POWER CHOICES
Pathways to carbon-neutral electricity in Europe by 2050

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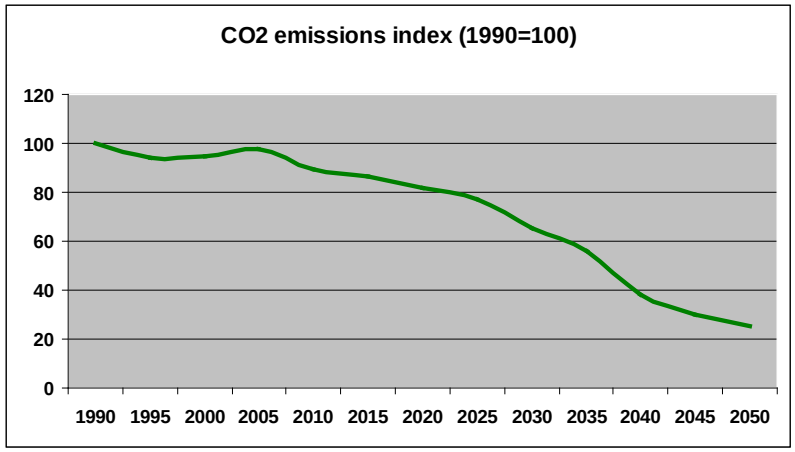
EURELECTRIC CEO Declaration

18 March 2009

1. **Carbon-neutral power in Europe by 2050**
2. **Cost-efficient, reliable supply through an integrated market**
3. **Energy efficiency & electricity use as solutions to mitigate climate change**

Main assumptions for Power Choices scenario

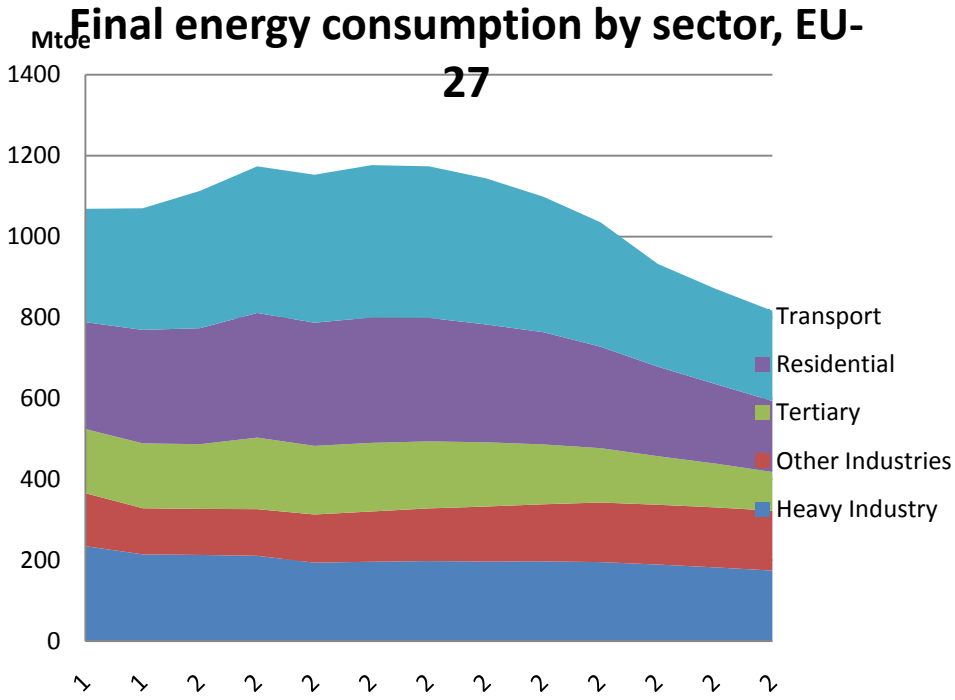
75% CO2 cut EU-wide



POWER CHOICES SCENARIO

- 75% CO2 cut across whole EU economy
- CO_2 price applied uniformly to all sectors
- Power becomes major transport fuel
- All power generation options available (with CCS commercially available as of 2025)
- Major policy push in energy efficiency
- No binding RES target post-2020
- CO_2 price is the only driver for low-carbon generation post 2030

Decrease in energy demand



➡ Paradigm shift to efficient electric technologies

➡ More electricity = less energy

Need for all low-carbon generation options

In 2050

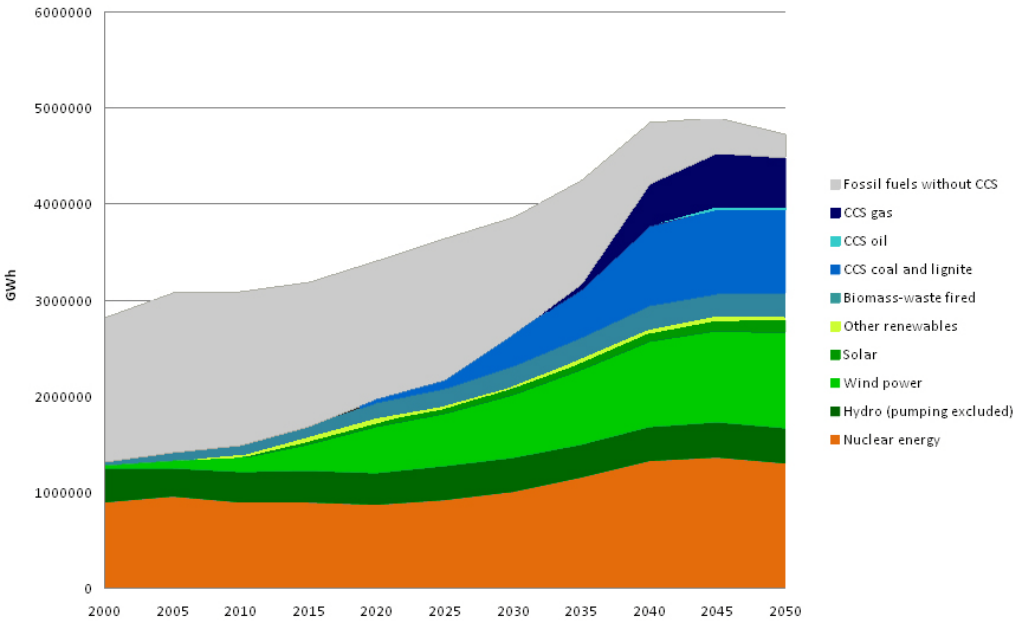
RES:
- 38% of total mix (1800TWh)
- Wind: 56% of RES

Nuclear:
- 27% of total mix (1300TWh)

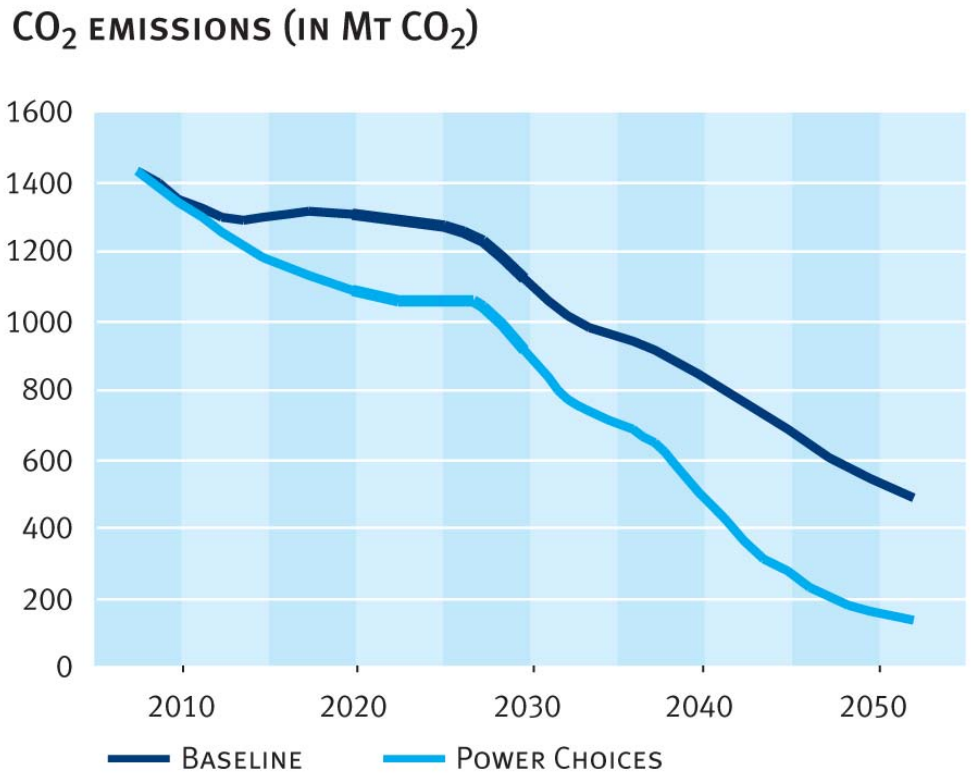
CCS:
- 30% of total mix (1414TWh)

Other fossils:
- 5% of total mix (231TWh)

Net power generation in EU-27



Carbon emissions from power fall by 90%



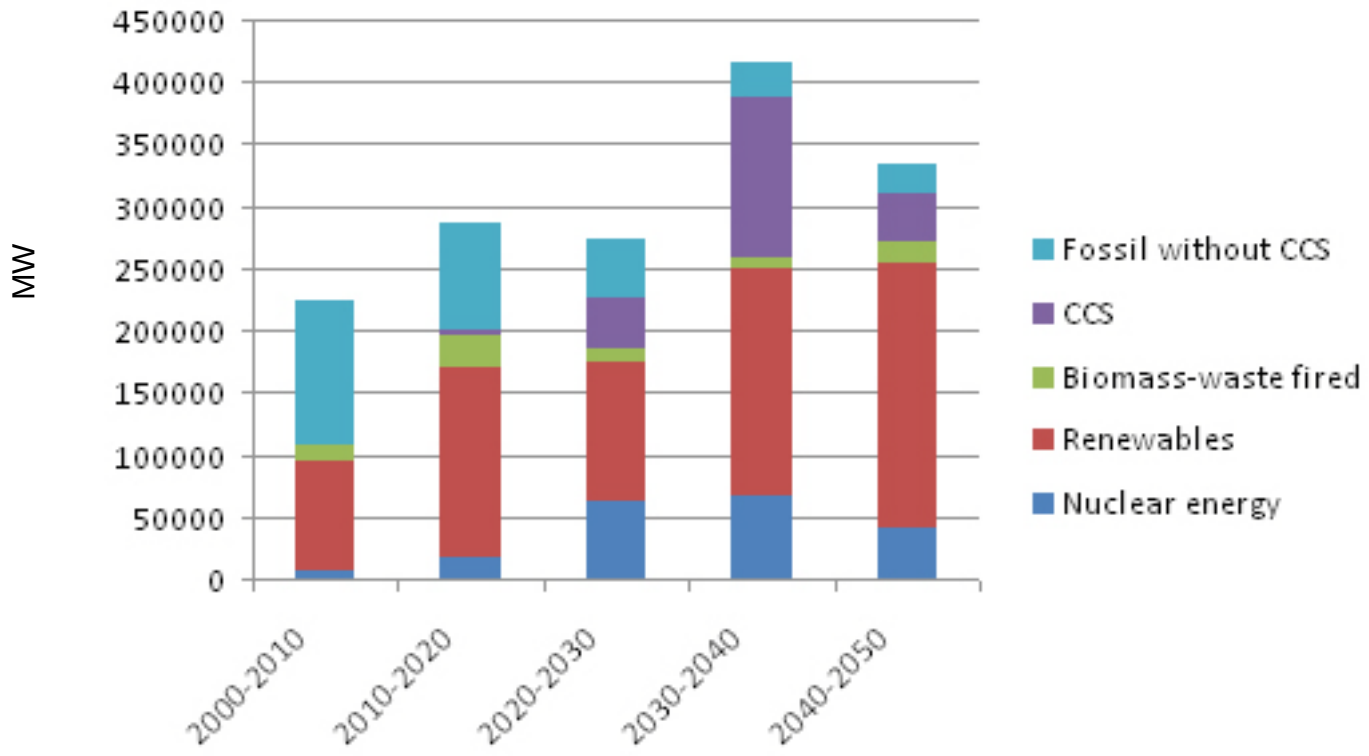
Deep emission cuts take place between 2025-2040.

But investments are needed NOW!

NOW: 1423 $MtCO_2$
2050: 128 $MtCO_2$

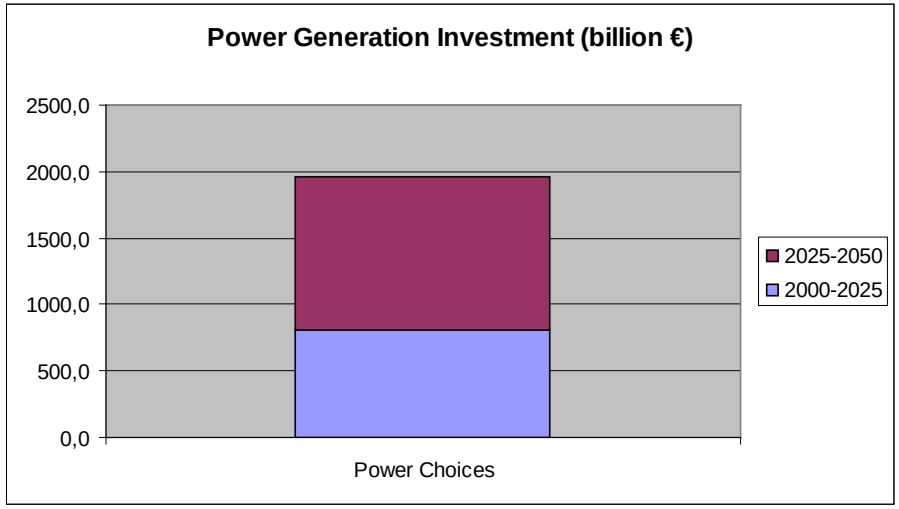
Investment needed across the period

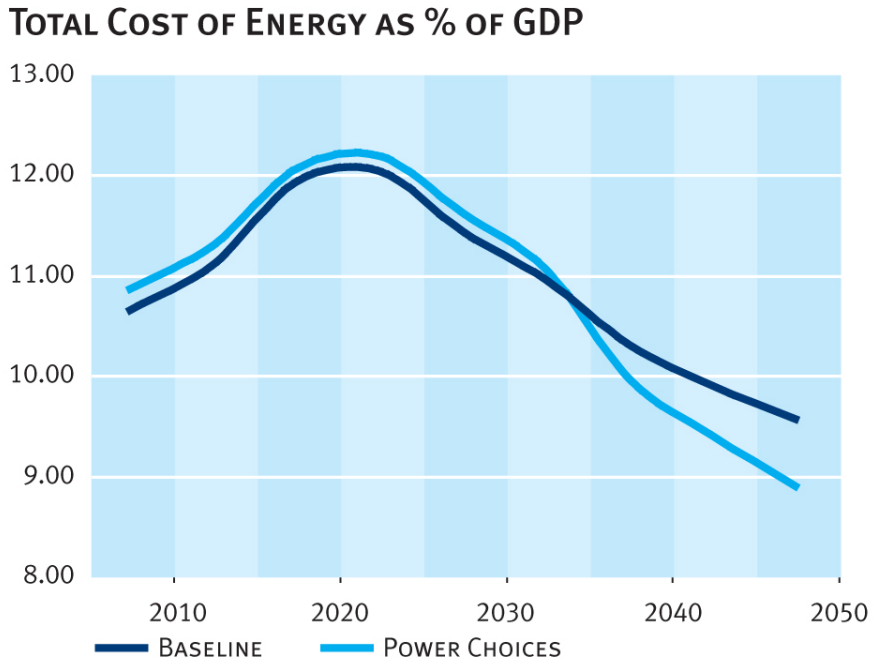
Gross investment in generation capacity



Significant investments…
… but a reasonable cost for society

Investment needed in power generation by 2050: €2 trillion





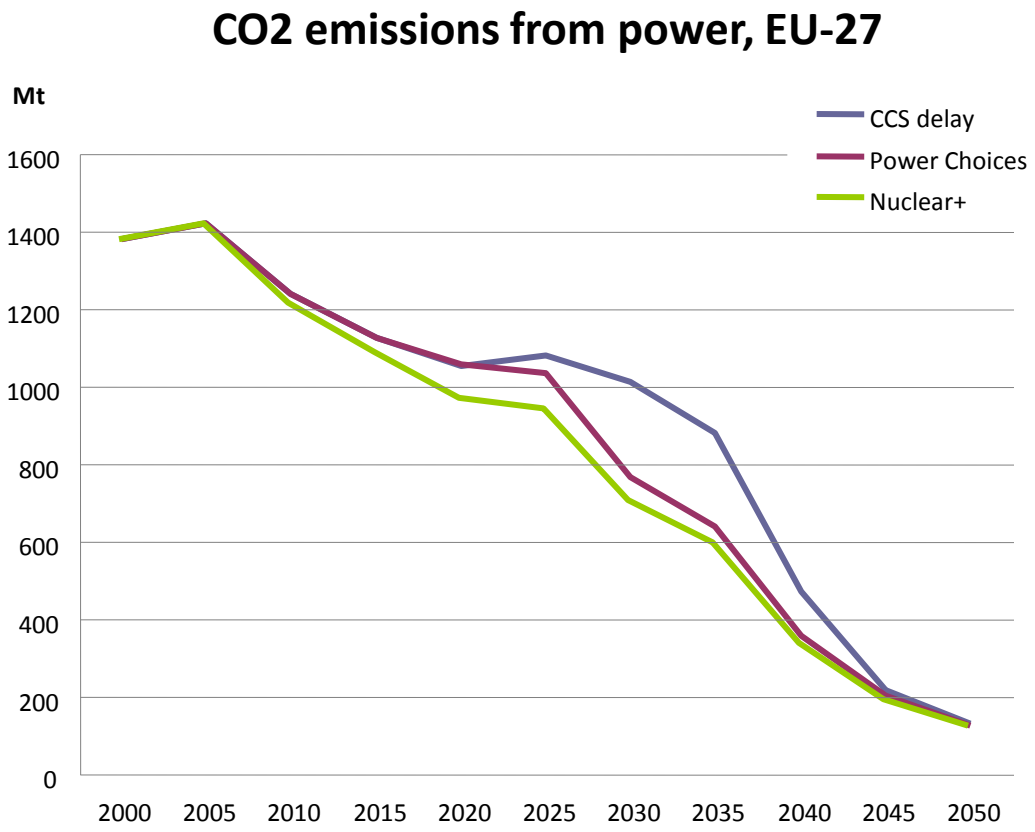
What if…

Nuclear phase-out is reversed in Germany and Belgium?

Commercial deployment of CCS is delayed to 2035?

One-third of onshore wind power is not built due to planning problems?

All technologies are *really* needed



- 10-year delay of CCS = delayed CO_2 emission reductions from power & whole economy!
- More nuclear = more rapid reduction curve
- 1/3 onshore wind not built = more CCS & nuclear, off-shore wind not likely to fill gap.

Key outcomes

- **EU carbon-neutral power by 2050 is realistic**
  ➡ -75% CO2 on whole economy can be reached

- **All power generation options needed**
- **Electrification of the demand side essential**
- **Significant investment but at acceptable cost to society**
- **The major CO_2 reductions in power are achieved from 2025 onwards**
- **CCS delayed &/or nuclear phase-out = slower CO_2 reduction**

Policy recommendations

CO2 reductions

- Support CO_2 market to deliver cap at least cost
- All sectors to internalise cost of GHGs
- Promote an international agreement on climate

Technology choices

- Enable the use of all low-carbon options for power generation
- Encourage public support for modern energy infrastructure: onshore wind, CCS, smart grids…

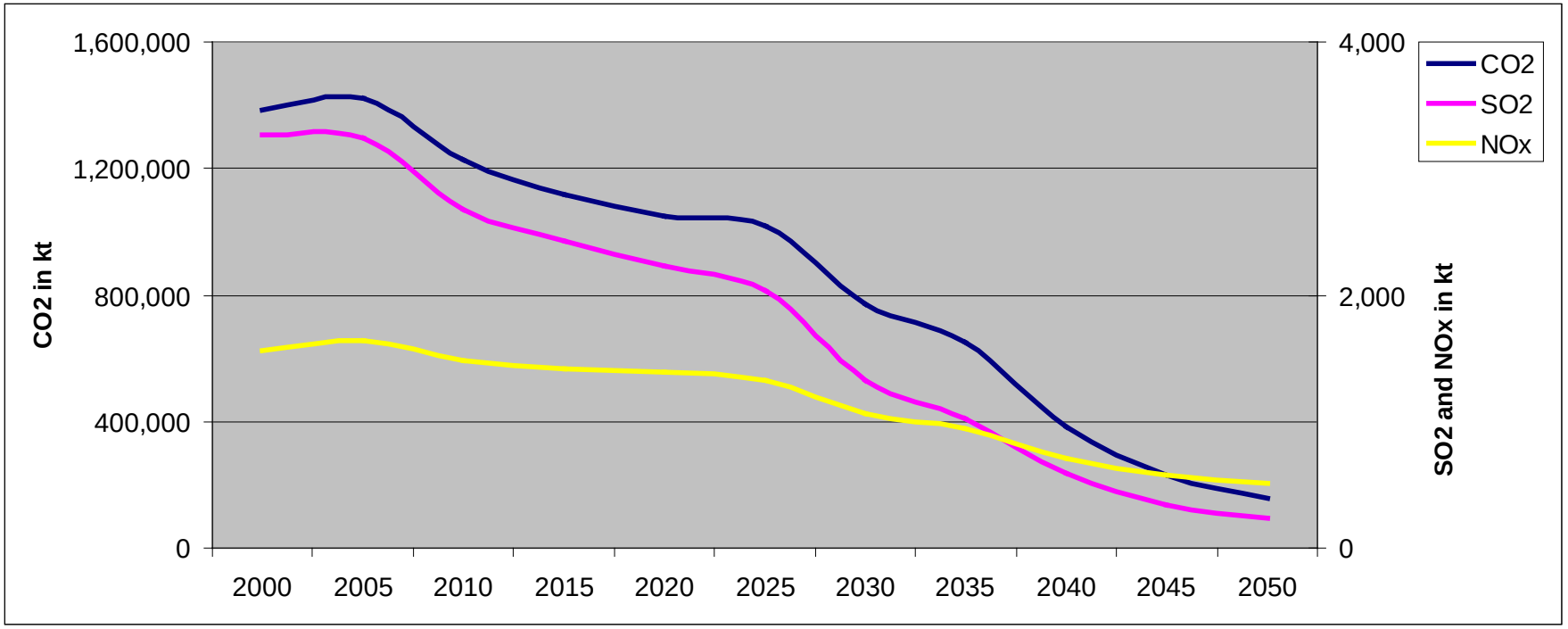
Cost

- Significant investment cost but reduction in share of GDP
- Recognise that cost of technology deployment differs substantially across the EU

Demand-side

- Facilitate electrification of road transport and spatial heating & cooling
- Major policy push in energy efficiency

Fall in SO2 and NOx emissions from power sector



EURELECTRIC's partner organisations in Power Choices study:

National Technical University of Athens

Verband der Großkraftwerks-Betreiber