

**PREPARE**



Education and Culture DG

Lifelong Learning Programme

# **Final Report**

## **Training on Resource Efficiency and Optimization (TREO)**

# Table of contents

1	Project .....	3
1.1	Partnership .....	3
1.2	Workplan .....	4
2	Workshops .....	5
2.1	Workshop on Building sector .....	5
2.2	Workshop on Mobility and transport.....	6
2.3	Workshop on Food .....	8
2.4	Workshop on Energy .....	12
2.5	Workshop on Tourism.....	14
3	Sector-specific courses .....	18
3.1	Course on Building sector .....	19
3.2	Course on Mobility and transport .....	22
3.3	Course on Food .....	25
3.4	Course on Energy .....	27
3.5	Course on Tourism .....	30
4	Dissemination .....	33
5	Conclusions .....	35
5.1	Recommendations for further work .....	35
	Annex I .....	37

# 1 Project

TREO (Training on Resource Efficiency and Optimization) was a partnership project implemented from October 2013 to June 2015. Its main objective was to transfer and exploit the vocational education and training (VET) European Course on Eco-efficiency developed within the TRUST IN partnership<sup>1</sup> to VET schools, business representatives and enterprises in partner countries, and implement it through interactive and innovative processes with enterprises and teachers and trainers at the partnering VET institutions.

The overall project objective was the transfer and practical implementation of the VET Course on Eco-efficiency including sector specific training courses in the following areas:

- building and construction,
- food,
- mobility,
- tourism,
- renewable energy sources and energy-related products.

The project was built on the concept of the VET training course developed within the Leonardo Lifelong Learning project "European Training Partnership on Sustainable Innovation" (TRUST IN). It aimed at linking this concept with the world of practice and facilitating its adaptation, practical implementation and further spread with VET professionals, enterprises, professional associations, chambers of industry and commerce, regional and local authorities, and higher education institutions. Special attention was given to facilitation of participation of specific sectors (see above).

The project partners organized workshops in different countries, each workshop specialized in one of the sectors mentioned above. Relevant stakeholders from the guest country were always invited to the workshop. In total, five workshops were organized (see chapter 2).

## 1.1 Partnership

The project Partnership was formed by the following organizations from the whole Europe:

- Aalborg University, Denmark
- Enviros, Czech Republic
- University of Maribor, Slovenia
- Stenum, Austria
- Fonden Dansk Standard, Denmark
- Austrian Institute of Ecology, Austria
- Nigrad, Slovenia
- Propektiker, Spain
- National Laboratory of Energy and Geology, Portugal
- Atmoterm, Poland
- Centrul National Pentru Productie si Consum Durabil, Romania

<sup>1</sup> Project nr. 2010-1-DK1-LEO04-01870 10.

- Camera de Comert, Industrie si Agricultura Timis, Romania
- Subalansuotos pramones pletros centras, Lithuania
- Social and Environmental Responsibility Centre, Bulgaria

## 1.2 Workplan

The project activities were implemented in accordance with the workplan developed in the beginning of the project:

Meeting	Date	Country
Kick-off meeting	October 2013	Slovenia
Workshop on Building sector	December 2013	Austria
Workshop on Mobility and transport	March 2014	Spain
Workshop on Food	June 2014	Denmark
Workshop on Energy	October 2014	Slovenia
Internal project meeting	December 2014	Denmark
Workshop on Tourism	April 2015	Romania
Project meeting on Building certification schemes	May 2015	Austria
Final meeting	June 2015	Czech Republic

In chapters 2 and 3, the main activities and outputs of the project are provided – i.e. description and summary of recommendations from the sector-specific workshops, and sector-specific courses on resource efficiency including definition of learning units and outcomes according to the ECVET system.

Additional information about the project can be found in Annex I.

## 2 Workshops

Within the project timeframe, five sector-specific workshops were organized:

- |                                      |                        |
|--------------------------------------|------------------------|
| • Workshop on Building sector        | December 2013, Austria |
| • Workshop on Mobility and transport | March 2014, Spain      |
| • Workshop on Food                   | June 2014, Denmark     |
| • Workshop on Energy                 | October 2014, Slovenia |
| • Workshop on Tourism                | April 2015, Romania    |

In the following sub-chapters, summary of the workshops is provided.

### 2.1 Workshop on Building sector

#### Day 1

After meeting in Aspern Seestadt, the participants did a guided site visit of the new city project lakeside Aspern+, which is in the east of Vienna and has an area of 240 ha (hectares). During the visit of Vienna's urban lakeside Aspern, the participants got an insight into the most important urban development venture ever initiated in Vienna and one of the largest of its kind in all of Europe. The city is to be built in several construction phases over a period of at least two decades. The project is one of the leading examples in terms of sustainable urban planning in Austria and should be completed by 2028, when 20,000 residents will live there and 20,000 jobs should be offered. All of the buildings are assessed by the assessment tool Total Quality Building (TQB), which was presented after the site visit by the first lecturer and architect Beate Lubitz-Prohaska (Austrian Institute of Ecology). TQB is an open source online tool, which was produced by five different institutions in the field of sustainable construction. The building certificate itself is issued by the ASBC – Austrian Sustainability Building Council and is called "TQB certification". It is aimed at optimizing the building in the planning and using stage. Therefore, buildings can receive a planning certificate and a finished building certificate. Furthermore, follow up measurements in the final building have to be done. The certificate is in conformity with the CEN standards and the methodology went through a 3rdparty assessment. The tool uses five main categories (location and facilities, economy and technical quality, energy and supply, health and comfort, and resource efficiency) with many sub criteria which are assessed and scored. Besides the already assessed 75 projects, about 50 other projects are currently in treatment (12/2013). The IQ building, which is on the areal of lakeside Aspern+ and already certified with the TQB was presented by Felix Heisinger from IBO – Institut für Baubiologie und Bauökologie (Austrian Institute for Healthy and Ecological Buildings). The office building has a plus of energy by producing electricity with photovoltaic and voltaic cells, using modern lighting and ventilation systems as well as improved insulation and shadowing.

#### Day 2

As an expert for VET education, Johannes Fechner presented the Austrian Climate Initiative klima:aktiv programme and related projects to prevent and mitigate climate change through voluntary measures including developing standards e.g. for smart buildings. Since 10 years the programme, which focuses on training and education, is active in the field of buildings, energy savings, energy efficiency, renewable energy, and mobility. A crucial point to the success of both

the programme and the education is the cooperation with other training institutions, the partnership with experts, and the direct contact to households and companies. The programme works among others with the Chamber of Commerce training institute, one of the biggest suppliers of training in Austria. Together with the Austrian Institute for Ecological Building they developed an e-learning platform.

Mr Fechner highlighted that the promotion of energy efficient and sustainable buildings depends strongly on the costing of the project, especially regarding the value of certificates and standards for investors. The discussion included how technicians can get updated knowledge on new energy and building technology including the use of certificated training and mutual recognition of training. In Austria there is a huge lack of skilled people to renovate buildings.

After the presentation of Johannes Fechner, the participants discussed which recommendations for resource efficiency training in the building sector can be derived and some questions arose:

Generally, the result of the TRUST-IN project gives a brief overview of VET in several of the participating countries in TREO, but what are the best training methods? Which topics should be covered? What can be improved and what could be added?

To answer these questions, the proposed course content should be presented to different stakeholders in our countries.

During the presentations, not all of the questions regarding best practices of smart and sustainable cities could be answered. The discussions led to the consensus that there is a need for the involvement of more stakeholders in order to obtain recommendations for VET. Therefore, each partner country asks relevant stakeholders (e.g. architects, project planners, civil engineers, building and construction craftsmen) of the building sector the following questions until the next meeting in San Sebastian in March 2014. The questions are related to the outcome of the TRUST-IN project:

- 1) Which issues are missing in the course design in TRUST-IN? Which competences should be covered? (Competences = Knowledge and skills – which can be obtained through education, training and work experience)
- 2) Which didactics can you recommend for the training?
- 3) Which training providers would you suggest for the training?

These questions can also be used for the other topics (tourism, mobility, energy, and food) in order to receive competent and topic related recommendations. When discussing the questions with stakeholders, it might be necessary to detail and specify the questions according to the content of the TRUST-IN results.

## 2.2 Workshop on Mobility and transport

The second TREO workshop held in San Sebastian, consisted on two differentiated sessions; the first one counted of the active participation of external relevant stakeholders from mobility and transport sector, as well as internal TREO partners, while the second one was developed only with the participation of internal TREO partners.

### Day 1

The first workshop session counted on the active participation of several relevant stakeholders from the mobility and transport sectors and VET training domain in the Basque Country. This

session was divided within two differentiated parts: in the morning, 6 representatives of several institutions and organizations presented their own experiences in relation to the sector and the VET area, while in the afternoon, all guests and TREO members participated actively in a participative dynamic session.

#### Presentations from the morning session

- Jakot Karrera – Planning Technician of the Territorial Transport Authority of Gipuzkoa province: Jakot Karrera presented the objectives, competences and activities of the Transport Authority, focusing especially on the successful Fare Integration project already implemented in the province: the same e-card with different operators (train, bus, ...), same zones for all, same prices and fares, same discounts and with special transfer conditions. He talked about future challenges, in relation to interoperability and new ticketing solutions among other issues.
- José Viteri - General Manager of the Cluster of Mobility and Logistics of Basque Country (private non-profit business association): Jose Viteri presented the objectives and milestones of the Cluster, highlighting the importance of the different stakeholders' role in the sector, as well as the impact of this sector in the Basque economy.
- Tamara Gómez and Josu Benaito – Technicians of the Mobility Department of San Sebastian Mobility: Tamara Gómez and Josu Benaito introduced the strategy on sustainable mobility of the San Sebastian municipality. This strategy is based on the following ideas:
  - Building the pedestrian network
  - Vertical public transport
  - Bicycle back to town
  - New public e-bike sharing system
- Concepción Garcia and Roberto Simal – Teachers from 2 VET training centres – Mobility and Transport module: Concepción Garcia and Roberto Simal presented the existing offer on mobility and transport, especially in relation to sustainability, in the current VET Basque system.
- Jon Labaka – Technology Innovation Coordinator of TKNIKA, the Centre for Innovation in Basque Vocational Training (Basque Government): Finally, Jon Labaka made an introduction of TKNIKA centre, as for the ongoing and developed projects in relation to sustainable mobility. A part from this presentation, an onsite visit to the centre was carried out, showing some projects outputs related to automotive sector (electric cars, ...), shipping sector (new materials, ...), etc.

#### Participative dynamic afternoon session

Finally, the afternoon session started with the presentation of some main current and future challenges related to sustainable mobility and training, in order to discuss in groups how to face this challenges. Several interesting ideas were identified through the active interaction of all the participants (TREO members and the previously mentioned guests).

### **Day 2**

All TREO members participated in this last session, with the following main objectives:

- To summarize the main ideas discussed the previous day as for sustainable mobility and transport in relation to resource efficiency, vocational education and training.

- To analyse and discuss the recommendations obtained from the previous TREO meeting in Vienna on sustainable construction sector (1st workshop held in Vienna).
- To define the next steps in order to involve more agents and obtain additional feedback from relevant stakeholders in each of the TREO partnership countries.

This way, all participants agreed that each partner country would ask relevant stakeholders of the mobility and transport sector the following questions until the next meeting in Copenhagen in June 2014. The questions are related to the outcome of the TRUST-IN project:

- 1) Which issues are missing in the course design in TRUST-IN? Which competences should be covered? (Competences = Knowledge and skills – which can be obtained through education, training and work experience)
- 2) Which didactics can you recommend for the training?
- 3) Which training providers would you suggest for the training?

This feedback will lead to a good quality obtaining of recommendations on resource efficiency training in the sector.

## 2.3 Workshop on Food

The food industry mainly consists of processors, manufacturers and distributors and is the third largest industry in the EU. About 90 Mt (million tonnes) of food is wasted annually in Europe – agricultural food waste and fish discards not included.<sup>2</sup>

The distributors are providing food to the retail sector, the leisure sector, the public sector and to the households through the retailers etc. The retail sector and the households generate alone 40% of the food waste generated in EU. Restaurants and public and private canteens also contribute significantly to food waste.

In the workshop, held in Copenhagen 12th June 2014, the focus was on food waste at canteens, restaurants and hotels. It consisted of 4 presentations; the lectures were

- Stig Hirsbak, Aalborg University: welcome and introduction,
- Michael Jorgensen, Aalborg University: Integration of environmental concerns in design and re- design of food products: innovation in products chains,
- Maria Kalleitner-Huber, Austrian Institute of Ecology: Food waste initiatives in Austria and
- Lotte Kjaergaard, Climate Food, Copenhagen, Green Business.

Afterwards, a participatory exercise and a poster session on VET training in Resource Efficiency in the food sector took place. The focus in smaller groups was on VET training and the exercise aimed to examine what knowledge, skills and competences there must be present for a successful outcome compared to VET training.

The participants discussed issues of food waste, kitchens, restaurants and canteens where education within food waste is taking place. The main objective of poster session was to share knowledge about the current status, brainstorm about improvement for the future and discuss concrete initiatives to reduce food waste.

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<sup>2</sup> European Commission, 2014



## Summary of presentations

### Stig Hirsbak, Aalborg University

Welcome and opening introduction to the day. The focus was on food waste and a look at the kitchens, restaurants and canteens where education within food waste is taking place. The focus is on VET compared to education on bachelor level; knowledge, skills and competences.

### Michael Jorgensen, Aalborg University

#### *Integration of environmental concerns in design and re-design of food products: innovation in products chains*

Food is one of the major contributors to Greenhouse Gas emissions – around 25 % together with increasing demand for agricultural land, so it is a big issue.

The social practice of eating stands for around 25 % of the CO<sub>2</sub> emission.

Environmental objectives for future food product development:

- Reduce environmental impacts
- Reduce land use of "our" food
- Reduce climate impact
- Reduce impacts from toxic substances and materials
- Reduce nutrient emissions to water
- Contribute to a diverse landscape and rich biodiversity

These objectives are translated into design criteria, a tool for products receiving a "score" to see what effect the product have compared to CO<sub>2</sub> emissions. The tool is for chefs or people working with food. The tool is supposed to push people gently in a more sustainable way.

Reducing GHG contribution from food:

- Reduce waste from distribution, from manufacturing to consumption → less GHG emissions

Climate friendly food consumption:

- The menu plan → Changing of more GHG heavy recipes
- Recipes → Substitution among and within food groups
- Ingredients → Season and local

What do we need to teach people within this subject:

- Scenario. We need to imagine how the future looks → The imagined future production and consumption
- System → the elements which are necessary for a "food system"
- Life cycle → From Cradle to Grave, from Cradle to Cradle
- Governance → how to organize: manage, involve, asses, decide, etc.

### Maria Kalleitner-Huber, Austrian Institute of Ecology

#### *Food waste initiatives in Austria*

Food waste has ethical/social and ecological impacts. Food waste occurs everywhere on a global scale and along the whole food chain. Data are different, and therefore difficult to compare across countries. Depend of the method used.

Some reasons for food waste:

- Products standards
- Lack of coordination, storage & cooling capacity
- Insufficient infrastructure in lower income countries, etc.

Consumer level:

- Insufficient purchase planning
- Expiring best before date/ use before date and loss of our natural senses
- Seasonal high amounts, etc.

Ethical, economic and ecological dimension of food waste – Food waste creates losses along the whole value chain. Initiatives against food waste in Austria have been presented. National goal is to lower the food waste with 20 % along the whole food chain.

It's all about values.

*Lotte Kjaergaard, Municipality of Copenhagen*

*Climate Food, Copenhagen, Green Business*

Lowering CO2 emissions in kitchens. A part of Carbon 20. Guide to climate friendly food, a challenge for the chefs in the canteen:

- Less meat
- Season vegetables
- Less food waste
- More planning

How did they reach the results? Scheme with measurements of CO2 emissions per mass of food – before and after.

### **Poster session**

Participatory exercise on VET training in Resource Efficiency in the food sector.

With a basic knowledge about food waste and its environmental consequences, given by the presentations during the workshop, the participants were divided in 3 groups (1, 2, 3) to take part in the participatory exercise on VET training in Resource Efficiency in the food sector. The focus was on VET training and the exercise aimed to examine what knowledge, skills and competences there must be present for a successful outcome compared to VET training.

*How can you increase Resource Efficiency in the food sector?*

Suggestions for ideas, in relation to the topic of food waste, with focus on food waste in private and public canteens/kitchens and consumers.

The focus is on VET compared to education on bachelor level. What should be the knowledge, skills and competences. In relation to reduce waste in canteen/kitchen. Come up with ideas for what students and organisations should be taught.

Main challenges concerning food waste:

- One third of all food produced for human consumption in the world is wasted (FAO, 2013)
- Have negative impact on CO2 emissions (FAO, 2013)
- About 90 Mt (million tonnes) of food is wasted annually in Europe - agricultural food waste and fish discards not included (European Commission, 2014)

- In industrialised countries, over 40% occurs at retail and consumer level (European Commission, 2014)
- Waste occurs in all steps in the supply chain

Canteen/kitchen:

- What are the causes of food waste in canteens/restaurants?
- Which future strategies and solutions could be developed in relation to minimize food waste in canteens/restaurants in order to increase Resource Efficiency in the food sector?
- How can you make it attractive to reduce production of food waste, for companies working with food production?

Consumers:

- What is the underlying reason for food waste among consumers? How can it be investigated?
- What behavioural changes are necessary, to achieve lesser food waste in private households?
- What strategies and solutions could be developed in order to motivate the consumer to reduce their production of food waste?
- How can the meaning of food waste among the consumers be investigated?

Other ideas concerning the education link:

- Which are the future needs and challenges related to societal behaviors towards reducing food waste?
- Which are the future needs and challenges related to educating consumers / retailers / kitchens

### Mapping competence demands and supply

Questions for the groups:

Each group had to deal with the following questions in the form of a poster session:

- What do you see as local future competence needs for increased resource efficiency in the food sector?
  - Reducing food waste and other types of resource consumption
  - Reducing environmental impacts
  - Changing food products, meals, menu plans, etc.
- Target groups?
- What VET are you already offering?
- What could be future VET within the food area?

### Answers from poster session, mixed groups

Future competence needs:

- 1) Process logistics planning, menu planning, management, awareness, social sustainable research, combining environmental knowledge with existing food info, experience (best practice examples).
- 2) Food value chain, life cycle of food processes, management tools for food production, menu planning, community involvement, food habits and trends.

- 3) Planning procurement (impacts of different options), execute what is most efficient, sustainable profitable options, protection of man and nature, sustainable profile of options, Life cycle assessment, gastronomy, waste management, how to cook (leftovers), how to plan, re-design scorecard.

Target groups:

- 1) VET schools, households (consumers), policy makers (national, local), media, retailers, local business (food suppliers), nutrition experts, primary schools.
- 2) Supply chain (farmers, producers, manufactures, retailers, consumers). Cooks, students, policy makers.
- 3) Agriculture (industry sector, VET trainer/teacher, farmer). Food processing (operator, butcher). Retail/restaurants (dietician, chefs, waiters, kitchen staff, shopping assistant), consumers

What VET are you already offering:

- 1) none
- 2) Agriculture universities, school for cooks
- 3) Farmer school, hotel restaurant schools

Future VET:

- 1) Life cycle management of food, sustainable food for animals, sustainable gastronomy
- 2) Logistics, environmental impacts, nursery related VET offer
- 3) Cooks, primary-, secondary-, evening schools.

What knowledge, skills and competences there must be present for a successful outcome compared to VET training?

By focusing on VET training, students must gain certain knowledge, skills and competences to ensure resource efficiency and minimize waste. VET training must have focus on sustainable solutions and look into the life cycle management of food. Combining environmental knowledge with existing food info can be necessary to understand what impacts waste can have on the environment. It can be seen necessary to provide the background for creating competences related to sustainable planning of procurement, process / logistics and menu planning through the whole food value chain. Sustainable gastronomy is a term that can be useful in relation to VET training with focus on waste management, knowing how to cook with minimum waste. Certain tools could be developed or re-designed to increase resource efficiency and minimize waste, such as CO2 scorecards, menu planning schemes and knowledge of profitable benefits of less waste

## 2.4 Workshop on Energy

The workshop consisted of two sessions; the first one was only for TREO members, while the second one was a workshop, designed not only for TREO partners, but for wider audience, who came to the ERSCP conference.

## Day 1

At the beginning, some organizational issues of the project were discussed. Then Peter Glavic, University of Maribor, had a presentation on Renewable Energy Sources and Energy Efficiency of Products. He introduced the energy efficiency and energy use, energy consumption and its enormous impact on the environment. Industry is one of the sectors with the highest GHG emissions but at the same time it has a great potential in energy saving, especially in areas like heating, cooling, refrigeration, air conditioning, lighting, etc. and reduce energy usage in buildings by increasing energy efficiency. In order to meet the goal of 20 % reduction of GHGs and increase the share of renewable energy to 20 % until 2020, we have to invest into renewable energy (wind, solar thermal and photovoltaic, geothermal energy).

It was concluded that the proposal will be circulated to project partners for comments until the end of November. The summary of discussions from the next day workshop will be included in the course content proposal. The final proposal will be discussed at the project partners' meeting at Copenhagen in December 2014.

We also had a visit by colleagues from another project, called RECDEV (Innovative 3D Platform for recycling of waste electric and electronic devices, WEEE). It was a dissemination activity. The leading partner and coordinator, Mr. Leonidas Somakos, presented the partnership and the main objectives of project RECDEV:

- to integrate existing practices and experience of the partners into the design of high-quality 3D training scenarios
- to develop, pilot implement and evaluate an interactive, multimedia and multilingual training approach that will familiarize low level trainees with the WEEE disassembly and packaging allowing them
- to perform it virtually before going to the physical device
- to develop, pilot implement and evaluate an interactive training approach that will help higher level personnel of the recycling industries to develop skills on identifying the types and qualities of the material in the WEEE
- to modernize WEEE educational content with state of the art ICT tools and an ontology on WEEE.

## Day 2

Next day, there was a workshop on energy efficiency in industry. Two presentations were delivered.

Hans Schnitzer, Graz University of Technology, had a presentation about Experiences on the use of renewable energy in industry, especially in the food processing sector. Europe's policy on Green House Gases (GHGs) emissions is to reduce them by 20 % until 2020. There are different pathways to a low carbon economy. But first we need to consider the improvement of energy intensity and then the improvement of the carbon intensity of the existing systems. Most of the present improvements are not enough. What we need are radical innovations. In the project they have chosen agro-food sector, because raw materials for food sector are renewables, majority of the material is wasted, the sector uses a lot of (fossil) energy and there are possibilities for recycling and reuse in this sector. Then Dr. Schnitzer presented approaches to reduce energy consumption and GHG emissions. Through different examples we have learnt how energy efficiency in industry is important for energy consumption reduction.

Johannes Fresner, STENUM Graz, had a presentation on Knowledge based energy management. Steps to an optimized data based and knowledge based energy management system: gap-analyses, system analysis (qualitative modelling), quantitative modelling, strengths and weaknesses analyses. Energy management is to systematically optimize the energy system.

### Discussion

The workshop was open for everyone, who wanted to participate, as well as for TREO members. Participants were invited to work in three discussion rounds on three questions:

- 1) How can we manage the transition to renewable energy?
- 2) Which tools and supporting materials do we need to speed up the process?
- 3) How should engineers communicate to management on these issues?

The discussion was very interesting. The participants divided into three groups and each group was working on a question for 15 min, and then moved on to the next question. Every group discussed each question. Here are some conclusions:

- Support to the transition to renewable energy: More data are needed, especially showing the availability of biomass. Basic understanding of the systems is not enough, more detailed knowledge is needed. Supporting legislations helps, as does awareness raising among engineers in industry.
- Need for supporting materials: More detailed technical knowledge should be prepared and disseminated. This includes availability, measuring, monitoring and quality management of renewable energy systems. Many tools are available, but overlapping. There is not one "standard" reference material to relate to.
- Improving the communication of engineers and management: engineers need to get rid of their image as being boring, complicated and always late in delivering. Communication should be focused and in target group addressing language – covering actually the elements of a short business plan – related to the business opportunity and fast to communicate. Engineers and management need to understand their different languages and integrate each other in communication all along a project development, to support mutual understanding and develop a common ownership of the project ideas. This means regular meetings with all the stakeholders.

## 2.5 Workshop on Tourism

The workshop focused on the topic of 'sustainable tourism' with participation of TREO project partners as well as local (Romanian) stakeholders active in the field of tourism, sustainable tourism and education on tourism.

In the morning session, two key presentations were delivered:

1. Willi Sieber: The challenges of sustainable tourism
2. Andrei Churican and Andreia Ispas: Romanian initiatives on sustainable tourism including results of UNIDO project in tourism (UVD, CNPCD)

In the afternoon session, the Participatory exercise on VET training and resource efficiency in tourism sector was performed. Its purpose was to identify opportunities and challenges of a sustainable tourism and how these can be addressed.

The five key elements of a sustainable tourism were discussed during the workshop:

- Hospitality: human welfare
- Responsibility
- Nature protection
- Social and cultural awareness
- Resource and energy efficiency

The main session of the workshop focused on identifying the participant's inputs on the opportunities and challenges of the sustainable tourism, from a life cycle perspective. For this purpose, Andrei Churican opened the session presenting the following topics:

- Sustainable tourism in Romania – the results and activities of the “Programme for the sustainable development of enterprises in Romania with focus on enhancing national expertise in CP and CSR methodologies in particular for the tourism industry”;
- Romanian tourism – key figures;
- Life Cycle of tourism development – based on the 10YFP framework.

The participants were organized in groups, one for each life-cycle stage element, and worked in teams. Additionally, the group session focused on identifying educational tools and the necessary training agenda to address the identified opportunities and challenges.

The interactive session was organized with the goal to identify specific opportunities and challenges for each individual life stage of the tourism development life cycle. The input of the participants is summarized in the following tables:

### **Production and consumption of goods and services**

Challenges	<ul style="list-style-type: none"> <li>• What are the sustainability criteria with the impact on quality of service</li> <li>• Lack of information regarding the legal framework on sustainability</li> <li>• Optimization of the processes</li> <li>• How to motivate the investments in sustainability?</li> <li>• How to collaborate with other stakeholders in the supply chain?</li> <li>• How to promote activities to generate local employment?</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>• Existing labels and guidelines</li> <li>• Proven benefits of applying green marketing strategies</li> <li>• Financial savings</li> <li>• Attracting new customers</li> <li>• Collaboration with other stakeholders, local authorities to develop regional strategies and increase the tourism affluence in the region</li> </ul>
Possible solutions	<ul style="list-style-type: none"> <li>• Guidelines</li> <li>• Platforms to promote collaboration of different stakeholders in a region</li> <li>• Best practices dissemination</li> <li>• Learning by doing concept</li> </ul>



Relevant training topics to be considered	<ul style="list-style-type: none"> <li>• Introduction to sustainability</li> <li>• Legal framework and standards</li> <li>• Production and consumption issues: energy, water, materials, waste, transport, mobility, logistic</li> <li>• Social dimension</li> <li>• Procurement</li> <li>• Stakeholder involvement</li> <li>• Best practices and case studies</li> <li>• Life cycle thinking</li> </ul>
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### Monitoring and evaluation

Challenges	<ul style="list-style-type: none"> <li>• Lack of information and data</li> <li>• Different levels of monitoring</li> <li>• Involvement of stakeholders</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>• Global STD criteria</li> <li>• Indicator systems – UNIDO, WTO</li> <li>• Certification systems, standards (TO verification and third party verification)</li> <li>• Baselines and benchmarks</li> </ul>
Relevant training topics to be considered	<ul style="list-style-type: none"> <li>• Why it is important to monitor</li> <li>• How to monitor: team, criteria and indicators, information collection, benchmarks</li> <li>• Monitoring methodology implementation</li> </ul>

### Tourism planning

Challenges	<ul style="list-style-type: none"> <li>• Planning methods and methodology</li> <li>• Identification of the best tourism product (service integration, stakeholder analysis)</li> <li>• Development of the Tourism Master Plan (at national level)</li> <li>• Defining the vision and mission on sustainable tourism</li> <li>• Implementation</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>• Benchmarks</li> <li>• Access to funds (different and multiple funding opportunities)</li> <li>• Development of eco-tourism destination</li> <li>• Social-media</li> </ul>

### Operation and management

Challenges	<ul style="list-style-type: none"> <li>• Resource management: energy, water</li> <li>• Waste management</li> <li>• Awareness of management. employees, tourists, local communities</li> <li>• Lack of information and collaboration</li> <li>• Working conditions</li> </ul>
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Opportunities	<ul style="list-style-type: none"><li>• Available funding (private and public)</li><li>• Local collaboration</li><li>• Development of local infrastructure</li><li>• Labels</li></ul>
Possible solutions	<ul style="list-style-type: none"><li>• Incentives (awards, premium, support, subsidies)</li><li>• Renting / sharing systems</li><li>• Information platforms</li><li>• Closed loop processes</li></ul>

### 3 Sector-specific courses

Based on workshop discussions and outputs, and consultations with experts in all partner countries, a structure of resource efficiency courses for specific sectors was developed. For each sector-specific course, learning units and outcomes according to the ECVET system were proposed.

The basic structure of the courses is presented in the following sub-chapters; more specific information can be found in the reports from the particular workshop.

### 3.1 Course on Building sector

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>3</sup>
U1/Introduction to the European Building and Construction sector	The unit provides an introduction to the sector, legislation, standards, eco efficiency and approaches to increase resource efficiency	U1 E1	Introduction to the European Building and Construction sector (TRUST-IN: 1-5): <ul style="list-style-type: none"> <li>General data and Motivation for eco-efficiency</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand the context of resource efficiency and the construction sector</li> </ul>	0.5
		U1 E2	<ul style="list-style-type: none"> <li>EPBD 2010/31/EU and overview of Standards</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the general directions of the European Energy Strategy</li> <li>The students will get to know the main requirements of the Buildings Directive, the Energy Efficiency Directive and the Strategy for the sustainable competitiveness of the construction sector</li> <li>The students will get to know about the relevant standards</li> <li>The students will understand the energy efficiency potential in the building sector</li> </ul>	1
		U1E3	<ul style="list-style-type: none"> <li>Four major concepts of eco-efficiency (Performance, conformity, life cycle cost and environmental impact).</li> </ul>	<ul style="list-style-type: none"> <li>The students will be familiar with established approaches to increase resource efficiency</li> </ul>	0.5

<sup>3</sup> 1 ECVET calculated analogous to ECTS. ECTS is the equivalent of 25 to 30 hours workload for the students, including preparation, studying, processing, wrap up

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>3</sup>
U2/Introduction to Energy Efficiency and Renewable energy	The unit provides an introduction to energy efficiency, water efficiency, materials efficiency and social aspects	U2E1	1. Building Efficiency (TRUST-IN: 6-9) <ul style="list-style-type: none"> <li>• Energy efficiency and renewables</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand buildings energy related problems and how to overcome these problems</li> <li>• The students will understand the benefits of energy management</li> <li>• The students will get to know the basics of renewable energy</li> <li>• The students will get to know the energy efficiency assessment method</li> </ul>	1
		U2E2	<ul style="list-style-type: none"> <li>• Water efficiency</li> <li>• Material efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand buildings water related problems and how to overcome these problems</li> <li>• The students will understand buildings materials related problems and how to overcome these problems</li> </ul>	0.5
U3/Practical implementation, tools, measurements	The unit provides an introduction to measuring techniques, evaluation schemes and their application	U2E3	<ul style="list-style-type: none"> <li>• Social improvements</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand health related and social problems and how to overcome these problems</li> </ul>	0.5
		U3	2. Practical application (TRUST-IN: 13-15) <ul style="list-style-type: none"> <li>• Concrete practical examples</li> <li>• Thermography camera for detecting thermal losses; radial thermometers; measurements of humidity and others related to the thermal comfort in buildings.</li> </ul>	<ul style="list-style-type: none"> <li>• The students will get to know how to perform the technical, economic and environmental analysis of a building</li> <li>• The students will practice calculations of energy savings</li> <li>• The student will be able to apply the knowledge in practise and present the results</li> </ul>	2

Unit identifier / name		Unit description		Element identifier/ name		Element description	Performance criteria (learning outcomes)	ECVET <sup>3</sup>
						<ul style="list-style-type: none"> <li>Use the topics of the TQB-assessment system (ASBC - Austrian Sustainable Building Council) to achieve an overall view on sustainable buildings.</li> </ul>		

### 3.2 Course on Mobility and transport

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>4</sup>
U1 Introduction to the European Mobility sector	The unit gives an overview on the sector, the legal framework and standardization, major concepts and motivation for eco- efficiency	U1E1 /Overview and motivation for eco-efficiency	<p>General data on the sector and motivation for eco-efficiency in the mobility sector</p> <ul style="list-style-type: none"> <li>Reduction of emissions and resources saving</li> <li>Link with climate change</li> <li>Sustainability</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the general overview of the sector</li> <li>The students will understand the need for eco-efficiency in the transport and mobility sector</li> </ul>	0.5
		U1E2 Legislations and Standards	<p>The legal framework and standardization</p> <ul style="list-style-type: none"> <li>European directives</li> <li>Overview of Standards;</li> <li>International and National approaches</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the main requirements of the different Directives related to the sector</li> <li>The students will get to know about the main related standards</li> </ul>	1
		U1E3/ Major concepts of eco-efficiency in relation to mobility	<p>Major concepts of eco-efficiency in relation to mobility</p> <ul style="list-style-type: none"> <li>Fuel saving</li> <li>Recycling</li> <li>Environmental impact (air emissions)</li> <li>Territory, spatial and urban planning</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand the sectorial specific aspects in relation to fuel saving and recycling</li> <li>The students will understand the main environmental impacts produced by transport</li> <li>The students will get to know major concepts in relation to territory, spatial and urban planning for eco-efficiency</li> </ul>	0.5

<sup>4</sup> 1 ECVET calculated analogous to ECTS. ECTS is the equivalent of 25 to 30 hours workload for the students, including preparation, studying, processing, wrap up

U2 Mobility and Efficiency	The unit describes the potential efficiency improvement aspects in the sector in relation to energy, water and materials	U2E1/ Renewable energies and energy efficiency	<ul style="list-style-type: none"> <li>• Regulation</li> <li>• Fuel efficiency and alternative fuels</li> <li>• Batteries and new engines</li> <li>• New electric solutions in automotive solution</li> <li>• Lighting</li> <li>• Efficient driving concepts</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand potentiality of renewable energies in the sector</li> <li>• The students will understand the benefits of energy efficiency in the sector</li> <li>• The students will get to know new solutions for energy efficiency and renewable energies use</li> </ul>	1
U3 Efficient mobility systems	The unit describes efficient mobility systems	U2E2/ Water efficiency	<ul style="list-style-type: none"> <li>• Impact of transportation on the water</li> <li>• Minimizing of water for transportation cleaning</li> <li>• Other water efficiency concepts</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand the impacts of transportation on water</li> <li>• The students will get to know benefits of water efficiency in the sector and other related concepts</li> </ul>	0.5
		U2E3/ Material efficiency	<ul style="list-style-type: none"> <li>• Current and innovation practices for material efficiency in the transport sector</li> </ul>	<ul style="list-style-type: none"> <li>• The students will get to know innovation practices for material efficiency in the transport sector</li> </ul>	0.5
		U3E1/ Efficient mobility systems	<ul style="list-style-type: none"> <li>• Prevention of mobility and car sharing schemes</li> <li>• Improvement of infrastructures</li> <li>• Incentives and taxation systems</li> <li>• Multi-modal freight transport</li> <li>• Optimisation of public transport systems</li> <li>• Logistics</li> <li>• Intelligent transport systems</li> <li>• Planning and strategy for efficient mobility systems</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand how to prevent mobility and reduce transportation needs</li> <li>• The students will get to know best practices to improve transport and mobility infrastructures</li> <li>• The students will understand how incentives and taxation influence on transport and mobility systems</li> <li>• The students will get to know how multi-modal freight transport potentialities and how to optimize public transport systems and logistics</li> <li>• The students will get to know intelligent transport systems</li> <li>• The students will understand</li> </ul>	1.5

U4 Sustainable consumption	The unit presents the main concepts related to sustainable consumption in relation to transport and mobility	U4E1/ Sustainable consumption	<ul style="list-style-type: none"> <li>• Concepts related to sustainable consumption for mobility and transport, from a social behaviour perspective</li> </ul>	planning and strategy general concepts for efficient mobility systems	0.5
U5 Practical application of the units of the Course	The unit includes practical exercises and work to apply previous knowledge and theoretical contents	U5E1/ Practical exercise and work	<ul style="list-style-type: none"> <li>• Laboratory techniques and testing facilities</li> <li>• Field work and practical project, together with companies and other relevant stakeholders</li> <li>• Gamification tools</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand major sustainable consumption concepts for mobility and transport in relation to social behaviour and a social transition</li> <li>• The students will apply acquired theoretical knowledge through practical exercise and techniques</li> </ul>	2



### 3.3 Course on Food

The Food sector course focuses on the issue of food waste, which represents one of the main challenges in resource efficiency.

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>5</sup>
U1/Introduction to the European Food sector	The unit provides an introduction to the sector, eco efficiency and approaches to increase resource efficiency	U1 E1	<p>Introduction to the European Food sector:</p> <ul style="list-style-type: none"> <li>From "farm to fork"</li> <li>The "players"</li> <li>Contribution to GHG (TRUST-IN: 1–5):</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand the context of resource efficiency and the Food sector challenges, its contribution to GHG, the sources and the practises that generate GHG and food waste</li> </ul>	1
		U1E2	<p>Environmental directions for future food product development:</p> <ul style="list-style-type: none"> <li>Reduce environmental impacts</li> <li>Reduce land use of "our" food</li> <li>Reduce climate impact</li> <li>Reduce impacts from toxic substances and materials</li> <li>Reduce nutrient emissions to water</li> <li>Contribute to a diverse landscape and rich biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the general directions of the European Food sector strategies and its impacts measures</li> <li>The students will get to know about measures (hard and soft) that can reduce the impact</li> <li>The students will as a result understand the potential reducing the impacts from the sector through reducing the food waste and sustainable consumption.</li> </ul>	1

<sup>5</sup> 1 ECVET calculated analogous to ECTS. ECTS is the equivalent of 25 to 30 hours workload for the students, including preparation, studying, processing, wrap up

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>5</sup>
U2/Introduction to Food waste and resource efficiency	The unit provides an introduction to specific sources and practises of generating food waste	U2E1	<p>3. Food efficiency:</p> <ul style="list-style-type: none"> <li>• One third of all food produced in world is wasted (FAO, 2013)</li> <li>• Waste occurs in all steps in the supply chain</li> <li>• 40 % of all food waste generated occurs at retail and consumer level</li> <li>• 90 Mt of food is wasted annually in Europe (EU COM, 2014)</li> </ul> <p>(TRUST-IN: 6–9)</p>	<ul style="list-style-type: none"> <li>• The students will understand practises behind food waste related problems in the supply chain including consumers,</li> <li>• The students will understand how to change practises in order to reduce food waste</li> <li>• The students will understand the cost and benefits of reducing food waste in a sustainable consumption context</li> </ul>	2
U3/Practical implementation, tools, measurements	The unit provides an introduction to measuring techniques, evaluation schemes and their application	U3	<p>4. Practical application with focus on food waste</p> <ul style="list-style-type: none"> <li>• Focus on Canteen and kitchens in restaurants and hotels</li> </ul> <p>Consumers (TRUST-IN: 13–15)</p>	<ul style="list-style-type: none"> <li>• The students will get to know how to perform the technical, economic and environmental analysis of changes in practises concerning food waste</li> <li>• The student will be able to apply the knowledge in practice and present the results.</li> </ul>	2

### 3.4 Course on Energy

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>6</sup>
U1/ Introduction to the European Energy sector	The unit gives an overview on motivation for energy efficiency, the legal framework and standardization and major components of energy efficiency	U1E1 Background and motivation	General data and motivation for energy efficiency <ul style="list-style-type: none"> <li>Climate change mitigation</li> <li>Energy strategy for Europe</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand the need for energy efficiency</li> <li>The students will get to know the general directions of European Energy Strategy</li> </ul>	0.5
		U1E2 Legislations and Standards	The legal framework and standardization <ul style="list-style-type: none"> <li>Energy Efficiency directive</li> <li>Overview of Standards;</li> <li>Renewable energy directive</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the main requirements of the Energy Efficiency Directive and Renewable Energy Directive</li> <li>The students will get to know about the main energy standards</li> </ul>	0.5
		U1E3/ Main sectors relevant for energy- efficiency and energy saving potential	Main sectors relevant for energy efficiency and specificities <ul style="list-style-type: none"> <li>Buildings (public and private) and services</li> <li>Industry (energy consumption problems and energy saving potential)</li> <li>Transport (sea, railway, road, air; personal, freight)</li> <li>Energy efficiency products (labelling)</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand the energy efficiency potential in different sectors</li> <li>The students will understand the energy efficiency specifics in the building sector, industry , transportation, products and services</li> <li>The students will get to know the main requirements of the energy efficiency labels in the above mentioned sectors</li> </ul>	1.0

<sup>6</sup> 1 ECVET calculated analogous to ECTS. ECTS is the equivalent of 25 to 30 hours workload for the students, including preparation, studying, processing, wrap up

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>6</sup>
U2 Energy management systems	The unit describes the energy management systems and the energy assessment methods in a company	U2E1/ The Energy Efficiency assessment	<ul style="list-style-type: none"> <li>Problems related to energy consumption in companies</li> <li>The basic and the benefits of energy management in a company</li> <li>EE assessment methods in companies</li> <li>Energy consumption and monitoring (residential, commercial) monitoring and analysis</li> <li>Energy data: meters, measurements, energy balancing, identification of losses</li> <li>Energy auditing (including international standards)</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand companies' energy related problems and how to overcome these problems</li> <li>The students will understand the benefits of energy management</li> <li>The students will get to know the basics of energy management</li> <li>The students will get to know the energy efficiency assessment method</li> <li>The students will get to know the methods to measure and monitor energy consumption</li> <li>The students will get to know the main requirements of the energy audit and energy management system audit</li> </ul>	1.0
U3 Major energy systems	The unit presents the main energy systems, typical area of improvements and energy conservation strategies and methods	U3E2/ Energy systems	<ul style="list-style-type: none"> <li>The basics of energy systems and typical areas and sources for improvements: compressed air, air conditioning, heating and cooling, refrigeration, ventilation, electrical motors, pumps and fans, load management, lighting, boilers, dryers, reactors and separators, total process energy optimization</li> <li>Energy integration, Heat and Power, poly-generation</li> <li>Energy efficiency, energy conservation strategies and methods</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand the functioning of the main energy systems</li> <li>The students will get to know the typical areas of improvements</li> <li>The students will get to know energy conservation strategies and methods for the main energy systems</li> </ul>	1.0

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>6</sup>
U4 Renewable Energy	The unit present the renewable energy systems	U3E3 Energy Efficiency planning and financing	<ul style="list-style-type: none"> <li>• Economic and environmental analysis of energy systems</li> <li>• Energy efficiency and energy savings               <ul style="list-style-type: none"> <li>• Calculating energy savings and environmental impacts</li> </ul> </li> <li>• Lab demonstration of energy monitoring and measuring equipment</li> <li>• Energy labelling and energy certificates</li> </ul>	<ul style="list-style-type: none"> <li>• The students will get to know how to perform the economic and environmental analysis of energy system</li> <li>• The students will get to know how to plan energy efficiency and how to finance energy efficiency projects</li> <li>• The students will practice calculations of energy savings</li> </ul>	1.0
U4 Renewable Energy	The unit present the renewable energy systems	U4E1 The renewable energy systems	5. Renewable energies: <ul style="list-style-type: none"> <li>• Bioenergy (biomass, biofuels, bio waste)</li> <li>• Hydro-electrical and tidal power</li> <li>• Solar (thermal, Photo Voltaic)</li> <li>• Wind power systems</li> <li>• Geothermal</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand the benefits of the renewable energy</li> <li>• The students will get to understand main renewable energy systems and how they function</li> </ul>	1.0

### 3.5 Course on Tourism

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>7</sup>
U1/ Introduction to the concept of Sustainable Tourism	The unit describes the key environmental impacts form tourism sector and the concept of sustainable tourism	U1E1 /Background and motivation	<p>General data and motivation regarding:</p> <ul style="list-style-type: none"> <li>Challenges of tourism rise</li> <li>Tourism categories</li> <li>The tourism industry response</li> <li>The benefits and problems of mass tourism</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the challenges of mass tourism</li> <li>The students will get to know what are the tourism categories</li> <li>The students will understand the need for more sustainable tourism</li> </ul>	0.5
		U1E2 Sustainable Tourism Concept	<p>The element will concentrate on the following topics:</p> <ul style="list-style-type: none"> <li>Sustainable tourism concept explained</li> <li>The key environmental impacts of tourism</li> <li>Quantification of environmental impacts</li> </ul>	<ul style="list-style-type: none"> <li>The students will understand the sustainable tourism concept</li> <li>The students will understand the key environmental impacts and how are they quantified</li> </ul>	1
		U1E3/ Standards and certification for sustainable tourism	<p>The element will describe the sustainable tourism standards and certifications</p> <ul style="list-style-type: none"> <li>Global Sustainable Tourism Council Criteria for Tour Operators</li> <li>Global Sustainable Tourism Standards for Destinations</li> <li>Austrian Eco-label for Tourism (Österreichisches Umweltzeichen)</li> <li>Certification for Sustainable</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the main sustainable tourism standards and certification schemes</li> <li>The students will get to know the main requirements sustainable tourism certification system</li> </ul>	1

<sup>7</sup> 1 ECVET calculated analogous to ECTS. ECTS is the equivalent of 25 to 30 hours workload for the students, including preparation, studying, processing, wrap up

Unit identifier / name	Unit description	Element identifier/ name	Element description	Performance criteria (learning outcomes)	ECVET <sup>7</sup>
U2 Ecotourism	The unit describes the alternative ways of tourism and the general principle of sustainable traveller	U2E1/ The Ecotourism explained	<p>Tourism (CST) for hotels</p> <ul style="list-style-type: none"> <li>European Ecotourism Labelling Standard (EETLS)</li> <li>Travelife Standard</li> </ul> <p>The unit will explain</p> <ul style="list-style-type: none"> <li>What is eco-tourism</li> <li>The benefits and problems of eco-tourism</li> <li>Alternative ways of tourism</li> <li>Being a traveller – Six general principles</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know the alternative ways of tourism</li> <li>The students will get to know what eco-tourism and the benefits of eco-tourism</li> <li>The students will get to know the six principles of sustainable traveller</li> </ul>	0.5
U3 Resource Efficiency and Cleaner Production in accommodation sector	The unit presents the method to increase efficiency in accommodation sector and the typical efficiency measures	U3E2/ RECP methodology in accommodation sector	<ul style="list-style-type: none"> <li>The RECP methodology               <ul style="list-style-type: none"> <li>Methodology</li> <li>Water Efficiency</li> <li>Energy efficiency</li> <li>Waste management</li> <li>Chemicals Management</li> <li>Best practices in housekeeping; food &amp; beverage, etc.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know methodology for applying RECP in accommodation sector</li> <li>The students will get to know the typical areas of improvements and the best practices</li> </ul>	1
U4 Social Responsibility in accommodation	The unit describes the social aspects of the accommodation sector and how these aspects can be	U3E3 Methods to increase resource efficiency in accommodation sector U4E1 Social responsibility dimensions of the tourism	<ul style="list-style-type: none"> <li>Economic and environmental analysis               <ul style="list-style-type: none"> <li>Water Efficiency</li> <li>Energy efficiency</li> <li>Waste management</li> <li>Chemicals Management</li> </ul> </li> </ul> <p>The element will describe the social dimensions of the tourism sector</p> <ul style="list-style-type: none"> <li>Local prosperity and</li> </ul>	<ul style="list-style-type: none"> <li>The students will get to know how to perform the economic and environmental analysis</li> <li>The students will get to know water, energy conservation strategies and waste reduction strategies</li> <li>The students will get to know the social dimensions of the tourism activity.</li> </ul>	1

Unit identifier / name	Unit description	Element identifier / name	Element description	Performance criteria (learning outcomes)	ECVET <sup>7</sup>
sector	addressed	sector	<p>community wellbeing</p> <ul style="list-style-type: none"> <li>• Social Equity</li> <li>• Cultural richness</li> <li>• Employment quality</li> <li>• Visitor fulfilment</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand the link between tourism activity and social aspects</li> </ul>	
		U4E2 Social impact assessment of accommodation sector	<p>The element will describe social impact assessment methods and criteria for accommodation sector related with the following aspects:</p> <ul style="list-style-type: none"> <li>• Employment</li> <li>• Labour relations</li> <li>• Health and safety</li> <li>• Training and education</li> <li>• Diversity and equal opportunities</li> <li>• Indigenous rights</li> <li>• Local communities</li> </ul>	<ul style="list-style-type: none"> <li>• The student will get to know methods and criteria to evaluate the social impact of the accommodation sector</li> <li>• The student will get to know criteria to be used within social impact assessment of accommodation sector</li> </ul>	1
		U4E3 SR strategy within the tourism sector	<p>The element will describe methods and techniques to improve the performance on the following topics:</p> <ul style="list-style-type: none"> <li>• Sustainable services and service quality</li> <li>• Employees engagement</li> <li>• Responsible sourcing</li> <li>• Community engagement</li> </ul>	<ul style="list-style-type: none"> <li>• The student will get to know how to apply social responsibility principles within touristic activities</li> <li>• The student will get to know strategies to improve the performance on the presented topics</li> </ul>	0.5



## 4 Dissemination

During its realization, the project was promoted primarily through its webpage hosted by PREPARE network (<http://prepare-net.com/project/treo>), which the partners are members of. The project outputs, including reports from workshops and structure of sector-specific courses, were published there.

The main dissemination activity was organization of project event at the international conference 16<sup>th</sup> European Roundtable on Sustainable Consumption and Production: The Europe we want (Portoroz, Slovenia, 14-16 October 2014). The event included introduction to the project, Workshop on Energy, and networking activity with project RECDEV that focuses on recycling of waste electric and electronic devices (WEEE).

The project partners also used their individual contacts and networks to disseminate information about the project.

At the end of the project, a dissemination plan was developed to specify dissemination activities after project termination. The plan is summarized in the following table:

Dissemination activities	Communication tools	Target group(s) / audience	Responsibility
Promote the outcomes of TREO project on PREPARE website – 2015–2016 and social media	(1) Briefings and meetings with stakeholders (2) Prepare website include the information related to project outcomes and training curricula, all partners provide links of their websites to the Prepare website (3) Newsletter and messages released in social media and published on the PREPARE website (4) TREO training curricula and /or final Brochure on the PREPARE website and partners ones	General public, target groups and potential beneficiaries, VET providers, academia, business environment, NGOs; government.	PREPARE Secretariat  All partners
Networking through participation in various education related events for increasing visibility of the TREO project results (dissemination of the TREO Brochure and training curricula)	(1) Briefings and meetings with stakeholders (2) Presentations in national and regional conferences focused on education	General public, target groups and potential beneficiaries, VET providers, academia, business environment, NGOs; government.	All partners

Dissemination activities	Communication tools	Target group(s) / audience	Responsibility
Dissemination of Final Report	(1) The electronic version of the Final Report will be distributed by email to the relevant stakeholders	VET providers, schools and universities, regional and national governments, professional associations and societies, chambers of industry, NGOs, etc.	All partners
Continuation of dissemination is foreseen during the future Prepare projects (Erasmus + LLL)	(1) The project events and relevant meetings with stakeholders will be used to disseminate TRO training curricula and the TRO Brochure	VET providers, schools and universities, regional and national governments, professional associations and societies, chambers of industry, NGOs, etc.	All partners involved in the new project

## 5 Conclusions

Demand for resources is being driven not only by a growing population, but also by increasing wealth. As people in the developing world grow richer, they are consuming far more resources than before. If global resource consumption levels per capita across all developing regions were to catch up with consumption levels observed in OECD countries, the world would require 180 billion tons of materials in 2050, almost tripling the amount of materials used compared to 2008 levels. Clearly, such a level of consumption cannot be sustained.

To prevent the depletion of vital natural resources, it is necessary to find new ways of decoupling economic growth from resource-intensive production. The production processes must be more resource-efficient, developing substitutes for supply-constrained resources and promoting the reuse and recycling.

In this context, the resource efficient Europe is a must in terms of growth and jobs. Communications and other initiatives from the Commission concerning resource efficiency and circular economy, including industrial symbioses, demonstrate a huge potential for combining resource efficiency and green jobs. In particular, Resource Efficient Europe is one of the seven flagship initiatives as part of the Europe 2020 Strategy aiming to deliver smart, sustainable and inclusive growth. This is now Europe's main strategy for generating growth and jobs, strongly supported by the European Parliament and the European Council.

The Roadmap to a Resource Efficient Europe<sup>8</sup> is a central element in a big transition of European industry, which will take place for many years. The industry is already aware of the resource efficiency importance, which was demonstrated in the workshops carried out in TREO project.

Nevertheless, the transition to an economic model where the resources use is more efficient will require significant innovation, from small incremental changes to major technological breakthroughs.

Obviously, to perform such transformation, it must be followed by upgrading of knowledge, skills and competences inside and outside the VET system in order to produce a skilled workforce.

However, the process has to start at regional or/and local level and it prerequisites that an actors network is established between VET institutions and the work of life. The TREO sector-specific workshops demonstrated various approaches between different local actors in order to provide input that can increase knowledge and competences in the VET system that benefit work of life with regard to resource efficiency. The outcomes of the project can be used by VET schools that provide training to students and by companies.

### 5.1 Recommendations for further work

The TREO project addressed five economic sectors including those that, according to the Roadmap to a Resource Efficient Europe, belong among the sectors with the highest intensity of resources use – i.e. food, mobility, construction and buildings. On the other hand, the 'greening' skills agenda is important for all economic sectors, spreading the knowledge, skills and capacities to the rest of the sectors.

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<sup>8</sup> COM(2011) 571 final

Lifelong learning – the continuous development of competencies – is a shared interest and responsibility for employers, employees and public authorities. For public authorities it is a priority in order to achieve the objectives related with resource efficiency policies. For employers, access to and development of a skilled and adaptable workforce is one of the conditions for innovation, productivity, competitiveness and lower production costs. For workers, acquiring, updating and developing relevant knowledge and competences throughout working lives is most effective to find and remain in employment, whilst simultaneously moving Europe towards its resource efficiency goals.

The partners of TREO project are members of the PREPARE network, the characteristic of which is that it is a network among universities, consultancies, NGOs and governmental institutions that through more than 20 years has connected to work of life through network oriented activities and projects across Europe.

In order to create a sustainable transition and a fair market inside EU, local networks have to connect across member states. PREPARE has already been behind the TRUST IN project a forerunner for TREO and has accomplished knowledge, skills and competences through the last five years.

The PREPARE network considers the ERASMUS+ programme as an opportunity to continue the capacity building in the VET system with regard to resource efficiency by expanding the network approach broader and to focus more on the potential of circular economy and industrial symbioses.

## Annex I

### Additional information about the project

#### Summary

TREO (Training on Resource Efficiency and Optimization) was a partnership project with the main objective to transfer and exploit the European Course on Eco-efficiency in vocational education and training (VET) developed within the Leonardo da Vinci Partnerships. Fourteen partners from ten countries, both 'old' and 'new' EU Member states took part in the project. They ranged from universities, VET, research and standardisation institutions, to municipal, consulting, small and medium enterprises and a chamber of commerce, constituting an effective public-private partnership. Together with VET schools, teachers' associations and enterprises in partner countries, it was implemented through interactive and innovative processes with enterprises, and teachers and trainers at the partnering VET institutions. The project is building on the concept of the VET training course developed within the Leonardo Lifelong Learning project "European Training Partnership on Sustainable Innovation" (TRUST IN), but including sector specific training courses in the following areas: building and construction, food, mobility, tourism, and renewable energy sources and energy-related products. Five workshops have been organised in five different partner states with all the relevant stakeholders from the guest countries. The programmes contained sector specific competences of environmental and resource efficiencies (energy, materials, water), standards and EU directives, together with learning methods and tools, management, and organisations of interest. The programmes have been discussed in all the partner states regarding three important questions:

- Which issues were missing in the specific sector course design and which competences should be covered?
- Which didactics could be recommended for the training?
- Which training providers would be suggested for such a training?

The programmes aimed at linking this concept of resource efficiency with the world of practice and facilitating its adaptation, practical implementation and further spread with VET professionals, enterprises, professional associations, chambers of industry and commerce, regional and local authorities, and higher education institutions. The project has achieved the planned specific objectives:

- Integrating resource efficiency and innovation in sustainability concepts and practices;
- Testing, applying and disseminating common concepts of sector specific courses on eco-efficiency;
- Supporting participants in the acquisition and use of knowledge, skills and qualifications to advance personal development, employability and active participation in the European labour market;
- Improving quality and innovation of VET system, institutions and practices;
- Enhancing attractiveness of VET employers and learners for jobs in resource efficiency.

Project results have been and will be presented at national and international conferences. The Final Report will be distributed to stakeholders in partner countries, EU and globally through the PREPARE and UNIDO's RECP Networks and published at the PREPARE portal and the European Shared Treasure database of Lifelong Learning Programmes. A dissemination flyer has been prepared for distribution.

#### European added value

The European added value is additional to the value created within TREO by actions of participants in their individual Member States. It results from legal certainty, application of best practices, coordination gains, greater effectiveness and complementarities. The model training course curriculum in resource efficiency can be applied not only regionally or nationally but EU wide.

The specific objectives of TREO are focused on teaching resource efficiency in sectors like energy, building, mobility, food processing, and tourism in order to:

- Identify, test and apply common concepts on sustainable development and resource efficiency with the aim to achieve a spreading at the level of the actors “on the ground”;
- Support participants in further activities in the acquisition and the use of knowledge, skills and qualifications to facilitate personal development, employability and participation in the European labour market;
- Support improvements in quality and innovation of the VET system, institutions and practices, especially in the areas of sustainable development and resource efficiency;
- Enhance the usability, understanding, target orientation of VET courses in sustainable development and resource efficiency for employers and individuals across Europe.

As the subject of sustainable development and resource efficiency is not yet established in secondary and higher education, the implementation of the subject in vocational training proved a pan European need. Developing vocational skills for jobs in resource efficiency is focused on labour market needs to provide vocational training in the young subject of sustainable development and resource efficiency to practitioners, and at the same time supports employers and public institutions in preparing employees for green jobs.

The following seven categories of European added value from the cooperation in TREO and its results have been identified:

- Implementing EU legislation (energy efficiency directive, building directive, resource efficiency roadmap)
- Focus on cross-border threats (climate change, resource scarcity, energy efficiency) in order to reduce risks and mitigate their consequences
- Economies of scale from application of the developed concept across the participating 11 countries both ‘old’ and ‘new’ EU Member States
- Promotion of best practice in all participating Member States in order for EU VET providers to profit from the state of the art best practices analysed and integrated into the design of the course concept
- Benchmarking of status of implementation of legal requirements and best practices in the individual member states
- Exchange of persons with a similar background in sustainable development and complementing experience with the aim of ensuring an integrated high quality result
- Networking as an important tool for disseminating results to all Member States including nonparticipants

The main objective of the proposed Partnership was the adaptation, transfer and exploitation of the VET European Course on Eco-efficiency (including sector specific training courses) developed in the TRUST IN partnership, to VET schools, business representatives and enterprises in the partner countries.

The course concept was tested and amended through interactive discussion processes with enterprises, teachers, trainers and other stakeholders at the partnering VET institutions. In the development, partners from eleven countries were involved. They contributed their experience with national legal requirements, strategies, best practices and implementation of comparable training courses. The final product is the integration of their specific background, experience and expertise.

### **Objectives achievement**

The main objective of the project to develop and test European VET course in resource efficiency and to adapt it to the state conditions in cooperation with VET professionals and employers’ representatives (enterprises, occupational sectors, higher education institutions) have been achieved by organizing workshops (WS) in different countries. The partners have strengthened the European dimension of VET schools and the course developed by including 14 partners from ten countries, both ‘old’ and ‘new’ EU Member States. Non-EU countries have participated in the European Roundtable on Sustainable Consumption and Production (ERSCP 2014) where the project was presented and the WS on energy carried out. WS stakeholders were VET schools and institutions, higher education experts, SMEs, professional

associations, chambers of industry and commerce, trade organizations, representatives of regional authorities, and Non-Governmental Organisations (NGOs).

Competences of individuals to plan, develop, deliver, evaluate and reflect on VET in resource efficiency are an important result of the project at personal level. Improved quality of VET training for many individuals participating represented much broader outcome. The project significantly increased knowledge and qualification of its target group members in the field of resource efficiency and sustainable innovation all over Europe, and thus contributed to the EU goals in sustainable development and competitiveness.

The overall project objective was the transfer and practical implementation of the VET Course on Eco-efficiency, including sector specific training courses in the areas of: building and construction, food, mobility, tourism, renewable energy sources and energy-related products. The project partners organized WSs in different countries, each one being specialized in one of the sectors mentioned above. Relevant stakeholders from the guest country have always been invited to the WS. Discussion taking place during the WS as well as the questionnaires sent later to stakeholders in partners' countries are described and documented in the Final Report together with the sectorial course description specialties. Energy, material and water efficiencies, teaching methods and tools, learning methods, institutional support, etc. were elaborated.

Specific objectives of the programme that have been achieved are

- Support knowledge, skills and qualifications,
- Facilitate personal development, employability and participation in the European labour market;
- Support improvements in quality and innovation;
- Enhance the attractiveness of VET to employers and potential employees.

### **Workplan and tasks**

All the tasks have been carried out according to the proposal but some changes occurred regarding partners and location. Some external factors made it not possible to follow the proposed planning/timing of the application. One of the main setbacks was that not all involved partners in the application got the approval to participate in the project (i.e. Turkey and Greece), so it was necessary to reschedule some activities and its timing, holding the first meeting one month later than scheduled, so the project plan including organizational plan of workshops (result No 1) was not ready for September 2013. In addition to that, the ERSCP conference was foreseen to take place in June 2014 in Spain in the application time, whilst it was organised in October 2014 in Slovenia, being necessary to adapt the workshop host countries and its order to the new situation. Despite the mentioned changes in the initial planning, the partnership has accomplished the promised results and outcomes.

### **Communication and cooperation**

Due to the fact that the financing of the partnership is limited to mobilities, it was challenging to execute tasks by partners outside the meetings. Even though, all partners contributed to the outcomes of the partnership. In addition to the meetings, tasks providing recommendations and providing training concepts were included. This process was combined with intensive sessions during the meetings.

Communication and cooperation worked out quite well. The project is promoted primarily through its web page hosted by PREPARE network (<http://www.prepare-net.com/project/treo>), which the partners are members of. The project outputs, including reports from workshops and structure of sector-specific courses are published there and on the websites of all the partner organizations. The project partners also used their contacts and networks to disseminate information about the project. The European Round Table on Sustainable Consumption and Production in 2014 was used to present the partnership TREO and its results.

Additionally to discussions during organized meetings the project leader organized internet meetings to discuss and support the project work guaranteeing the achievement of the project goals. Minutes from all meetings and accompanying workshops were kept, including feedback from participants, and circulated.



In the final stage of the project a brochure was developed which gives an overview about the project in general and its aims and approach. It contains information about the organized meetings, the course concept on resource efficiency for 5 specific sectors (Renewable energy and energy related products, Building and Construction, Food, Mobility and Transport, as well as Tourism).

It is planned to promote the outcomes of TREO project on PREPARE website and by networking through participation in various education related events for increasing visibility of the TREO project results. Within the PREPARE network further research projects based on the outcomes of the project TREO will be discussed.

### **Progress monitoring**

Project monitoring is the inevitable dimension of project management that empowers project owners, planners, managers, engineers and other stake holders to visualize various variables of project delivery like progress, cost, resources, etc. Monitoring is a necessary core management instrument, both for projects that might be encountering problems and for projects which are encountering particular success. The general objective of all monitoring activity is to maximise the impact of the programme and, as importantly, to maximise the return on investment of EU funds through the achievement of public policy objectives. Benefits of monitoring extend beyond a given project, since lessons can be learnt and principles of best practice disseminated. Monitoring is critical to all projects. Each project should have embedded internal project monitoring arrangements to check progress / achievement of milestones, identify problems, recognise the need for change / amendment / development and ensure quality. Monitoring is, therefore, to be perceived as a positive and constructive activity supporting the project and helping it to realise its objectives.

In the TREO project the PM was part of the overall project management, i.e. within the responsibilities of the shifting organizers of the partner workshops and therefore part of the workshop reports, the interim reports and the final reports. The steering committee of the project met twice a year to monitor progress and suggest corrective actions when needed. This way, the project realized the planned activities in due time.

Regular evaluation sessions were carried out with relevant stakeholders (participants) during the workshops. Their feedback was gathered and incorporated into the design of sector-specific courses. The conclusions and recommendations from the workshops are included in the workshop reports.

### **Outcomes achievement**

In the proposal submitted by the consortium, 12 results and outcomes were listed (D.4. Results and Outcomes) which have been fully developed through the involvement and contributions of all project partners. Even if it was necessary to reschedule the initial planning/timing due to different factors, which are listed above, the partnership has elaborated and developed all deliverables to achieve satisfactorily the objectives of the project.

So, the partnership has elaborated the resource efficiency course contents, with specific focus in 5 selected sectors (food, construction and building, mobility and transport, renewable energy sources and energy related products, and tourism) with the participation and contribution of the relevant stakeholders of all involved countries (results No 2, 3, 5, 6 and 8).

In October 2014 the project was presented in an Europe wide sustainable production and consumption related conference, one of the most relevant ones in the topic, attended by organizations of different profiles: public bodies, universities, VET institutions, companies, NGOs, associations, etc., and experts (result No 4).

The partnership Interim Report was elaborated, gathering the main conclusions and outcomes reached until that moment (result No 7).

During the last 4 months of the project, the activity has been intensified focusing the partnership's efforts on the elaboration of the deliverables connected with the project dissemination activities: Establishment of network involving stakeholders in VET (result No 9), project wrap up, conclusions, dissemination plan and



recommendations for further work (result No 10), and the concept of resource efficiency course content (result No 11).

Finally, the last month has been dedicated to elaborate the partnership final report (result No 11) by gathering the main conclusions of the project, the dissemination activities, and recommendations for further work.