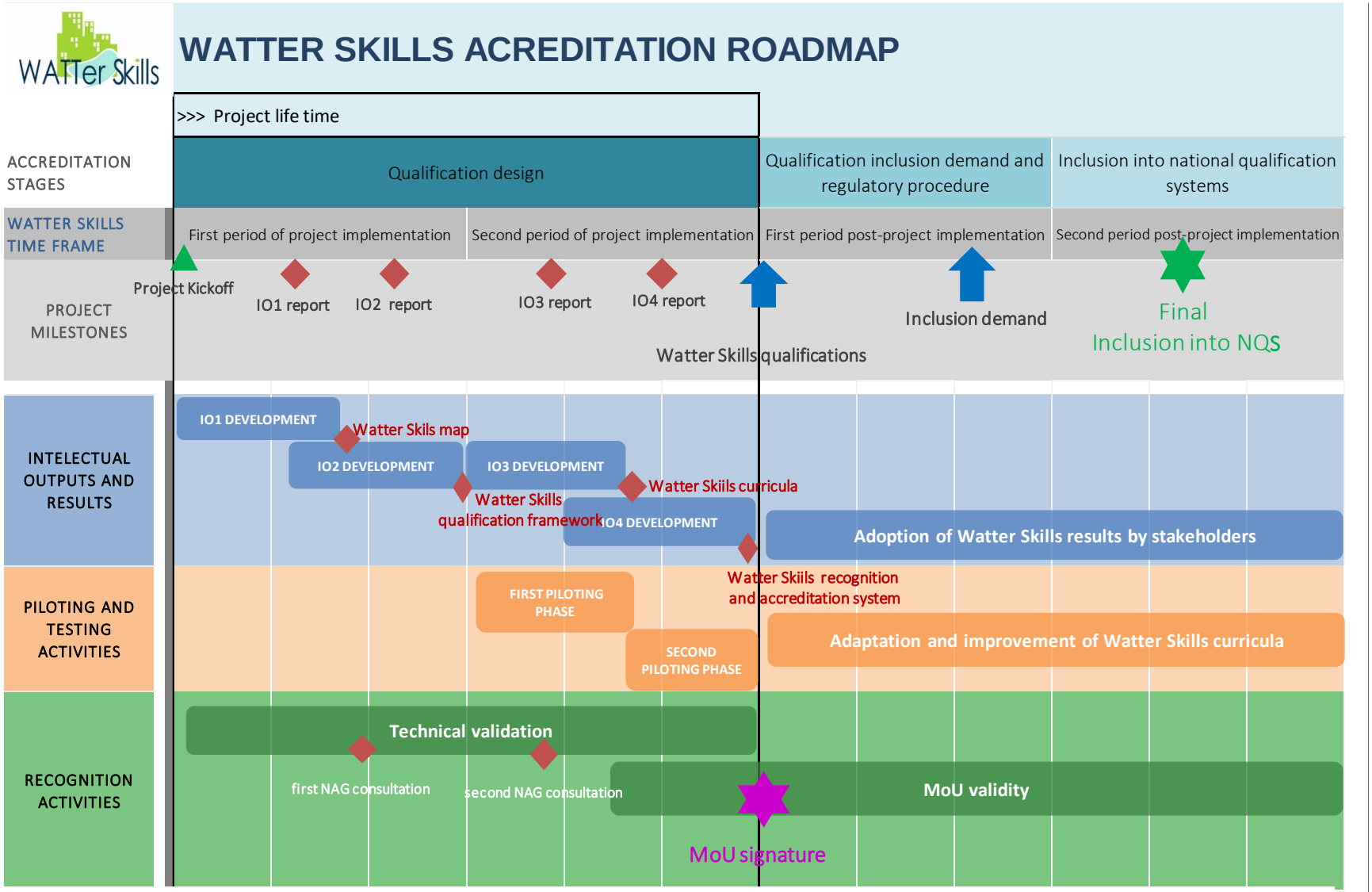

Figure 5-2 WATTer Skills proposal for the accreditation roadmap

6 Final considerations

In this fourth and final intellectual output of the WATTer Skills project, the roadmap for an accreditation and recognition system for water technicians and water experts by mapping the main institutions, stakeholders and requirements defined by each national qualification system has been defined. This was aligned with the first set of skills from IO1, the development of the skills maps in IO2, the learning outcomes identification in IO2, the training modules development (IO3 and the WET – water efficiency technician and WEE – water efficiency expert handbooks), the validation of the pilot trials and the revisions by the national advisory and stakeholder groups (IO4). The final long-term aim being to potentially achieve the integration of two new qualifications into national qualification frameworks (NQF) thanks to their structure, definition and development responding to the European qualification framework (EQF).

This Intellectual output aimed to promote the acquisition of new skills concerning the usage of efficient procedures in building plumbing fitting and retrofitting by providing ECVET to participants and promoting mobility and recognition of professionals in all EU Member States. Moreover, with the support of national advisory groups and their technical validation of the project outcomes, specially the courses curricula of this qualifications, the recognition by relevant stakeholders such as training centres but also policy makers will be achieved and potential official accreditation by national bodies will be advanced. Also, IO4 objectives were consolidated by the shared conclusions and engagements of the partners acquired during the final conference of the project.

By the means of a Memorandum of Understanding signed by all the members of the consortium and interested organizations, a multi-partner recognition system establishes a new set of skills to define the first “Water Efficiency Professionals” and recognize their competences with a transnational criteria application. This should be the framework in which all partners and interested organizations and stakeholders discuss the timeframe and practical solutions for their respective accreditation and recognition plans considering the results of the project, the country specific scenarios and the roadmap established during this IO. Fostering a solid basis for impact and sustainability of the Water Skills beyond its local applications.

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