



# European Construction Sector Observatory

Policy measure fact sheet

## Lithuania

Transferring Open Content on Energy-efficient Buildings (TOCEB)

Thematic Objective 2

January 2018



## In a nutshell

<b>Implementing body:</b>	Vilnius Builders Training Centre
<b>Key features &amp; objectives:</b>	Innovative teaching/learning materials and courses on energy efficiency in the building sector to enhance the qualifications of VET teachers and apprentices/students and deliver core competences, such as technical and language skills as well as skills in media use during the learning process.
<b>Implementation date:</b>	2013 – 2015
<b>Targeted beneficiaries:</b>	VET teachers and apprentices/students in the construction and energy sector
<b>Targeted sub-sectors:</b>	Construction and energy sectors
<b>Budget (EUR):</b>	n/a

Climate change and the rising prices of energy and resources are some of the key challenges that industry and policy-makers have to address. The modification of legal frameworks and their adoption at EU Member State level, in particular the European Energy Performance of Buildings Directive 2010/31/EU<sup>1</sup>, are examples of European policy-making that aims to encourage reform and innovation in the European construction sector<sup>2</sup>.

Although energy and environmental technologies are driving rapid growth in industry, their relevance to the education sector has been underestimated. Education needs to keep pace with developments in industry and must therefore integrate the latest developments in technology, methods and techniques into academic and professional courses in order to develop a more skilled workforce.

To address these challenges, the Vilnius Builders Training Centre in Lithuania entered into collaboration with partners in Austria, Italy, Poland and the Czech Republic in 2013 to implement the 'Transferring Open Content on Energy-efficient Buildings' (TOCEB) initiative. The aim was to improve skills and knowledge in each nation's construction sector by introducing an online platform (e-genius) for teaching materials on energy efficiency and renewable energy topics<sup>5</sup>.

The main two objectives of TOCEB initiative were to:

- Develop innovative teaching and learning materials on energy efficiency issues by using the information gathered through the e-genius online portal;

The Lithuanian construction industry is experiencing a shortage of skills in the workforce<sup>3</sup>. There is a shortage of workers with knowledge and expertise in the latest technologies and materials. To compound the problem Lithuanian universities also lack the teaching materials with which to educate and train new generations of construction workers<sup>4</sup>.

- Translate and adapt training courses and materials published on the e-genius platform to the national contexts of the participating countries in order to prepare properly for the implementation of the European Energy Performance of Buildings Directive 2010/31/EU.

Key outputs include online training materials and knowledge tests. Tests are available in the form of a range of assignments and more traditional exams. Access to the platform and its content is free of charge<sup>6</sup>. All training materials are available in the languages of the participating countries. Knowledge of English or German is not required to use the platform fully.

As an additional planned outcome, the TOCEB initiative is helping to improve green skills education and training in Lithuania<sup>7</sup>.

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- Develop innovative teaching and learning materials on energy efficiency issues by using the information gathered through the e-genius online portal<sup>9</sup>;
- Translate and adapt training courses and materials published on the e-genius platform to the national contexts of the participating countries in order to prepare properly for the implementation of the European Energy Performance of Buildings Directive 2010/31/EU<sup>10</sup>.

## 1

# General description

TOCEB is a two-year initiative (2013-2015) that is developing online teaching/learning materials on renewable energy sources and energy efficiency in buildings, in collaboration with academic institutions, and in particular with technical vocational schools and vocational higher secondary schools<sup>11</sup>. To achieve this broad objective, the initiative aimed to:

- Develop an online platform (e-genius) to provide adaptable training material and tools to support the development of a more skilled workforce<sup>12</sup>;
- Edit teaching materials on renewable energy sources and energy efficiency in buildings in collaboration with participating countries;
- Translate all teaching materials and tools into the languages of the participating countries (Lithuanian, Italian, German, Czech and English);
- Inform the workforce about good practice and provide installation guidelines on energy efficiency in buildings;
- Support the full adaptation of Directive 2010/31/EU at Member State level<sup>13</sup>.

The didactic approach primarily relies on ensuring easy accessibility of the teaching modules and highest possible flexibility in their application<sup>14</sup>. The teaching materials were developed based on learning targets at different levels, so that contents could be easily adapted to the specific needs of users, vocational schools (of different levels) and universities<sup>15</sup>.

The preparation of the materials was funded under the Lifelong Learning Program of the European Commission<sup>16</sup>.

The primary target groups of the TOCEB initiative were<sup>17</sup>:

- Teachers and trainers in vocational education and training (VET) centres/schools;
- Apprentices/students in the same VET institutions.

Theoretical learning with practical application demonstrations and exercises is provided on the e-genius platform. Supporting resources on the platform focus on four critical skillsets<sup>18</sup>:

## Skillset 1: Energy efficiency in buildings

The learning modules provide material on energy efficiency and the passive-house concept. The subjects covered include: integral planning, implementing the building envelope, making airtight layers, and planning aids for the avoidance of thermal bridging<sup>19</sup>.

## Skillset 2: Thermal building renovation

The learning material focuses on insulation improvements in old residential buildings and public buildings, in particular hospitals, schools and government buildings.

The platform provides teaching/learning materials on how to renovate the various parts of the building envelope (wall, roof, top-floor ceiling, basement ceiling/floor slab, windows and doors), and discusses different insulation materials and systems, their advantages and disadvantages, and the right way to use them<sup>20</sup>.

## Skillset 3: Insulation materials

The learning module covers the engineering properties of insulation materials, such as the heat transfer coefficient (U value), reaction to fire, vapour diffusion resistance factor ( $\mu$ ) and specific heat storage capacity<sup>21</sup>. It covers different groups of insulation materials, such as raw materials and their manufacture, areas of application, installation and practical tips, health and safety aspects, and their ultimate disposal.

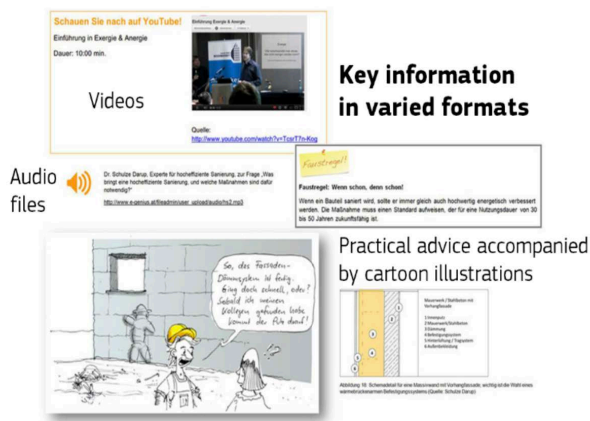
## Skillset 4: Façade systems

This learning module provides teaching materials on façade systems. It provides vast information on alternative structures for outside walls (with the appropriate insulation systems) and explains when insulating on the inside makes sense, and what needs to be taken into practical account in such cases<sup>22</sup>.

Learning materials are generally easily readable. The objective of the initiative was to develop learning modules that could be used by different types of schools and school grades<sup>23</sup>. Regardless of the qualification level of the learner, e-genius provides an ability to learn skillsets without any assistant<sup>24</sup>. The content is designed to enhance complexity and material depth so that it can be learned at different levels.

The learning materials are provided using a blended media approach to improve the learning experience. They include, for example, many practical examples, pictures, small video sequences and audio files, as shown in Figure 1. Key information is presented in the form of info boxes, rules or tips to achieve the most sustainable learning effect. This ensures that complex topics are conveyed in a practical and comprehensible manner<sup>25</sup>. A learner is then able to assess their knowledge by taking different tests for each skillset<sup>26</sup>.

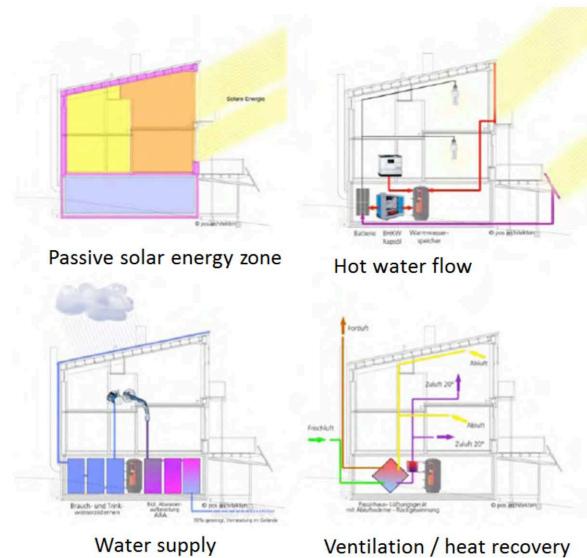
Figure 1: Blended media approach to presenting key information



Source: e-Genius<sup>27</sup>

The blended media approach also includes the provision of many visual learning materials, such as the example shown in Figure 2.

Figure 2: Example of visual learning materials on the e-genius platform



Source: GrAT<sup>28</sup>

Learning material content is primarily based on the research results of research programmes of the Federal Ministry of Transport, Innovation and Technology of Austria, as well as publications and research reports of the Climate and Energy Fund<sup>29</sup>.

Learning materials can either be used for self-learning or can be modified for teaching purposes, as required<sup>30</sup>. The materials are published under a Creative Commons license and are implemented on the basis of open software solutions<sup>31</sup>. This allows them to be used, modified and distributed free of charge, as long as they are not for commercial use<sup>32</sup>.

## 2

## Achieved or expected results

The TOCEB initiative was delivered by six experienced stakeholders<sup>33</sup>: the Centre for Appropriate Technology University of Technology in Vienna (Leader), ibis acam Bildungs GmbH - VET and Adult Education Training Institute (Austria), Association of Building Entrepreneurs of the Czech Republic, Prague, Centro Edile Andrea Palladio of the province of Vicenza, Vicenza - VET Centre in Construction of the province of Vicenza (Italy), Vilnius Builders Training Centre (Lithuania), and Polish Association of Construction Industry Employers.

E-genius is now a multilingual open-content platform providing 27 basic learning modules divided in 200 chapters<sup>34</sup>.

E-genius is now a multilingual open-content platform providing 27 basic learning modules divided in 200 chapters<sup>35</sup>. The learning modules have illustrative, practical subjects with a volume of 1,000 standard manuscript pages. The platform also offers 4 case studies, more than 500 interactive tasks including solutions of assignments, 31 online-learning paths for teaching and self-study<sup>36</sup>. A glossary with all terminologies for construction and energy themes is also provided in different languages.

The platform offers the following topics<sup>37</sup>:

- Photovoltaics;
- Solar thermal energy;
- Wind power and thermal power stations;
- Passive house buildings;
- Energy buildings and energy settlements;
- Innovative building concepts;
- Highly efficient renovation and energy efficient building materials, including insulation materials, façade system, etc.

At the end of the initiative, different language versions of e-genius (CZ, EN, IT, LT, PL) have been fully developed within the frame of the TOCEB project.

The e-genius teaching materials were developed on the basis of the latest research results from the areas of renewable energies and energy efficient buildings together with national as well as international experts<sup>38</sup>. During TOCEB initiative the initiative partners met twice per year to discuss the results and the progress of translation. All partners were able to give suggestions and recommendations in how to improve the e-genius platform<sup>39</sup>.

Vilnius Builders Training Centre was in charge of translating modules and assignments in Lithuanian language. By the end of the initiative, all the modules and assignments, which were presented in German language, were translated in Lithuanian. The audio and visual assignments were also recorded in Lithuanian language.

Newsletters and presentations on the TOCEB initiative were disseminated through the Vilnius Builders Training Centre, Vilnius Jeruzales Labour Market Training Centre, Lithuanian Builders Association, National Association of Passive House of Lithuania, and the Centre of Training for Energy Specialists, as well as universities, such as the Vilnius Gediminas Technical University and the Kaunas Technical University.

The e-genius online learning platform was awarded the prestigious Comenius-Siegel and the popular Comenius EduMedia medal by the European Association for Pedagogy and Information in Berlin on 25 June 2015<sup>40</sup>. With the awarding of the Comenius Medal<sup>41</sup>, which is regarded as the most prestigious award for educational media in Europe, the GPI supports outstanding ICT-based educational media in terms of pedagogy, content and design<sup>42</sup>.



## 3

## Perspectives and lessons learned

From an **educational perspective**, the Lithuanian VET teacher community says that the TOCEB initiative was evaluated positively. According to a VET professor, the e-genius platform is a great resource that enables teachers to provide students with a European approach energy efficient building construction<sup>43</sup>.

Most of the construction courses in Lithuania are based on old methods and tools. For example, the traditional literature used in classes is too old to be adapted to new methods on energy efficiency in the buildings<sup>44</sup>.

According to a Professor at Vilnius Gediminas Technical University, the e-genius platform is an important tool that provides teachers in Lithuania with modern teaching resources. Lithuanian teachers typically have to research on the internet to locate up-to-date teaching resources for students<sup>45</sup>. Most of the relevant resources are usually in English or other languages and translating information into Lithuanian is time consuming. Another barrier was that not all teachers understand English, which has often caused them to avoid teaching new methods to students, relying instead on resources that are available in Lithuanian or Russian<sup>46</sup>. The e-genius platform not only provides teachers with resources in Lithuanian, but also provides interesting case studies, assignments and tests, all of which can be used to teach new generations of construction professionals<sup>47</sup>.

The main strength of the learning modules, from the VBTC perspective, is that they are well structured and provide all of the necessary information for VET teachers and for students studying at VET schools<sup>50</sup>. The modules are also considered

From an **industry training perspective**, the Vilnius Builders Training Centre (VBTC) believes that the TOCEB initiative has been successful in Lithuania<sup>48</sup>. The e-genius platform is essential tool to help develop energy efficiency as an important discipline in the Lithuanian construction sector and to create a more qualified construction workforce in Lithuania<sup>49</sup>.

to be effective and beneficial to targeted groups because the e-platform focuses on four specific professions and because teachers / students / self-learning students can use the platform irrespective of their level of skills and experiences. This ensures an optimal learning speed for each learner<sup>51</sup>.

Looking forward, the Deputy Director at VBTC is unsure about the long-term sustainability of the Lithuanian language version of the e-genius platform, due to concerns about the availability of long-term financial backing or support. The TOCEB initiative and its funding ended in 2015<sup>52</sup>. It is planned to expand the e-genius platform with more information. Additional topics are also planned to be included in the platform, such as Smart Cities and Communities and Topic Renewable Energies. However, VBTC is unsure how much national financial support will be available to enable the platform to be expanded. No additional support has yet been confirmed<sup>53</sup>.

From an **implementation perspective**, a project manager of the TOCEB initiative says that the open content knowledge and learning platform was successfully integrated and implemented in the participating countries as the first open-content online platform with free teaching and learning materials<sup>54</sup>. The platform is widely used by teachers and students at VET institutions.

According to the TOCEB project manager, the success of the e-genius platform has led the implementation partners to define future objectives for the initiative. The aim is to expand the platform to offer learning modules on other topics, including heat pump technology, biomass firing systems. Another aim is to expand the glossary to include the most important terms used in modern construction and energy efficiency methods<sup>55</sup>. Cross-school cooperation through learning scenarios and team work will be also developed.

The TOCEB initiative offers new teaching methods and learning approaches as everything becomes digitalised<sup>56</sup>. The TOCEB project manager believes that the extended number of digital education materials available on the e-genius platform provide important flexibility for teachers and students. They can access all required information at any time. Another future objective of the platform is to make an 'e-genius mobile app', which will enable users to access platform content and information on their mobile phone free of charge<sup>57</sup>.

# Endnotes

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