

State of play and perspectives of RES in the EU and in Estonia

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14.8.2104

EREA's introduction





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Spreading information Stable, **Taking part** about RES predictable and from the 100% solutions, sustainable debates R&D&I renewables by informing regulatory concerning the? about the environment energy policy potentsials and effects



Defining the problem



Energy issue is serious(1)





Energy issue is serious(2)





Source: http://www.nap.edu/reports/energy/sources.html

Energy issue is serious(3)



OECD and IEA (2011)

http://www.oecd.org/document/57/0,3746,en_2649_37465_45233017_1_1_374 65,00.html

Energy issue is serious(4)





EU perspectives

Instruments for the Sustainable Development in EU Energy Sector





Instruments for the Sustainable Development in EU Energy Sector





Source:<u>http://ec.europa.eu/energy/efficiency/eed/doc/2011_directive/20110622_energ</u> y_efficiency_directive_slides_presentation_en.pdf

Instruments for the Sustainable Development in EU Energy Sector



20% less GHG 2020

- Directive 2009/29/EC on emissions trading
- Decision No 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
- Directive 2009/31/EC on the geological storage of carbon dioxide
- Directive 2009/30/EC on fuel quality
- Regulation (EE) No 443/2009, setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO2 emissions from light-duty vehicles
- (2008/C 82/01 Coomunity guidelines on State Aid for Environnebtak Protection

20% more renewables 2020

• Renewable Energy Directive 2009/28/EC

20% energy efficiency 2020

 The climate and energy package creates pressure to improve energy efficiency but does not address it directly. This is being done through the EU's energy efficiency action plan.

Instruments for the Sustainable Development in EU Energy Sector - ETS

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Source: European Parliament (2010) Functioning of the ETS and the Flexible Mechanisms

Instruments for the Sustainable Development in EU Energy Sector -Renewables

- EU mandatory goal to increase the share of renewable energy by 20% of final astuvenergia Koda energy consumption by 2020
- Binding national targets for renewable energy which collectively will lift the average renewable share across the EU to 20% by 2020 (more than double the 2006 level of 9.2%). The national targets range from a renewables share of 10% in Malta to 49% in Sweden. The targets will contribute to decreasing the EU's dependence on imported energy and to reducing greenhouse gas emission.
- Member States are free to choose whether the target is achieved through the increase of share of energy from renewable sources in the production of electricity, heating and cooling or transport, as long as 10% share of renewables in transport is complied.
- "energy from renewable sources" means energy from renewable nonfossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases;

Instruments for the Sustainable Development in EU Energy Sector -Renewables



Sectoral and Overall Growth of Renewable Energy in the EU

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EU development of renewable energy in electricity





Source: European Commission (2011) Renewable Energy: Progressing towards the 2020 target, COM (2011) 31

EU Energy Policy, Oct 7 2011

Instruments for the Sustainable Development in EU Energy Sector -Renewables



Main RES-E support instruments in the EU-27

Source: European Commission (2011) Financing Renewable Energy in the European Energy Market

- The Commission's COMM on infrastructure priorities identified more than € 1000 bn investmend needed between today and 2020 to achieve the EU energy policy qoals.
- □ € 500 bn for replacing or investing in new electricity generation capacity.
- EU Energy Strategy notes priority should be given to renewable electricity investments – 60-70% of all investments (€310-360 bn)
- annual capital investment to double from todays €35bnto €70bn
- Funding through private sector investment



- 2030 energy and climate package: Green paper published on 27.3.2013, EC put forward its vision on 22.1. 2014
 - Binding GHG reduction target for 2030 40% compared to 1990. incl ETS with the base year 2005 43% reduction and effort sharing reduction 30%. ETS linear factor to be increased from 1,74% to 2,2% after 2020.
 - **EU** binding RES target at least 27% by 2030.

Instruments for the Sustainable Development in EU Energy Sector – 2050 perspective

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- Political decision Feb 4 2011 of the European Council to GHG reductions by
 2050 80-95% below 1990 level incl. full decarbonization of EU power supply
- March 8. 2011 the Commission adopted a Communication on low carbon economy looking at decarbonisation options of the entire economy, COM (2011) 112
- q COM Energy Roadmap 2050 in 2011 to assess decarbonisation options in the energy sector



Source: European Commission (2011) A Roadmap for moving to a competitive low carbon economy in 2050, COM (2011) 112

Instruments for the Sustainable Development in EU Energy Sector – 2050 perspective

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GHG reductions compared to 1990	2005	2030	2050
Total	-7%	-40 to -44%	-79 to -82%
Sectors	/		
Power (CO ₂)	-7%	-54 to -68%	-93 to -99%
Industry (CO ₂)	-20%	-34 to -40%	-83 to -87%
Transport (incl. CO2 aviation, excl. maritime)	+30%	+20 to -9%	-54 to -67%
Residential and services (CO_2)	-12%	-37 to -53%	-88 to-91%
Agriculture (non-CO ₂)	-20%	-36 to -37%	-42 to -49%
Other non-CO ₂ emissions	-30%	-72 to -73%	-70 to -78%

EU GHG emissions towards an 80% domestic reduction (100% =1990)

Source: European Commission (2011) A Roadmap for moving to a competitive low carbon economy in 2050, COM (2011) 112

- The overall domestic emissions will have to be reduced 25% by 2020, 40% by 2030, 60% by 2040 and 80% by 2050. Additional 15% of reduction to be achieved internationally.
- The share of low carbon technologies in the electricity mix is estimated to increase from around 45% today to around 60% in 2020, to 75 to 80% in 2030, and nearly 100% in 2050.



Energy system in transition



OLD	NEW
Mass consumption – all consumers connected into central grid.	Decetralized and off-grid solutions replacing centralized grid
Scale effect– big, central power stations instead of small ones	Scale effect has dissapeared—small and medium sized PPs- are as competitive as big ones
SALE – reduction of prices with the increase in consumption	Rise in prices– energy saving and sustainable practices instead of promoting the unsustainable behaviour
Regulated market – PP-s regulated by the state	Open market – PP-s compete within the open market

Energy System in Transition



NEW	Renewable Sources	Fossils	Nuclear Energy	CCS
Decetralized and off-grid solutions replacing centralized grid	Existis	Exists	Missing	Missing
Scale effect has dissapeared– small and medium sized PPs- are as competitive as big ones	Competitve Small-scale solutions	Competitve Small-scale solutions	Missing	Missing
Rise in prices– energy saving and sustainable practices instead of promoting the unsustainable behaviour	High efficiency, CO2 free solutions	Low efficiency, CO2 emissions	Low effiency, CO2 free	Low efficiency, CO2 free
Open market – PP-s compete within the open market	Small scale (> 20 MW), absence of fuel cost ar low fuel cost	Small scale and cheap for natural gas PP-s, high fuel costs	Very high capital cost, large scale, low fuel cost	Very high capital cost, large scale, lhigh fuel cost, proven technology on commercial scale missing

EU-27 added power capacities, 1970- 2010







Regional outlook



World ranking	Nation	Tonne C per capita
16	Estonia	4.16
21	Finland	3.32
44	Denmark	2.51
45	Norway	2.48
53	Iceland	2.12
76	Sweden	1.47
87	Lithuania	1.23
105	Latvia	0.94
81	China	1.35
200-214	Mainly African nations	<.03

- exploitation, and leads efforts to exploit shale
 in other part of the world. Shale emits more
 carbon dioxide per energy unit than coal.
- **Finland** is the world leader in using peat. Peat emits more carbon dioxide per energy unit than coal. Reserves are greater than for oil.
- Iceland has the world's highest per capita use of electricity.
- Norway is one of the richest countries in the world, very much because of oil and gas.
- Sweden has the highest per capita capacity of nuclear power.



Air Pollution and Climate Secretariat publication "70% less by early 2020's" goals for the region:

- q 70 % less CO2 by 2020, 95% by 2030
- **q** NO for nuclear, CCS and new hydro, "hot air" mechanisms
- **q** YES for sustainable land and resource use

Nordic-Baltic region could be the best or the worst



From 10 GW to 40 GW installed wind energy cobined with existing hydro

Far-reaching programme for energy efficiency of buildings.

Take up of RES in H&Ce.g. + Swedish 84% RES in H&C) - Finland (14% RES)

Much more efficient new cars.

Heavy investments in second-generation biofuels.

A slow-down in Norwegian oil and gas production.

A complete phase-out of shale (Estonia), peat (Finland and Sweden) and coal

A significant, but limited investment in solar cells and wave power



Perfect pre-conditions for such transition:

- **q** Ample resource base in terms of hydro, wind, biomass
- **q** Wealth and knowledge
- q Existing infrastructure
- **q** Already well-functioning integrated market
- q High awareness



State of play in Estonia

Electricity and heat production in Estonia, 2011





State of Play of RES in Estonia





- Estonia first country to fulfil its 2020
 RES directive target (25%)
- Biggest growth in RES-H&C sector,
 2020 NREAP sectoral target was
 already exceeded in 2009
- RES-E growth above the trajectory,
 from 2% in 2008 to 12,3% in 2011
- q RES-T still non-existent

State of Play of RES in Estonia



RES vs fossile share in in final energy consumption, In various sectors 2012 (GWh)



State of Play of RES-H&C in Estonia



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- RES-H&C potential often underestimatated
- Growth due to combination of various reasons: fuel prices, targeted support measures



q

H&C produced in CHP and boilers, sharre of biomass 2007-2012 (GWh)

Good potential for further increase





Evolvement of RES-E Capacity in Estonia

- 381,6 MW RES-E capacities at the q end of 2012
- Until 2007 investments were nona existent, RES-E share in final energy consumption only 1,5%
- In 2007 new FiP scheme was put in q place
 - Fastest growth in 2009 with 119,4 q MW of added capacity
 - In 2013 12,5% of electricity was q produced from RES



RES directive sets Estonia's target Estonia´s NREAP 2005-2020, ktoe q at the level of 25% (18% in 2005) RES-H&C RES-E RES-T 607 **NREAP** sectoral targets: q 505 **RES-HC from 2005 31,3% to** \checkmark 38,4% in 2020, 165 **RES-E from 0,1% to 17,6%**, \checkmark 92 9 **RES-T from 0% to 10%** \checkmark 2005 2020

Evolvement of RES-E portfolios in 2020 and 2030 according to RE100







Energy security



Estonia not integrated into EU energy networks

- Baltic electricity networks remain synchronized with Russia's Northwest Grid, absence of Lit-Pol interconnection
- No gas interconnection other than Russia and Baltics
- Old power generation technology and large share of natural gas in H&C
- Reliance on old soviet power plants concentrated near Russian border
- 1/3 of heat generated from natural gas, 3/4 of natural gas used in H&C
- Increasing fuel consumption in transport
- EU too big reliance on natural gas from Russia
- Big dependence from Russia's natural gas of some EU MS
- Inadequate response to Ukraine aggression, lack of solidarity



Baltic states integrated into EU energy networks

Clear goal for the EU and Estonian policy makers to integrate Baltic states into EU electricity system

New, decentralised power generation technology and small share of natural gas in H&C

 Measures to promote decentralised power production and capabilities to maintain frequency without power plants in Narva

- Emphasis on decentralised power generation
- Removal of obstacles for the operation of energy cooperatives
- Strong emphasis for the development of smart grids and innovative storage solutions
- Rethinking the grid operation
- Nordic-Baltic cooperation to enhance joint electricity security



- Measures to reduce quickly the use of Russian gas in H&C
 - Rapid take up of RES in district heating via regulative measures
 - Support for the on-site RES H&C take up for those households and offices reliant on gas and heating oil
 - Discouraging the use of natural gas in H&C
- Measures to reduce oil consumption in transport
 - More efficiency in transport via regulation
 - Support of public transport, intermodal switching, cycling, rethinking the planning

EU reduced reliance on natural gas from Russia

Reinvigorated stress on energy efficiency and renewables incl in revised
 2030 framework

SUMMARY



Lower energy costs	RES fixes the energy prices for the long term perspective
Diverse production portfolio	RES provides a diverse and dispersed energy production portoflio that is based on local resources and provides security of supply
Cleaner environment	Widespread usage of renewable energy will lead to a cleaner environment, promoting sustainable development and public health
Efficient use of resources	Local renewable resources underused all across the EU
Creation of new jobs	new jobs with salaries more than average
Improving the trade balance	Elimination of the need to import gas
Economic development	Development of renewable energy sector will act as a growth engine to the economy



Thank you!

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