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Deliverable 4.1

Set of training contents in each country

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Dissemination level		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	

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1. SUMMARY

This deliverable describes the pilot training contents in each country in four partner countries: Finland, Spain, Hungary and Germany. The training contents have similarities: all are formed in modular structure, some identical modules are trained in the countries and the participants of the courses are all practicing professionals.

There are differences, too. The preliminary extent of the pilot courses varies from 10 ECTS to 60 ECTS. During the training needs analysis, short courses and negotiations with customers, it was concluded that a shorter course would be more valuable and cost-effective for the target audience. The only exception is the Hungarian training which is most extensive with 60 ECTS. In all of the cases, it has become evident there is a need for this training content and related competences in the market: urban and regional planners need information on how their planning decisions effect on emissions and energy use. There is also a great need among the different professionals (urban planners and energy experts) to work more closely together in the planning process and to understand each other's viewpoints.

The final ECTS extent will be calculated once trainings have been completed and evaluated. It should be noted that the ECTS give for the pilot training will not necessarily be the same as the forthcoming trainings in partner countries and other parts of Europe. The contents and extent will and should vary depending on national needs in the market.

Below is one possibility to organize UP-RES type of courses in Europe – the picture does not represent the actual UP-RES pilot trainings. Depending on the target group, different type of trainings could be organized: the shorter, more generic the course is, the more participants could be trained. In profound expert type of know-how, there would be fewer participants, but the extent of the program would be wider. Different type of trainings would naturally be priced differently. It is also possible for training participants to select modules that best fit to their competence needs: not all training participants need to follow same learning path.

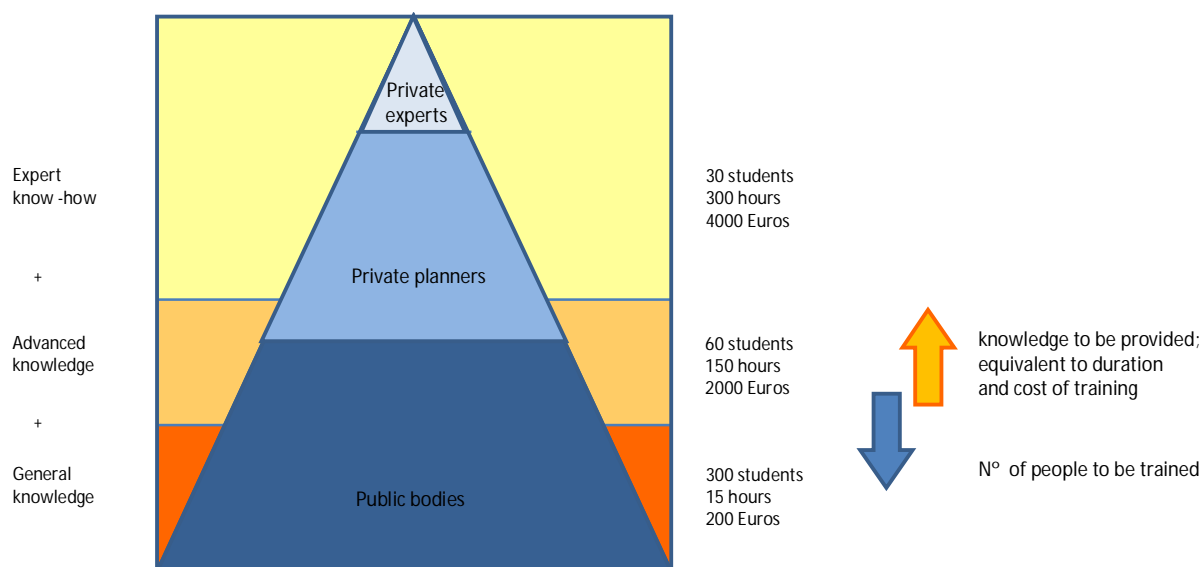


Figure 1. Ideal model concerning training level / number of students to be trained

2. FINLAND: ENERGY IN URBAN AND REGIONAL PLANNING

In Finland the pilot training ('Energy in Urban and Regional Planning', in Finnish 'Energia yhdyskuntasuunnittelussa') is structured in 8 modules, all consists of two face to face training days. In addition to the sessions, the participants work in groups on a project case.

Module 1: Targets and Policies of Emission Reduction

Contents:

- Planning as a tool for energy efficient and human built environment
- Viewpoints to climate change
- Built environment's carbon footprint
- Promoting sustainable development in built environment
- International aspect: objectives to reduce energy consumption and emissions
- introducing the project work for groups

Module 2: Buildings – new and old

Contents:

- Methods to improve energy efficiency in buildings
- Energy efficiency objectives for buildings (new building regulations to come on July , 2012)
- Modern lightning solutions in urban environments and impacts on EE
- promoting energy efficiency in systematic refurbishing of buildings

Module 3: Fuels and Emission Calculation

Contents

- air quality and the sources of pollutants
- examples of emission calculations of various fuels and energy sources (Excel sheet in OPTIMA)
- local energy assessment/inspection
- sustainable land use
- Collection and processing of municipal waste to energy

Module 4: Cities: Energy Systems and Emissions

Contents

- District heating and cooling: requirements and restrictions today and in the future
- Case Skaftkärr in the city of Porvoo Methodology
- Economy of heat pumps in urban and rural areas

Module 5: Local Energy Systems in scattered urban areas

Contents

- carbon footprint of rural living
- renewable energy sources
- local economy

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- local energy solutions
 - wind energy

Module 6: Economy of RES and EE as well energy facilities underground

Contents

- sustainable urban environment from energy and emission viewpoint
- CHP economy
- excursion to Helsinki Energy CHP plant
- ground water heat pumps
- use of geological information in planning

Module 7: Transportation and Traffic related to EE &RES and Emissions

Contents

- why and how we move?
- Energy consumption, economy and RES use per type of transportation
- car sharing experiences
- advanced liquid and gaseous bio fuels for transportation
- Requirements set by electric cars to urban infrastructure
- Advanced transportation experiences from USA
- Preliminary presentation of the group work among course participants
- Excursion to Helsinki capital transportation center (HSL)

Module 8: Applications and Future

Contents

- Conclusions and consequences of the Energy Program of Sitra
- Transferring the Energy Impact Assessment to urban and regional planning as a new permanent practise
- Presentation of the group works to the larger audience
- Feed-back discussions of the course
- Models of eco city in Finland and abroad
- Continuation of UP-RES type training

3. SPAIN: ENERGY AND URBANISM

The Spanish module specific contents are the following:

Module 1: An integrated vision. Sustainability in regional and urban planning

- current spatial and urban planning framework in Spain and particularly in Catalonia and the many different aspects of sustainability and its possible influence on urban planning.

Module 2: Energy. The existing energy model and market outlook

- consequences of the current energy model, its foreseen development on global level as well as particularly in Catalonia, and the existing energy transformation technologies.

Module 3: Buildings. Energy demand reduction strategies in new buildings and refurbishment

- parameters influencing the buildings' energy demand and the potential energy savings with special focus on zero energy buildings and deep renovation. The module provides an introduction to each measure / technology and opens space for discussion showing energy simulations and monitoring results of existing buildings.

Module 4: Mobility. Energy consumption reduction strategies in urban and interurban mobility

- trends in urban mobility (opportunities in the implementation of urban mobility plans, sustainable development plans, etc.)

Module 5: Urban planning. Energy demand reduction strategies in the urban metabolism

- parameters influencing the energy demand of the city as a whole and the energy savings potential at every planning level with particular focus on demand reduction.

Module 6: Energy resources. Renewable energy technologies in the urban scale

- resources, technologies, applications, limitations, integration into energy concepts at different level, market situation and economic feasibility of different renewable energy technologies

Module 7: Energy distribution: District Heating and Cooling

- advantages and operation of heating and cooling networks as well as technical design parameters and business plans for their implementation.

Module 8: New management concepts in the energy market

- outsourcing of energy generation and management. New concepts for energy measuring and interaction between energy demand and supply.

Module 9: Energy management. New models in contracting and management

- experiences in economic, financial and contractual models for DHC networks in Catalonia (Barcelona – Forum, Barcelona – Marina, Mataró, Cerdanyola) and other European regions that count on decades of implementation of this technology.

Module 10: Workshop. The right scale for every energy concept

- advantages and limitations of different energy concept implementation levels and the parameters influencing the selection: demand density, RES supply potential, distribution, etc. Application of basic tools for heat and cold mapping.

Specific exercises are to be developed in groups of three students in the modules 3,5,7 and 10.

4. HUNGARY

In Hungary the training consists of 10 modules + a diploma work. The training is the most extensive and its design has followed same procedure as any other university post-graduate programme. The extent of individual module varies from 4 ECTS to 10 ECTS.

Module 1 Energy demand management

Energy market, tariff systems, tasks of local authorities, follow-up the energy bills, statistical analysis of consumption data, methods of audit, display program of public buildings. Practice with infra camera, blower door and other instruments.

Module 2 Fundamentals of urban design

The development of urban settlements, historical city centres, new districts of multi-storey residential buildings built with industrialised technology, climate friendly cities, sustainable settlements.

Module 3 City management

Hierarchy of decision making, professional institutes, infrastructure, public transport, subsidised programs, actual national and EU tenders.

Module 4 Urban climatology

Mutual interactions of climate and built environment, urban heat island, wind patterns in cities, urban breeze, problem of precipitation, role of green areas, comfort conditions in open public spaces

Module 5 Energy conscious building retrofit

Diagnostic techniques, GIS methods, application of air borne infra and photo recording in the surveying of solar potential, added thermal insulation, retrofit of HVAC systems.

Module 6 Environmental protection

Emission, air pollution – propagation, concentration, waste management, biogas generation, water and sewage management, thermal water, environmental impact of the use of geothermal energy. Laboratory practice.

Module 7 Power supply

Photovoltaic systems, large and small scale wind turbines, automatic control, intelligent buildings, street-lighting

Module 8 District heating and cooling

Combined heat and power generation, gas and Stirling engines, biomass and biogas, seasonal storage, primary, secondary and tertiary circuits, smart metering.

Module 9 Geothermal energy

Geologic conditions, thermal waters, bore holes, energy collecting piles, heat pumps, COP, distribution network, heat losses, circulation pumps, automatic control.

Module 10 Solar energy

Solar energy potential in densely built urban environment, the available energy collecting area, the share of the on-site renewable energy, collector types, energy storage.

Diploma project

Selected and approved topics: this year e.g. energy conscious building retrofit on district scale, indicators of sustainable settlements, energy analysis of the public transport network of Debrecen, solar potential of the "Kelenfold" district Budapest, heat pump system, application of Stirling engine in a district heating system, photovoltaic power generation, hydraulic balancing of district heating network, etc.

5. GERMANY: DER ZERTIFIZIERTE ENERGIEEFFIZIENTE STADTPLANER

The German pilot training is structured in following eight modules:

Module 1: Basics and Introduction to the System of City and Technical Infrastructure

Definitions, historical development, development of urban planning, including the technical infrastructure, current situation, urban redevelopment/ mechanisms of urban development, 8 pillars of sustainable urban planning (decentralised concentration and demography, strategy and processes, density and mixture, identity and general principle, efficient and intelligent urban infrastructure, existing buildings, environment and landscape, mobility), 5 strategies for energy efficient urban development (the “compact city”, living in the city - for young and old, monument conservation - energy efficiency, target-orientated funding, innovative energy concepts - prioritization of funds usage), future challenges (metropolitan regions, scenarios of negative growth)

Module 2: Basic Conditions and Characteristics of Energy and Energy Efficiency

Energy markets (reserves and resources; security of supply, flexibility, consumption), political framework (targets and implementation guidelines of the EU and Germany, structural policy, urban development funding, “Leipzig Charta”, program for the national urban development policy), urban identity and general principle (needs and objectives, interaction and restraints, public relations and communication), Environment (climate changes/ climate models, heat/ climate control, CO₂ effects and GHG, influences and packages of measures regarding technical infrastructure, factors of interpretation), Demography (statistics, living space, lifestyles, socio-demographic factors, effects), funding and mechanisms (overview, system and design, effects)

Module 3: Physical and Technical Background / Forms of Energy / Energy Sources / Buildings

Fossil fuels (oil/ gas/ coal), RES, residual waste, cooling systems, forms of conversion – district heating - CHP, power plants – grids – building services, energy storage, buildings (heat demand, renovation strategy), use of GIS

Module 4: Definitions and Fields of Application/ Application Limits of RES

Biomass (harvesting factors, agricultural conditions, climate changes, cycles), photovoltaics/ solar thermal energy (connection to central/ local grids, research results), geothermal energy (surfaces and deep geothermal), wind (locations and fields of application), water, utilization of waste heat, special forms: building materials / waste water heat recovery, conditions regarding locations (clearance areas, immission control)

Module 5: Basic Economic Data

Framework (national and international, heat and power), energy market, energy price (price coupling, interplay between systems), costs (economic efficiency, benchmark of systems, investment cycles, calculation methods and simulations, sensitivity analysis, profitability analysis/ weighting of parameters), electricity exchange (mechanisms, time horizons), CO₂ abatement costs of different technologies (€/t CO₂)

Module 6: Creating a Concept

InSek / EneffSeko (methodology, contents, interaction, structure, measures) IEuKK (objectives and contents, Heating and Cooling Atlas, CO₂ balance, funding, scenarios), processes (process chains, prioritisation, implementation measures; Ministry for Research and Technology (BMFT): Energy Efficient City), energy saving potentials (hydraulic compensation, thermal insulation, energy efficiency systems, evaluation methods and decision support), interaction of all concepts, quality assurance and monitoring, restructuring and heating concepts for different types of buildings (practical information, approaches for implementation, funding opportunities)

Module 7: Legal Framework for the Implementation of Energy and Climate Policy, as well as Urban Planning related Objectives

European level (EFRE, EDL, EED), federal level, federal state level, local level, support programs, contract law, European awarding law, options for action for municipalities (possibly model contracts), data protection (mechanisms, solutions)

Module 8: Implementation measures - Best and Worst Practice with Examples

During this module all the contents of the modules 1 to 6 are illustrated in the form of "Best and Worst Practices".