

Renewables in Sweden

Tallinn,

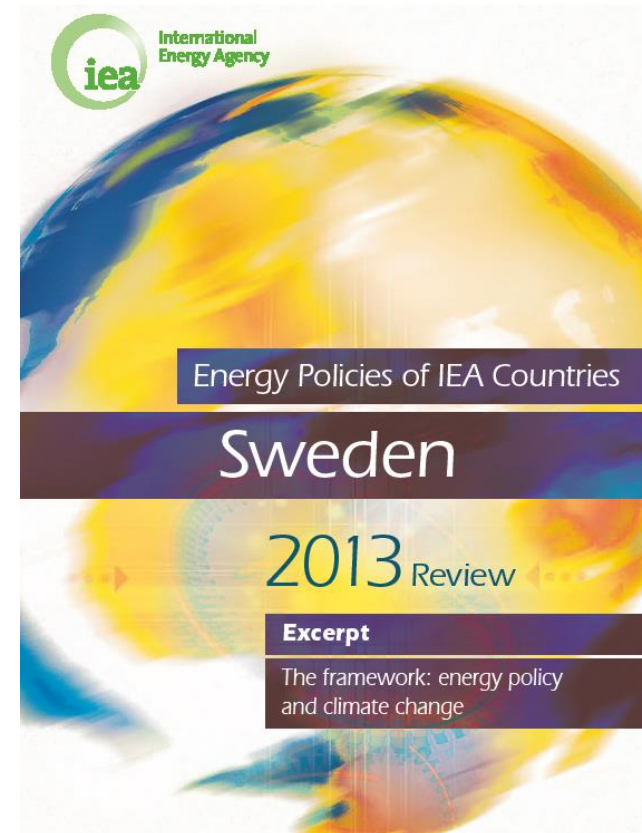
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Swedish Energy Agency

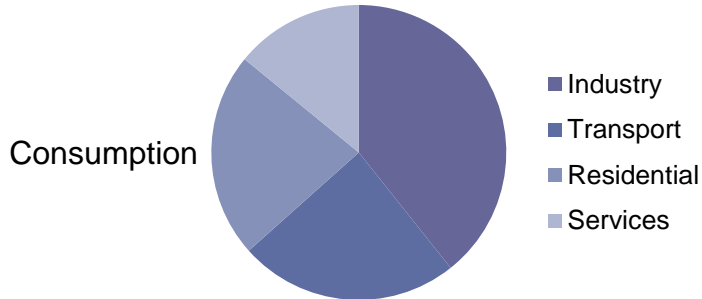
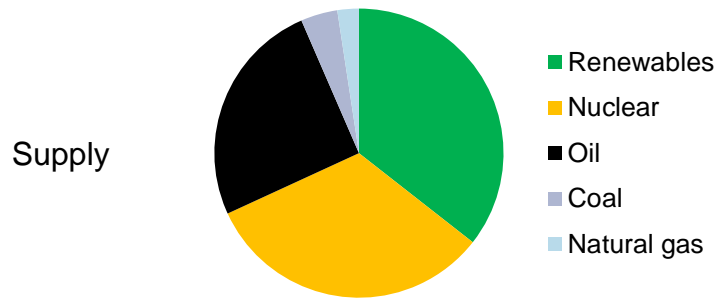
The situation today ...

- Almost fossil-free electricity production
- Low CO₂ emissions per capita and GDP
- Energy-efficient industry
- High thermal standards in buildings
- CO₂ taxes and other policy incentives



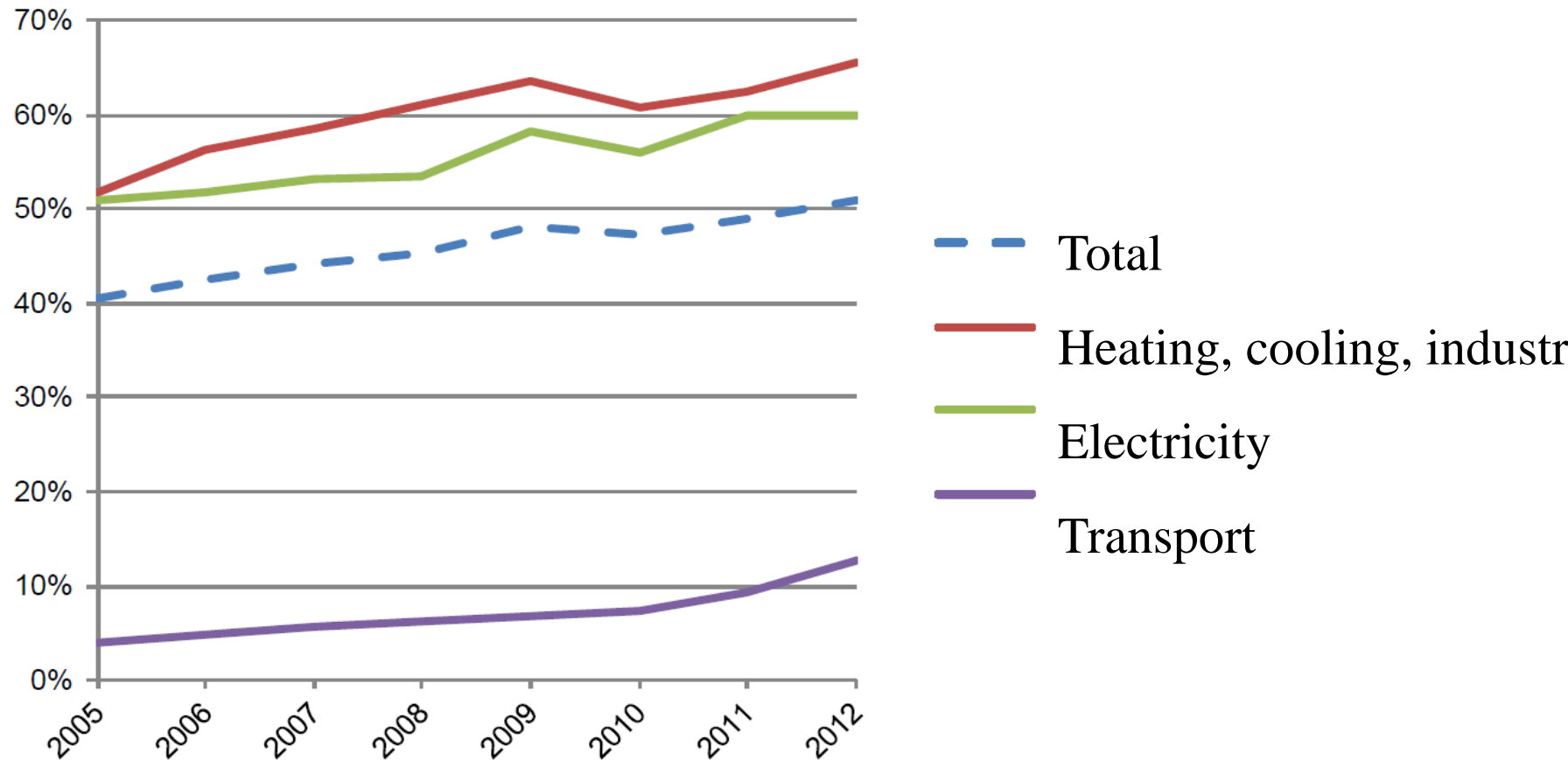
Total energy supply (2011): 569 TWh

Domestic energy production: 69 %



Electricity supply	TWh (2012)
Hydro power	78
Wind power	7
Nuclear	61
Other thermal power	15
Export	20
Total	161

Share of Renewable Energy 2005 - 2012



How did we get here?

Market-based and general instruments

- Energy tax on electricity and fuels since decades
- Carbon dioxide taxation since 1991
- Information and education; innovation and RD&D
- Green certificate system for RE since 2003
- Emissions trading of CO₂ in the EU
- Various specific programmes and support schemes over the years.

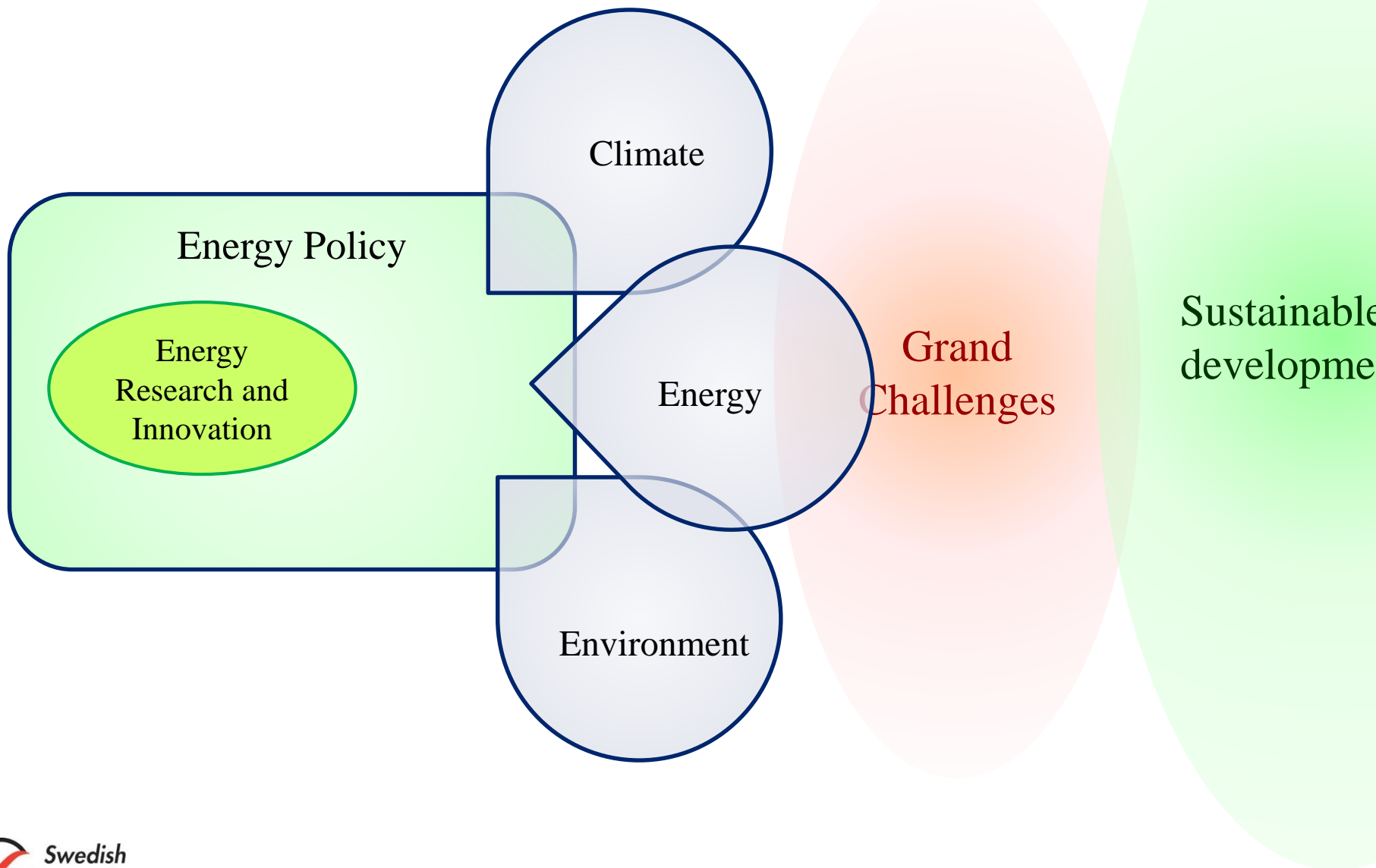
Energy tax and CO₂ tax (1)

- Excise duties on energy – two components:
 - Energy tax on fuels and electricity.
 - CO₂ tax on fossil fuels.
- Energy tax:
 - Introduced in: 1924 petrol ; 1951 electricity ; 1957 oils and coal ; 1964 LPG ; 1985 natural gas ; 2013 low blended bio motor fuels.
- CO₂ tax:
 - Based on fossil carbon content of fuels.
 - Introduced in 1991, along with existing energy tax. Part of major general tax reform.
 - CO₂ tax achieves cost effective emission reductions.

Energy tax and CO₂ tax (2)

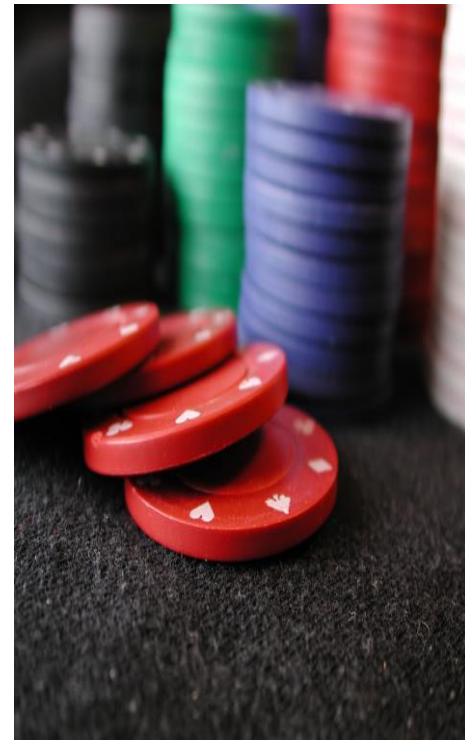
- Basic principles: Same level of CO₂ taxation for motor fuels and heating fuels, per ton fossil CO₂.
- Two levels of CO₂ tax for heating fuels, per ton CO₂
 - *high* for households and service (27 € in 1991 ; 114 € in 2014)
 - *low* for sectors subject to international competition and risk of carbon leakage = industry, agriculture and heat production in combined heat and power plants (CHP).
 - *In 1991: 7 €; in 2014 outside EU ETS 34 €, within EU ETS industry and CHP 0 €.*
 - Gradually raising the lower CO₂ tax level

Energy R&I in the overall picture



The electricity certificate system

- Market-based support scheme for renewable electricity
- Entered into force on the 1st of May 2003, joint market with Norway since 2012
- Entitled production: all renewable electricity (except large-scale hydro power)
- Replaced previous investment and operational state aid



Certificate system – basic features of the regulatory framework

- Producers receive one certificate unit for each MWh renewable electricity produced
- Quota obligation on end-use consumers
- Electricity-intensive industry is exempted
- Certificates are traded on the market
- Certificate = extra revenue in addition to the electricity price revenue





What do the politicians think?

- Long and uncontroversial use of environmental taxes
 - All political parties in broad consensus of basic structure
 - Thorough discussions and analysis before presenting proposals, involving business
 - Step by step approach, gradual introduction gives time to adapt
- Climate change accepted as a fact by most
 - Environmental issues given high priority by Government and citizens
 - Green technology sector is growing rapidly, making green technology affordable
- General welfare state



What do the politicians think?

- Broad consensus on green certificates
 - All political parties in broad consensus of basic structure
 - Discussions around details
 - The common market with Norway well liked... ... in Sweden at least
 - Green card for green certificates from the EU-court 😊
- Transport sector is the big challenge
 - Quota obligation for biofuel is investigated



What could the politicians think?

- Renewable energy is far more than a climate issue
- That the entire energy system is the issue – not individual technologies
- What is this with 100% renewable electricity?

THANK YOU!