

Prof/trac project – improving skills for successfully designing, constructing, renovating and operating nearly zero energy buildings

Andrei Vladimir LIȚIU¹, Tiziana BUSO², Anita DERJANECZ²,
Carmen Luminița CUC³, Ioan Silviu DOBOȘI⁴, Adrian RETEZAN⁵

¹S.C. PRODAO-ING S.R.L./KTH Royal Institute of Technology, ²REHVA, România

³S.C. PRODAO-ING S.R.L., România, ⁴S.C. DOSETIMPEX S.R.L., România

⁵ University "Politehnica" Timișoara, Romania

Abstract:

Nearly Zero Energy Buildings (nZEB) construction and renovation require a large contribution from the building sector and is a challenge for the construction industry. It requires innovative design processes and technologies based on an integrated design approach and multidisciplinary team work. This approach is not yet common, as the building sector still works in a fragmented process. PROF/TRAC provides a solution to overcome this barrier by offering an Open Training Platform and Qualification Scheme for Continuing Professional Development for professionals in the building sector. This platform targets technical experts, architects and building managers involved in nZEB design, construction, renovation and operation.

Keywords: nZEB skills, design, construction, maintenance, continuing professional development.

Rezumat:

Construirea și renovarea Clădirilor cu consum de Energie aproape Zero (CEaZ) necesită o contribuție considerabilă din partea sectorului de construcții civile și reprezintă o provocare pentru industria construcțiilor.

Sunt necesare procese de proiectare și tehnologie inovative bazându-se pe o abordare de proiectare integrativă și muncă multi-disciplinară în echipă. Această abordare încă nu este uzuală deoarece sectorul construcțiilor civile lucrează într-un proces fragmentat. PROF/TRAC prevede o soluție pentru a depăși acest obstacol oferind o Platformă de Pregătire și un Sistem de Calificare deschise pentru continuarea dezvoltării profesionale a practicienilor din sectorul construcțiilor civile.

Această platformă țintește experți tehnici, arhitecți și administratori de clădiri implicați în proiectarea, construirea, renovarea și exploatarea CEaZ.

Cuvinte cheie: nZEB abilități, proiectare, construcție, întreținere, dezvoltare profesională continuă.

1. Overview

The PROF/TRAC European Qualification Scheme on nZEB skills aims at overcoming market barriers towards a successful design, construction, renovation and

operation process of nZEB. It targets professionals with a higher education degree in the construction sector, the so-called white-collars.

The qualification scheme is the outcome of an intensive consultation among national experts in PROF/TRAC partner countries. This work resulted in the definition of:

- Harmonized work fields;
- nZEB skills;
- nZEB skills levels;
- Description of qualifications across Europe.

This framework constitutes a solid basis to compare the nZEB skills requested to different professions and to the same profession from one country to the other.

Defining and targeting specific professions at the European level is still difficult. On the one hand, a specific profession can fulfil different tasks in different countries; on the other hand, definitions of professions differ from country to country and some professions are not defined at all outside national borders.

For overcoming this fragmented EU situation, PROF/TRAC grouped professions per work field. Seven work fields were identified, and for each of them reference professions were selected.

Work fields and corresponding reference professions are described on task basis, to facilitate a transparent and harmonised understanding as presented in Table 1.

Table 1

*Work fields and reference professions targeted in PROF/TRAC
Qualification Scheme*

Work field	Reference profession(s) within the work field
Architecture	Architect
Civil engineering	Structural Engineer
	Civil Engineer
	Construction Engineer
Mechanical engineering	Mechanical Engineer
	Energy Engineer
	Building Automation Engineer
Electrical engineering	Electrical Engineer
	ICT Engineer
Construction management	Project Manager
	Cost Expert, Cost Engineer
	Manager of Building Process
Building management	Facility Manager
	Technical Energy Engineer
Financing and procurement	Procurer
	Chief Procurement Officer
	Project Developer

2. The Qualification Scheme

The Qualification Scheme answers to the need of defining and mapping nZEB skills in a harmonized way across work fields.

The scheme lists the essential technologies and skills required for professionals dealing with nZEB, categorized in four areas of expertise as shown in Figure 1:

- Energy Management (EM)
- Energy Production (EP)
- Energy Reduction (ER)
- Interdisciplinary Skills (IS)

For each technology and interdisciplinary skill, a precise description of recommended competences is also provided.

These specific competences, here named as “qualifications”, describe in more detail the needed knowledge, skills and behaviour of a professional in nZEB.

Of course, not all professions are expected to have the same skills and qualifications levels for all the identified nZEB technologies. Thus, PROF/TRAC has:

- Established skills levels, with assigned scores from 0 (min.) to 5 (max.);

Set-up recommendations about the minimum skills level for each work field per skills and qualifications.

It should be noted that the current list of technologies, skills and qualifications is the result of the consultation with nZEB experts within PROF/TRAC consortium.

With the disclosure of this qualification scheme to other experts and considering the fast technological progress of the energy performance of buildings market, this list is expected to extend.

2. nZEB skills recommendations

Based on national skills mappings and experts’ consultations, PROF/TRAC defined minimum skills levels per work field for each nZEB technology and interdisciplinary skill described in the Qualification Scheme. A selection is illustrated in Figure 2, Figure 3, Figure 4, Figure 5.

By cross-referencing PROF/TRAC EU skills levels recommendations per work field and skills levels recommendation per qualification, PROF/TRAC offers a EU harmonized nZEB skills mapping tool.

S K I L L S L E V E L S	0	Not applicable/no knowledge and skills required	
	1	Has little knowledge and skills with respect to the relevant field/technology (mostly outside the own field of expertise)	
	2	Understands basic knowledge and has practical skills within the field/technology, is able to solve simple problems by selecting and applying basic methods, tools, materials and information (mostly outside the own field of expertise)	
	3	Has comprehensive, factual and theoretical knowledge and skills within the field/technology, is capable of solving problems within the field	
	4	Has advanced knowledge involving a critical understanding of theories and principles, and skills required to solve complex and unpredictable problems in the field, and is aware of the boundaries	
	5	Has specialized knowledge and problem solving skills, partly at the forefront of knowledge in the field, in order to develop new knowledge and procedures and to integrate knowledge from different fields	
S K I L L S	EM1	Smart grid systems	ENERGY MANAGEMENT
	EM2	Domotic systems	
	EM3	Building management systems	
	EP1	Geothermal energy	ENERGY PRODUCTION
	EP2	Biomass	
	EP3	Biogas	
	EP4	District Heating and Cooling	
	EP5	Heat pumps	
	EP6	Solar power systems for Electricity generation	
	EP7	Solar thermal systems for Cooling generation	
	EP8	Solar thermal systems for Domestic Hot Water and/or Heating	
	EP9	Mini wind power	
	EP10	Combined Heat and Power (CHP)	
	ER1	Insulation	ENERGY REDUCTION
	ER2	Air tightness building	
	ER3	Micro climates	
	ER4	Envelope systems	
	ER5	Hot Water systems	
	ER6	Window and/or glazing systems	
	ER7	Heating and Cooling emission systems	
	ER8	Electric Heating systems	
	ER9	Artificial lighting systems	
	ER10	Ventilation systems	
	IS5	Sustainable architectural design	SUSTAINABLE INTEGRATED DESIGN
	IS6	Integrated design	
	IS7	Sustainable building materials	
	IS8	Sustainable installation materials	
	IS9	Environmental (indoor) quality	
	IS1	Communication	INTERDISCIPLINARY SKILLS
	IS2	Information management	
	IS3	Collaboration	
	IS4	Quality assurance	

Figure 1 nZEB skills levels and technology

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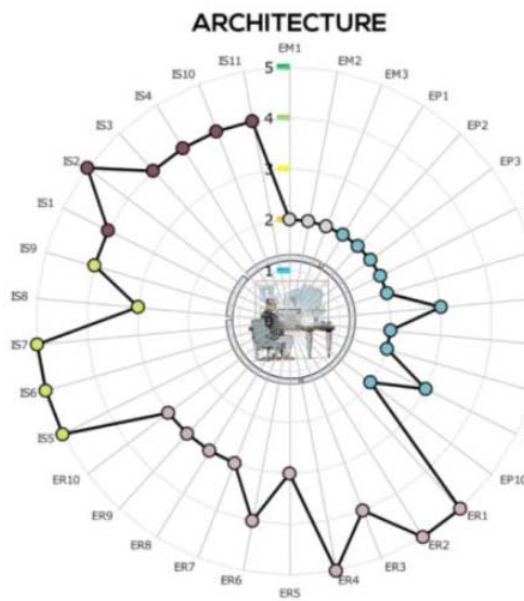


Figure 2 nZEB skills levels

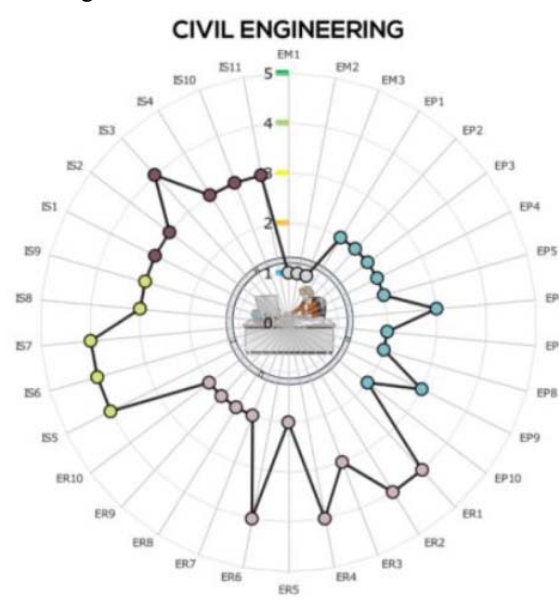


Figure 3 nZEB skills levels

These scores represent the minimum recommended nZEB skills levels for the listed skills and refer to the reference professions representative of the work fields.

These recommendations can be adapted to the national level situation and needs. Depending on the competences (i.e. the “qualifications”) required for a defined profession in a specific country, the PROF/TRAC suggested minimum skills levels may be adjusted higher or lower.

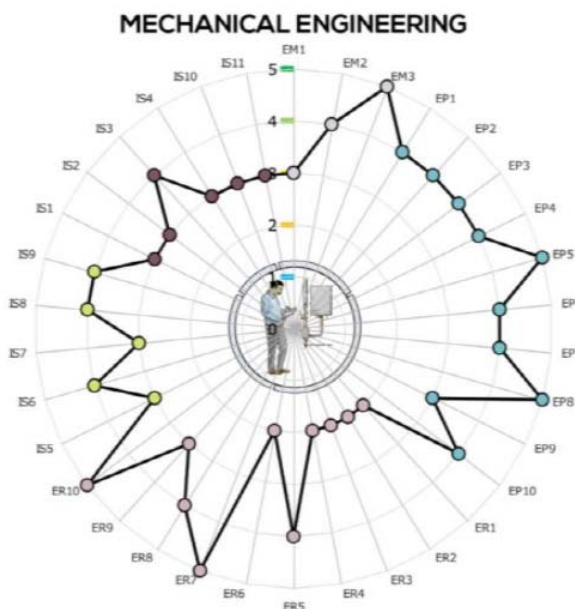


Figure 4 nZEB skills levels

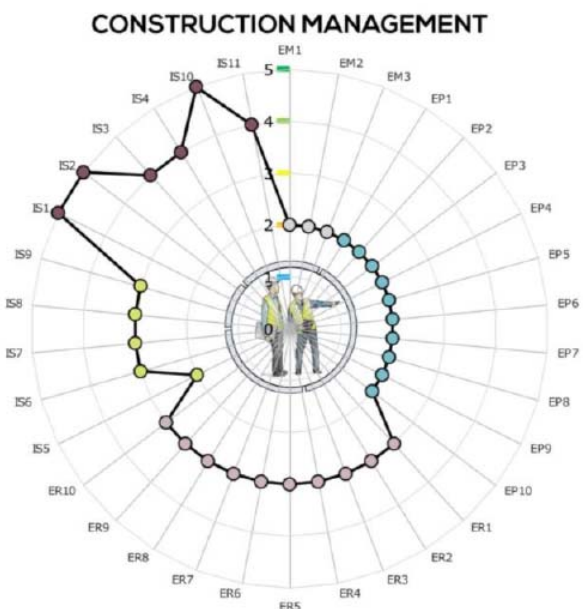


Figure 5 nZEB skills levels

3. Outcome

The PROF/TRAC team finished a successful 3-years project in February 2018 with many achievements to be proud of. The project outcomes were presented in a successful event in Brussels on 20 February 2018, engaging many stakeholders in interesting discussions.

PROF/TRAC project's consortium developed a European Qualification Scheme with minimum skill levels recommendations for the professions involved in the design, construction, renovation, and operation of nearly Zero Energy Buildings. The scheme offers a skills mapping methodology adaptable to each country, and a BUILD UP Skills Advisory App for assessing skills and matching training needs with course offers.

PROF/TRAC trained 128 certified trainers from 23 countries, who are now ambassadors deploying the courses across Europe. The Train-the-Trainer course is published as recorded webinar series available to all experts along with the open Training Material Repository collecting materials for courses.

The certified PROF/TRAC ambassadors organised several courses in Europe and have trained 1,389 professionals in 3 years.

PROF/TRAC courses will roll-on also after the project. REHVA member associations are committed to keep up the trainings, at least 50 courses are foreseen in the next 5 years with 1.700 more professionals to be trained.

In coincidence with the Project's closure, the PROF/TRAC website (www.profrac.eu) has been updated for facilitating the use and dissemination of the Project's results and to foster its after project life. The new design and content structure will help the viewers to identify useful information e.g. the complete list of Certified Training Providers, the Qualification Scheme, the nZEB skills recommendations and to access training material e.g. the online Train-the-Trainers course, the Training Material Repository.

Bibliografie:

PROF/TRAC Project: Open Training and Qualification Platform on NZEB construction and renovation. The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 649473. (<http://profrac.eu/opentraining-platform-for-nzeb-professionals.html>)