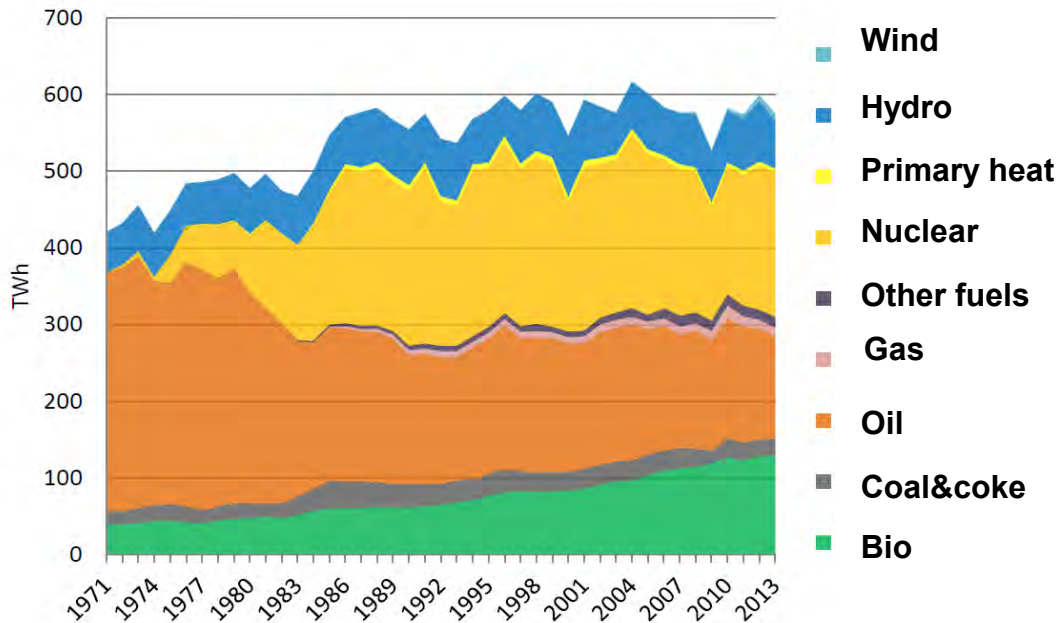


Sweden's renewable energy policies towards 2020 and 2030

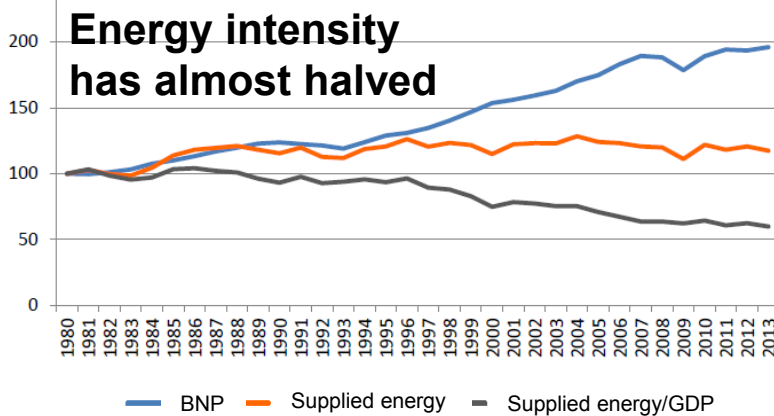
**Eva Centeno López
Swedish Ministry of Environment and Energy**

Tallinn, 12th Maj 2016

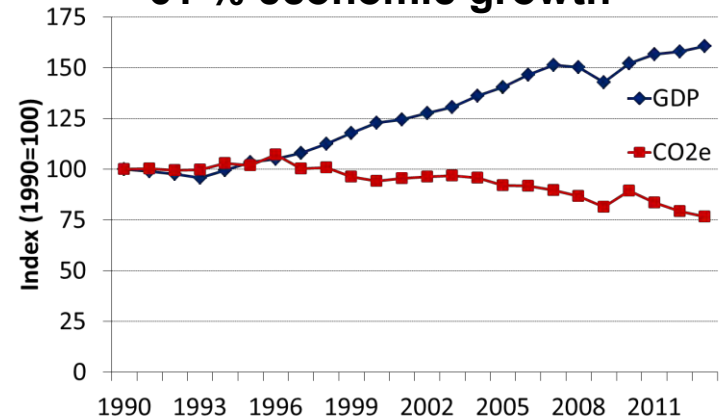
The Swedish Energy System



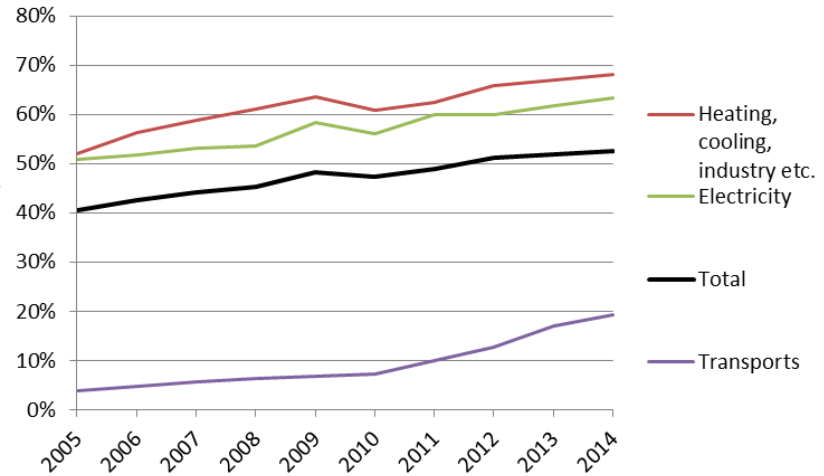
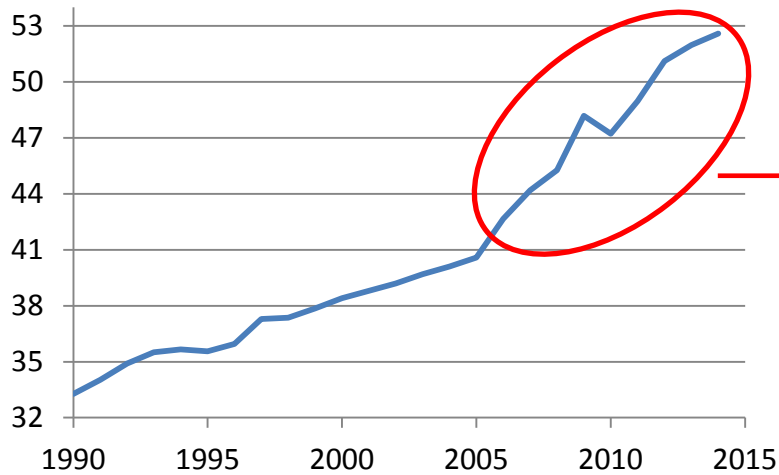
Total primary energy supply in 2013 → 563 TWh
1/3: oil
1/3: nuclear fuel
1/3: renewable energy



1990 – 2013:
23 % reduction of CO₂e emissions
61 % economic growth

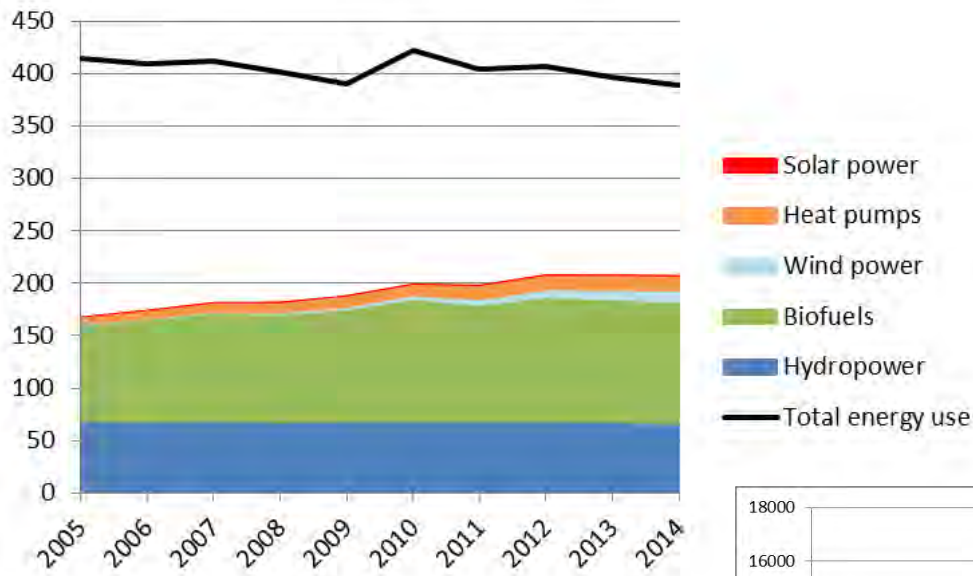


Share of renewable energy (calculated as in RESD)

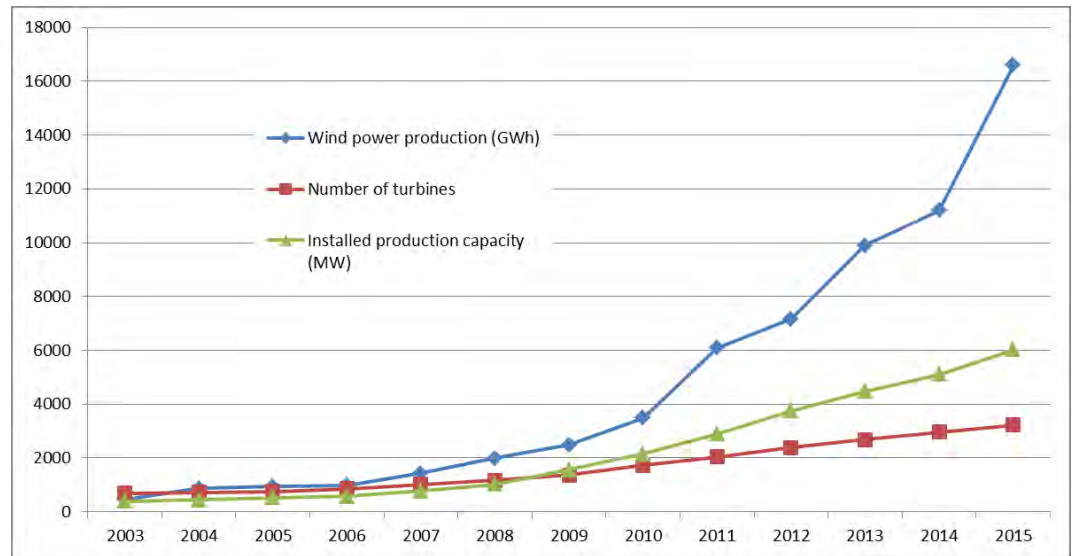


Sverige	2009	2010	2011	2012	2013	2014	2020
RES-total	47,3%	47,8%	48,8%	51,0%	52,0 %	52,6 %	54,8% (projection) Burden sharing according to RESD = 49%
RES-transport	Minst 7,4%	Minst 8,0%	9,4%	12,6%	17,0%	19,2%	

Renewables- Progress II



**Wind power
production was over
16 TWh 2015
compared to 1 TWh
2006**



How did we get there?

General policy instruments

- **Energy tax on electricity and fuels since decades**
- **Carbon dioxide taxation since 1991**
- **Green certificate system for RE since 2003**
- **Emissions trading of CO₂ in EU**

Targeted instruments

- **Information and education, innovation and RD&D**
- **Various specific programmes and support schemes over the years**

Swedish Energy and CO₂ taxation

1924 – 2015, *Basic Design (I)*

- **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 in 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.

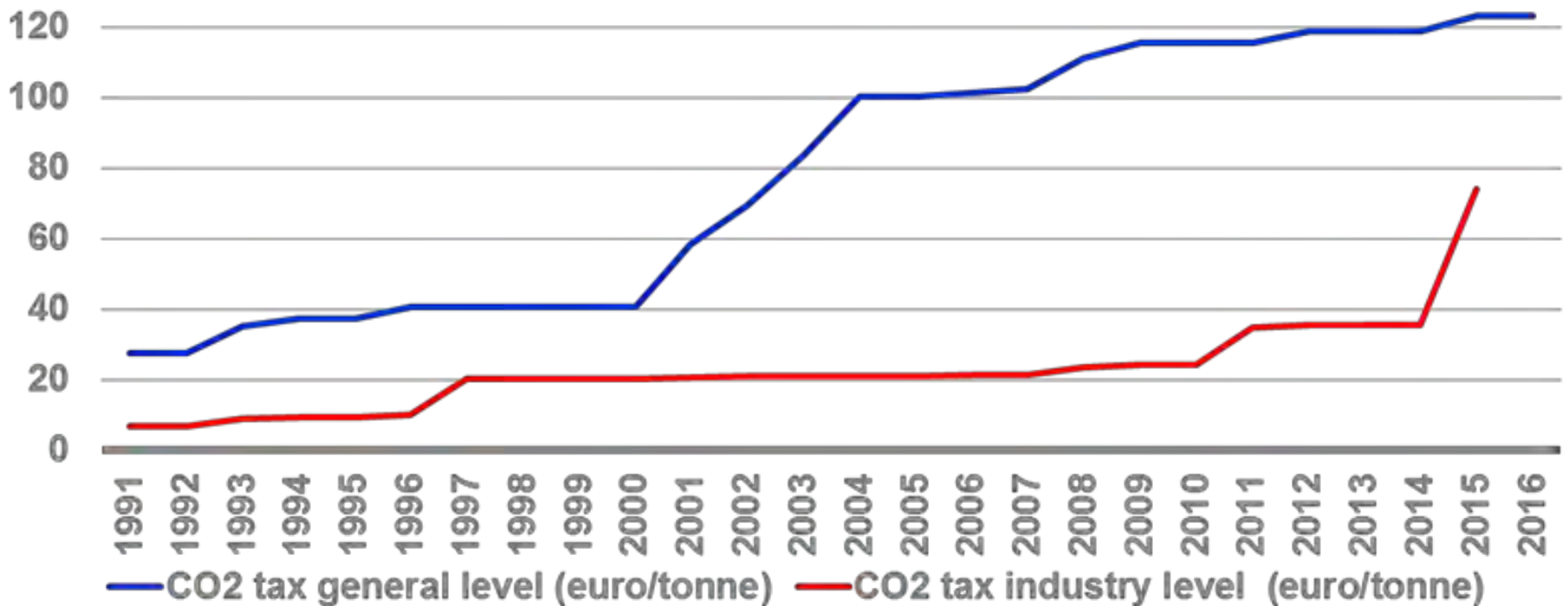
Swedish Energy and CO₂ Taxation 1924 – 2015, Basic Design (II)

- **CO₂ tax:** Same level of for fossil motor and heating fuels, per ton fossil CO₂.
- **Two levels of CO₂ tax for heating fuels, per ton CO₂**
 - *high* for households and service (27 €¹ in 1991; 123 € in 2015)
 - *low* for sectors at risk of carbon leakage = industry, agriculture and heat production in combined heat and power plants.
 - *In 1991: 7 €; in 2015 outside EU ETS 74 €, within EU ETS industry and CHP 0 €.*
 - The alternative would have been an overall much lower tax level for all operators, resulting in significantly lower environmental results.
 - Border Tax Adjustments have never been an alternative considered in Sweden.
- **Energy tax:** Two tax levels for heating fuels and electricity
 - high for households and service.
 - low for industry (within and outside EU ETS) and agriculture.

¹ Exchange rate 1 € = 9,0932 SEK is used throughout this presentation (Official rate per 1 October 2014, 2014/C344/03)

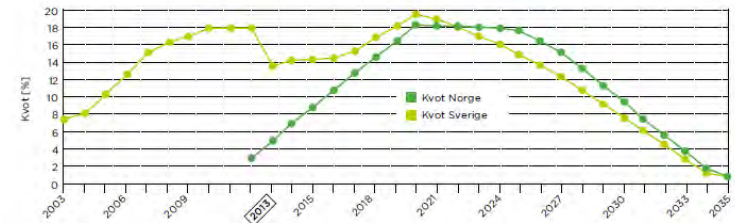
Development of the Swedish CO2 Tax

General Level and Industry Level

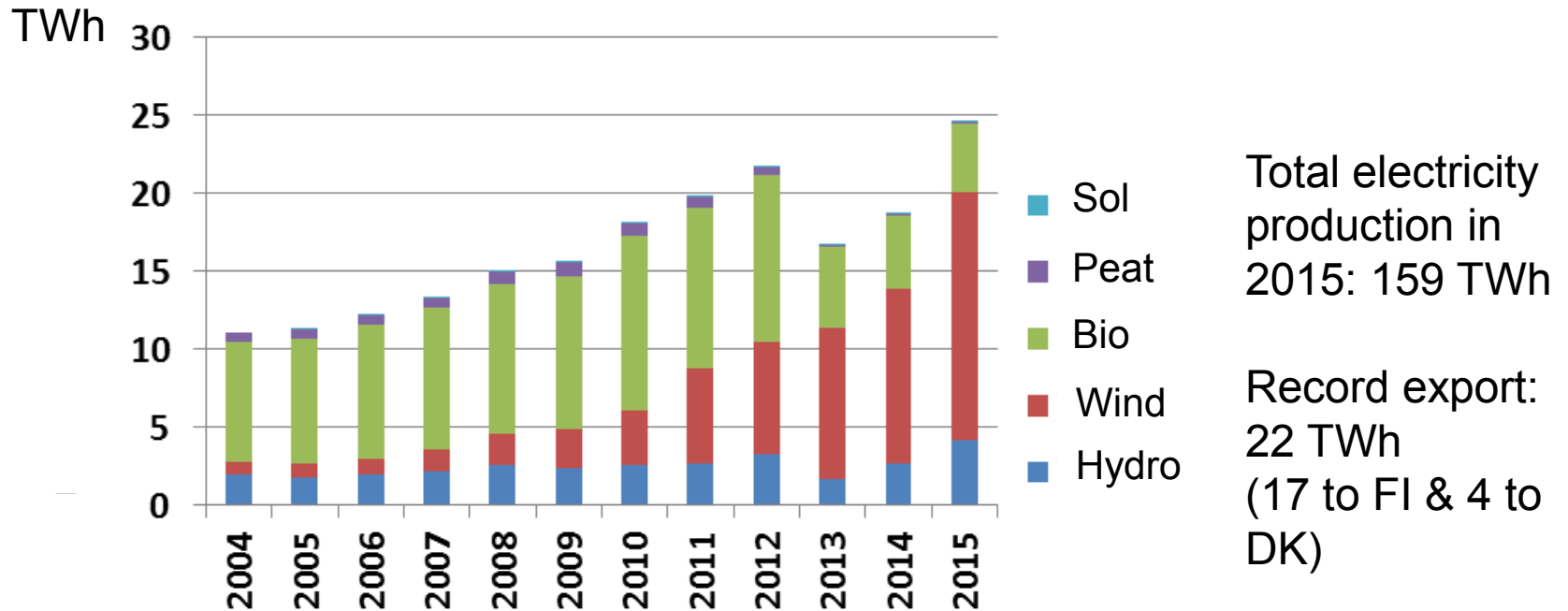


The electricity certificate system-Principles

- **Yearly obligation on demand of certificates**
- **Technology neutral**
- **No financing from the state**
- **Enable international harmonisation**



Deployed RES-E in the certificate system in Sweden

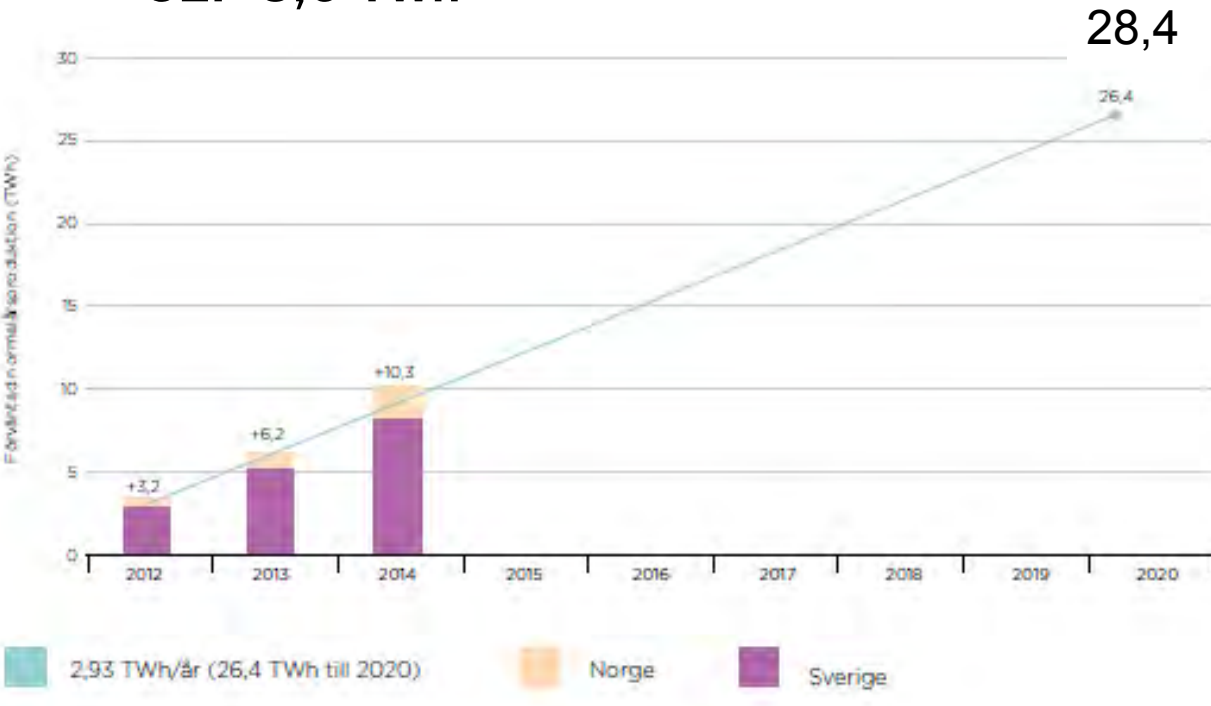
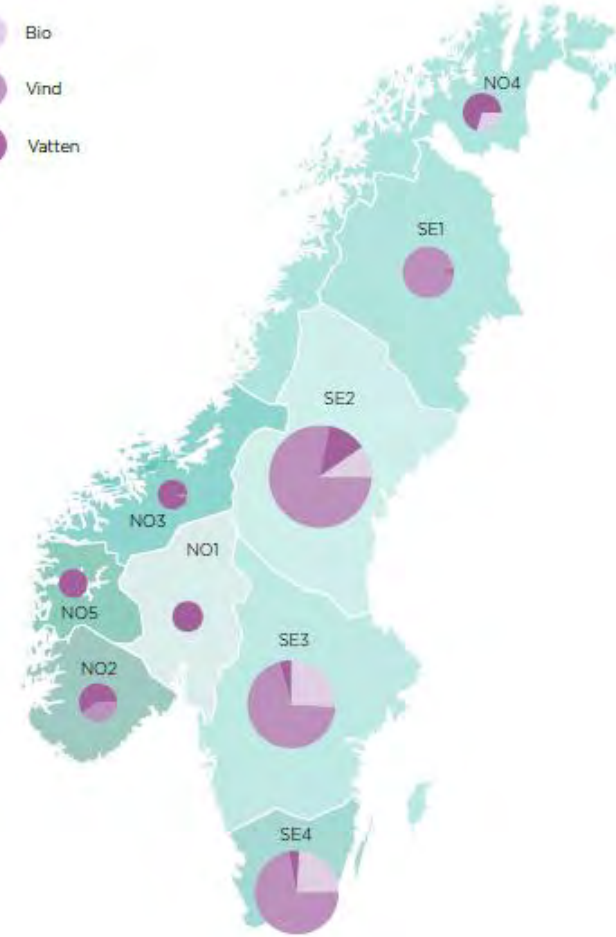


The decrease in 2013 is due to the phase out of old plants from the certificate system, mainly hydro and biomass plants

A common market with Norway

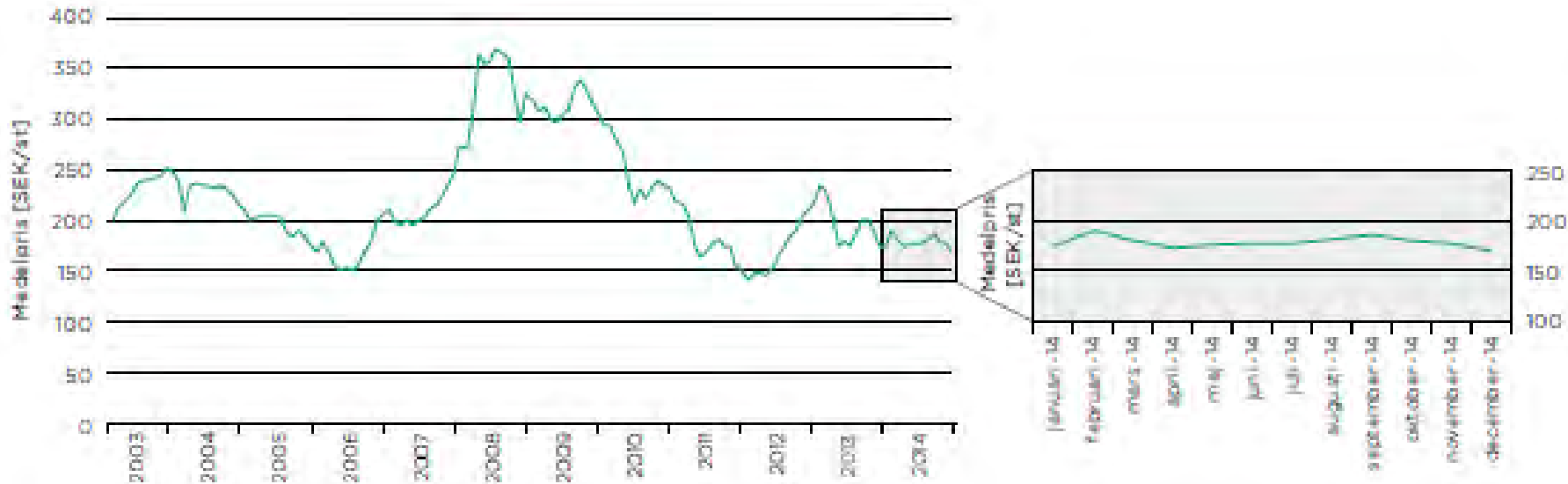
Normalised electricity production
 2014 counting to the common target
 NO: 1,7 TWh
 SE: 8,6 TWh

- Sol
- Bio
- Vind
- Vatten



Källa: Energimyndigheten, NVE

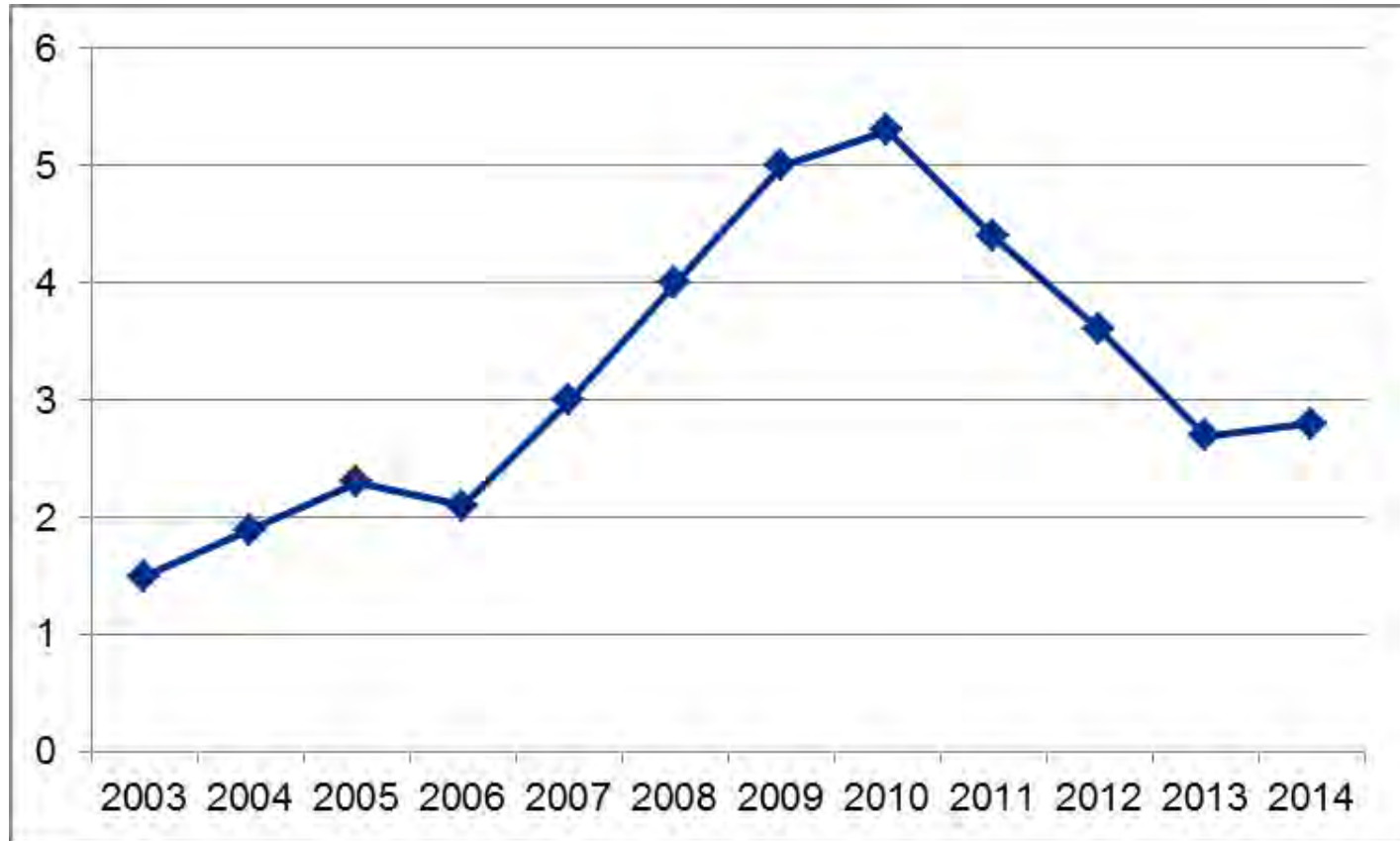
Spot prices at major brokers



Källa: CleanWorld, ICAP och Svensk Kraftmaking

The current electricity certificate price is about 136 swedish crowns per certificate (SEK/MWh) equivalent to about 14 EUR/MWh

Price for consumers



Between 2 and 5 EUR/MWh, 2003-2015

Swedish energy policy for challenges ahead

- **Objectives for 2020**
 - at least 50 % RE of total energy use
 - at least 10 % RE in transport
 - 20 % more efficient energy use
 - 40 % reduction in greenhouse gas emissions (non-ETS)
- **Vision ...**
 - By 2020, fossil fuels for heating will be phased out
 - By 2030, Sweden should have a vehicle stock that is independent of fossil fuels
 - By 2050, a sustainable and resource-efficient energy system and no net emissions of green house gases
 - Ambition to have a 100% renewable energy system in the longer term

Recent policy initiatives

- Increased ambition for the electricity certificate system to 2020 (finance 30 TWh to 2020 compared to 2002)
- Tax reduction for micro-generation of electricity
- Reduced percentage of investment support for solar power but increased budget to this aim
- Support for storage for households with own electricity production
- A strategy on solar is being developed

The Energy Policy Commission



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Terms of reference

Task:

Propose the basis for a broad agreement on long term energy policy, with particular emphasis on the electricity sector.

Time horizon : 2025/2030 and beyond.

Work divided into three phases :

Knowledge phase

Analytical work

Negotiations

Timeline: 1st of January 2017

Main challenges and issues

Challenges

- Changing energy landscape - new roles, new actors
- Power system (plants and grid) is ageing
- Surplus of energy/low electricity prices, no willingness to invest
- Will there be sufficient electricity supply every single hour?
- Long lead times for any new investment
- How to secure R&D and innovation?

Issues

- Long-term goals and vision – where should we be heading?
- How to reinforce an efficient use of energy and electricity?
- How do we replace nuclear? Timing?
- Is there a need to adapt electricity market design?
- Which policy measures are needed, e.g. taxes, support systems, regulation?

Some words on coming EU regulation

- Avoid more administration for just renewables
- Governance → strong and predictable, at least 27% RES to 2030 has to be achieved!
- Support schemes → still up to each MS to decide on geographical scope
- Cooperation → voluntary basis, KOM facilitator
- Market design → improvements can be made but should apply for all technologies
- Heat&cooling → this sector needs more focus, externalities has to be included
- Transport → a strategy for decreasing emissions after 2020 including e-mobility, efficient transports and biofuels is needed.



Thank you for your attention!

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