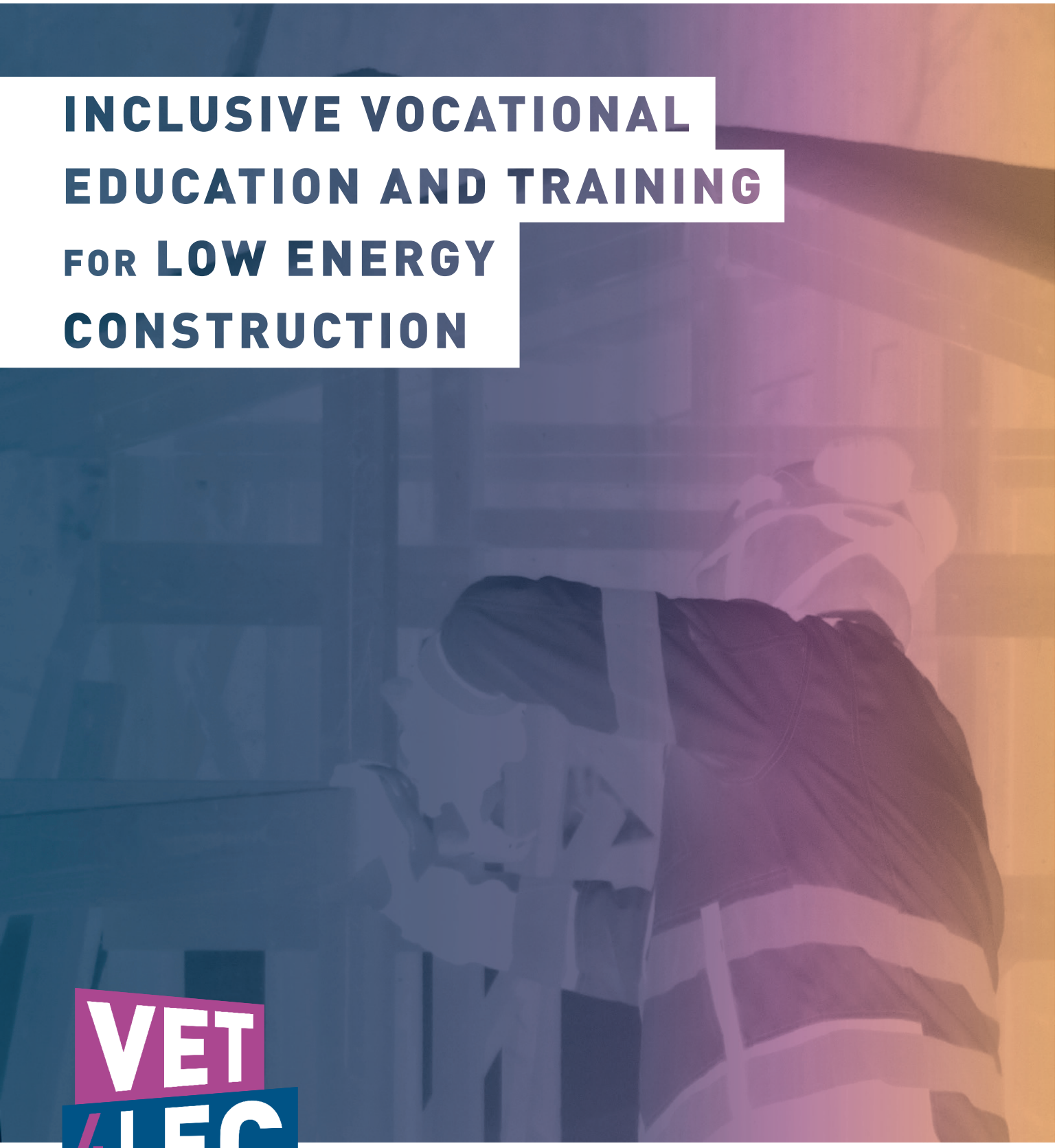
INCLUSIVE VOCATIONAL EDUCATION AND TRAINING FOR LOW ENERGY CONSTRUCTION



VET 4LEC

COUNTRY SUMMARY SLOVENIA
FEBRUARY 2019

European Federation
of Building
and Woodworkers

EFBWW

FIEC

THIS SUMMARY was prepared by the research team,
based on the Slovenian national report produced by CCBMIS.

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SLOVENIA

Construction Industry

The construction industry contributed 3.85% to GDP in 2015. The value of construction output has been increasing since 2014, except for civil engineering where there has been more fluctuation. The *black economy* is estimated to be about 10% of GDP, but estimates vary between Slovenian and European statistics, which suggests that the figure could be as high as 24%. In the *recession* between 2008 and 2013 about 34,000 jobs were lost, around a third of construction sector employment, with many workers leaving the sector and the country all together. Between 2010 and 2017, the value of construction output decreased by 33%. 'Building construction' dropped by nearly half, and 'civil engineering' by over 22%. There are signs of modest improvement. The number of workers increased by 6.4% from 2014 to 2015, profit in 'civil engineering' by 10% and in 'specialised construction activities' by 17%. The number of building permits is increasing. In 2016, 57% more buildings and 7% more dwellings were completed than in 2015.

According to 2015 statistics, there are 17,757 construction companies and sole entrepreneurs. The great majority (96.5%) are 'micro' companies that employ less than 10 workers[1] and hold 17% of the market share. Companies that employ up to 50 workers make up only 2.63% of the sector and the number employing over 100 workers is only 120 (1.62%) (p.5). Out of all construction companies, 58.9% are *sole entrepreneurs* with no paid employees. In terms of the distribution of construction companies across NACE[2] activity categories, 64% are in 'specialised construction activities', 29% in 'construction of buildings' and nearly 6% are in 'civil engineering'. Sole entrepreneurs are more likely to be found in 'specialised building activities'; 90% of companies in this sub-sector have no paid employees. In 'construction of buildings', the proportion of sole traders is just over 8%, and, in 'civil engineering', a negligible 1%.

Construction workforce

In 2015, 54,314 workers were employed in all NACE F activity categories. On average, 18% of all workers are self-employed. The share of *self-employed workers* is highest in 'specialised construction activities' (25%), followed by 'construction of buildings' (7%) and lowest in 'civil engineering' (1%). The characteristics of the workforce are:

- *Migrant workers* make up 32% of the workforce, which dropped from 40% in 2008. Most are from outside the European Union (EU).
- *Women* make up about 9% of construction workforce; among Slovenians, this figure is 12%, while among 'foreigners' it is only 2%.
- *Qualification levels:* The majority of construction workers hold Upper Secondary school qualifications (72%) and a further 10% has higher qualifications. One fifth has lower or no qualifications[3].
- *Age profile:* Under 5% of the workforce are aged 15-24, and 84% are 25-49 years old. The remaining 11% are over 50[4].

General educational levels in the workforce are high, although not necessarily relevant to the sector or the occupation in which the worker is engaged.

Vocational Education and Training (VET) system

The Ministry of Education, Science and Sport has the responsibility for preparing legislation, financing and adopting programmes, standards and qualifications. The Institute of the Republic of Slovenia for VET (IRSVET or slov. CPI) is responsible for implementation, monitoring and guiding the development of VET, providing teacher training and maintaining standards. It also acts as a link between ministries, schools and

1 Company size definition also includes, in addition to number of employees, income, asset value.
2 NACE is the Industry Standard classification used in Europe, Code F refers to construction.
3 Own calculation from raw numbers in Table 9, p.20 of original report.
4 Own calculation from raw numbers in Table 10, p.21 of original report.

social partners. Social partners are involved in the governance of VET and are represented on the consulting body for the Ministry; employers contribute to the preparation of 'open curricula' and the training of students.

Initial Vocational Education and Training (IVET) is school based. The main training programmes are:

- a technical upper secondary programme of 4 years, combining general and vocational education, and with the possibility to continue to higher education;
- a vocational upper secondary programme, 3 years, labour market oriented, with a school path that is only 20% with an employer or an apprenticeship path that is 50% or more with an employer, with the possibility to complete to technical education with a further 2 years study;
- short, lower grade, vocational upper secondary programmes of 2 years.

The transition from/to general and vocational education is facilitated. In 2017, a dual system of VET was introduced for a small selected range of occupations, which also included construction. The legislation increased the autonomy of schools and teachers over curricula and 20% of the national programme is defined in response to local and economic (employers') needs. Since 2006, changes have taken place in school curriculum planning, the school-company cooperation culture, and assessment approaches. There is increased emphasis on company-based training, and investment in company training centres has increased. Local companies cooperate with VET schools to establish intercompany training centres.

There are continuing vocational programmes (CVET) for adults within the formal education system and these are identical to the ones for young people. CVET is also provided by private companies, manufacturers, craft chambers and public institutions. The NVQ based system, in place since 2000, enables individuals to obtain formal recognition for on the job learning and existing competences. A substantial part of CVET training is competence-based training, leading to NVQs obtained through competence-based accreditation of prior experiential learning (APEL), presumably organised on a similar conceptual basis to the English NVQ.

Slovenian Build Up Skills – LEC training needs

The Build Up Skills findings from the Status Quo Analysis (SQA) estimate that from 2012 to 2020 between 4810 and 5770 workers need to be trained each year in NZEB relevant competencies. The qualitative assessment of existing VET shows that this is very much theory based, with only a small practical component, and interdisciplinary thinking is lacking. Further training opportunities for those already in the sector are very limited and there are no systems for facilitating the accreditation of on-the-job learning, exacerbated by a weak life-long learning culture. Barriers to meeting the anticipated shortage of LEC trained workers include the general labour shortages in the construction sector and declining rates of VET participation, with the recruitment of young people presenting a particular challenge. The Roadmap recommends that the existing VET system should be reviewed to embed energy literacy and training in LEC for all occupations related to EE and RES, including in master crafts and foreperson examinations, supported by a system of accreditation and certification of informal learning. New educational programmes and professional standards are recommended to be developed for emerging occupations in new technology installations. A broad reform programme with sufficient funding should also be pursued to upgrade VET more generally and to bolster the training of teachers.

VET for LEC developments

Although it is known that there are LEC skills shortages – including in green skills, social abilities such as planning and co-ordination, literacy, health and safety, and ICT – LEC training is not yet properly included in IVET programmes. The Build Up skills investigation identified a skills gap in meeting the EU2020 targets. However, due to lack of resources, it has not been possible to implement the recommendations for upgrading VET. There are short further education type courses in RES installations provided by manufacturers of building materials and other private companies. However, this is not regulated or continuous training. Slovenia was also a partner in EMILIE, a project that supported SMEs in developing capacity in the field of energy efficiency, involving technical workshops for introducing new technology on regional pilot sites. Currently national SRIP networks (Strategic Development and Innovation Partnerships) appear to be the triggers of LEC developments, including in construction[5].

5 For more on this topic, see: http://www.svrk.gov.si/delovna_podrocja/strategija_pametne_specializacije/strateska_razvojno_inovacijska_partnerstva_srip/ or http://www.mgrt.gov.si/si/sripi/

Initiatives related to VET for LEC

- *Build Upon (2015-2017):* Slovenia participated in this Horizon 2020 funded project along with 12 Green Building Councils (GBCs), under the coordination of GBC Spain and support from the World Green Building Council. The project sought to create a collaborative community, establish innovative platforms for cross-sector partnership. Through 80 connected events, it aimed to help countries design and implement national renovation strategies.
- *EMILIE (2013-2015)* was funded by the Mediterranean transnational cooperation programme and aimed to support SMEs in developing their capacity for innovation in the field of energy efficiency. The project supported the development of a network and involved organising technical workshops for introducing new technology that is tested on six regional pilot sites. These pilot operations are still open for public SMEs and regional and local administrations in charge of managing public buildings and contracts for building construction and renovation[6]. On-line monitoring of built in installation performance is available for interested public.
- *Initiative to recruit more young people and girls into construction:* The Ministry of the Environment and Spatial Planning calls for sectoral initiatives and in 2017 construction VET schools were successful in their campaign in elementary schools. Private construction companies offer competitive stipends for young people through VET schools in the region and accessible through a competition. There are also state scholarships for different occupations in short supply in Slovenia. There is a call every year, inviting young people/future pupils to apply for the public scholarship stipend, which is 100 EUR per school month. For construction VET programmes in 2016/2017 there were 5 occupational profiles identified as in short supply and pupils enrolled in the respective programmes were eligible to apply for the stipend. There were some initiatives to attract girls into construction. *Day for girls* was a very successful project, planned to be repeated every year, encouraging girls into technical VET programmes. To attract school pupils, construction VET schools organise 'Technical days' twice per school year in different elementary schools across Slovenia where information about training and employment opportunities are presented, also using past pupils as role models.
- *Skillco (2016-2019):* The main goal of the *Sector Skills Alliance project* is to define and identify four (one of them green) existing and anticipated sectoral, technical skill needs and to elaborate and define learning units, with the use of ECVET principles, which could be integrated into formal VET programmes or used as training courses. The intention is, on the one hand, to integrate the learning unit outcomes elaborated within the framework of the project into the existing sectoral curricula, corresponding the 4th EQF level, and, on the other, to include them (where possible, due to the differences in the various education systems, and where required with specific adaptations) in the national occupation standards and regular VET programmes. These goals therefore constitute the first attempts to elaborate and implement comparable curricula in different countries, with the aim to foster trainees' and workers' mobility.

6 http://www.emilieproject.eu/eng/home.aspx

SLOVENIA – NZEB definition

OFFICIAL STATUS	In official document
RESIDENTIAL/NON-RESIDENTIAL	✔
SINGLE FAMILY HOUSES	
APARTMENT BLOCKS	
OFFICES	
EDUCATIONAL BUILDINGS	
HOSPITALS	
HOTELS/RESTAURANTS	
SPORT FACILITIES	
WHOLESALE AND RETAIL	
BUILDING TYPOLOGY	
BUILDING CLASS	
BALANCE	
PHYSICAL BOUNDARY	
HEATING DHW	
VENT, COOL, A/C	
AUXILIARY ENERGY	
LIGHTING	
PLUGS, IT, APPLIANCES	
CENTRAL SERVICES	
ELECTRIC VEHICLES	
EMBODIED ENERGY	
ON-SITE RES	
OFF-SITE RES	
EXTERNAL GENERATION	
CREDITING	
PRIMARY ENERGY INDICATOR (kWh/m²/y)	✔

Source: based on European Commission (2016a) *Synthesis Report on the National Plans for Nearly Zero Energy Buildings*, JRC Science for Policy Report

National NZEB definition

According to the European Commission's Joint Research Centre for Policy Report (EC 2016a), Slovenia's NZEB definition has been included in an official document. In its definition, Slovenia defines NZEB for both residential and non-residential buildings but does not include specific subcategories.
With regard to the specification of generation boundaries in Slovenia's definition, information is classified/defined/limited for three different building types: one-storey buildings; multi-dwelling buildings; and non-residential buildings and activities (new building, major renovation (reconstruction), and RER (the share of renewable resources in terms of total energy input, as defined by REHVA).[7]
The Energy Act (EC-1) defined in Article 330 the requirement that all new buildings must be almost zero-energy. The term 'virtually zero-energy building' in this law means a building with very high energy efficiency or a very small amount of energy needed for operation, whereby the required energy is largely produced from renewable sources on site or in the vicinity. The transitional provisions in Article 542 provide that the provision of Article 330 of this Act shall apply on 31 December 2020. For new buildings owned by the Republic of Slovenia or self-governing local communities and used by public sector entities, Article 330 of the law applies from 31 December 2018[8].

The numeric indicators of energy performance below, expressed as primary energy (kWh/m²/y) are specified in Slovenia's definition (EC, 2016a: 23-26, Table 7).

Intermediate targets

Slovenia has set the intermediate targets below for all new buildings and all new buildings occupied and owned by public authorities.

At the moment in Slovenia in the field of NZEB construction, wooden buildings are at the forefront, being the most numerous and also considered the most suitable among the experts and most of the investors. The national sectoral NZEB development is also driven by many innovative construction products and installations developed by the Slovenian building materials industry. Some of these also received innovation awards by the Chamber of Commerce and Industry of Slovenia (GOSPODARSKA ZBORNICA SLOVENIJE) on National Innovation Day.

7 For a detailed overview of NZEB requirements, see the table at: http://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/akcijski-nacrt-za-skoraj-nic-energijske-stavbe/

8 Source: SLO energy act in EN: http://www.energetika-portal.si/fileadmin/dokumenti/zakonodaja/energetika/ez-1/ez-1_energy_act_proposal.pdf

SLOVENIA – Energy performance expressed as primary energy (kWh/m²/y)

RESIDENTIAL BUILDINGS (kWh/m²/y)		NON-RESIDENTIAL BUILDINGS (kWh/m²/y)		
NEW	EXISTING	NEW	EXISTING	NOTES
75 (single family), 80 (multi-family)	95 (single family), 90 (multifamily)	55	65	Per unit of conditioned surface, depending on the reference building.

SLOVENIA – Intermediate targets

ALL NEW BUILDINGS			ALL NEW BUILDINGS OCCUPIED AND OWNED BY PUBLIC AUTHORITIES		
QUALITATIVE 2015 TARGET	QUANTITATIVE 2015 TARGET	NOTES	QUALITATIVE 2015 TARGET	QUANTITATIVE 2015 TARGET	NOTES
Heating energy demand < 25 kWh/m²/y; fraction of RES > 50%.	480 single-family houses, 8 apartment blocks, 26 other nonresidential buildings.	n/a	For the public sector, the requirements are tightened by 10%.	41 public buildings.	n/a

Source: AKROPOLA

CASE STUDY: Eco Silver House, http://www.ee-highrise.eu/

Case studies

The three case studies are a high rise building and two pre-fabricated houses. The following observations complement, and should be read in conjunction with, the information contained in the National Report.

THE 'ECO SILVER HOUSE' HIGH RISE APARTMENT BLOCK was built to the Eco Silver House standard, meets PH design criteria and is registered in the PH database https://passivhausprojekte.de/index.php?lang=en#k_4522. The design: 'fulfilled minimal requirements of cost-optimal for apartment building with Net Present Value of 272 EUR/m² and primary energy use of 79 kWh/m²/y' in line with the 'Slovenian national cost optimal study of minimum energy performance requirements from the year 2014' which defines NZEB as 75 (single family), 80 (multi-family) kWh/m²/y primary energy: http://www.scirp.org/journal/PaperInformation.aspx?PaperID=59005. The 2015 Qualitative Intermediate targets of < 25 kWh/m²/y must be based on end-use or metered energy with a fraction of RES > 50% in final energy use. Currently the renewables aspect comprises district heating based on a mix of 9% of biomass, grid electricity, with 33.5% hydroelectricity and a photovoltaic array together comprising 44.3% of total PE. It is expected that the renewable component of the district heating will reach 39.3% by the year 2020, thus significantly superseding the NZEB requirement for >50% RES. An

analysis of Slovenian NZEB, including the Eco Silver House is available at:
https://file.scirp.org/pdf/GEP_2015082411220849.pdf

The Eco Silver House description provides a broad definition of renewables in that it includes 'off-site' carbon savings through the district heating with its biomass fuel mix and through the hydro-electric component of grid electricity supply. For those member states defining NZEB as meeting the EPBD 'cost optimal' requirement, the inclusion of off-site renewables could have a significant impact on the final low energy design. Large-scale renewables such as hydro-electric schemes are generally more cost effective than, for example, small scale photovoltaics, thus providing lower cost energy. This allows for enhanced envelope design at higher cost but within cost optimal provisions. It also moves the maintenance requirements from the individual installation (the responsibility of owners) to suppliers and, inter alia, achieves economies of scale. All the stakeholders learned a lot during the construction process and on the basis of the monitoring results of the building. Now they know what they could do differently and have, above all, acquired a valuable experience and the knowledge of which solutions, technologies and products can be used in following NZEB projects.

THE TWO CASE STUDY HOUSES ARE THE HOUSE PRIMUS D137D AND THE ACTIVE HOUSE LUMAR. A web search reveals the 'PLUS ENERGY HOUSE PRIMUS-D 137DD' with the same photograph as in the partner report stating the Primus D137DD is the first 'plus energy' house in Slovenia and certified at the Passivhaus Institute in Germany https://passivhausprojekte.de/index.php?lang=en#k_1840. The plus energy component is the 62.5 m² photovoltaic array (approximately 7 to 8 kW peak). The dwelling must therefore exceed Slovenian NZEB demands both for energy and RES.

THE ACTIVE HOUSE FROM LUMAR IG, Slovenia is described as a: 'highly energy-efficient structure [that] makes best use of solar energy and offers utmost living comfort'. http://www.swst.org/wp/meetings/AM14/pdfs/presentations/kuzman%20pdf.pdf.
The term 'Active house' implies more than nearly zero and represents a net positive concept and thus must exceed Slovenian NZEB requirements. Its specification is as follows:

- Location – Dragočajna; Year – 2013; Total floor area – 151 m²; 1 year construction time.
- Timber-frame wall element with I-studs and a fully insulated cavity.
- Energy efficiency – plus energy (PHPP 15 kWh/m²/y)
- U-value (W/(m²K)) – wall 0.1; roof 0.1; floor 0.12; window 0.87: glass 0.6; frame 0.86
  Services – air to water heat pump with underfloor heating; solar thermal collector; photovoltaic array; MVHR and a rainwater collector.

Source: LUMAR

CASE STUDIES: House Primus D137d (left) and Active House (right), both Lumar company www.lumar.si