Environment and Climate Regional Accession Network ECRAN

Environment and Climate Regional Accession Network (ECRAN)

ECRAN -TAIEX Multi-Beneficiary Workshop on LEAP Modelling: Module 2

26-28 May 2015, Istanbul

Enviroment and Climate Regional Accession Network ECRAN

ENVIRONMENTAL AND CLIMA REGIONAL NETWORK FOR ACCESSION - ECRAN

WORKSHOP REPORT

Activity No 3.1. SUBTASK 1.1-C

ECRAN -TAIEX MULTI-BENEFICIARY WORKSHOP ON LEAP MODELLING: MODULE 2

PRACTICAL TRAINING ON QUANTITATIVE MODELS AND SCENARIO DEVELOPMENT TO BE USED TO ASSESS CLIMATE AND ENERGY POLICY OPTIONS AND TO SET EMISSION TARGETS

26-28 May 2015, ISTANBUL, TURKEY

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Contents

LIST OF ABREVIATIONS	
BAU	"Business-as-usual"
COP	Conference of Parties
EE	Energy Efficiency
EED	Energy Efficiency Directive
EMF	Energy Modelling Forum
ESD	Effort Sharing Decision
ETS	Emission Trading System
EU	European Union
GHG	Greenhouse Gas
HCFCs	Hyrdochlorofluorocarbons
IEA	International Energy Agency
IEA DSM	International Energy Agency Demand Side Management Programme
INDC	Intended Nationally Determined Contributions
LEAP	Long-range Energy Alternatives Planning System
LEDS	Low Emission Development Strategies
LULUCF	Land use, Land use change and Forestry
MS	Member State
NEEAP	National Energy Efficiency Action Plan
PAM	Policies and Measures
PFCs	Perfluorocarbons
RES	Renewable Energy Sources
SEI	Stockholm Environment Institute
UNFCCC	United Nation Framework Convention on Climate Change
WAM	Scenario with additional measures
WEM	Scenario with existing measures
WOM	Scenario without measures

I. Background/Rationale

There is a need to start developing concrete climate policies based on full alignment with the EU Climate acquis and Greenhouse gas (GHG) emission reduction target setting. At present the absence of national or regional targets and roadmaps towards implementation of these targets hamper the development of robust climate policies in the region and thus low emission development (LEDS). ECRAN could provide the platform to start a regional work on this topic. Climate policy related strategy development as well as fulfilling the reporting requirements of Annex I countries towards the UNFCCC, similarly to the EU acquis requires detailed modelling of emission scenarios on country level.

In most ECRAN beneficiaries there is experience in modelling aided scenario work, especially in the framework of the preparations of National Communications. However, in many cases this work has been designed and outsourced by international organisations or other external organisations without adequate involvement or ownership of the results by the countries. As such, the knowledge base within the administrations on modelling aided scenario work is limited.

In terms of technical requirements, the focus of the training will be on one specific modelling platform, the Long-range Energy Alternatives Planning System (LEAP*)* which has been developed by the Stockholm Environmental Institute (SEI). Of the 8 beneficiaries 6 are already using LEAP, and one (Kosovo*[1]) has expressed interest in using it. The training program will be organized into four modules to be conducted during one year:

- Module 1 – Introduction to modelling techniques and assessing data needs for the base year;
- Module 2 – Development of a baseline (without measures) scenario;
- Module 3 – Development of with measures and with additional measures scenarios and sensitivity analysis;
- Module 4 – Gap analysis and identification of further technical capacity building needs.

The modules 1 and 4 will be organized back to back with Regional Training Workshops to ensure that capacity building of technical skills is delivered in combination with capacity building related to the selected EU Climate Acquis. This integrated delivery of capacity building related to policy and technical skills will increase the understanding of modelling as a policy tool which can promote policy-making based on evidence and analysis.

As the aim of the exercise is to increase capacity in public administrations, the tasks will as a general rule, target staff working at the public administration. In particular, the involvement of staff working on the climate, energy and transport policy in ministries, in providing technical support at government agencies and bodies, as well as staff, working at national statistical offices, is desirable. However, the heterogeneity of institutional arrangements for modelling among the ECRAN beneficiaries warrants a flexible approach in selecting the target audience of the trainings and follow-up activities. In some cases the national public administrations are working together closely with academia and prefer the continuation of existing working arrangements. In addition, although a general focus of capacity building activities on the public administrations seems to be the preferred option, low levels of capacity and overburdened staff may be an obstacle to active participation in trainings and follow-up

[1] *This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ opinion on the Kosovo declaration of independence.

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activities. In such cases targeting academia in addition to staff of public administrations may be a better solution than inadequate participation on behalf of some of the beneficiaries.

To ensure active participation, ECRAN beneficiaries will be asked to commit that the experts nominated for the bottom-up exercise are allowed sufficient time for carrying out the work required under the different tasks, including attending seminars and conducting the follow-up activities. Experts from the beneficiaries are expected to spend 12 days participating in workshops, and a minimum of 15 days in follow-up activities implementing the regional pilot modelling exercise. The ECRAN team will be monitoring work progress to ensure that the exercise, which requires a significant commitment, is advancing as foreseen.

II. Objectives of the training

General objectives

The wider objective is to strengthen regional cooperation between the EU candidate countries and potential candidates in the fields of climate action and to assist them on their way towards the transposition and implementation of the EU climate policies as a key precondition for EU accession.

Specific objectives

The specific objective of the training program is to increase technical capacities in the countries to allow them to carry out modelling of emission scenarios. The modelling aided scenario work will benefit countries by helping them meet their future EU and UNFCCC reporting requirements, and to form a rational position on national efforts contributing to the EU 2050 roadmap and the 2030 Framework for Climate and Energy Policies. It may also assist them by promoting evidence based planning in energy policy, including development of an energy strategy, energy efficiency action plan and a renewable energy action plan.

Depending on the circumstances of the national public administrations and their future plans to build modelling capacity inside or outside the public administration, the technical modelling skills can be used in one of two ways. If the chosen option is to carry out modelling work within the public administration the exercise will help building technical capacity and will provide a basis for future work. If the chosen option is to outsource modelling work, the exercise can help beneficiaries gain a better understanding of modelling work which will enable better communication with consultants, thereby ensuring that modelling is relevant to policymakers and that policymakers understand the limits of the work and are able to better interpret the results.

Results/outputs

The following results were expected from the regional exercise:

- The training workshop contributes to building technical capacities to carry out modelling of emission scenarios;
- The training enhances a better understanding of modelling work which will ensure that (future) modelling is relevant to policymakers and that policymakers understand the limits of the work and are able to better interpret the results;

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- The training provides a proper introduction on LEAP as well as provides the initial steps in filling the LEAP structure with country relevant data and building up a basic model;
- The regional network of experts is strengthened.

Aim of the workshop in Istanbul (May 26-28)

The first four-day long meeting was organized in Skopje in November 2014 and aimed to give an introduction to the participants to the policy environment, give an introductory training on LEAP as well as provide initial steps in filling the LEAP structure with country relevant data, building up the basic model. Three more modules of training will follow along with homework within the yearlong program.

Building on the first meeting, the second meeting was organised in Istanbul In May 2015. The aim of the training was to further build analytical capacity of participants. The focus of the training was on the definition of scenario types, definition and reporting on policies and measures, projections of drivers of future emissions, costs of technologies.

The beneficiaries of the training are the Ministries of Environment of the beneficiary countries who participated in the Module 1 or at the Tirana follow-up training in March 2015 as well as the participants of the national training in Belgrade in April 2015.

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III. EU policy and legislation covered by the training

- **Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions** and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC. This regulation lays down a mechanism for monitoring and reporting GHG emissions and for reporting other information at national and EU level relevant to climate change. These provisions also apply to:
  - Reporting on the EU and its MS low-carbon development strategies;
  - GHG emissions from sectors and sources and the removals by sinks covered by the national GHG inventories;
  - GHG emissions;
  - The non-CO2 related climate impacts, which are associated with emissions from civil aviation;
  - the EU and its MS's projections of anthropogenic emissions by sources and removals by sinks of GHG not controlled by the Montreal protocol, and the MS' policies and measures relating thereto;
  - MS' actions to adapt to climate change.

- **The 2030 Framework for climate and energy policies**

  EU leaders agreed on 23 October 2014 to the internal 2030 greenhouse gas reduction target of at least 40% compared to 1990 together with the other main building blocks of the 2030 policy framework for climate and energy, as proposed by the European Commission in January 2014. This 2030 policy framework aims to make the European Union's economy and energy system more competitive, secure and sustainable and also sets a target of at least 27% for renewable energy and energy savings by 2030.

  While the EU is making good progress towards meeting its climate and energy targets for 2020, an integrated policy framework for the period up to 2030 is needed to ensure regulatory certainty for investors and a coordinated approach among Member States.

  The framework presented will drive continued progress towards a low-carbon economy. It aims to build a competitive and secure energy system that ensures affordable energy for all consumers, increases the security of the EU's energy supplies, reduces our dependence on energy imports and creates new opportunities for growth and jobs.

  - <u>Reducing greenhouse gas emissions by at least 40%</u>

    A centre piece of the framework is the binding target to reduce EU domestic greenhouse gas emissions by at least 40% below the 1990 level by 2030.

    This target will ensure that the EU is on the cost-effective track towards meeting its objective of cutting emissions by at least 80% by 2050. By setting its level of climate ambition for 2030, the EU will also be able to engage actively in the negotiations on a new international climate agreement that should take effect in 2020.

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To achieve the overall 40% target, the sectors covered by the EU emissions trading system (EU ETS) would have to reduce their emissions by 43% compared to 2005. Emissions from sectors outside the EU ETS would need to be cut by 30% below the 2005 level. This will need to be translated into Member State targets. The European Council has outlined the main principles to achieve this.

- Increasing the share of renewable energy to at least 27%

  Renewable energy will play a key role in the transition towards a competitive, secure and sustainable energy system. The Commission proposed an objective of increasing the share of renewable energy to at least 27% of the EU's energy consumption by 2030. The European Council endorsed this target which is binding at EU level.

- Increasing energy efficiency by at least 27%

  The European Commission proposed a 30% energy savings target for 2030, following a review of the Energy Efficiency Directive. The proposed target builds on the achievements already reached: new buildings use half the energy they did in the 1980s and industry is about 19% less energy intensive than in 2001. The European Council, however, endorsed an indicative target of 27% to be reviewed in 2020 having in mind a 30% target.

- Reform of the EU emissions trading system

  The EU ETS will be reformed and strengthened. A 43% greenhouse gas reduction target in 2030 in the ETS translates into a cap declining by 2.2% annually from 2021 onwards, instead of the rate of 1.74% up to 2020.

  In January 2014 the Commission proposed to establish a market stability reserve from 2021 onwards. This is to address the surplus of emission allowances in the EU ETS that has built up in recent years and to improve the system's resilience to major shocks. This will ensure that in the future the EU ETS is more robust and effective in promoting low-carbon investment at least cost to society.

  The European Council underlined that a reformed, well-functioning ETS with an instrument to stabilise the market in line with the Commission's proposal will be the main instrument to achieve greenhouse gas emission reductions.

- New governance system

  The 2030 framework proposed a new governance framework based on national plans for competitive, secure and sustainable energy as well as a set of key indicators to assess progress over time. The European Council agreed that a reliable and transparent governance system will be developed to help ensure that the EU meets its energy policy goals.

- **Effort Sharing**

The current Effort Sharing Decision (ESD) (Decision No 406/2009)) establishes binding annual greenhouse gas emission targets for Member States for the period 2013–2020. These targets concern emissions from most sectors not included in the EU Emissions Trading System (EU ETS), such as transport (except aviation and international maritime shipping), buildings, agriculture and waste. In the framework of the Effort Sharing Decision the sectors covered by the EU Emissions

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Trading System (EU ETS) would have to reduce their emissions by 30% compared to 2005. Emissions from sectors outside the EU ETS would need to be cut by 10% below the 2005 level.

Within the 2030 Framework for Climate and Energy Policies, the sectors covered by the EU Emissions Trading System (EU ETS) would have to reduce their emissions by 43% compared to 2005. Emissions from sectors outside the EU ETS would need to be cut by 30% below the 2005 level. This will need to be translated into Member State targets using the same methodology as in the current Effort Sharing Decision (Member State targets will vary between 0% -40%; Current GDP data will be updated; for Member States with GDP/capita above the EU average: targets will be adjusted with cost effectiveness). The European Council agreed in October 2014 that a reliable and transparent governance system will be developed to help ensure that the EU meets its climate and energy policy goals.

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IV. Highlights from the training workshop

Reference is made to Annex I for the agenda, and Annex III for the presentations. Only the highlights are indicated below.

1. Introductory part to the training (theory)

Introduction (Imre Csikós, ECRAN) on:

- Paris COP and the need to prepare INDCs;
- Long-term need to align accession policy for candidate countries with EU climate policy;
- Modelling of climate scenarios and emission reduction pathways needed to underpin both INDCs and actions to be taken as the future EU Member States;
- From this follows the need to train people working in public administrations to understand and if necessary carry out modelling work;
- Aim of workshop is to further develop the ability of participants to carry out basic modelling work, to understand modelling work conducted by external experts, and to better understand EU monitoring and reporting requirements.

Definition and reporting of Policies and Measures (Justin Goodwin, ECRAN)

Figure 1. MMR requirements on PAM reporting

- PAMs Article 13
  - **(a) national systems for reporting on policies and measures;**
  - (b) updates relevant to their low-carbon development strategies;
  - **(c) information on national policies and measures and on implementation of Union policies and measures;**
  - **(d) information on planned additional national policies and measures;**
  - (e) information on domestic action and the use of flexible mechanisms under the Kyoto Protocol.
- Projections Article 14
  - (a) projections with measures and where available WOM & WAM;
  - (b) total GHG projections and separate estimates for EUETS and ESD;
  - **(c) the impact of PAMs: Article 13;**
  - (d) **sensitivity analysis**;
  - (e) references to the assessment and the technical reports;
- Years of reporting:
  - 2015, 2017, 2019, 2021

- PAMs scenario definitions;
- Data to be included in reporting;
- Reporting format tables;
- In 2015, i.e. the 1st year of reporting according to the MMR, 20 – 120 PAMs reported per Country, 17% of which were WAM of which 65% quantified PAMs, and 83% of which were WEM of which 34% quantified PAMs;
- Examples of PAMs;

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- Elements of national systems for PAMs: national entity, steering committee, management and coordination, sectoral/compilation expertise, data sources.

What are scenarios? (Aleksandra Novikova, Germany)

- Concept of scenario making as an analytical tool to illustrate ideas about the future

Figure 2. Difference between forecasts and scenarios

	Forecasts – what is likely?	Scenarios - what could be?
Approach	Focus on analysis and outcome	Focus on process and strategy
Objective	To develop the most likely pathways and characterize uncertainty	To develop a number of insightful pathways that explore uncertainties
Methods	Analytical models and driver variables	Qualitative stories evaluated by models
Treatment of uncertainty	Probabilistic methods, statistics, and transparency of assumptions	Exploration of critical uncertainties and separation of predetermined and uncertain elements in crafting stories
Important actors	Reliance on experts, planning agencies	Strategists

- Scenarios as either descriptive (exploring paths into the future without any preconceived endpoint) or prescriptive (exploring the routes to desired endpoints or vision)
- Steps of scenario development:
  - Step 1. Identify a question that scenarios will explore, e.g. Global Energy Assessment: How can societies reach the global goals of welfare, security, health, and environmental protection simultaneously with feasible changes in energy systems?
  - Step 2. Determine driving forces of change, e.g. population growth, economic growth, technological change, lifestyles
  - Step 3. Rank the driving forces by importance and uncertainty
  - Step 4. Create scenario logic, map plausible scenarios

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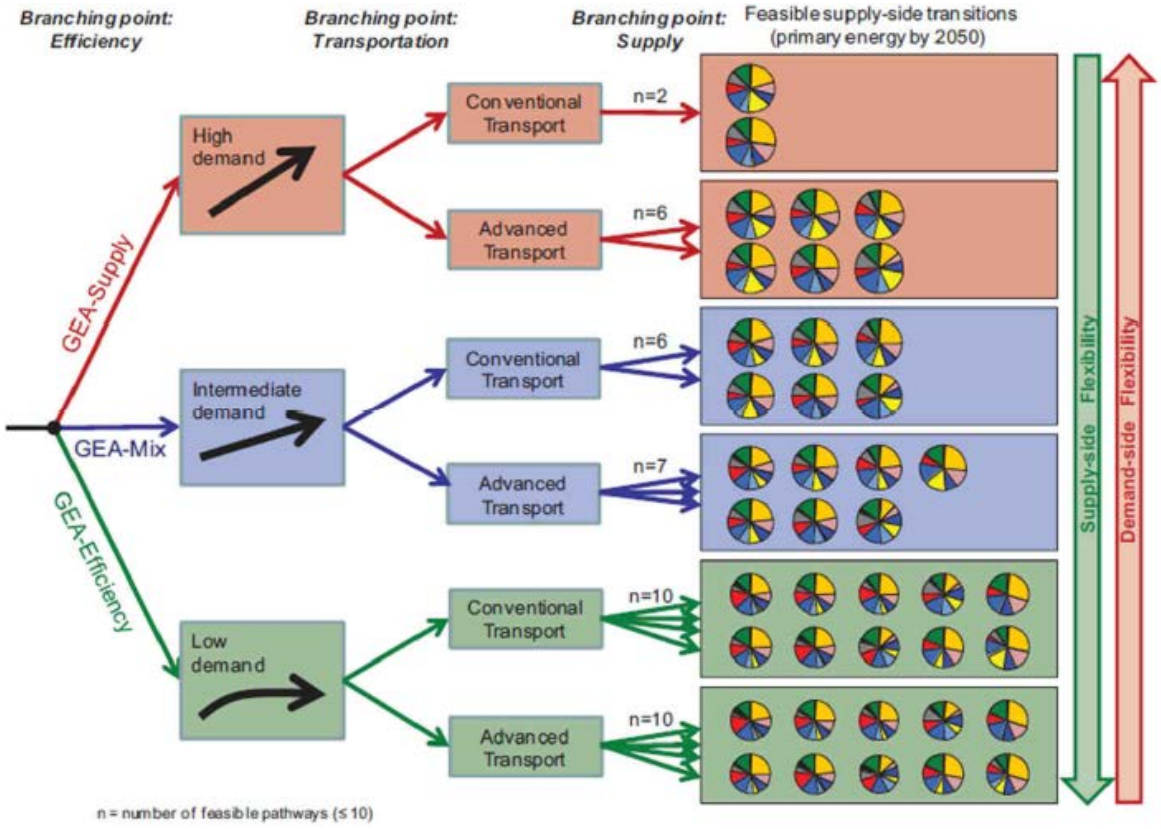
Figure 3. Global Energy Assessment map of scenario logic



- Step 5. Flesh out the scenarios: 5 W's (what who when what why) and How? and prepare the model
  - Choosing a model:
    - simple and complex models may have errors of same order of magnitude;
    - approach depends on aims and data availability;
    - basic types: top-down and bottom-up.
- Step 6. Assess implications: how does decision look under each scenario, what are the vulnerabilities, is the decision robust under all scenarios?

- Types of scenarios often referred to in the literature:
  - frozen efficiency scenario: no energy efficiency (EE) improvement and no reduction of specific energy consumption;
  - low(high) efficiency scenario: assumes low(high) penetration level of energy efficiency/low carbon technologies;
  - business-as-usual scenario: assumes that no new energy efficiency and low carbon policies are implemented additionally to those which have been already realized and energy and carbon intensities change because of market forces;
  - Low carbon development scenarios.
- Presentation of an example of scenario development for the Turkish transport sector for low carbon transportation by 2030

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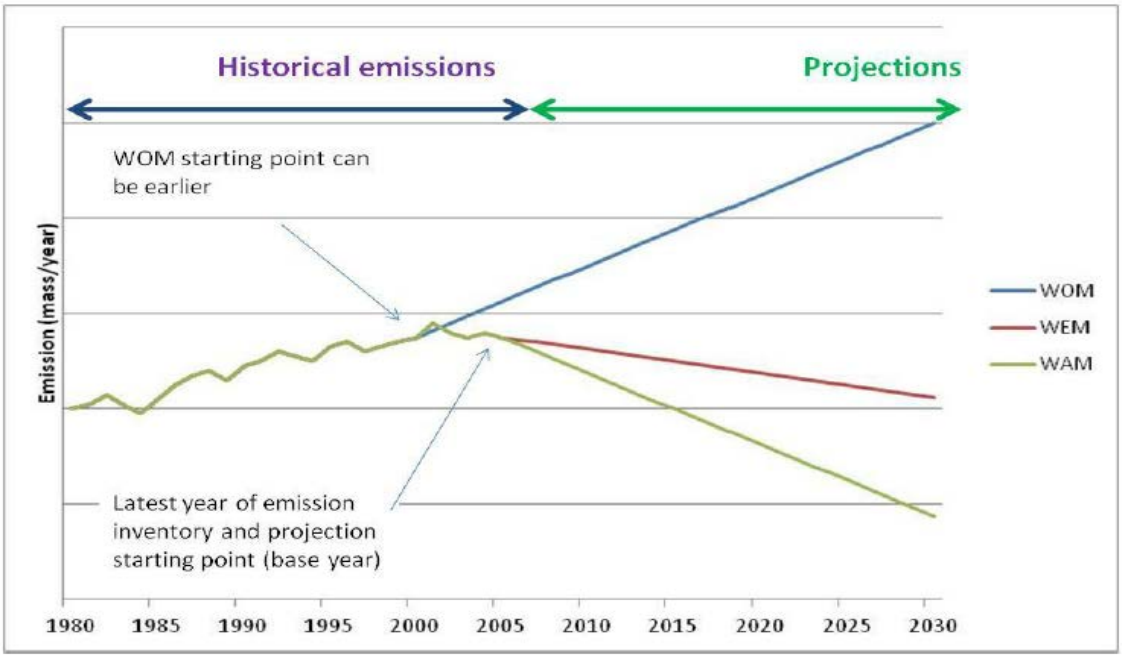
EU reporting requirements on scenarios (Ágnes Kelemen, ECRAN)

- legislative background and guiding documents
- national (and Union) systems for reporting on PaMs and projections
  - deadline: 9th July 2015;
  - systems comprise institutional, legal and procedural arrangements;
  - implementing act on the structure, format and submission process of information;
  - consistency with internationally agreed reporting requirements as well as timetables;
  - reporting required on the designation of the appropriate national entity or entities entrusted with responsibility for projections and on description of systems.
- scope and format of reporting:
  - anthropogenic greenhouse gas emissions by sources and removals by sinks;
  - organised by gas or group of gases (HFCs and PFCs) and by sector;
  - total emissions + separate estimates for the ETS and effort sharing sectors;
  - quantitative estimates years ending with 0 or 5 until 2030;
  - tabular formats set out in Annex XII to the implementing regulation;
  - by March 2015 and every 2 years afterwards.
- types of scenarios:
  - without measures (where available): exclude the effects of all policies and measures which are planned, adopted or implemented after the year chosen as the starting point;
  - with (existing) measures (obligatory): policies and measures that have been adopted and implemented;
  - with additional measures (where available): policies and measures which have been adopted and implemented as well as policies and measures which are planned.

Figure 4. WOM, WEM and WAM scenarios



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- Quality criteria for reporting:
  - Timeliness;
  - Transparency;
  - Accuracy;
  - Consistency;
  - Comparability;
  - Completeness.

Policy instruments - Mitigation policies and measures for Renewable Energy Sources (László Szabó, Hungary)

- Presentation of specific RES modelling experience using the EEMM model
- 2 options in economic terms to make higher cost RES technology competitive: internalising external costs of fossil fuel based production, or supporting RES
- Types of impacts of RES policies considered: Merit order effects, lower market value of RES, integration costs
- Types of Renewable Energy Sources (RES) support policies modelled:
  - Price based options:
    - Feed in tariff schemes (price based scheme);
    - Feed in Premiums (price based scheme).
  - Quota based schemes (quantity based targets):
    - Tradable green certificates;
    - Quota obligations.
  - Other supports:
    - Investments supports;
    - Tax advantages;
    - Grid related supports.

Figure 5. Different Feed-in premium schemes

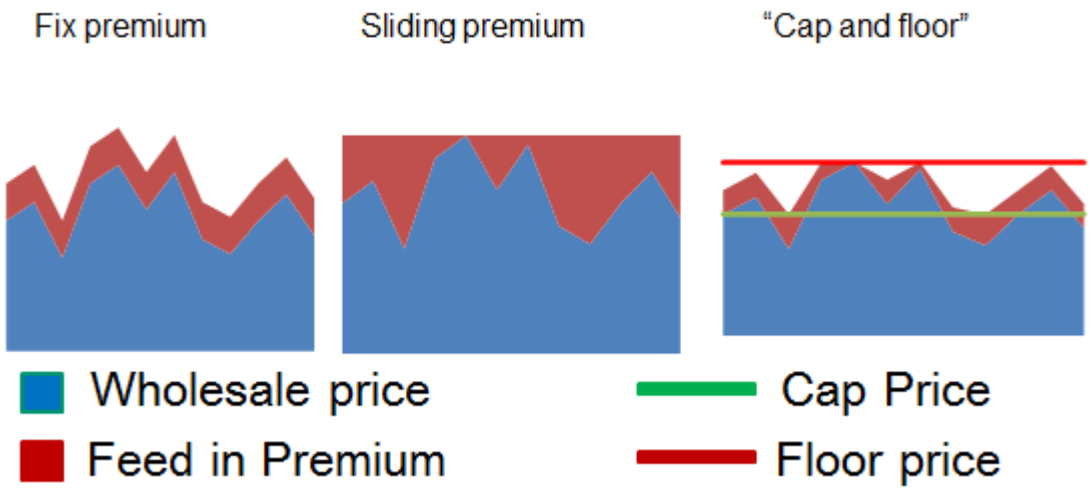

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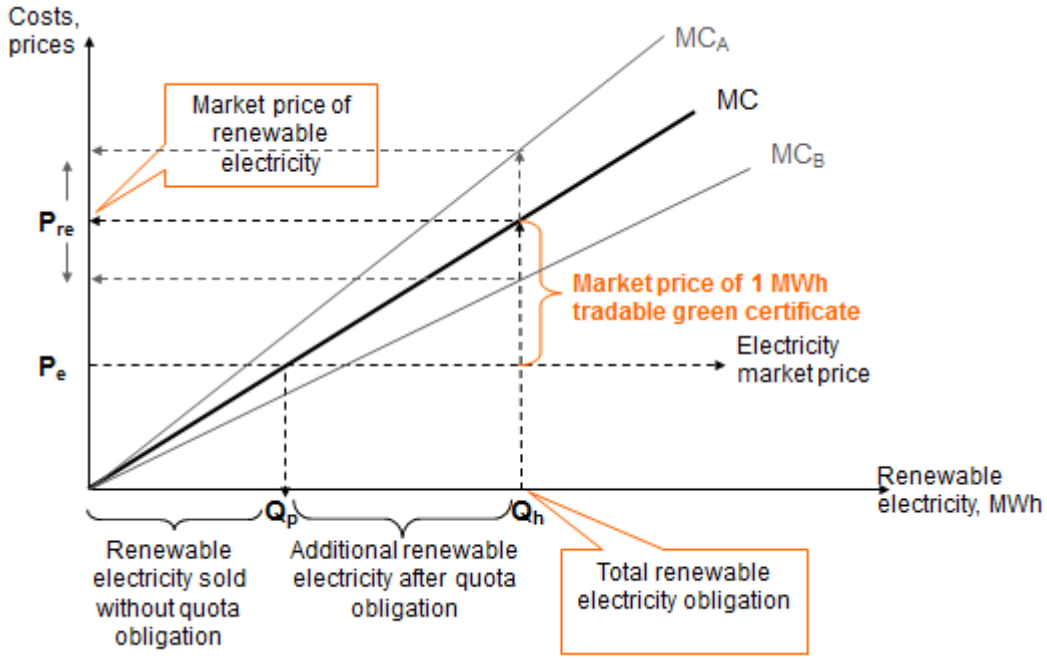
Figure 6. Support scheme based on RES quota obligation



- As RES-E has two main characteristics in most EU member states, priority dispatch and low variable cost, when modelled RES is dispatched first
- When modelling high RES penetration rates, the following impacts have to be considered:
  - Merit order effects
  - RES market value reduction
  - Integration costs (Profile costs, balancing costs, grid costs)
- Integration cost of RES:
  - Profile cost: arise from the fact that RES-E has a low capacity factor, so by installing 1 MW new capacity, no (or small amount of) conventional capacity could be removed from the system. If they stay in the system, their utilisation rate will be reduced – means more costly operation
  - Balancing cost: RES-E production is variable, so higher balancing costs are associated with them than to conventional producers.
  - Grid cost – usually higher than conventional producers (e.g. wind)

Case study: Demand side (Aleksandra Novikova, Germany)

- Presentation of different policy instruments to reduce GHG emissions:
  - Regulatory approaches
    - Emission standards;
    - Technology standards;
    - Product standards.
  - Economic instruments
    - Taxes;
    - Subsidies;
    - Emission trading schemes.

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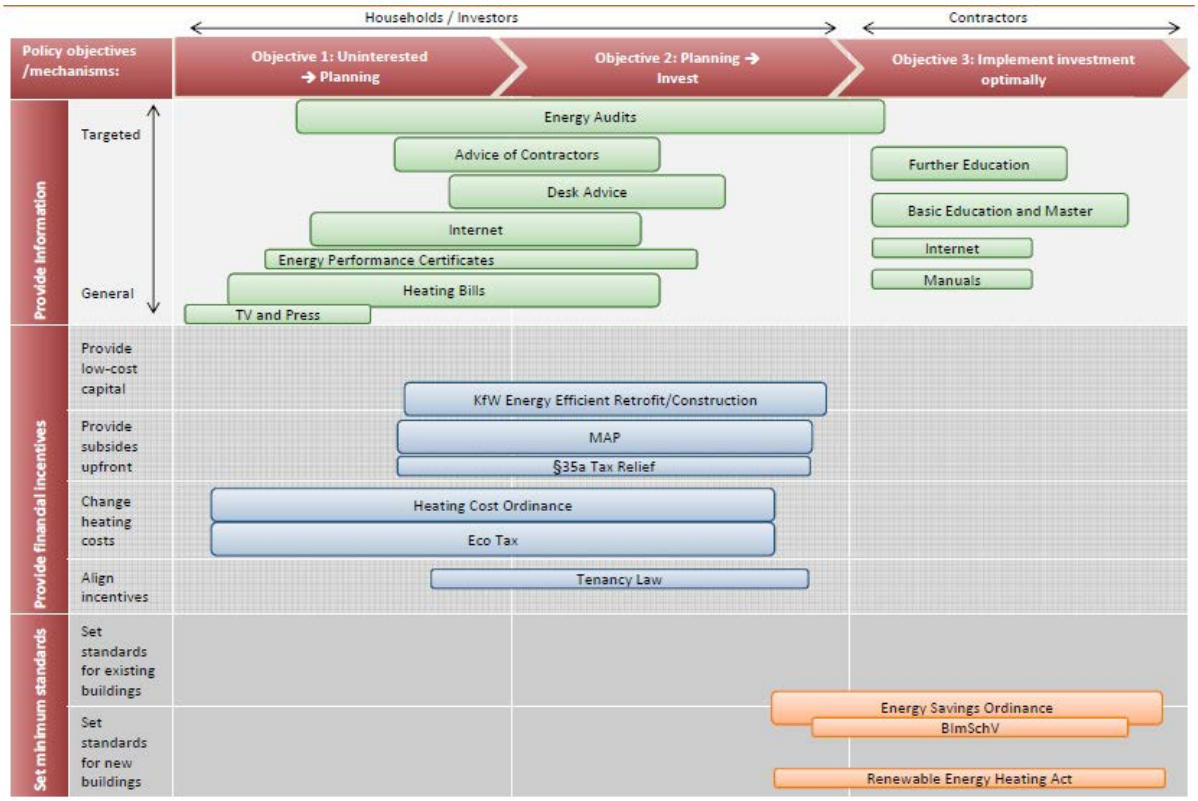
- Information programmes
  - Labelling;
  - Energy audits;
  - Detailed bills;
- Government provisions of public goods and services
- Voluntary actions

Figure 7. Example of policy mix – Map of German policies and programmes to support thermal insulation in buildings



- Examples of policy packages by sector:
  - Buildings;
  - Industry;
  - Transport.

Case Study: Transport (Mihael Krail, Fraunhofer ISI, Germany)

- Transport is the only sector with increasing emissions in the EU since 1990

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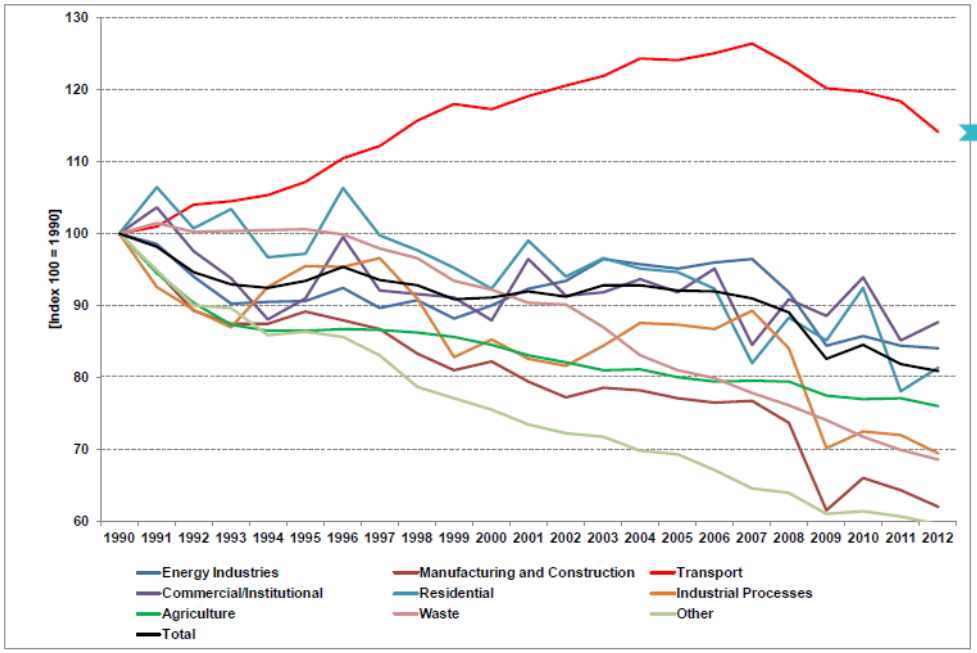
Figure 8. EU sectoral emission trends 1990-2012



Source: EU Transport in Figures 2014

- annual emission reduction of 4.3% and 2.7% are needed in the transport sector to reach the IPCC 2050 goal and the EU Transport White Paper goal respectively, compared with a 1% annual growth rate between 1990-2009
- the German Energiewende aims to reduce transport emissions by 80% in 2050 compared with 1990 via electrification
- Measures and programmes in Germany include the Integrated Energy and Climate Package, the National Action Plan Energy Efficiency, the Climate Protection Plan 2020, the National Development Plan for Electric Mobility, the National Innovation Programme for H2 and FCEV, and the Mobility and Fuel Strategy

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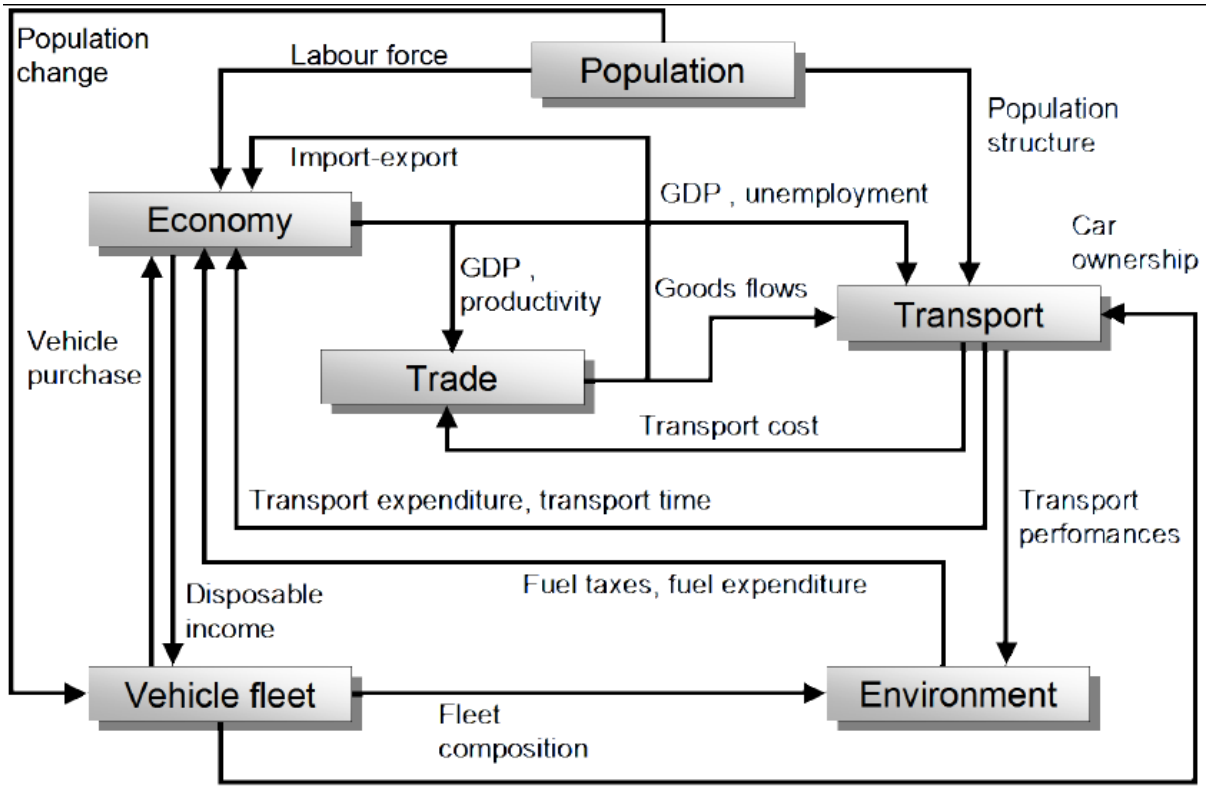
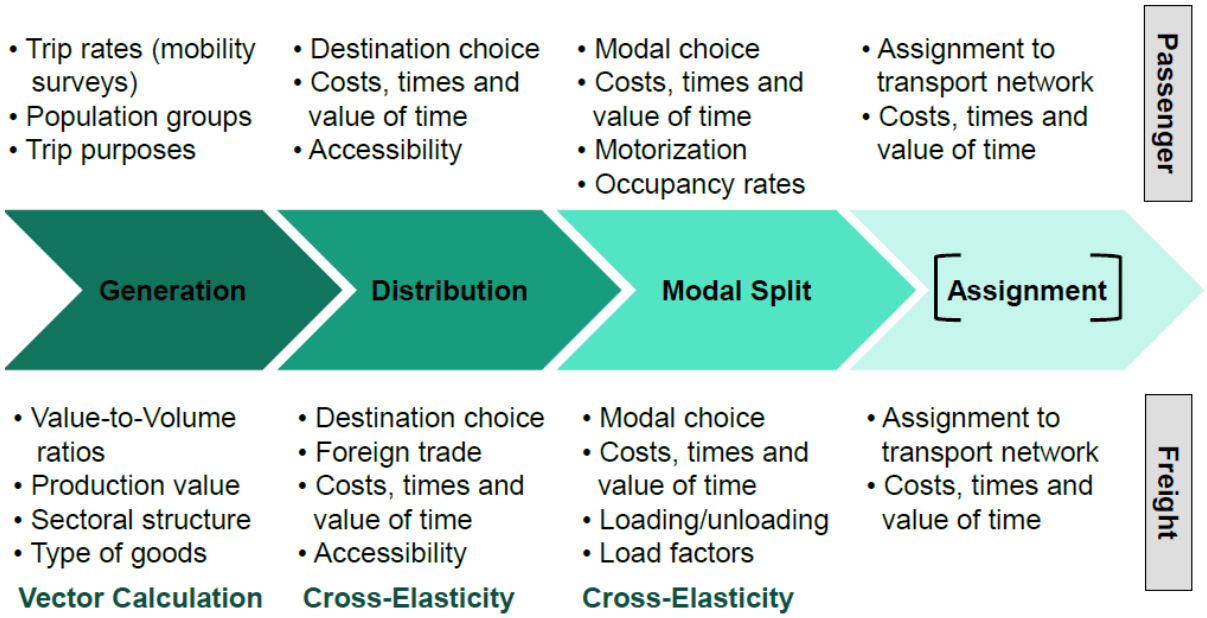
Figure 9. Example of a transport model – ASTRA



- the ASTRA model shows the interaction between transport, economy and environment, and is based on System Dynamics methodology

Figure 10. The transport module of the ASTRA model



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- Economy, vehicle fleet and environmental modules of the ASTRA model
- Steps of estimation of GHG emission reduction potential of the transport sector using ASTRA:
  - Extraction of relevant CO2 reduction technologies from literature research, technology journal review and expert interviews;
  - Estimation of feasible CO2 reduction potential for each technology based on 2nd review if possible (otherwise medium potential is taken);
  - Allocation of technologies to 12 categories (e.g. car body, injection, etc.);
  - Final choice of technology packages with highest CO2 reduction potential under consideration of technical compatibility;
  - Calculation of relative CO2 emission reduction potentials for each technology cluster.
- Data needs, parametrization, calibration and validation

Figure 11. European transport related CO2 emissions (Mt)

Scenario	2020	2030	2050	Var. % 1990-2050	
				Stat. 1990	Model Base
REF	930	946	1,029	+23%	+20%
MAX_E&M	754	582	541	-35%	-37%
EV	835	679	682	-18%	-20%
HFC	859	734	674	-19%	-22%
EV+HFC	691	548	552	-34%	-36%
AMB_TP	729	530	483	-42%	-44%
AMB_REG	727	526	337	-59%	-64%

Source: GHG-TransPoRD.

2. LEAP training

(All presentations by Anna FLESSA, Greece, training by Eleni-Danai MAVRAKI, Greece, with the support of Ágnes KELEMEN (ECRAN), Aleksandra NOVIKOVA, Germany and Anna FLESSA, Greece)

The format of the workshop consisted of blocks of presentations which addressed both practical modelling tips and theoretical background to the modelling exercise. These presentations were followed by practical exercises in model building.

Introduction to demand sector modelling

Demand sectors

- Industry
- Commercial
- Total Final Demands

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Transformation sector (Electricity)

- Definition of energy transformation (transmission and distribution, energy conversion and extraction)
- Transformation modules/sectors in LEAP and their properties
- General module structure (feedstock and auxiliary fuels, processes, dispatch and output)
- Modelling losses in transmission and distribution
- Modelling electricity generation
- Modelling oil refining
- Steps of setting up a transformation model
- Definition and steps of defining a load shape curve
- Dispatch rules

Other transformation sectors

- Charcoal production
- Oil refining
- Coal mining
- Resources

Transport sector

- Current Accounts
- BAU scenario
- BAU emissions
- BAU results
- Policy scenarios

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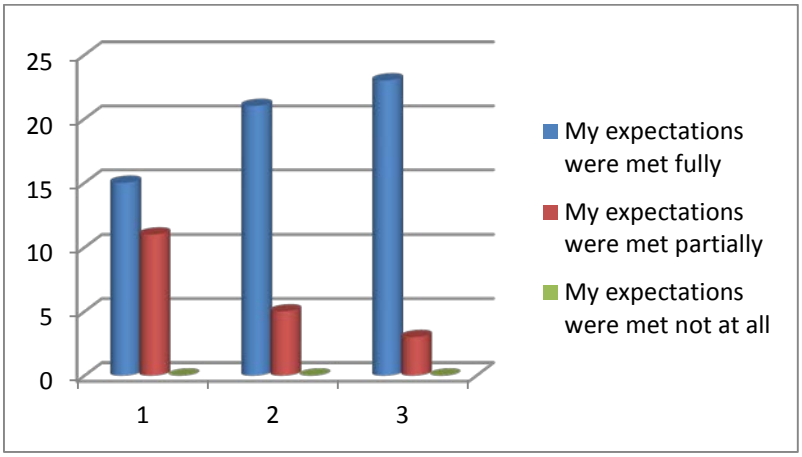
V. Evaluation

Reference is made to Annex V. The evaluation confirmed that the training workshop helped to strengthen the capacities to carry out modelling of emission scenarios (58% of participants mentioned this was achieved fully, the remaining mentioned this was achieved partially).

The training helped participants to gain a better understanding of modelling work which will enable participants to ensure that (future) modelling is relevant to policymakers and that policymakers understand the limits of the work and are able to better interpret the result (81% of the participants indicated that this results was achieved fully).

Finally, 88% of the participants indicated that the training gave a proper introduction on LEAP as well as providing the initial steps in filling the LEAP structure with country relevant data, building up the basic model

1. The training workshop contributes/helps us for building technical capacities to carry out modelling of emission scenarios.
2. The training helps us to gain a better understanding of modelling work which will enable us to ensure that (future) modelling is relevant to policymakers and that policymakers understand the limits of the work and are able to better interpret the results.
3. The training gave us a proper introduction on LEAP as well as providing the initial steps in filling the LEAP structure with country relevant data, building up the basic model.



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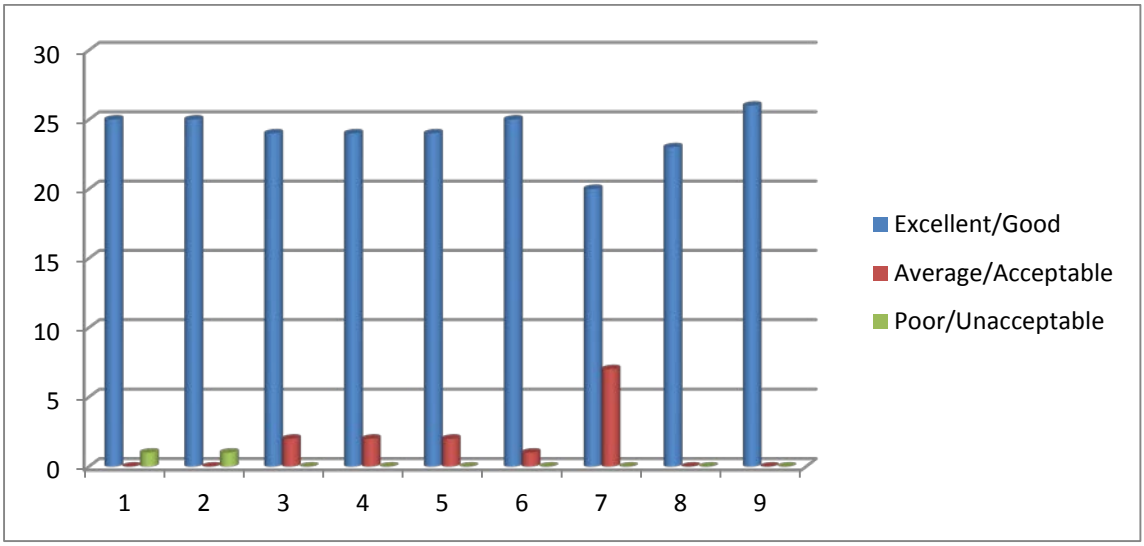
1 The workshop achieved the objectives set
2 The quality of the workshop was of a high standard
3 The content of the workshop was well suited to my level of understanding and experience
4 The practical work was relevant and informative
5 The workshop was interactive
6 Facilitators were well prepared and knowledgeable on the subject matter
7 The duration of this workshop was neither too long nor too short
8 The logistical arrangements (venue, refreshments, equipment) were satisfactory
9 Attending this workshop was time well spent



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ANNEX I – Agenda

Tuesday 26 May 2015

Chair and Co-Chairs: **Venue: Istanbul, Turkey**				
Start	**Finish**	**Topic**	**Speaker**	**Sub topic/Content**
08:30	**09:00**	**Registration**		
09.00	09.15	Introduction	Imre CSIKÓS, ECRAN	
09.15	10.00	Definition and reporting of Policies and Measures	Justin GOODWIN, ECRAN	(objective, type, status of implementation, monitoring and evaluating progress, estimation of emission effect, cost, ex ante and ex post assessment)
10.00	10.40	What are Scenarios?	NOVIKOVA, Alexandra, TAIEX	General definition of scenarios Typology of scenarios Drivers in scenarios
10.40	10.55	***Coffee Break***		
10.55	11.35	Scenarios II	KELEMEN, Agnes, ECRAN	EU reporting requirements on scenarios
11.35	13.00	Homework from the first module	Presentations from beneficiaries and ECRAN team (10 min. each beneficiary)	- Country results - Challenges / bottle necks
13.00	14.00	***Lunch Break***		
14.00	14.30	LEAP training	Charles HEAPS, Stockholm Environmental Institute	Short Recap of what was taught in Module 1

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14.30	15.30	Freedonia and other exercises on baseline scenarios	Charles HEAPS, Stockholm Environmental Institute FLESSA, Anna, KEPA MAVRAKI, Eleni-Danai, KEPA with the support of other TAIEX – ECRAN experts	Demand sector • Industry • Transport • Commercial • Total Final Demands
15.30	15.45	***Coffee Break***		
15.45	17.15	continued		Demand sector • Industry • Transport • Commercial • Total Final Demands

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Wednesday 27 May 2015

Chair and Co-Chairs: **Venue: Istanbul, Turkey**				
Start	**Finish**	**Topic**	**Speaker**	**Sub topic/Content**
08:30	**09:00**	**Registration**		
09.00	09.45	Policy instruments Mitigation policies and measures (Renewable Energy Sources)	Laszlo SZABO, REKK	(categories, design characteristics, EU best practice examples) (for the emission sectors: *Power*, *Industry*, *Transport*, *Residential and Services)*
09.45	10.30	Case study: Demand side	Aleksandra NOVIKOVA, IKEM	Case studies considered: Buildings, industry, transport
10.30	10.45	***Coffee Break***		
10.45	13.00	LEAP training	Charles HEAPS, Stockholm Environmental Institute FLESSA, Anna, KEPA MAVRAKI, Eleni-Danai, KEPA with the support of other TAIEX – ECRAN experts	Demand sector • Industry • Transport • Commercial • Total Final Demands
13.00	14.00	***Lunch Break***		
14.00	15.30	LEAP training	Charles HEAPS, Stockholm Environmental Institute FLESSA, Anna, KEPA	Transformation sector • Charcoal production • Electricity generation • Oil refining • Coal mining • Resources

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			MAVRAKI, Eleni-Danai, KEPA with the support of other TAIEX – ECRAN experts	
15.30	15.45	***Coffee Break***		
15.45	17.00	LEAP training	Charles HEAPS, Stockholm Environmental Institute FLESSA, Anna, KEPA MAVRAKI, Eleni-Danai, KEPA with the support of other TAIEX – ECRAN experts	Transformation sector • Charcoal production • Electricity generation • Oil refining • Coal mining • Resources

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Day 3 : Thursday 28 May 2015

Chair and Co-Chairs: **Venue: Istanbul, Turkey**				
Start	**Finish**	**Topic**	**Speaker**	**Sub topic/Content**
08:30	**09:00**	**Registration**		
09.00	10.30	Case study on PaMs Transport	Jonathan KOHLER, Fraunhofer ISI, Germany	Policies and measures in PaMs Transport in Germany
10.30	10.45	***Coffee Break***		
10.45	12.45	LEAP training	Charles HEAPS, Stockholm Environmental Institute FLESSA, Anna, KEPA MAVRAKI, Eleni-Danai, KEPA with the support of other TAIEX – ECRAN experts	Transportation study • Current Accounts • BAU scenario • BAU emissions • BAU results • Policy scenarios
13.00	14.00	***Lunch Break***		
14.00	15.30	LEAP training	Charles HEAPS, Stockholm Environmental Institute FLESSA, Anna, KEPA MAVRAKI, Eleni-Danai, KEPA with the support of	Transportation study • Current Accounts • BAU scenario • BAU emissions • BAU results • Policy scenarios

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			other TAIEX – ECRAN experts	
15.30	15.45	***Coffee Break***		
15.45	16.00	Leap training	Charles HEAPS, Anna FLESSA, KEPA MAVRAKI, Eleni-Danai, KEPA with the support of other TAIEX – ECRAN experts	Transportation study • Current Accounts • BAU scenario • BAU emissions • BAU results • Policy scenarios
16.00	16.30	Follow-up assignment	Anna FLESSA, KEPA	Introduction of the assignments for participants for the period between Module II and Module III trainings
16.30	16.45	Conclusions	FEILER, Jozsef, ECRAN	Comments, next modules and next steps

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ANNEX II – Participants

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ANNEX III – Presentations (under separate cover)

Presentations can be downloaded from:

http://www.ecranetwork.org/Files/Workshop_presentations,_Modelling_Module_2,_May_2015,_Istanbul.zip

Homework instructions can be downloaded from:

http://www.ecranetwork.org/Files/ECRAN_Module_2_Homework_Instructions.pdf

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ANNEX IV – Exercises given to participants to be completed before module 3

Exercise for participants

The following exercise is a part of module 2 of the ECRAN modelling training on LEAP. The exercise consists of three (3) parts. Participants are requested to complete all tasks and report on their progress to the ECRAN team by the deadlines indicated. If you are having difficulties in carrying out these tasks, please contact ***Jozsef Feiler*** at jozsef.feiler@ecranetwork.org, who will appoint members of the helpdesk to assist you. For this purpose please appoint a single contact point in your country who will communicate any difficulties to the ECRAN team.

The tasks have to be understood in connection with the LEAP exercises introduced at the regional trainings in Skopje and Istanbul. They are based on the datasets provided for your countries by Charlie Heaps. [2]

Task 1.

Step 1: Open the LEAP starter dataset for your country distributed by Charlie. Using "Current Accounts" (Scenarios button), check the input data needed to populate the variables. At present, these variables are filled with data gathered from the International Energy Agency (IEA) balances and other sources. They are compiled until the base year 2011 and include:

a) key social and economic data such as population, urbanisation rates, human development indicators, GDP, sectors' value added, income, transportation intensity and others listed in "Key Assumptions",

b) historical energy balances for the energy demand sectors in "Demand" and the transformation sector listed in "Transformation",

c) GHG emission factors entered for the Demand and Transformation sectors[3].

Then, find locally available input data for these variables in your countries (national statistics, etc.) and compare them to the data of LEAP dataset for at least 5 years (2007-2011). In case you can find data for a longer period, try to compare as many time-series data as possible.

Tip: For comparing the energy balances from the National Statistics to those in LEAP dataset, you could press the Energy Balance View in the View bar (on the left of the screen) and choose the years 2007 and 2011, and then check the numbers both for demand and transformation.

Step 2: See how GHG emissions calculated by LEAP starter dataset (using *Results View* and choosing *Result* option: *Global Warming Potential*) match the latest GHG inventory available for your country[4].

[2] Charlie will provide a starter LEAP dataset for Kosovo.

[3] In order to find the GHG emission factors for each technology in LEAP dataset, you need to click on each technology branch and choose the "Environmental Loading" tab. Another option is to look in the TED database (in the View bar on the left). Then, compare those with the national GHG emission factors.

[4] You can check for inventory data from local experts and at http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php. Usually, National Communications contain a chapter on inventories, but the data might not be enough detailed – this varies by country.

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If there are significant differences among these, then try to find out causes for the differences, using the comparison results of step 1.As a result of your work:

Prepare a brief report on

- the **coincidences and differences between GHG emissions** calculated in LEAP starter dataset and emissions as reported in the national inventories
- the **causes of those differences**, providing your judgement which data are the more realistic.
- and **possible data gaps and/or data quality problems.**

Deadline for submitting the brief report (maximum 2 pages): **Friday 17rd July, 2015.**

Tip: You could go to "Results View", choose Result category: One Hundred Year Global Warming Potential, and click each time on different sectors of the tree so that you compare the GHG emissions for each sector. The causes of any differences could be, most probably, related to different GHG emission factors or differences on energy consumption/production of the fuels. So, if you notice differences in a certain sector, you check the energy consumption or production in this sector and the respective emission factors of the fuels.

Task 2.

Step 1: Review the demand sectors in the LEAP starter dataset for your country. Make suggestions how to improve the tree based on the data identified in the Task 1; you may also wish to think about the further sector disaggregation into branches. Depending on the data availability, these could be, for instance, disaggregation of the residential sector by types of buildings and/or by end-uses; disaggregation of the services sector by sub-sectors, by end-uses, and/or by types of buildings; further disaggregation of transport or industry, etc.

Step 2: **Prepare a new LEAP dataset** based on your research and **save it under a different name**. This dataset should include **detailed branches** for the following sectors:

- residential
- services
- transport
- industry
- other energy use

For the above demand sectors, populate their variables with the historical data identified in the previous Task from the base year (2005 or earlier where applicable) to 2011 or 2012 depending on the country time-series data. Where the data is not available, try to find data in literature (national reports, etc.). At this point, use only the "Current Accounts" of LEAP.
Use the "Notes" tab in the *Analysis View* so as to indicate your data sources for the data of all variables.

Task 3.

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Step 1: **Build a reference scenario for the above demand sectors of your country until 2030**. Include assumptions about the development of social and economic indicators, technology stocks (shares or saturations of technologies), and energy intensities of end-uses/technologies, using official references (for instance, population growth projections from United Nations).

Tip: You need to create a new scenario called "Reference" using the button "Manage scenarios". Then, you need to switch to "Reference scenario" and insert appropriate functions, using "Function Wizard" or "Time-series Wizard" to represent your assumptions. You could make population growth projections using the censuses from United Nations reports or the National Statistics and GDP growth projections using IMF projections.

Step 2: **Prepare a brief report using the results of your reference scenario and including comments on them**.

Deadline for submitting the LEAP dataset of Task 2 and the brief report (maximum 2 pages) of Task 3 by **Friday 4th September, 2015.** The submission e-mail address of the outputs of Task 1, Task 2 and Task 3 is jozsef.feiler@ecranetwork.org, with a copy to imre.csikos@ecranetwork.org

You may also wish to join the LEAP Facebook group or the COMMAND website and ask there your questions.
The Facebook group is here: https://www.facebook.com/groups/LEAPSoftware
The COMMEND web site: http://www.energycommunity.org/

Resources:

National Statistical Services
http://www.energycommunity.org/
Energy Statistics Manual - http://www.iea.org/publications/freepublications/publication/energy-statistics-manual.html
GHG Projection Guidelines – European Commission
http://ec.europa.eu/clima/policies/g-gas/monitoring/docs/ghg_projection_guidelines_en.pdf
http://ec.europa.eu/clima/policies/g-gas/monitoring/docs/ghg_projection_guidelines_a_en.pdf
http://ec.europa.eu/clima/policies/g-gas/monitoring/docs/ghg_projection_guidelines_b_en.pdf

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ANNEX V – Evaluation

Statistical information

1.1	Workshop Session	ECRAN Modelling: Training Module 2
1.2	Facilitators name	As per agenda
1.3	Name and Surname of Participants (evaluators) optional	As per participants' list

Your Expectations

Please indicate to what extent specific expectations were met, or not met:

My Expectations	My expectations were met		
	Fully	Partially	Not at all
1. The training workshop contributes/helps us for building technical capacities to carry out modelling of emission scenarios.	IIIII IIIII IIIII	IIIII IIIII I	
2. The training helps us to gain a better understanding of modelling work which will enable us to ensure that (future) modelling is relevant to policymakers and that policymakers understand the limits of the work and are able to better interpret the results.	IIIII IIIII IIIII IIIII I	IIIII	
3. The training gave us a proper introduction on LEAP as well as providing the initial steps in filling the LEAP structure with country relevant data, building up the basic model	IIIII IIIII IIIII IIIII III	III	

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Workshop and Presentation

Please rate the following statements in respect of this training module:

Aspect of Workshop	Excellent	Good	Average	Acceptable	Poor	Unacceptable
1 The workshop achieved the objectives set	IIIII IIIII II	IIIII IIIII III			I	
2 The quality of the workshop was of a high standard	IIIII IIIII IIII	IIIII IIIII I			I	
3 The content of the workshop was well suited to my level of understanding and experience	IIIII IIIII IIIII II	IIIII II	I	I		
4 The practical work was relevant and informative	IIIII IIIII IIIII II	IIIII II	I	I		
5 The workshop was interactive	IIIII IIIII IIIII IIII	IIIII	I	I		
6 Facilitators were well prepared and knowledgeable on the subject matter	IIIII IIIII IIIII IIIII	IIIII		I		
7 The duration of this workshop was neither too long nor too short	IIIII IIIII IIIII	IIIII	IIIII	II		
8 The logistical arrangements (venue, refreshments, equipment) were satisfactory	IIIII IIIII IIIII IIIII	III				
9 Attending this workshop was time well spent	IIIII IIIII IIIII IIIII I	IIIII				

Comments and suggestions

I have the following comment and/or suggestions in addition to questions already answered:

Workshop Sessions:

- Well organised
- All ok
- Transportation exercise and presentation on case study PaMs Transport in Germany was a good idea
- A bit less time for presentations, more time for work and exercise
- It was very good and very good presentations. Thank you very much
- We did not manage to stay until the end of the workshop, because our flight was booked on the last day of the meeting. This was not good for us.
- Too many introductory presentations which sometimes only loosely related to LEAP
- The sessions were too long and there were things completely out of scope

Facilitators:

- Facilitators are well prepared
- Ok
- Excellent as always
- Very god presentation of Michael Krail. All facilitators were helpful in performing tasks and providing instructions to participants
- Excellent speakers and interesting topics
- Charlie: Tips are a great whimsical motivator. I love the tip from Rosa Parks ☺
- Very good

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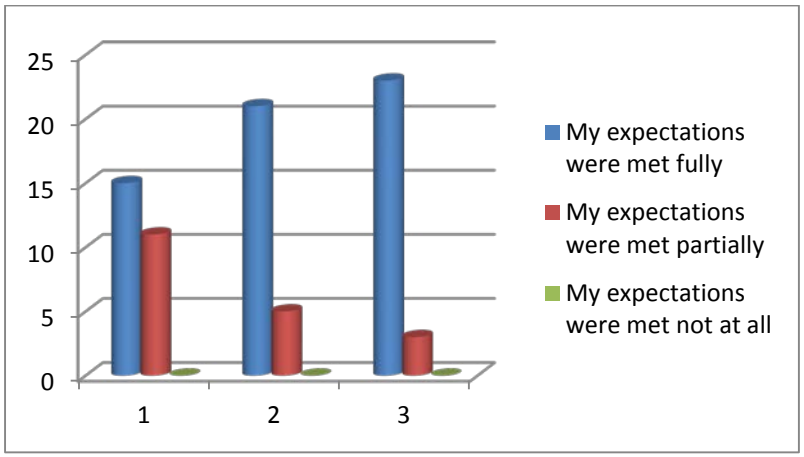
- Charlie Heaps is an excellent lecturer
- There should be more details on sectors particularities instead of instructions how to click on certain icons and buttons. Too much time was spent on explaining how to convert from point to comma separator, how to change units…. It was too slow

Workshop level and content:

- Too many bugs in the LEAP Programme
- Some of the presentations were not in compliance with the task of the workshop. Feed-in tariffs were presented as a concept which is old for more than 8 years and already functioning in our countries. For future better planning of the exercises in LEAP working on practical examples
- Ok
- Perhaps to have two groups of exercises: One for the beginners, and one for those that participated in Module 1.
- In the exercises all steps should be shown (e.g. it would be possible to find solutions for each task, so those who are lost can check this instead of slowing down the entire group)
- It was at my level and contents was at my level, very good. Thank you very much
- Satisfying, with the opportunity to improve knowledge of the subjects discussed

3. The training workshop contributes/helps us for building technical capacities to carry out modelling of emission scenarios.
4. The training helps us to gain a better understanding of modelling work which will enable us to ensure that (future) modelling is relevant to policymakers and that policymakers understand the limits of the work and are able to better interpret the results.

3. The training gave us a proper introduction on LEAP as well as providing the initial steps in filling the LEAP structure with country relevant data, building up the basic model



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1 The workshop achieved the objectives set
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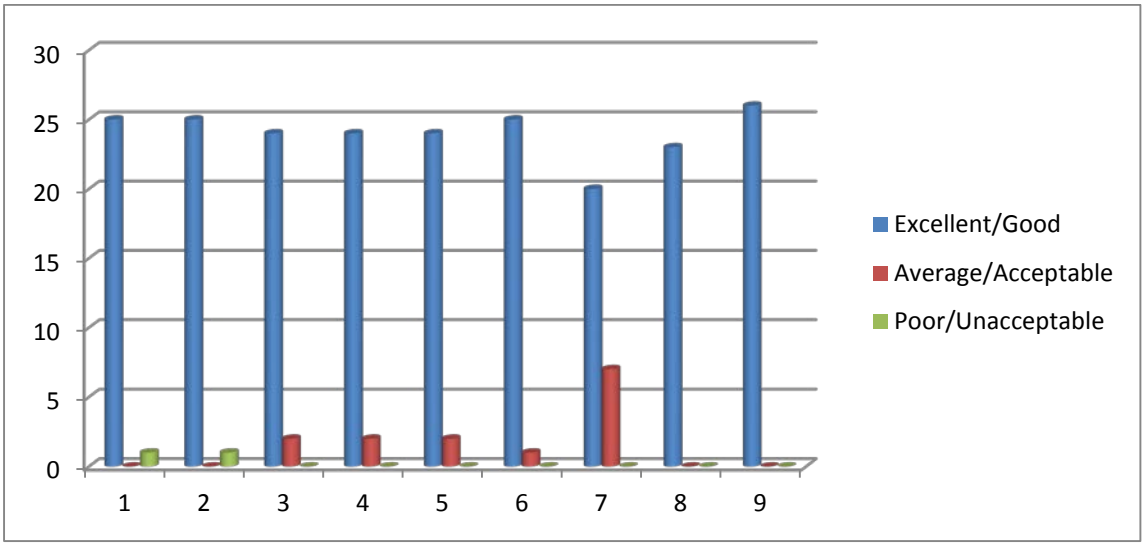

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