

After the removal of the nuclear tax – Swedish nuclear industry is ready for Round 2

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BNS Seminar 2017-04-27, Brussels

SKS

SVERIGES KÄRNTEKNISKA SÄLLSKAP

SWEDISH NUCLEAR SOCIETY

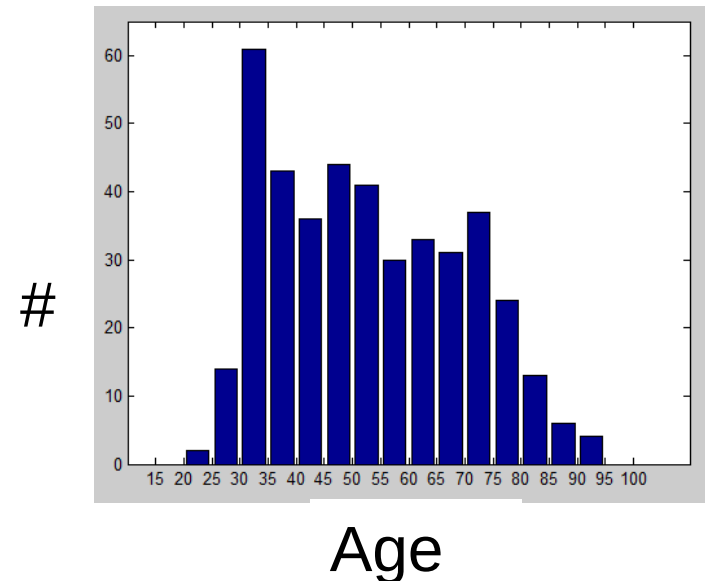
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SKS in short

- Promotion of peaceful nuclear applications
 - Member activities
 - Bill remittance
 - Communication
 - Nuclear heritage
 - Nuclear trendspotting arena

430 members
Average age: 52 years



Nuclear Power in Sweden

- Heavy-water program 1947-1974 resulted in:
 - Nuclear knowledge
 - Domestic LWR reactor construction capacity
 - Fuel factory
 - Research reactors for fuel testing
 - Computerized core modelling
- Establishment of light-water reactor fleet 1966-1985 (12 reactors)
 - Fastest large scale establishment of CO₂-free electricity production per capita.



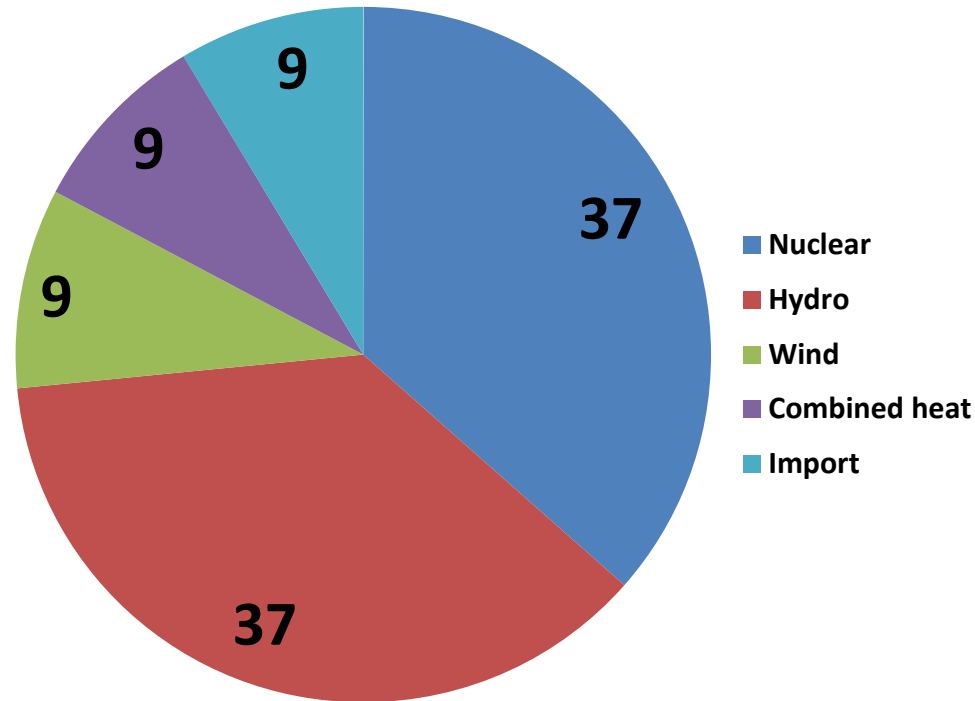
Electricity production in Sweden

2016 [%]

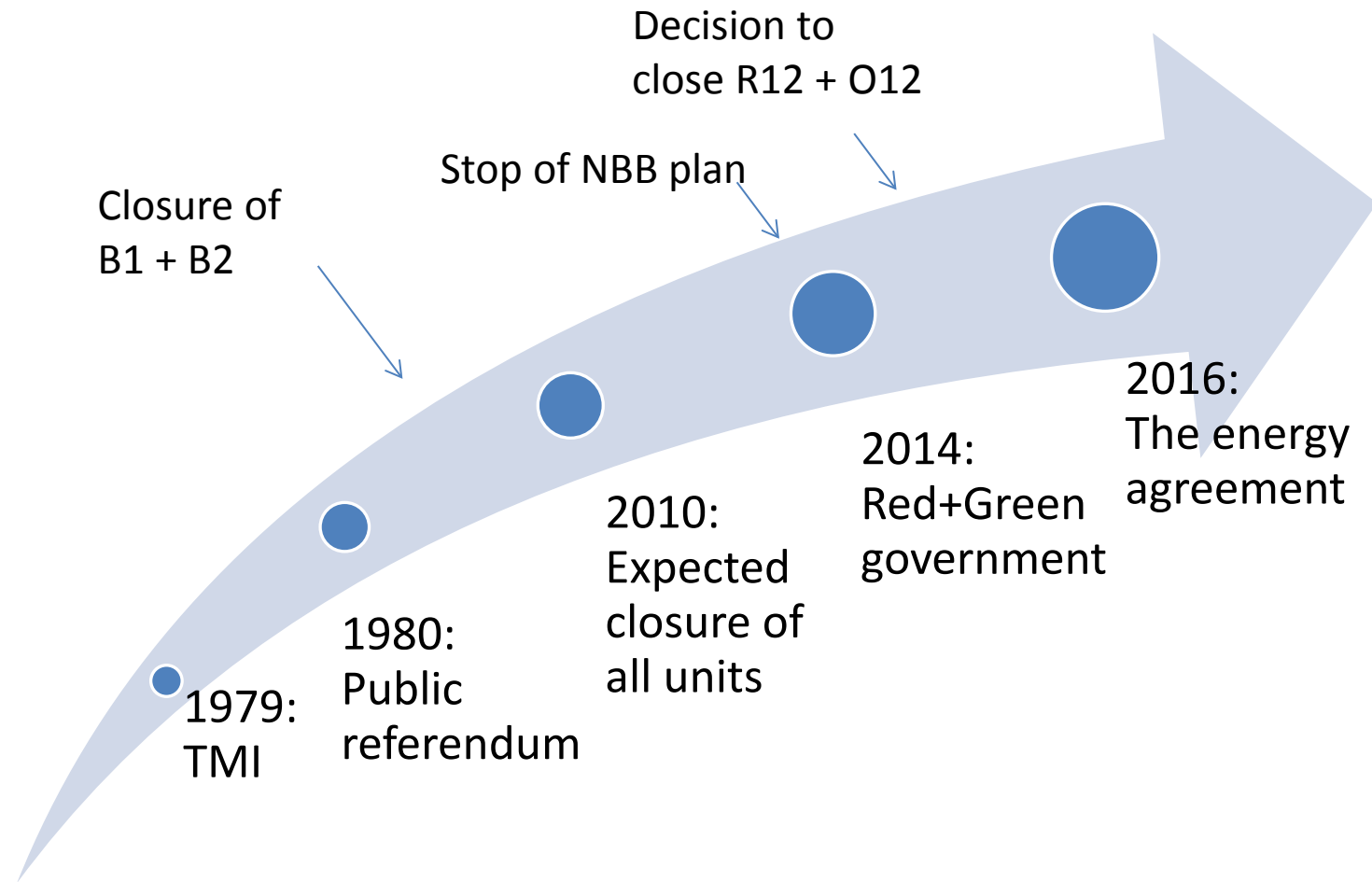
Total: 165,7 TWh
(151,5 TWh + import)

~100% CO₂-free

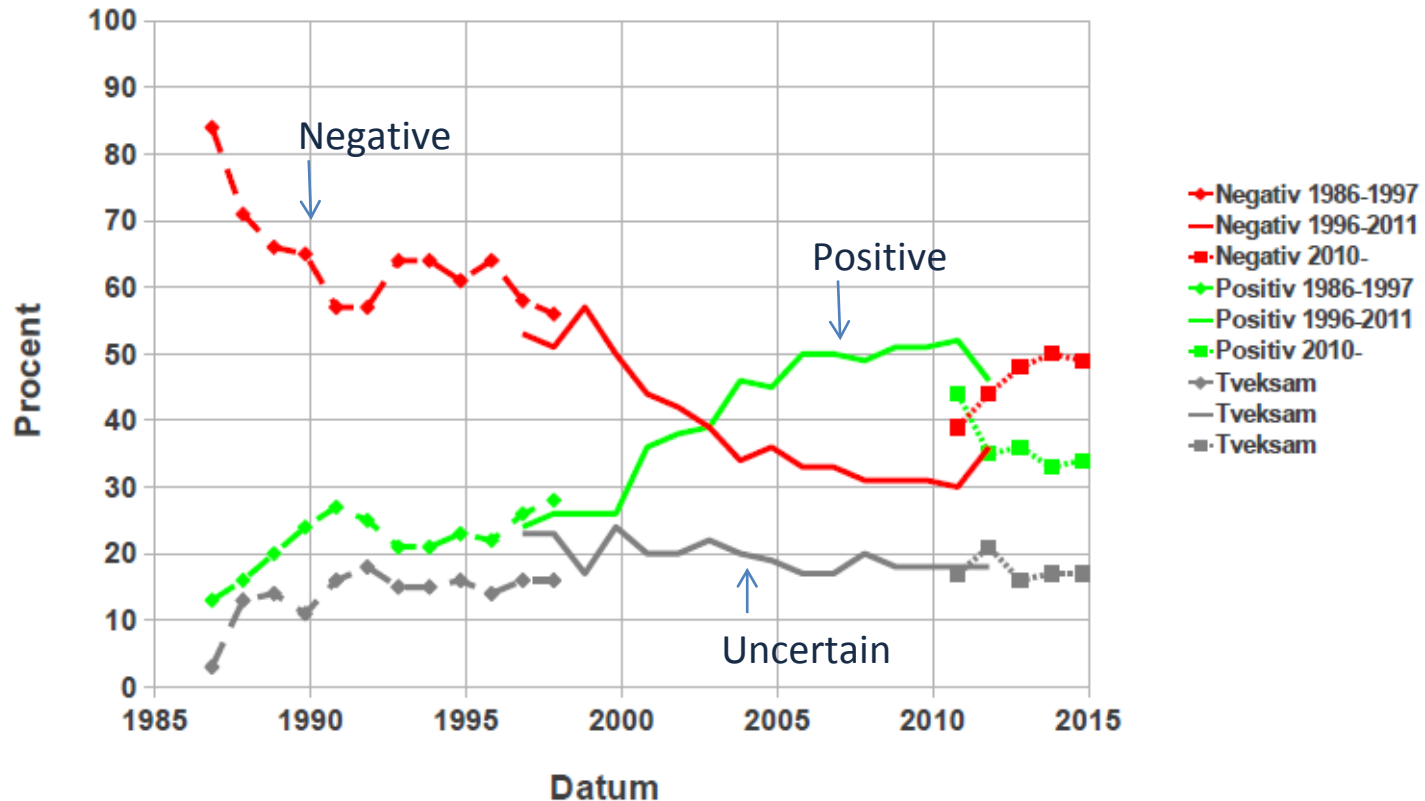
WEC: AAA



History of nuclear debate in Sweden

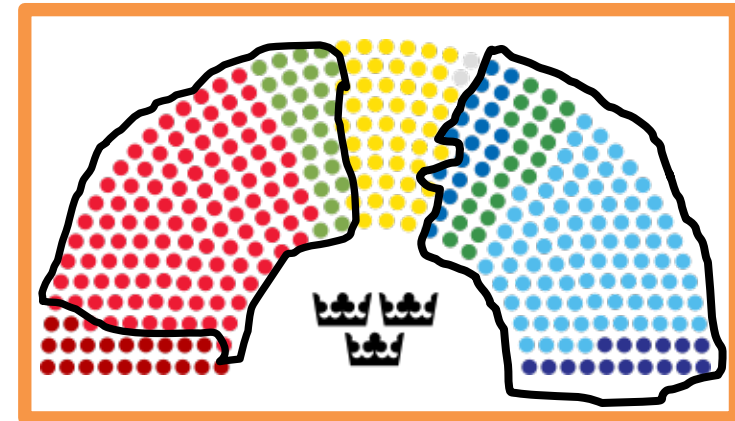


Public opinion



The 2014 election

- Complex parliamentary situation:
 - Minority Government acting on opposition budget
- Solution:
 - Always vote for the budget of the Government
- Cooperation areas:
 - Pension, defense and energy



The Energy Commission

- Parliamentary commission
- Chaired by the Minister of Energy
- Two years of work:
 - Information gathering
 - Scenario identification
 - Negotiations



Pressure on Swedish nuclear and the Energy Commission

Nuclear tax

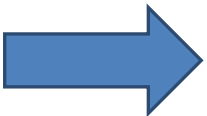
- 12 648 SEK/MW/month (since 2008)
- 14 770 SEK/MW/month (after 2015)

Post-Fukushima requirements

- Independent core cooling
- 60 years

Low electricity prices

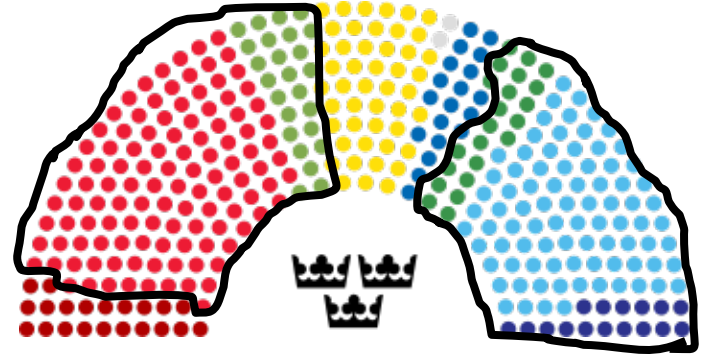
- Below 30 €/MWh

- 
- Definite closure of four units before 2020
 - Possible closure of all units by 2020

The Energy Framework Agreement



June 2016



The goal in 2040 is 100% renewable electricity production. This is a goal, not an end date which prohibits nuclear power and it does not mean the closure of nuclear power through political decisions.

The Energy Framework Agreement

- Removal of the nuclear tax
- Removal of the real estate tax on hydro power
- Continued subsidies to renewables: 18 TWh by 2030
- Renewed construction of the nuclear waste fund
- Possibility to build new reactors will remain
- Accident liability: 1200 M€

Further agreements...

- 50% more effective energy use by 2030
- Zero emissions 2045
- More export than import of electricity
- International grid connections
- Etc... (400 pages)
- No impact analysis



Nuclear challenges? Round 2...

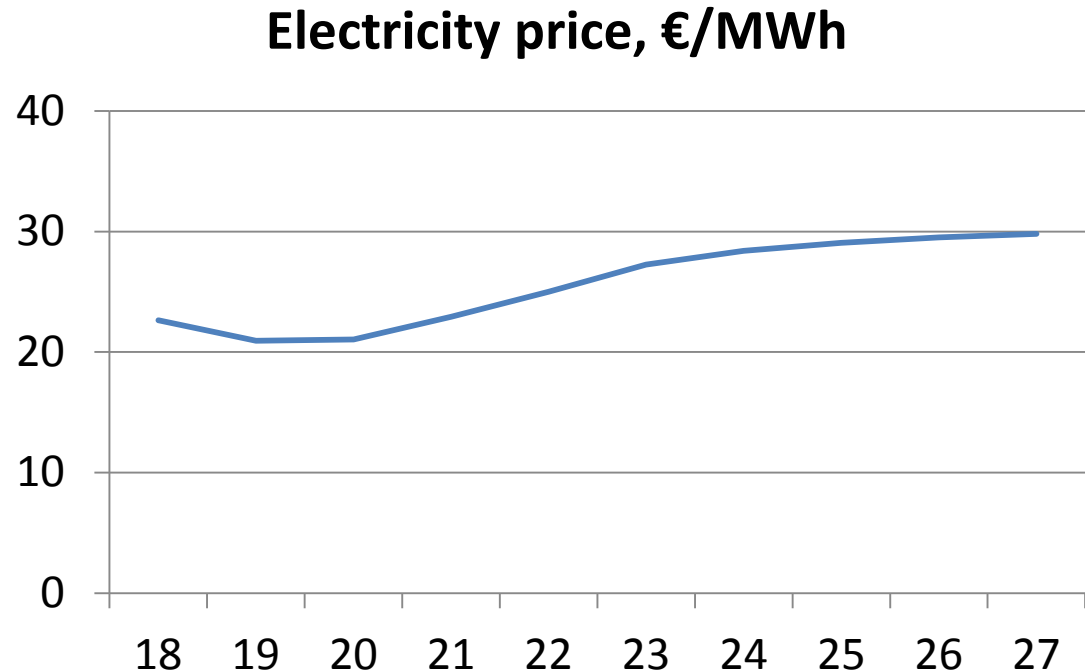
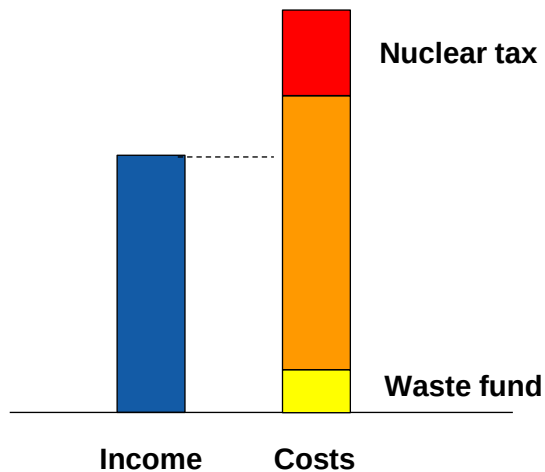
- Renewed construction of the nuclear waste fund.
- Further subsidies to renewables (18 TWh)

The nuclear waste fund

- Green party: 40 years down-payment period, placement in low risk papers
- Industry + authorities: 50 years and placement in stocks.
- Agreement included linear ramping of subsidies for renewables: 2022-2030, 2 TWh/year

Operation until 2040?

- Vattenfall: Operation cost < 19 öre/kWh ~ 21 €/MWh



New nuclear?



Thank you for you attention!

Nuclear power plants

Oskarshamn

- O1, BWR, 490 MW_{el}, in operation since 1972
- O2, BWR, 620 MW_{el}, in operation since 1974
- O3, BWR, 1 450 MW_{el}, in operation since 1985

Forsmark

- Forsmark 1, BWR, 998 MW_{el}, in operation since 1980
- Forsmark 2, BWR, 1 126 MW_{el}, in operation since 1981
- Forsmark 3, BWR, 1 176 MW_{el}, in operation since 1985



Nuclear power plants

Ringhals

- Ringhals 1, BWR, 881 MW_{el}, in operation since 1976
- Ringhals 2, PWR, 906 MW_{el}, in operation since 1975
- Ringhals 3, PWR, 1 072 MW_{el}, in operation since 1981
- Ringhals 4, PWR, 1 109 MW_{el}, in operation since 1983



Barsebäck

- Barsebäck 1, BWR, 620 MW_{el}, in operation 1975 – 1999
- Barsebäck 2, BWR, 620 MW_{el}, in operation 1977 – 2005

