

## EXPERT GUIDELINES

### FOR CONSTRUCTION SPECIALISTS' TRAINING ON SUSTAINABILITY

#### 1. INTRODUCTION

The purpose of this document is to provide guidance to vocational education and training (VET) specialists drafting training programs and teachers preparing lectures and trainings of construction sector qualified workers with focus on sustainability. The document can be used by high school specialists and lecturers for the same purpose, but illustrations and guiding questions shall be adapted correspondingly. The document provides core ideas, aspects of sustainability to teach, train and promote.

Although this document is not intended to be a prescribed course outline or “how to” list, it is intended to emphasize the essential components of a successful learning of the subject. Therefore, these guidelines can also be used by teachers of general education institutions, by employees of institutions and other stakeholders as well as personnel and human resources staff of construction companies.

The guidelines have been prepared in co-operation of Practical Skills Center (Poland), Riga State Technical School (Latvia) and Vilnius Jerusalem Labor Market Training Center (Lithuania), implementing **project “Ecofriendly worker 1.0” (No: 2021-1-PL01-KA210-VET-000032894)** funded by Erasmus+ Programme of the European Union.

The information required for the preparation of the guidelines was collected by analyzing the legislation, methodological recommendations, training programs and other relevant content in the partner countries. It is also in line with international and national instruments, regulations and standards governing the construction sector, and the legal and regulatory framework defining environmental performance.

## 2. TERMS AND DEFINITIONS

2.1. **Construction works** means **buildings** and civil **engineering works**.

2.2. **Sustainability** is the ability to exist constantly. **Sustainability** means making only such use of natural, renewable resources that people can continue to rely on their yields in the long term.

2.3. **Environmental impact** is defined as any change to the environment, whether adverse or beneficial, resulting from a facility's activities, products, or services. In other words it is the effect that people's actions have on the environment.

2.4. **Lifecycle of building (construction works)** – it is environmental impact of construction works through its whole existence, from extraction of raw materials to construction phase, use of construction works and finally demolition and disposal of waste. Environmental impact includes, but not limits to **carbon footprint**. It is possible make a **lifecycle assessment** of a construction works to find out how it will affect the environment in every stage of lifecycle.

2.5. **Carbon footprint** – the amount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organization, or community.

2.6. **Energy performance certificate** means a certificate which indicates the energy performance of a building or a part of a building, calculated and issued according to a State legislation.

## 3. MAIN ASPECTS OF SUSTAINABILITY

### 3.1. Definitions

There are many definitions or specific wording concerning different aspects or components of sustainability. It is often used in media, official and non-official announcements or advertisements without any explanation, quite often misleading not directly involved people. For “sustainable” or “green” today's construction participants necessary to have an understanding of at least some of them.

a) **Life cycle of building (construction works)** – whole existence or all stages starting from extraction of natural resources, transportation, production of materials or products, designing, construction (assembly), use, repair, renovation, demolition, extraction and separation of waste to materials in the same composition or shape found in nature and put back to nature or put to the beginning of other life cycle.

It shall be taken care in every stage of impact on environment including CO<sub>2</sub> emission, waste generation and other impacts on. It shall be taken care in every stage of possibility to separate or extract some materials in the same composition or shape found in nature instead of generation of waste.

*Illustration: The beginning of road life cycle is small stones extracted kilometers away and the end of road life cycle is same stones put to the same place.*

*Guiding questions: What do you know construction product with longest life cycle? Shortest life cycle? Which product is more environment friendly and why?*

b) **Circular economy** – an economic system aimed at eliminating waste and the continual use of resources. Circular systems employ reuse, sharing, repair, refurbishments, remanufacturing and recycling to create a close-loop system, minimizing the use of resource inputs and the creation of waste, pollution and carbon emissions. The circular economy aims to keep products, equipment and infrastructure in use for longer, thus improving the productivity of these resources. It does not mean a drop in the quality of life for consumers, it allowing us to keep enjoying similar products and services.

*Illustration:* All 'waste' should become 'food' for another process: either a by-product or by recovered resource, or as regenerative resources for nature, e.g. compost.

*Guiding questions:* What waste in construction site can be a raw material for another (or next) work?

c) **Energy performance of building** - European parliament and of the Council directive 2010/31/EU with amendment of 30 May 2018 promotes the improvement of the energy performance of buildings within the Union, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness following ambitious Union commitments to reduce greenhouse gas emissions further by at least 40 % by 2030 as compared with 1990, to increase the proportion of renewable energy consumed, to make energy savings in accordance with Union level ambitions, and to improve Europe's energy security, competitiveness and sustainability. The Directive obliges every country of EU to establish legislative minimum requirements for energy efficiency of buildings expressing them in short and understandable energy efficiency classes. Today's requirements are mostly known as A++ class or nearly zero energy building.

d) **BREEAM** is the world's leading UK sustainability assessment method for masterplanning projects, infrastructure and buildings. It recognizes and reflects the value in higher performing assets across the built environment lifecycle, from new construction to in-use and refurbishment (renovation). BREEAM assessment evaluates the procurement, design, construction and operation of a development against a range of targets based on performance benchmarks. It focuses on sustainable value across range of categories: Energy, Land use and ecology, Water, Health and wellbeing, Pollution, Transport, Materials, Waste, and Management. Each category focusses on the most influential factors, including reduced carbon emissions, low impact design, adaption to climate change, ecological value and biodiversity protection.

e) **Green building** is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life. There are a number of features which can make a building 'green'. These include: Efficient use of energy, water and other resources; Use of renewable energy, such as solar energy; Pollution and waste reduction measures, and the enabling of re-use and recycling; Good indoor environmental air quality; Use of materials that are non-toxic, ethical and sustainable; Consideration of the environment in design, construction and operation; Consideration of the quality of life of occupants in design, construction and operation; A design that enables adaptation to a changing environment.

f) **LEED** - (Leadership in Energy and Environmental Design) is widely used green building rating system. Available for all building types, LEED provides a framework for healthy, highly efficient, and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement and leadership. LEED is for all building types and all building phases including new construction, interior fit outs, operations and maintenance as well as core and shell.

g) **ISO 14001 standard** – is defined as an international environmental management standard specifying requirements for establishing an environmental management policy, determining environmental impacts of products or services, planning environmental objectives, implementing programs to meet objectives, and conducting corrective action and management reviews. Implementation of requirements of the ISO 14001 standard shall be proved by third party certificate.

*Illustration: Even producing environmentally non-friendly products company can introduce requirements and get the third party certificate, if it determined environmental impacts of product, have planned environmental objectives and set up programs to meet these objectives.*

*Guiding questions: A specific requirements of product and services are set in the standard. Can be standard applicable for construction company?*

h) **EU Ecolabel** – is recognized across Europe and worldwide, the EU Ecolabel is a label of environmental excellence that is awarded to products and services meeting high environmental standards throughout their life-cycle: from raw material extraction, to production, distribution and disposal. The EU Ecolabel promotes the circular economy by encouraging producers to generate less waste and CO<sub>2</sub> during the manufacturing process. The EU Ecolabel criteria also encourage companies to develop products that are durable, easy to repair and recycle. The EU Ecolabel is not mandatory and for granting of it companies' efficiency of environmental actions shall be guaranteed through third party controls.



i) **Eco design** – is an approach to designing product with special consideration for the environmental impacts of the product during its whole lifecycle. In a life cycle assessment, the life cycle of a product is usually divided into procurement, manufacture, use, and disposal. Eco-design is a growing responsibility and understanding of our ecological footprint on the planet. Green awareness, overpopulation, industrialization and an increased environmental population have led to the questioning of consumer values. It is imperative to search for new building solutions that are environmentally friendly and lead to a reduction in the consumption of materials and energy.

j) **Passive house** – is a voluntary German standard for energy efficiency in a building, which reduces the building's ecological footprint. It results in low energy buildings that require little energy for space heating or cooling. It is first well known private initiative on energy performance of buildings especially focusing on using 'passive energy' occasionally generated in a building by uses, residents or (household) equipment.

### 3.2. Energy consumption during use of construction works

The construction works itself and the users are main “influencers” of energy consumption of construction works.

The energy consumption of buildings first of all determined by designer and expressed by energy performance class. The requirements for class may be slightly different in every country. Highest is “A” or “A++” class. For buildings it is mandatory to start designing having targeted energy performance class not lower than required by country legislation for certain type of building.

For engineering works (as roads, pipelines, sport fields etc. ), where usually is no heating or cooling systems or they are radically different from buildings, energy consumption as a target is set by the owner and it’s needs.

In other words **intended use** or predicted processes in building and engineering works, users’ needs and typical users’ behavior are primer preconditions for energy performance as a target. It is because high energy performance may fail when owner starts using building or engineering works for different, than was foreseen in design purpose.

Every user of building shall follow rules (in most of cases unwritten), but not refuse of hygiene, health or beauty habits and living comfort.

Very low or zero external not renewable energy use of building is final goal of designers, construction products or elements producers and construction engineers as well as workers, not compromising high comfort and hygiene level.

*Illustration: A++ energy class house inhabitants must not shave their heads that building would comply with maximum amount of energy used to produce hot water.*

*Guiding questions: Is it a correct energy saving measure to keep internal temperature of living rooms in winter time 2 °C lower than the standard?*

**Energy performance of building** must cover at least the following aspects of energy consumption:

- a) Actual thermal characteristics of the building (thermal capacity; insulation; passive heating; cooling elements and thermal bridges);
- b) Heating installation and hot water supply, including their insulation characteristics;
- c) Air-conditioning installations;
- d) Natural and mechanical ventilation which may include air-tightness;
- e) Built-in lighting installation;
- f) The orientation of the building and outdoor climate of the place of building;
- g) Passive solar systems and solar overheating protection;
- h) Indoor climatic conditions;
- i) Internal loads of heating (people, equipment generating heat (computers, TV and other).

Energy performance of building must cover also the positive influences – energy saving aspects:

- 1) Solar exposure conditions, active solar heating and electricity systems;
- 2) Electricity produced by cogeneration;
- 3) Natural lighting;
- 4) Use of on energy from renewable sources at the building or nearby.

**Energy performance certificate** of building shall be issued before starting use of building after construction or refurbishment. Issuing the certificate includes simple check of building, “A” and higher classes usually includes airtightness testing by accredited laboratory. Threshold values.

Energy consumption during use of construction works mainly depends on design solutions and use of right products and materials. Bad quality of installation works has crucial influence on it: thermal bridges, airtightness, thermal insulation envelope, heat loss in piping system or overheating of some parts of building because of that (extra cooling needs), lower than foreseen thermal insertion of walls and ceilings - in buildings, heat loss in pipelines, extra heating needs against dangerous icing of outside elements – in engineering works and other.

Correct maintenance of building is underestimated today. For example adjusting and lubricating windows and doors in every second year to have the same airpermeability class of building envelope or reprogramming the automated heating/cooling system depending on number of residents or schedule of use.

**Big danger of bad quality or defects – mostly it has no evidences at the beginning of use. When evidences appear – it is much too expensive or sometimes impossible to correct!**

*Illustration: An “A+” class building - former bakery, where by baking process generated heat covered all heating demand of building, now is office of C class performance, because earlier heating system and efficient thermal insulation where not needed and thereof not installed and heating demand now is much higher.*

*Guiding questions: Can refurbished lighting system (into automated LED) of an office cause higher energy performance class of the building? Can wrong installation of electrical engineering system cause lower than planed energy performance class? How and why if can and if cannot?*

### 3.3. Energy consumption during construction

Cranes, trucks, lighting, heating winter time, welding, drying by heat generation, drilling and use of many other machinery and processes shall be planed basing on ‘best available’ technology.

Proper consequences and seeking to do everything once without repair or replacing.

‘In time’ has a meaning in chain of sustainability – if all or a part of building finished earlier than planned or some parts finished too late – empty premises would be necessary to heat and keep at least some energy using systems running for no purpose.

In many countries 'demolishing' is a type of construction activity. So, it would be time to plan energy needed to demolish construction works during design and construction. Selection of proper product characteristics, structural solutions and assembling could minimize energy for demolishing and sorting all waste into reusable, recyclable and disposable.

*Illustration: Unnecessary high class of concrete will cause higher energy amount for demolishing. Construction works can be not sustainable at that aspect because of that.*

*Guiding questions: Can be extra energy used because of bad planning of construction process? Can be extra energy used for construction of building because of faulty casting of concrete?*

### 3.4. Use of other resources

It covers all stages – construction, use, repair and use construction works stages. For workers most important are construction, repair and renovation stages.

In construction and renovation stages it is unavoidable to use all resources foreseen in design. Main issue – how to minimize extras: extra land, will not be under the construction works, but necessary to install temporary office, storage, waste collection place, cranes, reinforcement and other construction elements production or assembly place, security and workers premises. Engineers shall take care in planning stage of it, but workers play a crucial role in construction stage.

Other recourse No 1 is water. We are: drinking water, using water for technology processes, using water for household at site, hygiene needs and for auxiliaries (equipment, site washing etc.). Waste water is also important to consider. When used water in necessary way gets to sewerage system, somewhere electricity will be used to pump it and to clean it up; in addition certain amount of oxygen will be used for that.

All practical measures are welcome:

- settlement tanks, where dust can be settled down and water shall become suitable to use once again;
- cleaning firs when washing instruments and tools;
- accounting consumption of water and installing bonus system, when used amount is going down and staying low etc.

Important other recourse still is timber (or wood). It means timber for installation auxiliary things like stairs, paths, fences, temporary supports and other construction site needs. It does not mean making paths or stairs of thinner section of timber comprising security, but it means cutting timber in such a way, to get as little as possible or zero small pieces to waste.

List shall cover but not limit to soil, aggregates, solvents, plywood for formwork, cleaners, lubricants, temporary fasteners etc.

**It means keep all pieces clean in dry tidy place and reuse them as many times as possible – task for construction workers!**

Important to remember – employer can increase salary of workers having significant savings of resources in site.

*Illustration: To call yourself a "green" worker, you should not drink as little water as possible, but try to consume as little fresh water as possible: do not keep the water tap open for a long time after adding water, not throw away half a bottle every evening and take the new one every morning, do not pass through an incompletely closed drinking water tap or water pump without closing it completely.*

*Guiding questions: Is it a good way to store water to collect rainwater and then moisten the hardened concrete with it?*

### 3.5. Use of environment friendly construction products and auxiliary materials

Some countries already have databases of environment friendly products or suppliers of them. **Even two identical construction products can be totally different in impact on environment because of different quantity of energy used to produce and transport them to construction site!** Today is slowly growing initiatives, but in near future can become mandatory in European countries to calculate and declare the amount of energy used to produce and transport every construction product! It should be a part of Declaration of performance of construction product.

In present time in EU and in many countries legislation limits or prohibits some substances in construction products. European Union regulations REACH adopted and directly valid in every EU country to improve the protection of human health and the environment from the risks that can be posed by chemicals. It also establishes assessment methods to be used, order and rules for registration of products, declaration of substances in them and information of uses of products. Worker shall know that the result of REACH is safety label on every construction product, containing substance from the REACH register. Safety Data Sheet demonstrates that the product conforms to legal requirements and there are mandatory workers' and environment's protection measures on it.

Water-based materials - they do not need the solvents needed to prepare the mixture or wash the instruments; they are also an important ingredient in the preparation of many dry mixtures (paints or glues) by hand.

Eco-labels contribute significantly to the selection and development of environmentally-friendly building products. Their purpose is very wide, as they can be used starting with providing clear information to the user and ending with evidence supporting building certificates.

There are 3 types of ecolabels: Type I Ecolabels - Consumer-friendly and externally-tested; Type II Ecolabels: Self-declared environmental claims; Type III Ecolabels: Transparent, Comprehensive, and Independently Verified.



Packaging of some construction products and auxiliary products often is an issue for environment as well. There is usually a choice of products or materials packaged in different ways. It is possible that the method of packaging is determined by the quantity of products or materials selected as well as the way they are transported to the site. However, when choosing



materials or products, the company could assess the amount of packaging waste each time and try to choose a packaging method that minimizes waste.

Due to the wide range of offers on the market, an environmentally friendly company should only look for and purchase auxiliary products and materials that can be reused or have the shortest life cycle.

**If the choice of construction products is the task of the worker, it is necessary for him to consider the choice of such products which: are the most natural; contains no solvent; uses as less as possible packaging material; are Eco labeled with manufactures declaration of performance; are the shortest transported to the construction site; are supplied by supplier from “green suppliers” list or those who have ISO 14001 certified environment management system; are recyclable after use, but durable at needed degree.**

*Illustration: An igloo (Inuit languages: iglu) also known as a snow house built of snow, typically built when the snow is suitable. It is fun, but is true – the natural suitable snow in snow field could be recognized as most environment friendly construction product without any labeling as well as declaration of performance and certificate.*

*Guiding questions: Can you name all aspects, why natural (suitable for construction of Igloo) snow is environment friendly construction product?*

### 3.6. Waste management

There are defined two types of waste in construction – **construction waste** and **hazardous waste**. All requirements to management are different depending on type of waste.

Best management of waste – reduce generation of waste. It can be even economically beneficial for construction company. Or opposite – excess generation of waste always affects profit of company and negatively influencing salaries, including workers. Second good practice of waste management – reuse or convert waste into raw materials. Non-hazardous inert construction waste generated on site can be shredded by mobile equipment and reused in construction as provided in the construction design (project). Third possibility – sort waste and supply it for reuse directly in other construction processes or supply it for recycling.

Sorting, accounting and storage at site shall be done at least according to country and local requirements, but often according to more accurate company policy and rules. Hazardous waste usually shall be handled, packed, marked, stored and accounted according to legislation (rules or procedures). Most of these requirements should be part of the training curricula. Pupils and students should be able to recognize hazardous waste common in every construction site.

*Illustration: If we don't sort the waste at the construction site, it will be taken somewhere in nature, piled up in one big pile, and filled with earth, forming a hill that we will admire for several hundred years. But every time we admire this "beauty", we will not know how much effort various specialists put or should put into preventing the rainwater from this landfill to get into local creek, generated gases or nice district of residential houses in the neighborhood.*

*Guiding questions: Would it be sufficient to sort waste into renewable and non-renewable? What should it depend on?*

### 3.7. Durability of construction works

The construction works designed to be used specific time taking into account certain maintenance actions and measures under 'normal' exploitation conditions within allowable degradation. It is called "durability". Durability is a basic performance characteristic of mostly every construction product. If construction works not durable enough (compare to planned period) it will be necessary repair, renovate or demolish – it would be clear failure of sustainably - resources, products, energy, waste etc. again instead of successful use and planning finances maintenance only. In other hand too durable construction works would be too expensive or would demand too much energy for 'too early' demolish taking into account good physical condition of some parts of construction works.

What durability characteristics shall be respected of certain elements of construction works:

- Wear resistance of flooring, paving and other surfaces;
- Freeze-thaw cycling resistance;
- Resistance to light and UV radiation exposure;
- Resistance to rotting of organic materials;
- Resistance to corrosion of steel elements;
- Resistance to crumbling or other failure as a result of evaporation of bonding resin or plasticizer;
- Resistance to loss of thermal resistance because of leakage of inert gasses;
- Resistance to cleaning agents and solvents;
- Resistance to fatigue from many times repeated loading.

*Illustration: If you put a pear into fridge (-15°C), take it out after a month and thaw (unfreeze) it – you will be able eat it as it would be fresh. If you thaw (unfreeze) it after a week and freeze and unfreeze it every day, it will come black after several times and you will have no idea to eat it. Take a closer look to concrete pavement tile – it will have some degradation evidences after three years of exploitation in Lithuania and no any evidences in north of Norway, where it freezing and thawing once a year.*

*Guiding questions: Why plastic pipe is like new after a year in a soil, but "milky" color and non-glossy surface after a sunny spring and summer in open storage at construction site?*

### 3.8. Social activity and culture

#### a) The role of the employer

Most people believe in the need to act sustainably to protect the environment. A frequent employee understands that small actions add up to collective impact; however human beings are surprisingly averse to change: we struggle to adapt our behaviors and to adopt new habits, even when we want to. Knowing and wanting isn't always enough. Smooth green change requires a clear understanding and acceptance among employees. That is why it is important to have a set of clear organizational core values that are communicated effectively and discussed with the employees so that they feel part of it. It is the commitment that an organization or a company makes to certain policies and actions "going green". It is not enough to state this in the mission statement, brand story or in marketing and promotional material. It is crucial that demonstrable actions are taken regularly so that the employees feel an individual and personal responsibility towards these values. This will ensure that they can evaluate their own attitudes

towards these positive core values, and take pride in them. The involvement of employees in the “green change” process could increase employee awareness, accommodate their initial doubts and thus lead to increased consciousness for “green change”. This could result in higher employee motivation to up-skill and thus a smoother implementation of the related new green procedures and technologies. Furthermore, employee participation can reduce the negative effects of green change on job quality. Employees need to know both why an action is important and how to do it. And hearing a message multiple times, in multiple ways, is often necessary for it to sink in.

Evidence shows that although “green change” definitely brings savings to business, it is not automatically beneficial for employees in terms of, for example, saved jobs, higher income or qualification, better health and safety, etc. The benefits resulting from “green change” are usually either not clearly communicated and thus not understood or not provided altogether. Lack or limited awareness of the benefits of “green change” and a lack of understanding of this process may lead to employee resistance to “green change”, inadequate efforts and adverse attitudes towards the implementation of “green change” processes. Thus, benefits need not only be shared, but also clearly communicated.

Many organizations are adding Sustainability or Green Practices sections to their websites as a way to communicate their commitment to sustainability to their customers and employees as well. These web pages often explain the organizations’ goals and current green practices. Another source of information may be Sustainability Reports. They can range from informal quarterly reports to more formal annual reports, which can be distributed to staff or the public by email, intranet or website.

*Illustration: An enterprise's efforts, if not purely declarative, to protect the environment will only be effective if the change strategy chosen by the employers engages as much as possible the employees who will support the "go green" goals set by the employers and the "go green" actions chosen by the company.*

*Guiding questions: What measures should employers take to get as many employees as possible to the "go green" path chosen by the company?*

### b) The role of the employee

As they’re deciding how to act, people look to both leaders and peers. If others they respect are doing or endorsing behaviors, people are likely to follow them. Group activities can be a way to make people feel that peers are also engaged. Green teams are instrumental in creating positive environmental change within an organization. Gaining the support of management for your green team is important to ensure the team has the resources it needs to be successful. Before meeting with management, prepare a strong value statement to articulate the green team’s benefit to the organization. Value statement should define why being green is meaningful to the business and its employees. Not every green team will have management support via official status, budgets, or endorsed initiatives. Even an a volunteer status, a team can accomplish no-cost, easy actions such as setting up basic recycling and educating coworkers about behaviors that save energy and resources.

Establishing and prioritizing clear goals will keep the team focused and motivated, and provide the team, coworkers and management with a clear picture of what the team accomplishes. A good goal is specific, contains actions, and can be measured and accomplished in a reasonable timeframe. Prioritizing goals will help guide the direction of green team's activities and initiatives. That is why the team should have a simple sustainability plan that incorporates focus areas, baseline information, goals and prioritized items. Focus areas could include waste prevention, recycling, composting, water, energy, social sustainability, transportation, and purchasing. These tactics may seem simple, but everyday habits and routines are very important for developing environmental habits at work.

There are many easy steps you can take to ensure both your green team and your coworkers are engaged and excited about the work you are doing. Engaging and energizing staff around green team initiatives is a key to green team's success – after all, it's coworkers who implement green team's ideas. So every time communication with staff (during staff meetings, employee blog or newsletters, annual sustainability event, discussion groups, etc.) is an opportunity to educate and engage. Even lunch time gatherings are a great way to raise awareness, engage and educate employees on sustainability issues. It is necessary to discuss the green initiatives, implemented green practices and success stories. It's also okay to share some upcoming projects, but they should be coupled with goals already attained.

*Illustration: One or more groups of employees should come together in a company that has chosen the path of "greening" to promote sustainability in their daily behavior and actions and to try to involve as many colleagues as possible.*

*Guiding questions: What peer-pooling activities can a team of proactive employees do to create an environmentally friendly work culture within the company?*

### c) The role of the VET centers and high schools

Every school should encourage its students to try and make sense of the most pressing issues defining our times. The high demands placed on schools to help their students cope and succeed in an increasingly interconnected environment can only be met if education systems define new learning objectives based on a solid framework, and use different types of assessment to reflect on the effectiveness of their initiatives and teaching practices. In this context, PISA aims to provide a comprehensive overview of education systems' efforts to create learning environments that invite young people to understand the world beyond their immediate environment, interact with others with respect for their rights and dignity, and take action towards building sustainable and thriving communities. A fundamental goal of this work is to support evidence-based decisions on how to improve curricula, teaching, assessments and schools' responses to cultural diversity in order to prepare young people to become global citizens.

VET centers and high schools are users of buildings and engineering works. It is key importance, that future specialist form habits of behavior practically all day, not only theoretically during lectures and seminars.

It would be very helpful, if center or high school could demonstrate and involve everyone in own advanced waste sorting, energy use of building observation, photo voltaic elements, heat



pomp, ventilation and recuperation, LED lighting system, indoor climate indicators registration, outdoor weather sensors in use observation. Would be much appropriated to organize participation in airtightness and thermovision test, preferably of problematic zones of own premises or building. All staff of VET center or high school shall follow internal rules on sustainable use of building and silently be an example of habits and behavior.

Finally, educating for global competence can help form new generations who care about global issues and engage in tackling social, political, economic and environmental challenges. The 2030 Agenda for Sustainable Development recognizes the critical role of education in reaching sustainability goals, calling on all countries “to ensure, by 2030, that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development” (*Target 4.7, Education 2030, Incheon Declaration and Framework for Action, page 20*).

*Illustration:* Already in a vocational or higher school, the “green” habits of a future specialist can be formed, which he would apply not only in the workplace, but also in his personal life.

*Guiding questions:* By what means, methods or examples can an educational institution influence the formation and consolidation of a pupil’s / student’s “green” skills?

#### d) The role of the initiatives of pupils and students

Every pupil and every student can take action for collective well-being and sustainable development. This dimension focuses on young people’s role as active and responsible members of society, and refers to individuals’ readiness to respond to a given local, global or intercultural issue or situation. This dimension recognizes that young people have multiple realms of influence ranging from personal and local to digital and global. Competent people create opportunities to take informed, reflective action and have their voices heard. Taking action may imply standing up for a schoolmate whose human dignity is in jeopardy, initiating a global media campaign at school, or disseminating a personal view point on the sustainability via social media. Globally competent people are engaged to improve living conditions in their own communities and also to build a more just, peaceful, inclusive and environmentally sustainable world.

Any initiative on sustainable use or small refurbishment (renovation) of center or school should be promoted and supported. It even can replace some lectures or trainings. Better, but not must it is in connection with future qualification.

*Illustration:* A group of students decides to initiate an environmental awareness campaign on the ways in which their school contributes to local and global waste and pollution. With support from their teachers, they arrange a series of talks on how to reduce waste and energy consumption. They also design and strategically distribute information posters that help guide students to make better choices when buying products and when disposing of waste. Furthermore, they collaborate with both student representatives and school administrators to introduce recycling bins and energy conservation strategies on the school premises.

*Guiding questions: What tools, methods or examples can be used to ensure the greatest possible involvement of peers in pupils'/ students' sustainability initiatives?*

#### 4. METHODS OF TRAINING

The teaching of sustainability in a particular training program may be a separate embedded module or a component of each module of the program content. This theme can also be presented in combination, with a greater part of the program introductory module and information inserts related to the content of each subject module. However, a separate (preferably introductory) module of the program is recommended for a consistent and effective presentation of the topic.

Traditional approaches to training still offer a number of benefits and are commonly found in many schools and companies today. Here is a list of training methods from the traditional category that should be considered when choosing the best training techniques for pupils and students at school or employees in company:

1. **Classroom-Based Training** usually led by a teacher or qualified facilitator. Classroom learning takes place over one or more days in a physical venue on- or off-site. Groups of students or employees go through a series of presentation slides and activities, like case study assessments or information on environmental issues and requirements. The advantage of classroom-based training is that a group of students or employees can attain large amounts of knowledge at the same time. Unfortunately, most students and employees find this approach to training boring.
2. **Interactive Training** is one of the most effective training methods in the workplace. Interactive training actively involves learners in their own learning experience. This training can take the form of simulations, scenarios, role plays, quizzes or games. By practicing their new skills and applying them in realistic work scenarios, learners are not only more engaged but more likely to retain what they've learned, too. However, it can be time-consuming when done in person, especially when learners require regular feedback from a content expert.
3. With **On-The-Job Training**, not only are learners actively involved in learning, but they also participate in real activities that relate to their current or future job. This is one of the most effective training methods for succession planning. This type of training can result in rapid learning because learners are thrown into the proverbial deep end. This experience can be a little too stressful for some learners, let alone time-consuming, because of the frequent input required.

It is likely that sustainability module taught to pupils in schools should include classroom-based training and discussions in small groups with specific situations selected. Meanwhile, a combination of interactive training and on-the-job training would be more appropriate for apprentices and employees.

## 5. EXPECTED RESULTS AND ASSESSMENT

After completing the sustainability module, the successful candidate is expected to:

### General Competence:

- be able to communicate about professional issues relevant to environmental protection and sustainable use of resources, on a common level;
- be able to apply acquired knowledge and skills within new work tasks and atypical situations;
- be able to read a job descriptions and instructions, understanding where it is appropriate to apply the knowledge and skills gained.

### Knowledge:

- have general knowledge about environmental protection and sustainable use of resources;
- have general knowledge of the planning of environmental measures and the sustainable use of resources;
- have specialized knowledge about selected topics when dealing with different work tasks;
- have main qualification related knowledge of every mistake, failure, misuse influence to sustainability of construction works.

### Skills:

- be able to comment and make suggestions on how to improve the company's environmental practices and sustainable resource management strategy;
- be able to identify the necessary measures and develop a plan for the application of environmental measures and the sustainable use of resources in a specific task;
- be able to identify operational challenges/problems in environmental measures and the sustainable use of resources plan and to assert the measures and methods to resolve these;
- be able to select relevant measures and methods for approaching a given environmental problem;
- be able to choose and use relevant tools or technology in implementing environmental problem solution methods.

There is no need for a separate assessment of this module. However, sustainability control questions or tasks can be used to assess the knowledge and skills acquired through other modules in the curriculum.

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