PROMITHEAS – 4

Development and Assessment of Mitigation / Adaptation Climate Change policy portfolios for Estonia

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6th International Scientific Conference
Energy and Climate Change
9 – 11 October 2013
Athens, Greece

Outline

- Introduction
- Climate change policy mixtures
  - Data collection
  - BAU, OPT,PES scenarios developing
  - Results
- Needs and gaps
- Future opportunities

Area = 45 226 km²
Population –
1 287 000 inhab.
Capital - Tallinn
(population 360 000)

Tallinn University of Technology

- The provision of education -1918
- University since 1936
- Second largest (public) university
- Diploma, bachelor, master and doctorate programs
- Budget 2012 – 36,3 mlj eur.(9,7mlj–state)
- From 2013 ~ higher education in Estonia for free
- ~14,000 students, ~ 2,400 (1300 R&D)staff
- Total area – 150 000 m^2 - 72 buildings
- TUT key areas for R/D up to 2015 include:
  - Changing climate and environment and sustainable technologies

Our PROMITHEAS-4 team

Me – Alvina Reihan, PhD - TUT, Partner 16 – management, reporting

Tanel Laasma, MSc – Environmental Research Center – database, modelling

Nadezda Dementjeva, PhD – Eesti Energia – modelling, AMS

Workshop in Tallinn, 8 May 2013

Development and assessment of Mitigation / Adaptation Climate Change policy portfolios for Estonia

To identify all posible needs and gaps related to

- Established national procedures (for GHG inventory), sources, reporting forms, available data and information
- Database for the LEAP (Created in EXEL-form)
- Policy mitigation/adaptation instruments

A pathway to M/A policy portfolios

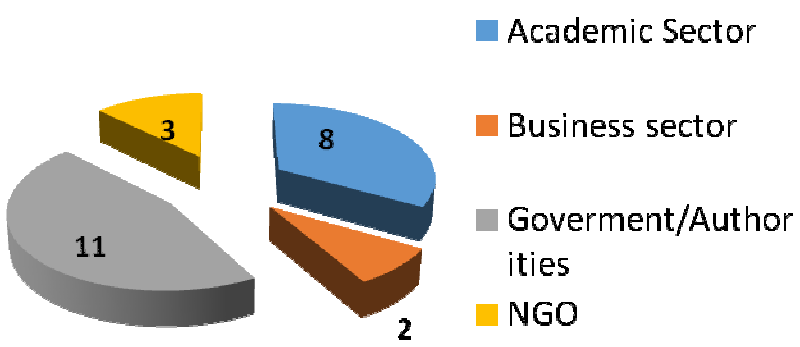
Scenarios and policy portfolios, up to 2050

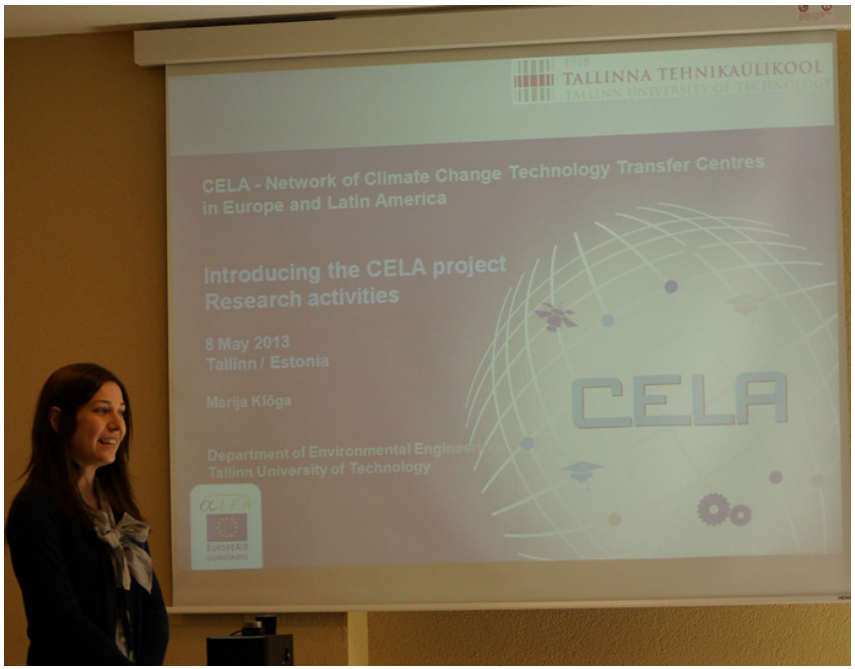
A tool for policy makers

Workshop in Tallinn, 8 May 2013

Gender	Participants	%
Male	10	42
Female	14	58
Total	**24**	**100**

The gender dispersion – slightly larger proportion of women (58%) than men (42%)





Introduction of CELA Network of CC Technology Transfer Centres in Europe and Latin America

Comments received

- Estonian Renewable Energy Association
  - Assumptions of energy consumption;
  - EUA and ERU prices;
  - Transnational network connections and its impact on the local energy market;
  - District heating and local heating ratio;
  - Newest regulations, reports and directives (after late 2011)

Workshop in Tallinn, 8 May 2013

6th International Scientific
Conference E n e r g y a n d C l i

Waste to Energy!!!

Objectives

The national objectives:

- 8% GHG emissions reduction by 2012 compared to year 1990;
- 25% share of RES in the gross final energy consumption by 2020;
- 9% reduction of final energy consumption by 2016 in comparison to the period 2001–2005.

The additional objectives:

- "Estonian Electricity Sector Development Plan until 2018"
- "Estonian Environmental Strategy 2030"
- "Estonia's National Renewable Energy Action Plan 2020"

Mitigation options	Adaptation needs
Exploitation of RES	Energy sector
Energy efficiency	Agricultural sector
Mitigation through JI and GIS	Forestry sector
	Water resources

Data collection

- Sources:
  - Statistics Estonia;
  - Eurostat;
  - Estonian Environmental Information Centre;
  - Elering (Estonian Transmission System Operator);
  - National Inventory Report (NIR) on Greenhouse Gas Emissions in Estonia (1990-2010).
- Problems:
  - the lack of reliable data: GDP distribution per sector, energy efficiency in sectors, initial data in tourism and health service, transport sector, etc.
  - significant gaps and uncertainties in the available data;
  - the component of adaptation in climate change policy is not fully developed, it requires data related to the frequency of extreme events, water resources and use, low-income groups, biodiversity, etc.
  - Estonian unique situation using oil shale as a feedstock for shale oil production

Business-As-Usual Scenario

- Mitigation and adaptation policy instruments were implemented before 31.12.2010;
- The Estonian BAU scenario is mainly a mitigation policy portfolio:
  - penetration of RES in the gross final energy consumption,
  - support to increase energy efficiency;
  - GHG emission reductions through JI and EU-ETS;
  - selling of AAUs though the GIS;
  - adaptation policy oriented towards water and forest management

BAU - Key Assumptions

- Demographics: “medium variant” of the population projections are used for all 3 scenarios (BAU, OPT, PES);
- Economy: GDP growth rate is assumed to be 4% by 2050 based on IMF projections for all 3 scenarios;
- Climate statistics:
  - precipitation will increase between 1 and 2% per decade;
  - average air temperature will be 8,35 ℃ by 2050;
  - surface water will increase as 7% by 2020 and 15,5% by 2050;
  - the increase of ground water is 10% average for the region by 2050.
- T&D losses is assumed to decrease by 0,3% annually;
- 1000 MW of wind farms would be in operation by 2050;
- Feed-in-tariffs follow their historical trends;
- Environmental charge rates are in place until 2015;
- Projections for the global trends prices are provided by KEPA.

Optimistic Scenario

- Mitigation/adaptation policy instruments Estonia has set into force after 01.01.2011;
- Maximum exploitation of the potential of the country in energy efficiency and renewable energy sources;
- Wider range of policy instruments:
  - performance standards;
  - financial policy instruments (subsidies and grants);
  - dissemination policy instruments.
- Adaptation policy instruments are foreseen for the agricultural sector

OPT - Key Assumptions

- OPT policy portfolio sets stringent mitigation targets in all sectors;
- Climate statistics:
  - precipitation is increased by an annual growth rate of 7,5%;
  - average air temperature is assumed to be 7,4 ℃ by 2050;
  - increase in the frequency of the heat waves follows the increase of the temperature in the same scenario;
  - increasing of surface water is assumed to be the maximum 5% by 2020 and 9% by 2050, groundwater is estimated at 5% by 2050;
- T&D losses is assumed to decrease by 0,6% annually;
- New oil shale based units would be built with capacity 300MW;
- The extension of RES in heat generation in boiler stations;
- Nuclear power plant with capacity 600MW by 2023;
- 2000 MW of wind farms would be in operation by 2050;
- Cutting of feed-in-tariffs almost by 30%;
- Increase in the environmental charges;
- The additional policies concerning the transport and agriculture sectors.

Pessimistic Scenario

- Mitigation/adaptation policy instruments Estonia has set into force after 01.01.2011;
- No other additional policy instruments apart from those already decided to be implemented and in line with the EU climate change policy;
- Minimum exploitation of the potential of Estonia in energy efficiency and RES.

PES - Key Assumption

- Climate statistics:
  - precipitation is increased by an annual growth rate of 24%;
  - average air temperature is assumed to be 9,9 ℃ by 2050;
  - increase in the frequency of the heat waves follows the increase of the temperature in the same scenario;
  - increasing of surface water is assumed to be the maximum 15% by 2020 and 22% by 2050, groundwater is estimated at 15% by 2050;
- T&D losses is assumed to decrease by 0,15% annually
- No other new power units or plants would be built and only planned capacities would operate;
- Cutting of feed-in-tariffs almost by 50%;
- Increase in the environmental charges;
- Biofuels will not reach the 5,75% in agricultural sector.

Results of LEAP – Global Warming

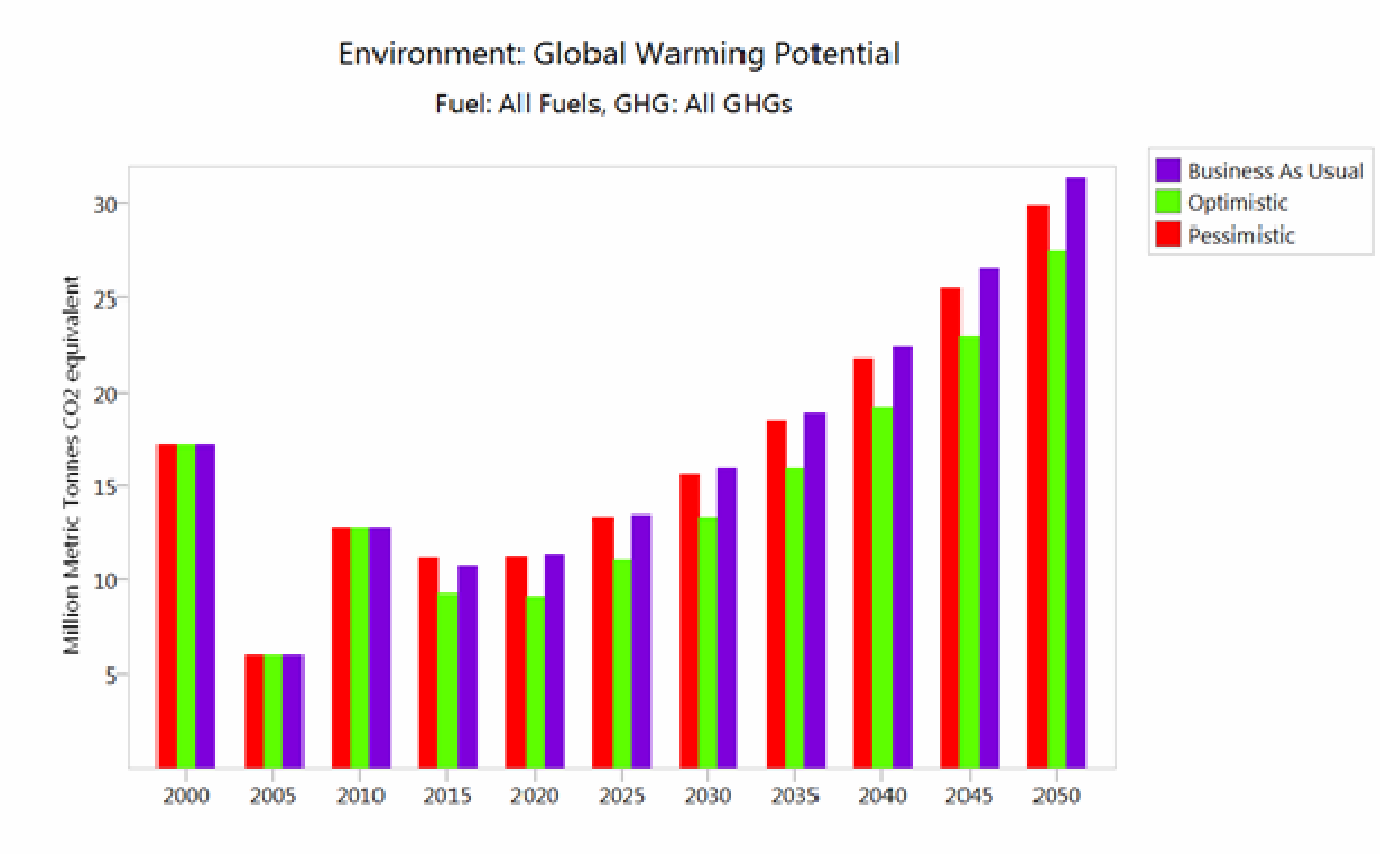


Figure 1: GHG emissions

Results of AMS - Assessment of scenarios

Criteria	Scenarios		
	BAU	OPT	PES
Direct contribution to GHG emission reductions (0,833)	0,000	83,300	3,324
Indirect environmental effects (0,167)	0,000	16,700	10,020
Environmental performance (0,675) - A	**0,000**	**100,00**	**13,344**
Cost efficiency (0,390)	0,000	47,300	35,063
Dynamic cost efficiency (0,227)	11,688	4,656	1,855
Competitiveness (0,103)	2,175	5,459	0,866
Equity (0,188)	0,000	17,500	0,703
Flexibility (0,056)	1,764	2,795	0,440
Stringency for non-compliance (0,036)	1,133	1,133	1,133
Political acceptability (0,259) - B	**16,761**	**78,844**	**40,061**
Implementation network capacity (0,228)	10,300	10,300	10,300
Administrative feasibility (0,685)	19,367	19,367	19,367
Financial feasibility (0,088)	3,667	3,667	3,667
Feasibility of implementation (0,065) - C	**33,333**	**33,333**	**33,333**
Total (A+B+C)	**15,503**	**78,120**	**34,940**

Table 1: AMS results for each scenario

Modelling Results

- BAU scenario:
  - GHG emissions will be reduced by 35% in 2020 compared to year 2000;
  - RES share will be 0% in the transport sector and 20,6% in EG in 2020 .
- OPT scenario:
  - GHG emissions will be reduced by 46% in 2020 compared to year 2000;
  - RES share will be 11,25% in the transport sector and 32% in EG in 2020.
  - The final energy consumption will be reduced by 9% in 2020 compared to BAU.
- PES scenario:
  - GHG emissions will be reduced by 34% in 2020 compared to 2000;
  - RES share will be 5,6% in the transport sector and 25,5% in EG in 2020;
  - The final energy consumption will be reduced by 4% in 2020 compared to BAU.
- AMS assessment:
  - the mitigation/adaptation policy portfolio in the Optimistic scenario is the best one in terms of overall performance;
  - but requires the encouragement of business investments in RES and energy efficiency projects, the continuation of the demonstrated effectiveness of the implementation network and more stringent frame for non-compliance.

Needs and gaps

- General needs:
  - improvement of data integration and sharing;
  - to provide more adequate information for generating research in climate policy;
  - to realize and estimate climate change potential and risks etc.
- Research needs:
  - scenarios and policy portfolios up to 2050;
  - future climate change estimation;
  - direct and indirect impacts on to Estonian sectors of activities;
  - measures to reduce the impact of climate change;
  - future research of existing policies and measures on GHG emissions
- Gaps:
  - lack of knowledge on methods and approaches how to analyze adaptation options and chose possible actions and adaptation measures;
  - lack of transfer of innovative technologies ;
  - lack of human resources;
  - lack of financial support for climate change research.

Possible future cooperation and training

Needs to:

- ❖improve the cooperation way between countries for reducing impact of climate change;
- ❖improve future research related to the potential of economic sectors to reduce GHG emissions and reduction measures, and the projected impact by the year 2020, with a view to 2030, 2040 and the 2050th.
- ❖organize special educational programs on climate change in the Estonian universities and/or cooperation with other universities;
- ❖organize/improve cooperation with/between Statistics Office of Estonia, Governmental/nongovernmental agencies, Estonian Renewable Energy Association etc in term of sharing not only data and technical information but also in the exchange of the best knowledge and experience in this area.

Thank you very much for your attention!

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