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Renewable energy, energy independence and climate goals in Estonia

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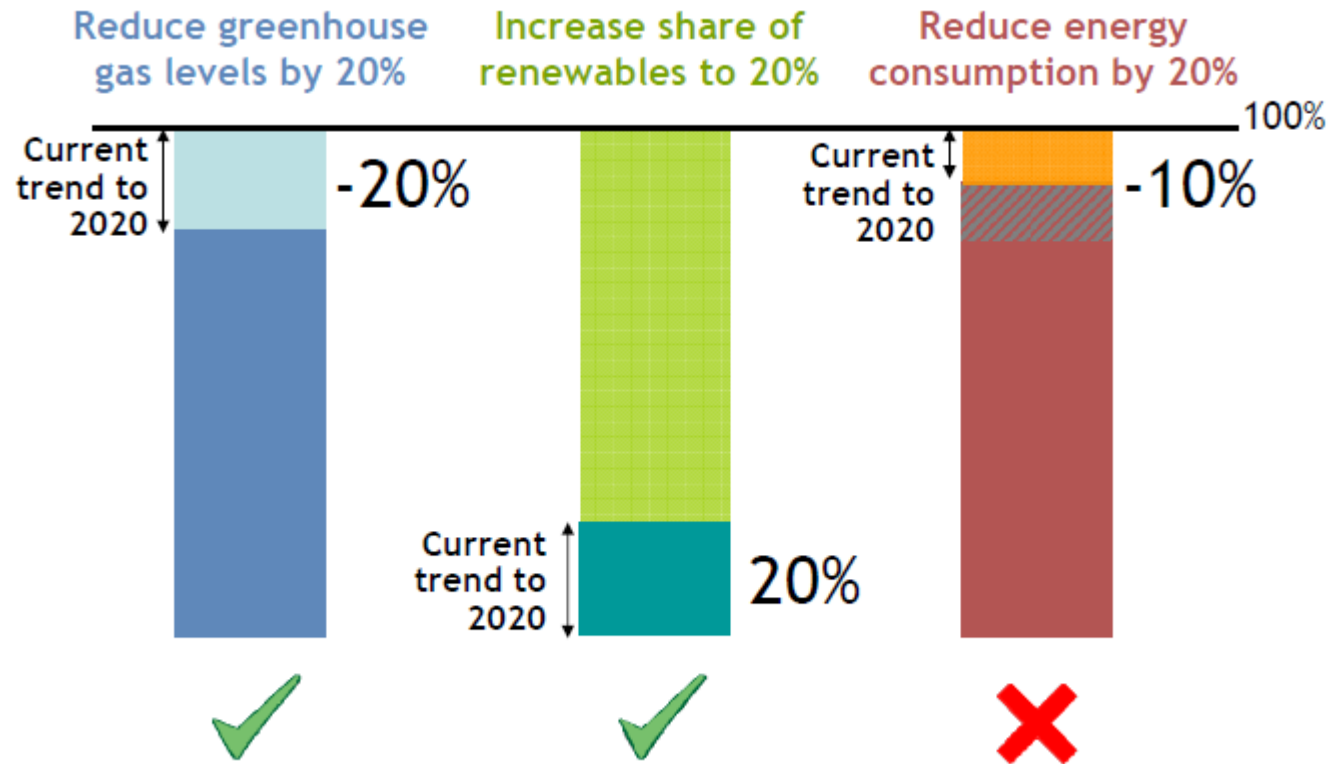
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EU perspectives

2020 targets – challenge of energy efficiency



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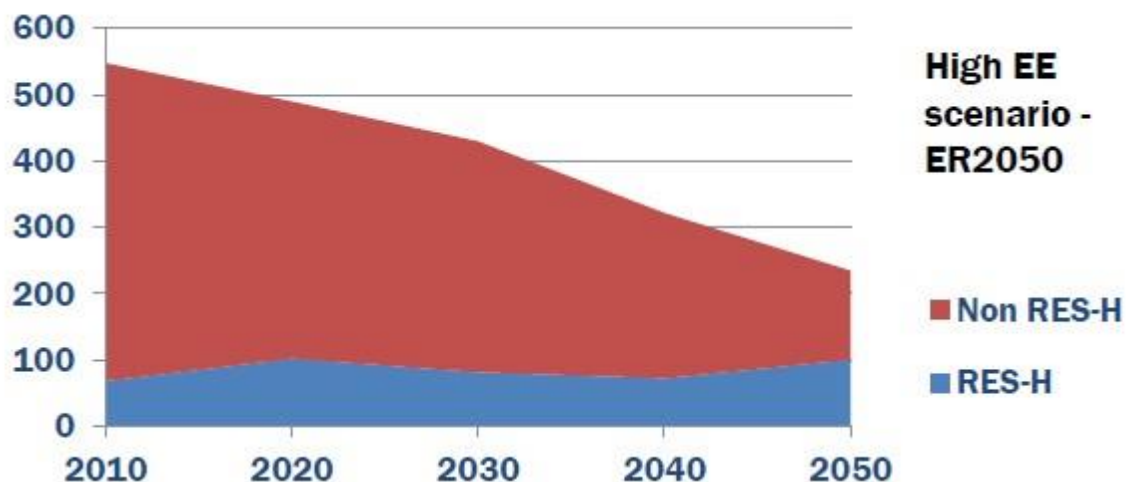


Source: http://ec.europa.eu/energy/efficiency/eed/doc/2011_directive/20110622_energy_efficiency_directive_slides_presentation_en.pdf



Outlook

- 2030: the 27% renewables target proposed by the European Commission and adopted by the Council is insufficient to provide a signal especially for the renewable heating and cooling sector, where 39% of natural gas in the EU is consumed



- 27% renewables in 2030 = stagnation for renewable heating and cooling
 - From 21% in 2020 to 25% in 2030
- Only a higher target will have a real impact!



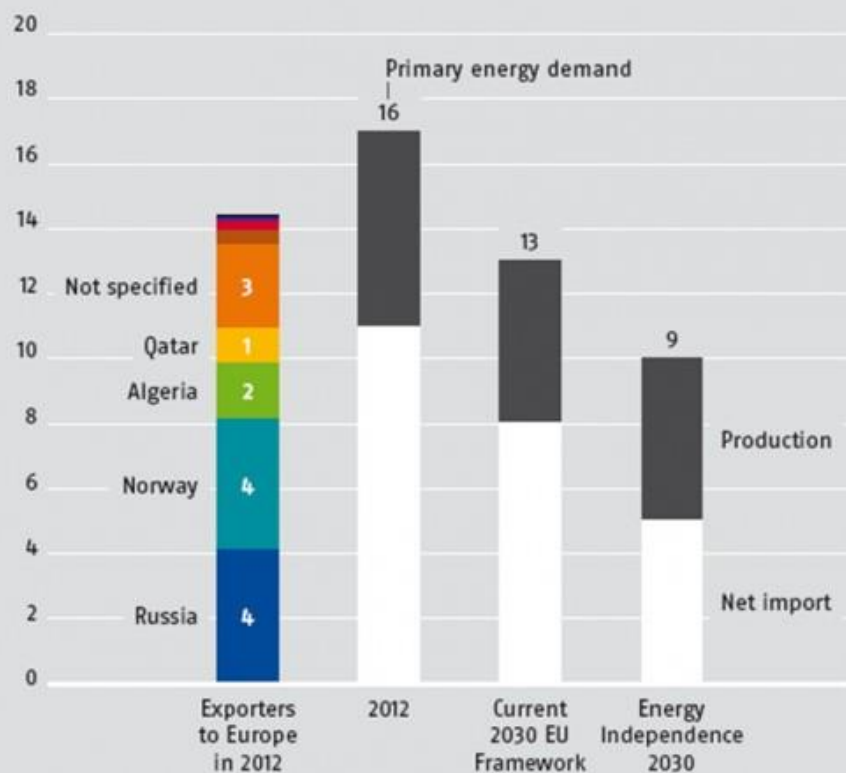
The effect on natural gas imports

ECOFYS

Sustainable energy for everyone

By ramping up cost-effective investments in renewable energy and energy efficiency the European Union can cut its dependency on natural gas imports in half

Europe's natural gas imports, production and net import [EJ/year]



- 58% of natural gas consumption in buildings could be displaced between now and 2030 (equates to 23% of all natural gas consumed in the EU in 2012).
- In power generation 19% of total current natural gas consumption in the EU could be reduced, in industrial sector 5%..



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Regional outlook

Nordic-Baltic region could be the model
region for RES take up



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

Far-reaching programm 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**



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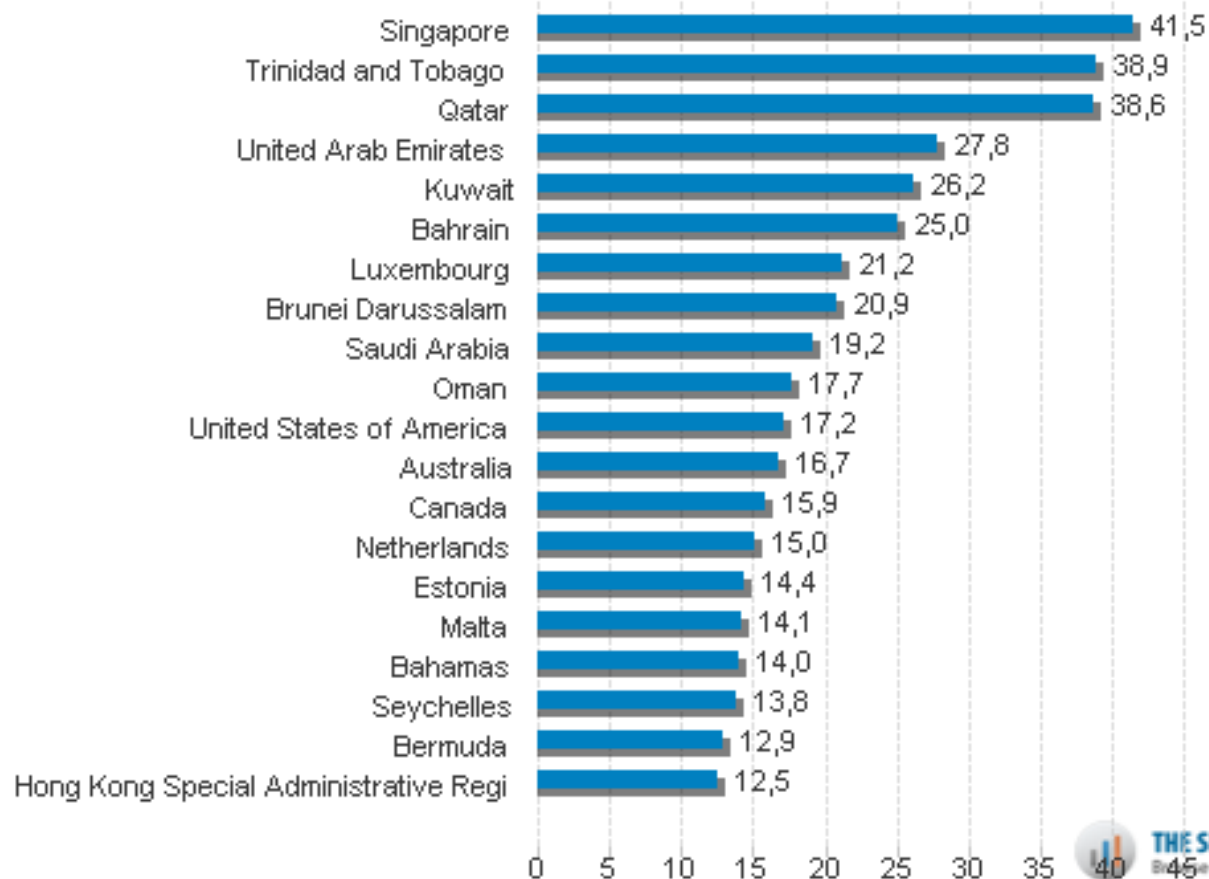
State of play in Estonia



- q Area: 45.227 km²
- q Population: 1,315,819
- q GDP per capita: \$26,555
- q Energy consumption: 32,4 TWh/a=2818ktoe/a
- q Primary energy production: 69,7 TWh/a=5995ktoe
- q Exports: 18,7 TWh/s=1610ktoe/a
- q Forest area 51,8%
- q CO2 emissions 14,4 tons per capita t

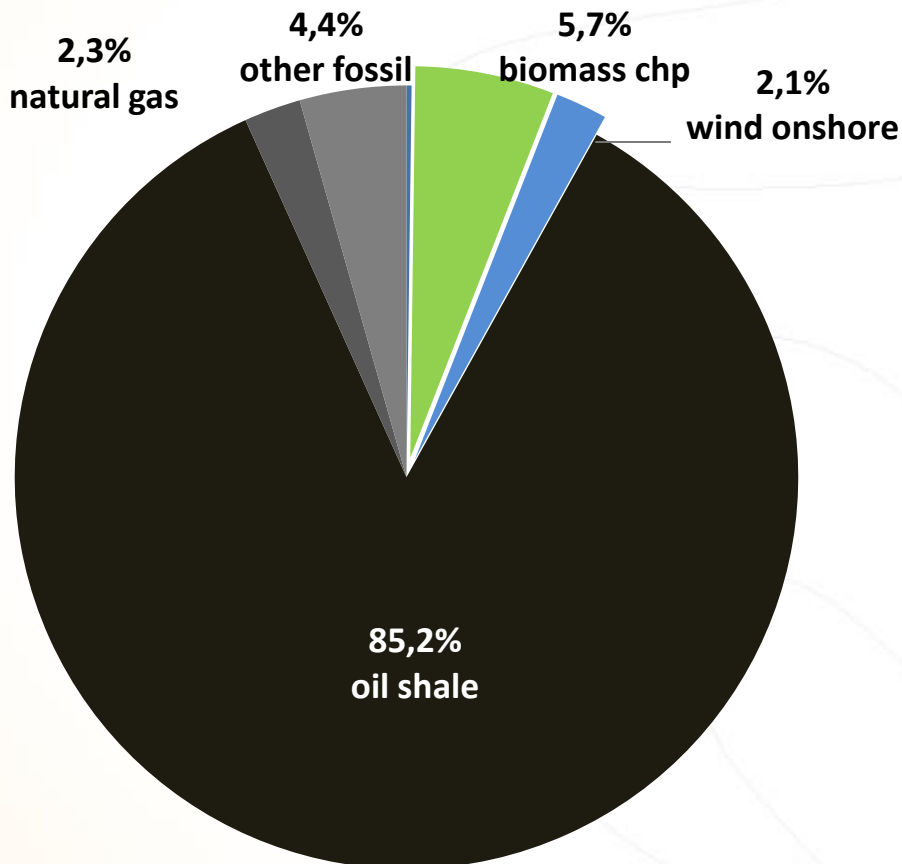


World TOP 20 Countries with highest CO2 emissions per capita from Energy Consumption in 2013 (MtCO2 per million people)

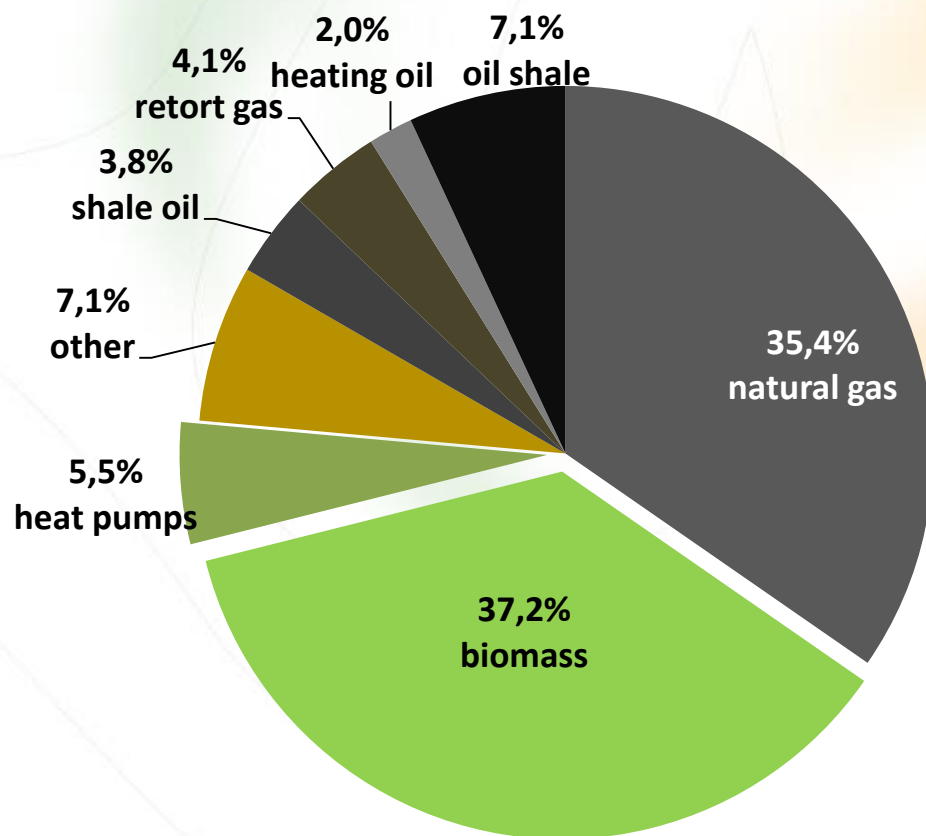




Electricity consumption by fuel (%)

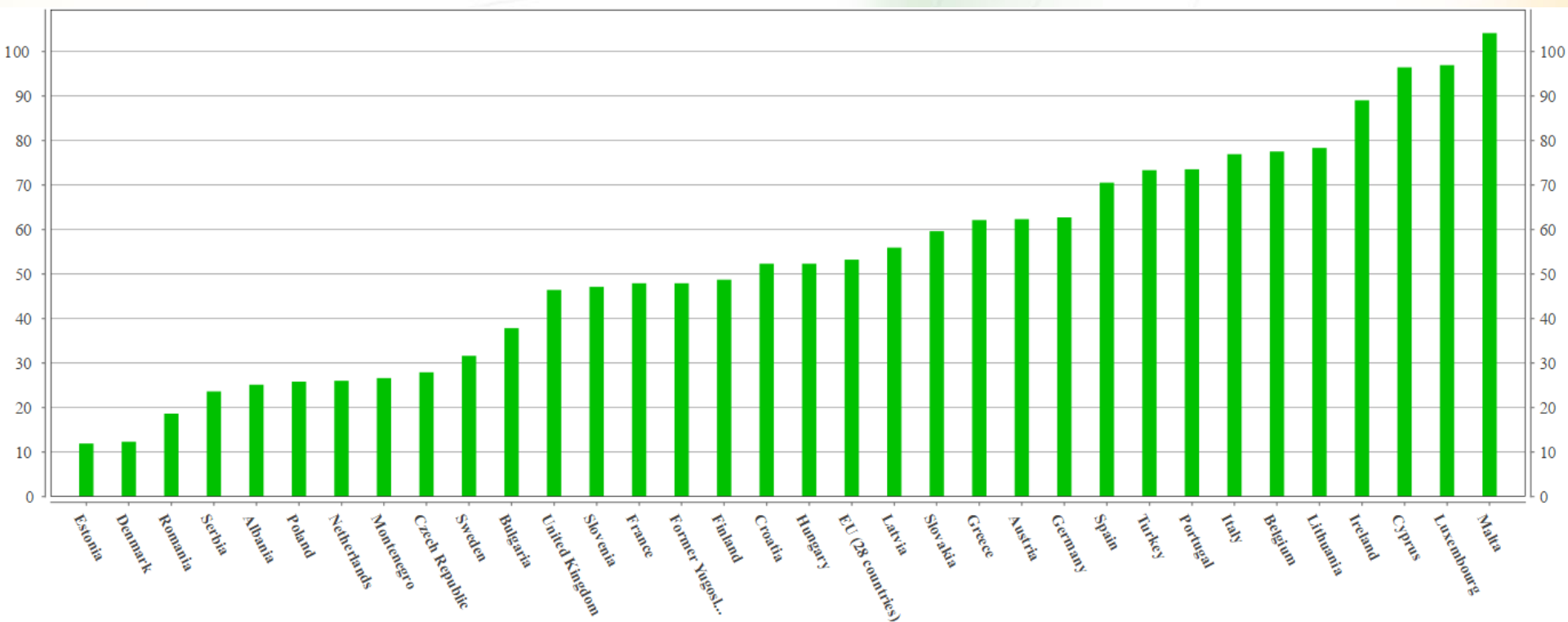


H&C consumption by fuel (%)





Energy dependence in EU (%)



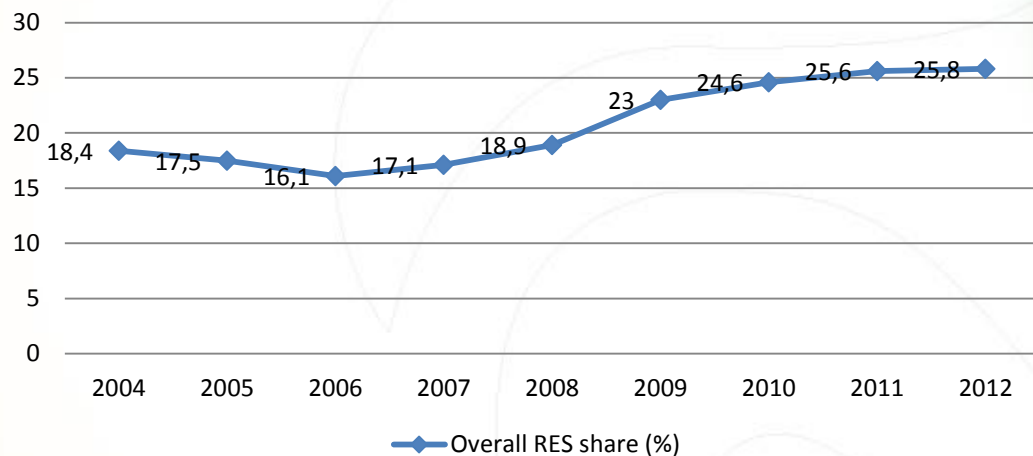


Estonian energy sector

- Diversification of energy sources – lowest in EU
- Carbon intensity – highest in EU
- Gas until very recently imported 100% from Russia – problems with supply



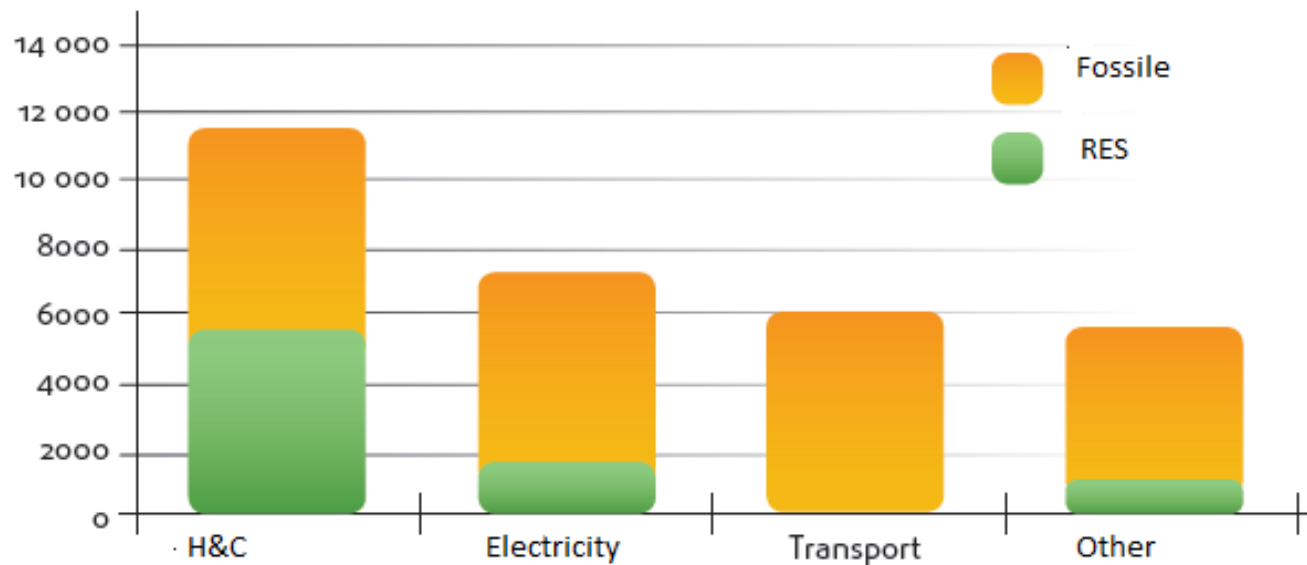
RES share in final energy consumption in Estonia, % 2004-2012



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



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



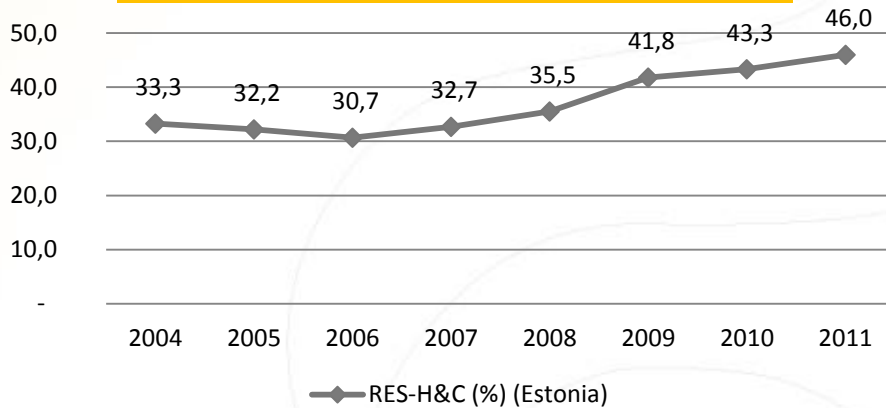
- q RES-H&C 43%
- q RES-E 12,5%
- q RES-T negligent 0,2%

State of Play of RES-H&C in Estonia



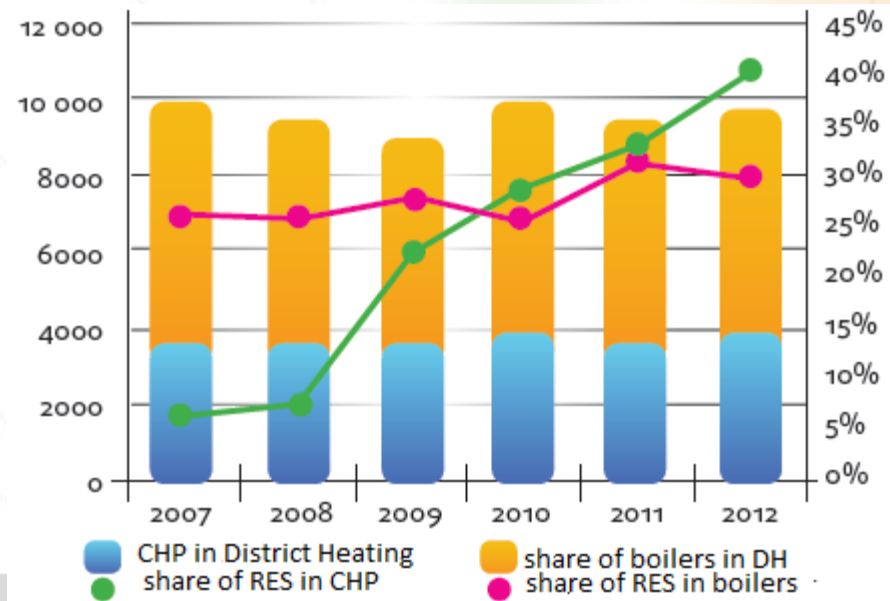
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RES-H&C in Estonia, % 2004-2011



- q RES-H&C potential often underestimated
- q Growth due to combination of various reasons: fuel prices, targeted support measures
- q Good potential for further increase

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





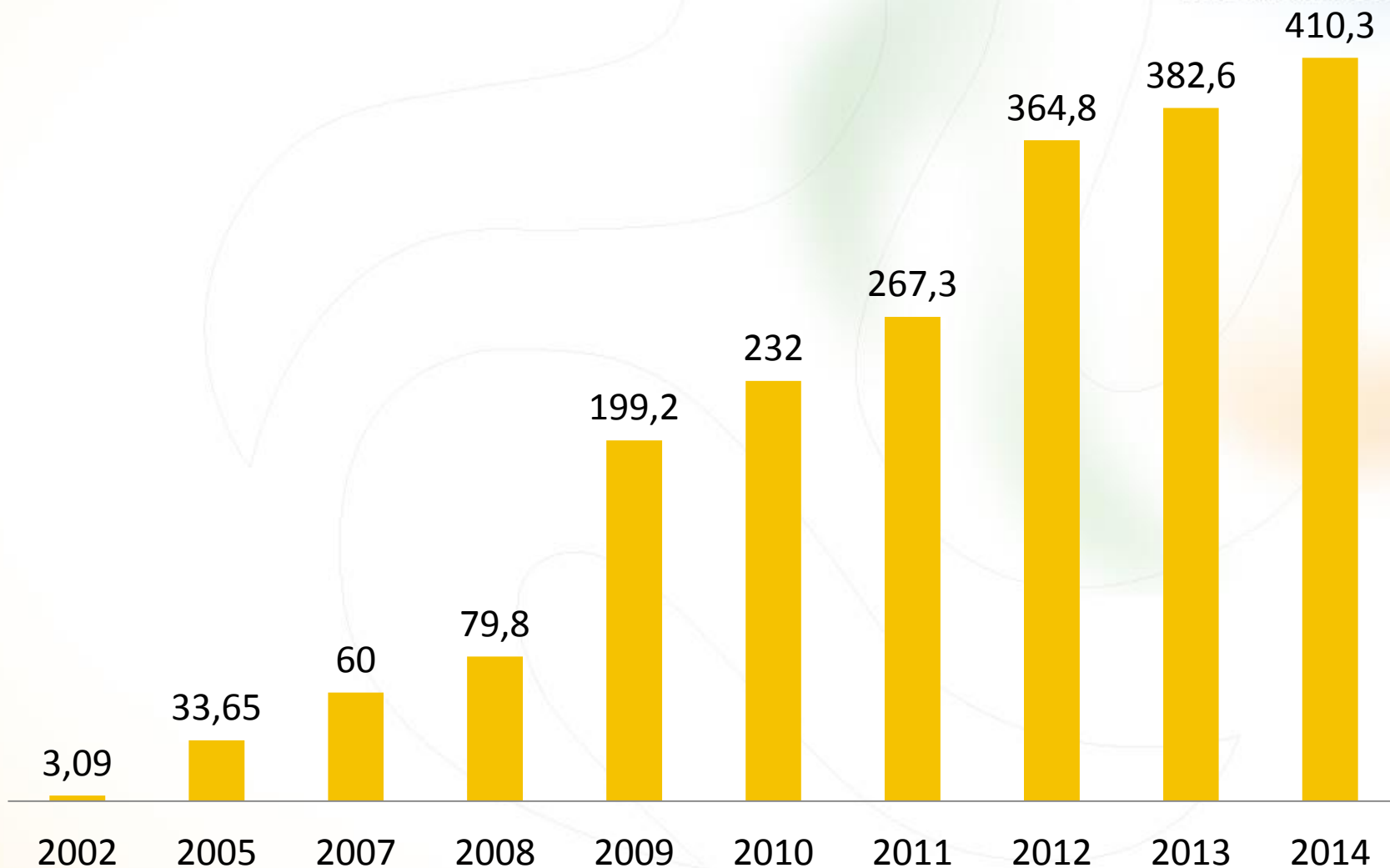
Transportation sector:

- RE share in transportation sector is 0.2%
- Measures to achieving 10% RE share in sector:
- Nationwide electric-vehicle charging station network (First in the World)
- Up to 18 000 euros rebate, when buying electric-vehicle - finished.
- 51,4 MEUR EU funds to develop biomethane
- Blending requirement introduced in coming years

RE added capacity per year (MW)

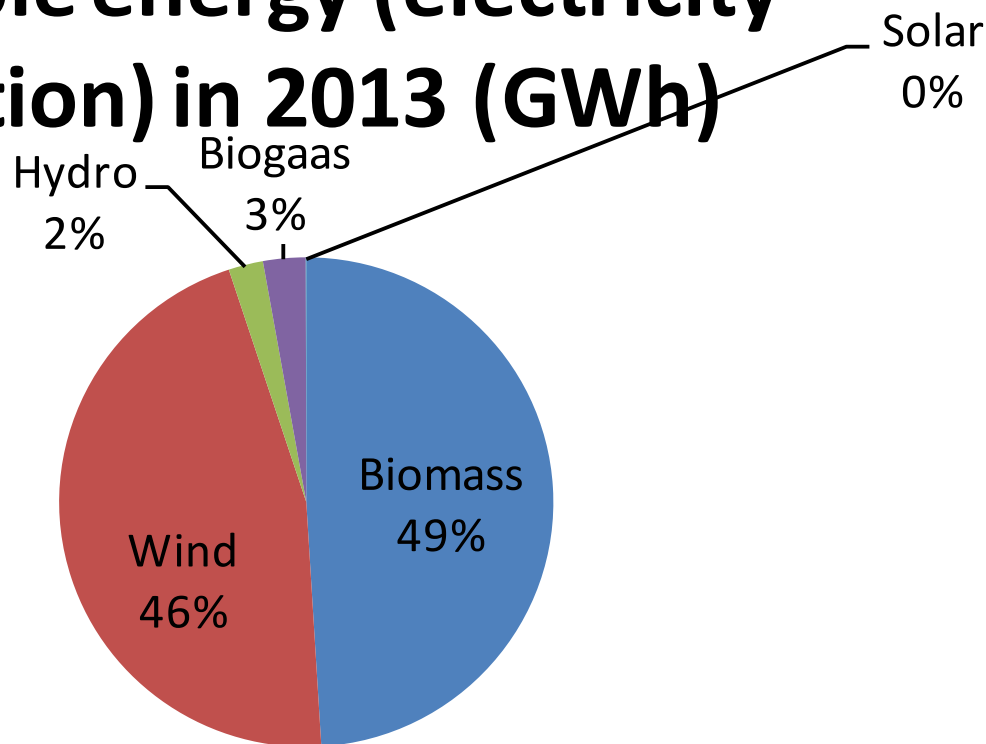


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Renewable energy (electricity production) in 2013 (GWh)

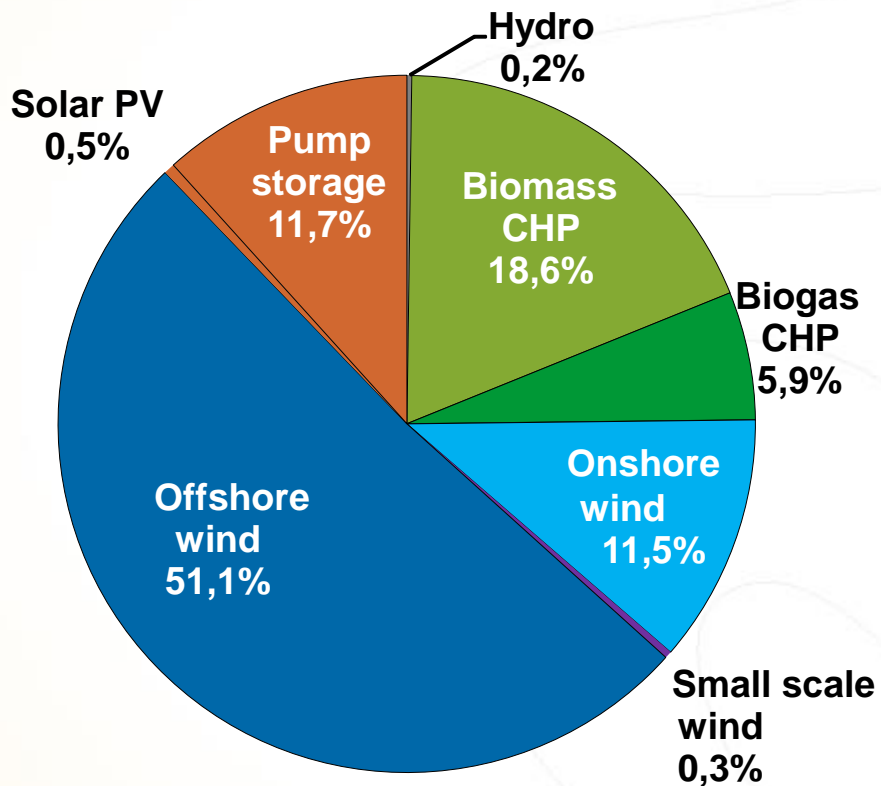


Evolvement of portfolios in 2030 according to 100% of renewables

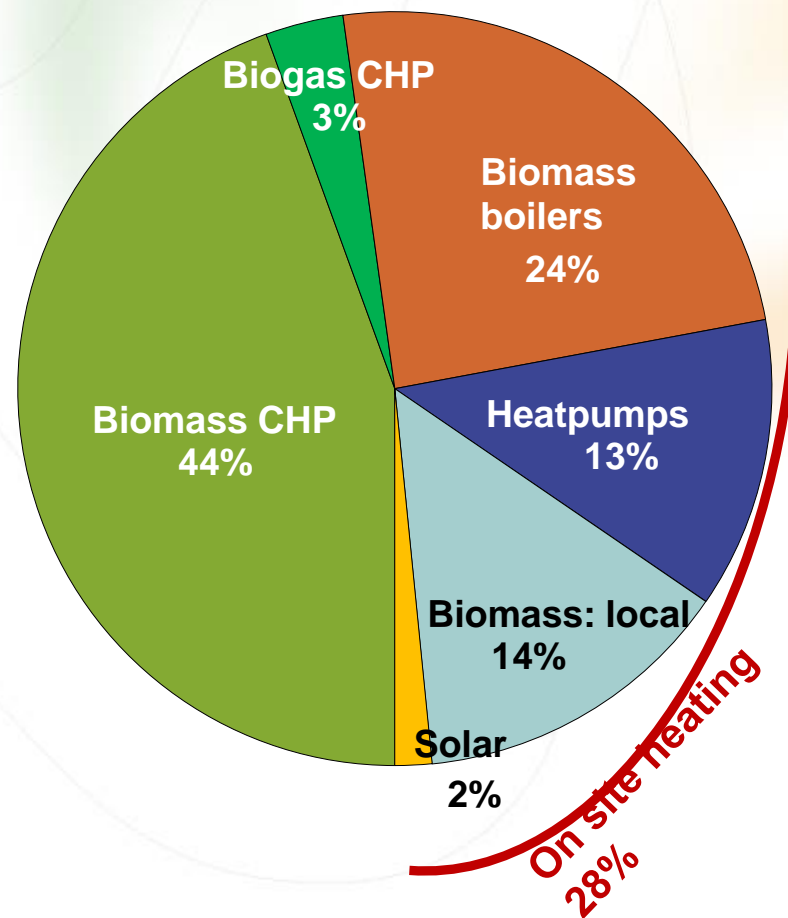


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RE100 Electricity production by 2030



RE100 heating production by 2030



Civil society's attitude towards

RE:



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- Climate change issue
- Renewable support scheme – separately on electricity bill
- Negative image of developers (island Hiiumaa example)
- Towards microgeneration totally different attitude



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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 inefficient transport sector**
- Reliance on old soviet power plants concentrated near Russian border
- Increasing fuel consumption in transport
- **Heavy reliance on natural gas from Russia**
- 100% dependence from Russia's natural gas, worst performing in the stress tests of natural gas
- 1/3 of heat generated from natural gas, 3/4 of natural gas used in H&C
- lack of understanding of the problems from the EU partners



Challenges for Estonia's energy security (continues)

▪ **Problems concerning production**

- Carbon intensity - highest in EU (mainly due to oil shale)
- Diversification of energy sources - lowest in EU

▪ **Transportation sector**

- Estonia has the least fuel-efficient cars in EU
-



- **Goal for the Baltic states incl Estonia to be integrated into EU energy networks**
- Clear goal for the EU and Estonian policy makers to integrate Baltic states into EU electricity system
- **Emphasis on new, decentralized power generation technology**
- Measures to promote decentralized power production and the ability to maintain grid stability even during the crises
 - Emphasis on decentralized power generation
 - Strong emphasis for the development of smart grids and innovative storage solutions
 - 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

- Reinigorated stress on energy efficiency and renewables at the EU level



Diverse production portfolio

- RES provides a diverse and dispersed energy production portfolio that is based on local resources and provides security of supply

Resources underused

- Local renewable resources underused all across the EU, especially in the H&C sector

Lagging energy efficiency

- Cost-efficient energy efficiency measures still untapped

Improving the trade balance

- More RES and EE reduces the need to import gas

Economic development

- Development of renewable energy sector will act as a growth engine to the economy



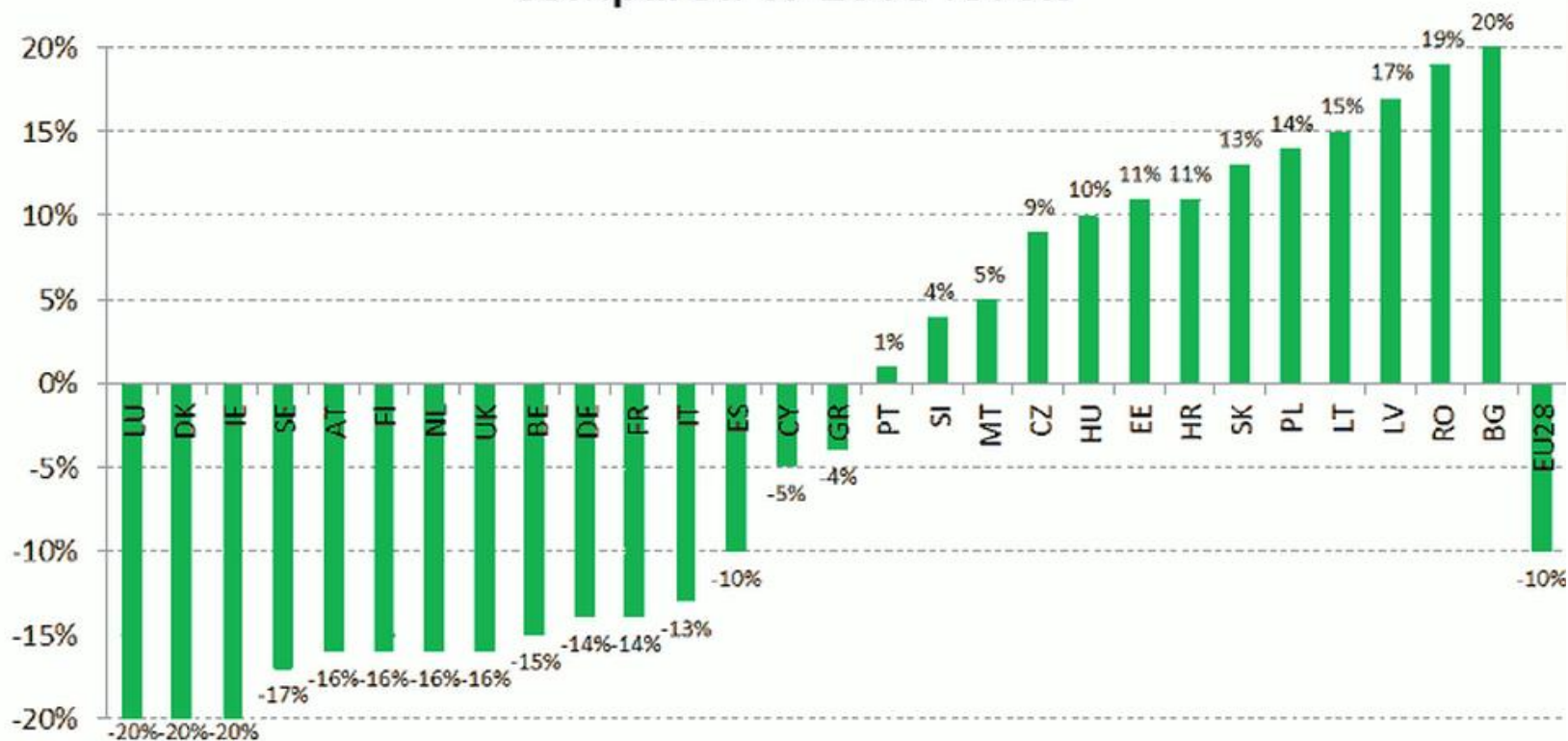
Climate change goals

- Estonian targets part of EU 20-20-20 goals
- Estonia has to limit its emissions in the non-ETS sectors to an increase of 11 % by 2020 compared to 2005 levels
- 70% share of emissions under ETS, highest in EU
- 99 % of Estonian emissions originate from the power sector which will keep receiving free allowances due to the derogation granted to Estonia pursuant to Article 10c of the ETS Directive

Non-ETS sector



Member State greenhouse gas emission limits in 2020 compared to 2005 levels





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Thank you!

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