

First attempts to internalise the externalities in electricity generation sector in Estonia

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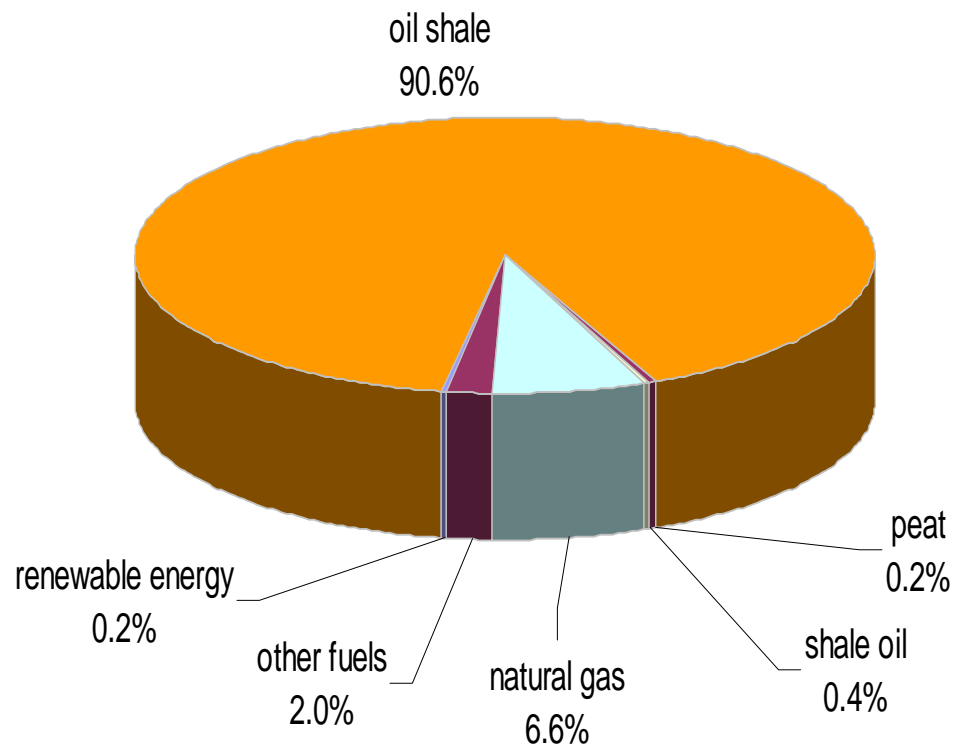
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Why internalisation is needed?

- Important tool of policy making towards SD
- Fair accounting of power production costs of electricity production
- RES wider deployment
 - Estonian target under the Directive 2001/77/EC is 5,1% in electricity consumption. In year 2003 it meant the growth rate of 1700 % in RE electricity production!!
 - Due to wind energy intensive development by private sector Est is now at level ~1.5%
- In TPE use EU RE target is set to 12% in 2010. Due to wide use biomass in heating sector the target is reached already by now!

Power generation is based on a national resource – oil shale (data of 2003)



- One company AS EE generates 95% electricity in Estonia
- Total ~10 TWh/a
- Export 1,9 TWh to Latvia and Russia
- After Ignalina NPP closure the situation changed

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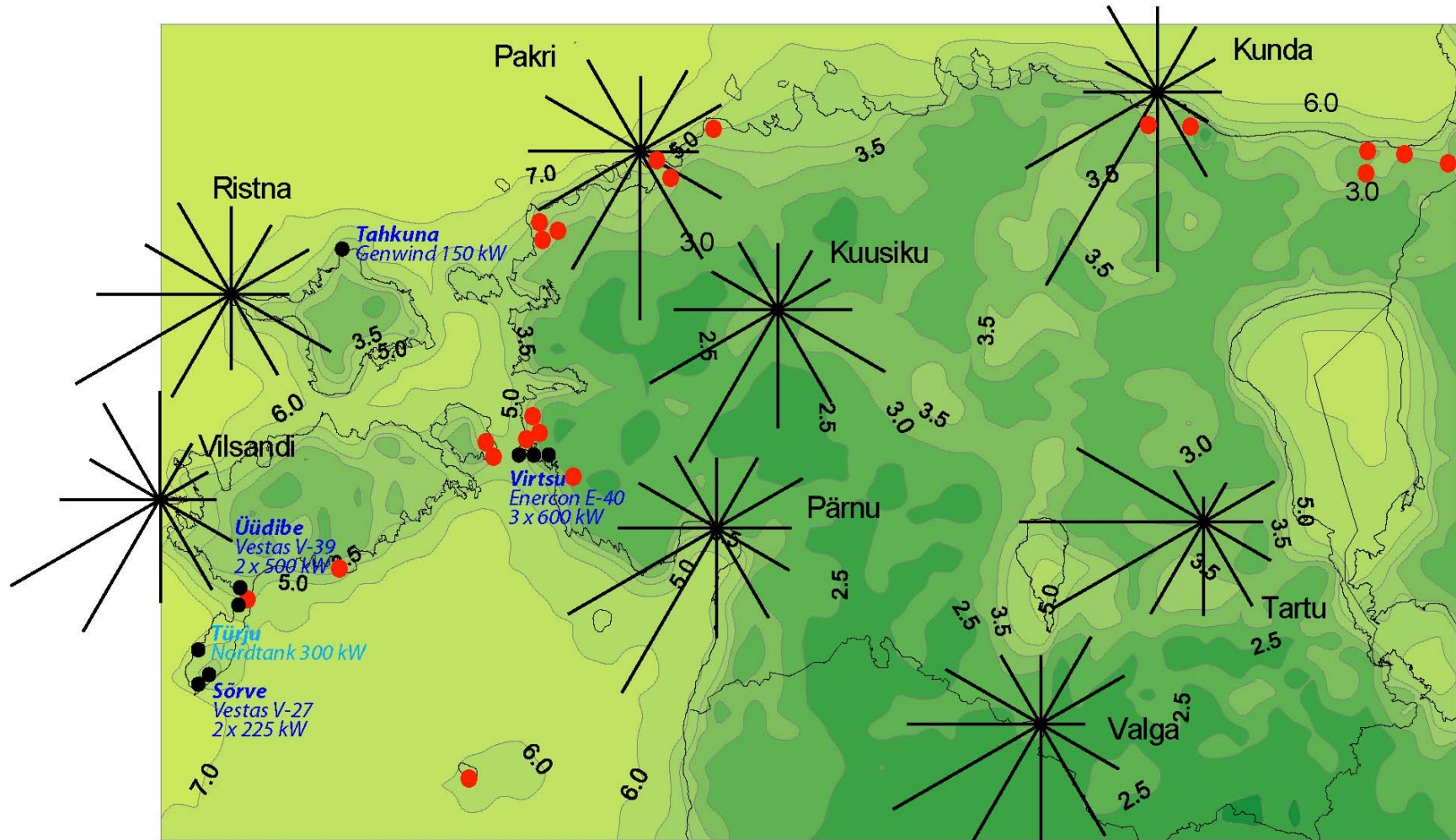
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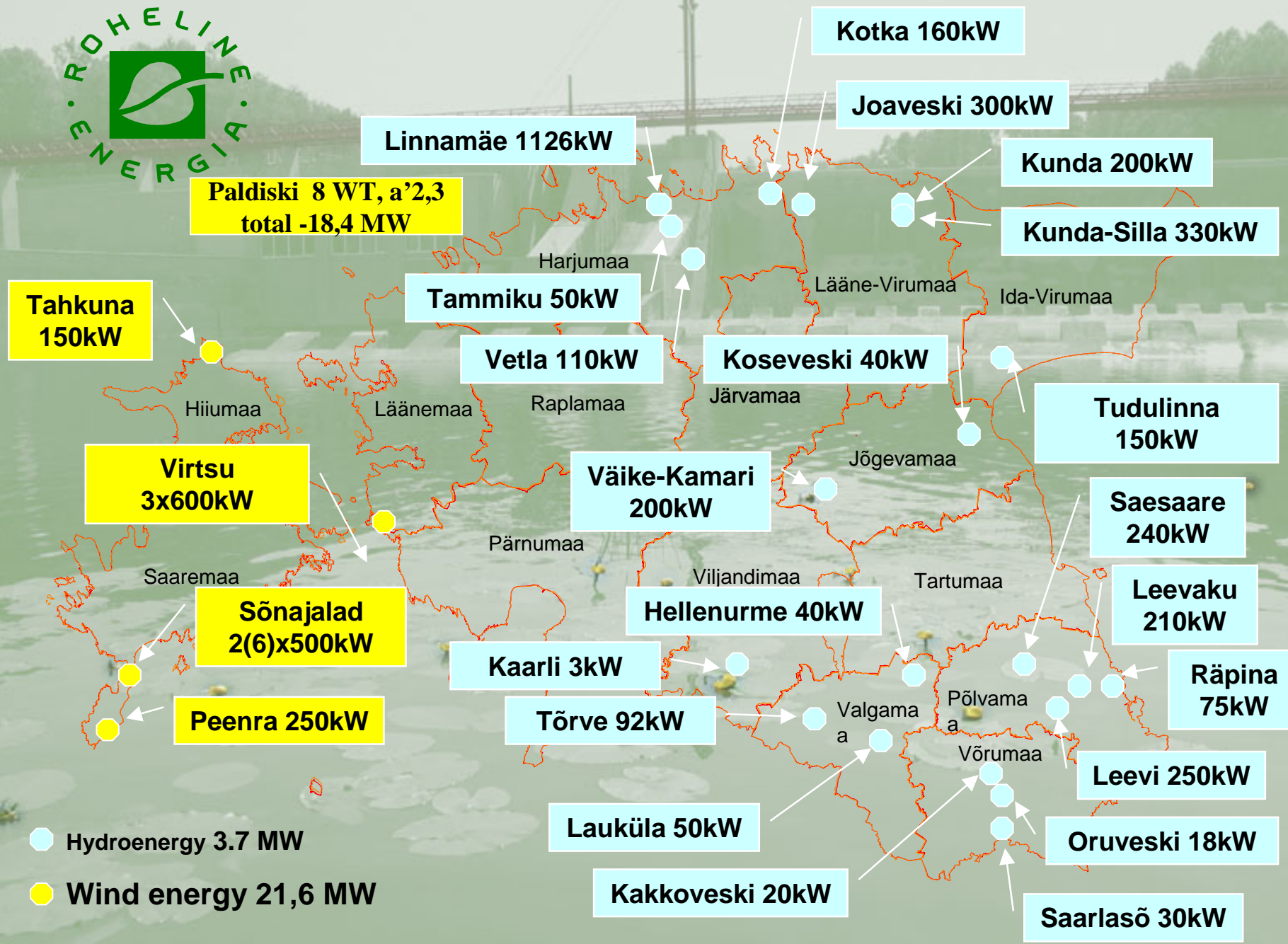


Major RES in EStonia

- Biomass
 - Wood, woodwaste (at present for heating only)
 - Biogas from landfills
- Wind
- Small hydro
- Solar (for heating only)
- Hydrogen (biohydrogen, fossil based generation, etc.)

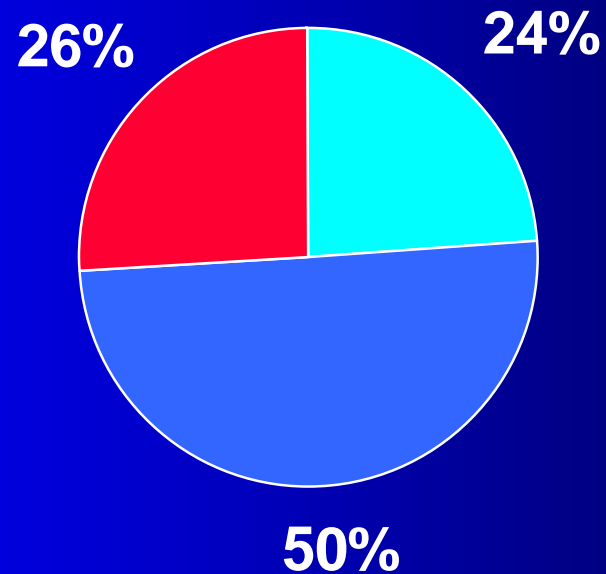
Present situation in wind energy sector in Estonia





Renewable energy production

2003 total production 25
GWh



■ Wind ■ Hydro ■ Landfill gas CHP

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European Union supports the practice of internalisation and RES wider deployment

- Directive 2001/77/EC requires beside of RE energy increase also continuous phase-out of fossil fuel in electricity generation.
- Every EU MS must prepare the reports on phase-out of fossil fuels after 2 and 5 years period of enforcement of the directive. For “old MS” the first in-depth report will be dated to 2006, for new MS ?

Resources needed and emissions in oil shale electricity generation, t / GWh

Resources/emissions	Old technology	Upgraded, FBC
Oil shale	1321	1120
Cooling water	140	125
Ash deposition	630	535
Particulates	3,2	0,5
CO ₂	1200	800
SO ₂	7,8	0,1
NO _x	1,3	0,7

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CO₂

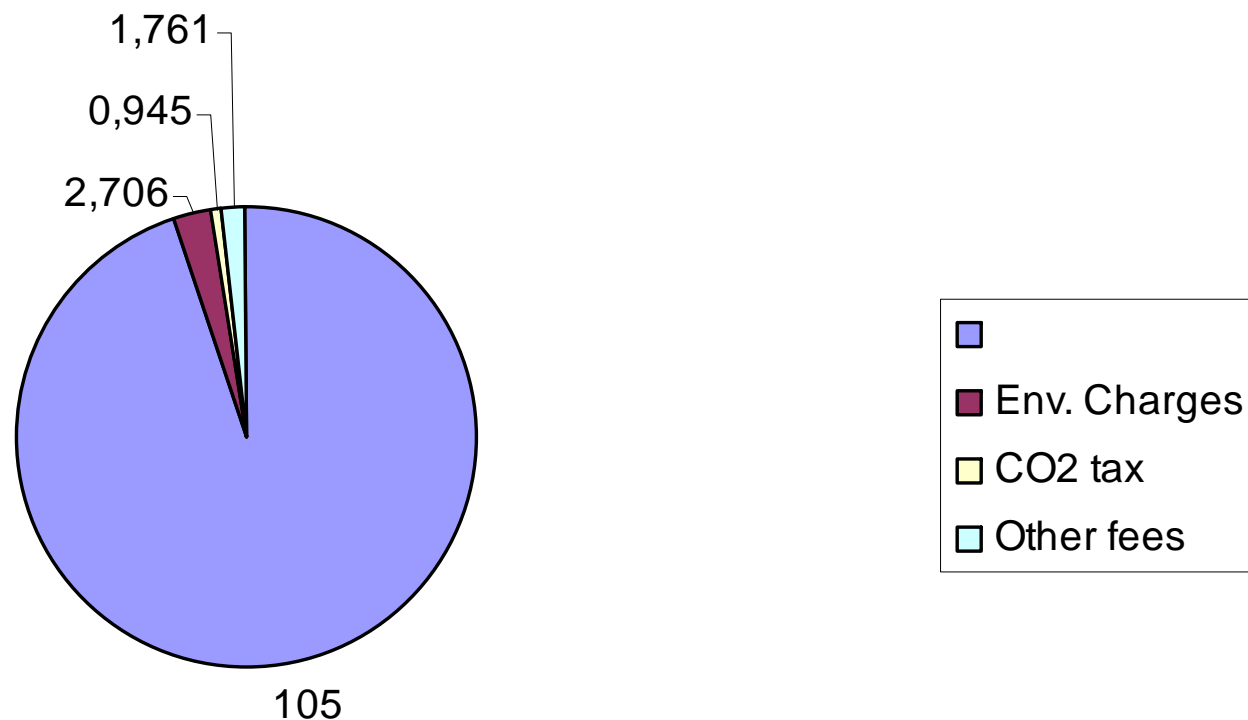
- Taxation instruments in general are in place since 1991 in Estonia. CO₂ is included to the electricity production cost since 2000 (at EUR 0.3/tonne).
- Current tax rate in Est is still relatively low - ~EUR 0.73. It means tax has very little impact yet
- However, in case we use the neighbouring EU “old MS” CO₂ tax rates, in particular those of Sweden and Denmark (countries what have done a significant effort towards SD via RES wider deployment) the production cost goes up significantly!

Water consumption

- **Ground water**
- Huge amount of ground water is pumped out from oil shale mines, in 2000 ~230 million m³, what makes up ~78% of overall consumption.
- **Surface water**
- 1.1. billion m³ out of overall consumption of 1.2 billion m³ was used for cooling in power plants
- Externalities not internalised – heavy price distortion still in force.

Could Estonia be considered sustainable and competitive?

Environmental taxes share in electricity price, 2002/2003, EEKcents/kWh



Internalisation of external costs is needed...

... because the goal is to become sustainable, competitive, knowledge based society! These goals are fixed in Estonian national development strategies.

At present Estonia could not yet considered sustainable. Carbon content of energy production is still ~3 times that of old EU MS's.

The share of fossil fuels in electricity generation still very high ~97,8%.

Tax instruments (e.g. CO₂ taX) happen to be efficient in case there is still room available for alternative development prospectives.

Thank you!

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