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# Environmental and climate aspects of Polish Nuclear Power Program

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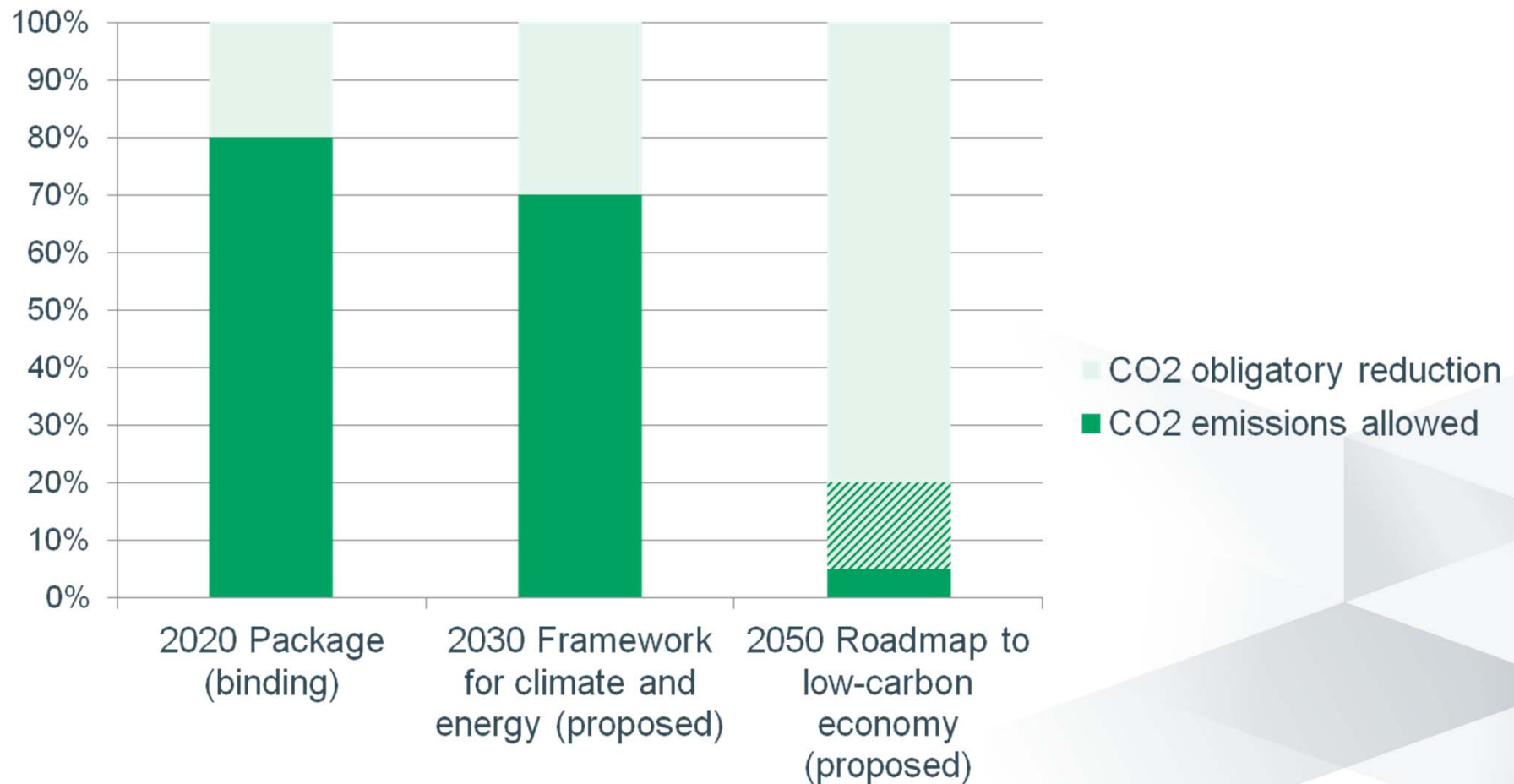


## Energy Policy of Poland until 2030

### Key objectives of Policy:

- To improve energy efficiency
- To enhance security of fuel and energy supplies
- **To diversify the electricity generation structure by introducing nuclear power**
- To develop the use of RES, including biofuels
- To develop competitive fuel and energy market
- **To reduce the environmental impact of the power industry**

## EU ambitions regarding climate change – a challenge for Poland



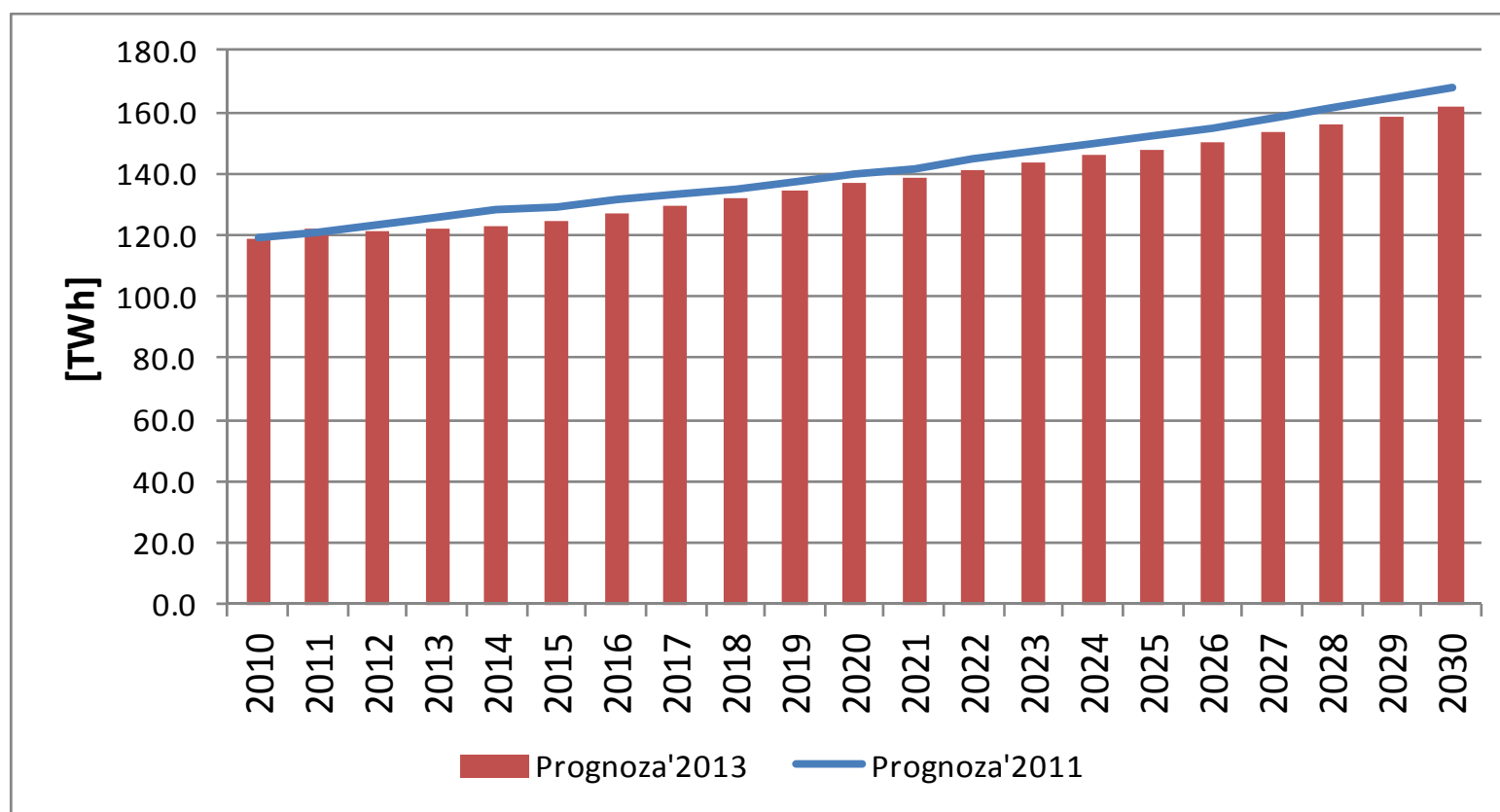
## Polish Nuclear Power Program

Rationale to introduce nuclear power in Poland:

1. assuring long-term security of electricity supply
2. maintaining electricity prices at levels acceptable by the national economy and the society
3. **reducing emissions of SO<sub>2</sub>, NO<sub>x</sub>, PM and CO<sub>2</sub>**



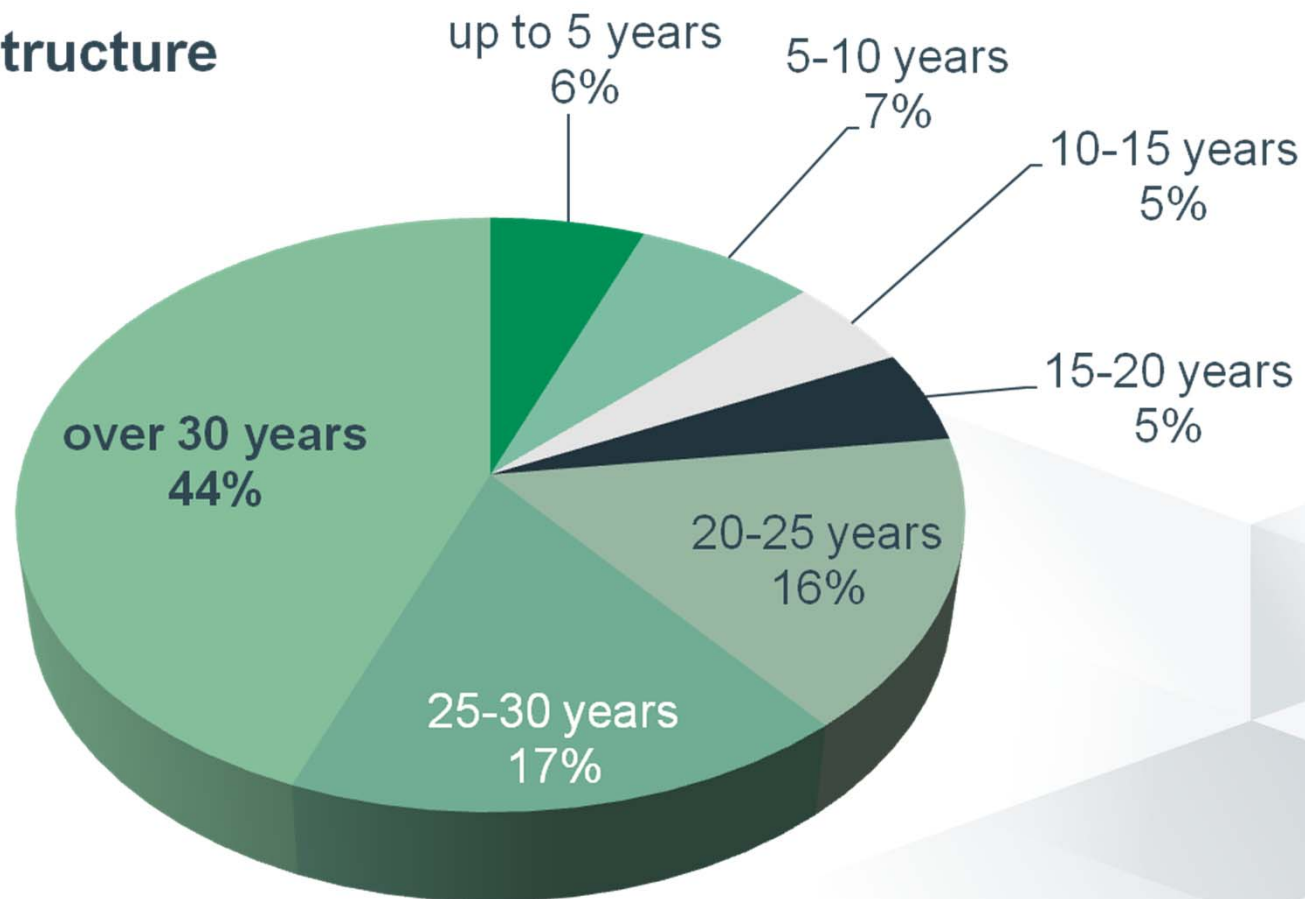
## Update of forecast for electricity demand until 2030



Source: Update of prognosis of fuels and energy demand, EMA, July 2011

## Existing Power Plants in Poland

### Age structure



## Emissions of main air pollutants by the electricity generation sector in Poland (2011)

Pollutant	PM	SO <sub>2</sub>	NO <sub>x</sub>	CO	Cd	Pb	Hg	CH <sub>4</sub>	CO <sub>2</sub>
Amount (tons)	19 346	366 634	231 573	41 850	104	2 032	2 722	3 501	150 188 000
Trend 2010/2011	↓	↓	↓	↑	↑	↓	↑	↑	↑

source: Emitter 2011, Energy Market Agency (ARE S.A.)

## Coal electricity generation is more efficient and clean today, but still emitting air pollutants

Power plant	Dolna Odra	Jaworzno III	Bełchatów	Opole	Pątnów II	Łagisza	Opole
Unit(s) no.	1 - 8	1 - 6	1 - 12	1 - 4	n/a	10	5 - 6
Capacity (MW <sub>e</sub> )	total 1567	total 1535	total 4440	total 1492	1x 474	1x 460	2x 900
Type	PC	PC	PL	PC	PL	PC CFB	PC
Start-up year	1974-77	1977-79	1981-88	1993-97	2008	2009	(2017-18)
Main Fuel	hard coal	hard coal	lignite	hard coal	lignite	hard coal	hard coal
PM (kg/MWh)	0,072	0,030	0,049	0,050	0,040	0,090	0,030
SO <sub>2</sub> (kg/MWh)	2,233	1,060	2,671	0,630	0,720	0,600	0,260
NO <sub>x</sub> (kg/MWh)	1,807	1,660	1,336	1,360	0,490	0,600	0,260
CO <sub>2</sub> (kg/MWh)	941,80	912,21	1091,00	875,00	≈ 660,00	750,00	926,83

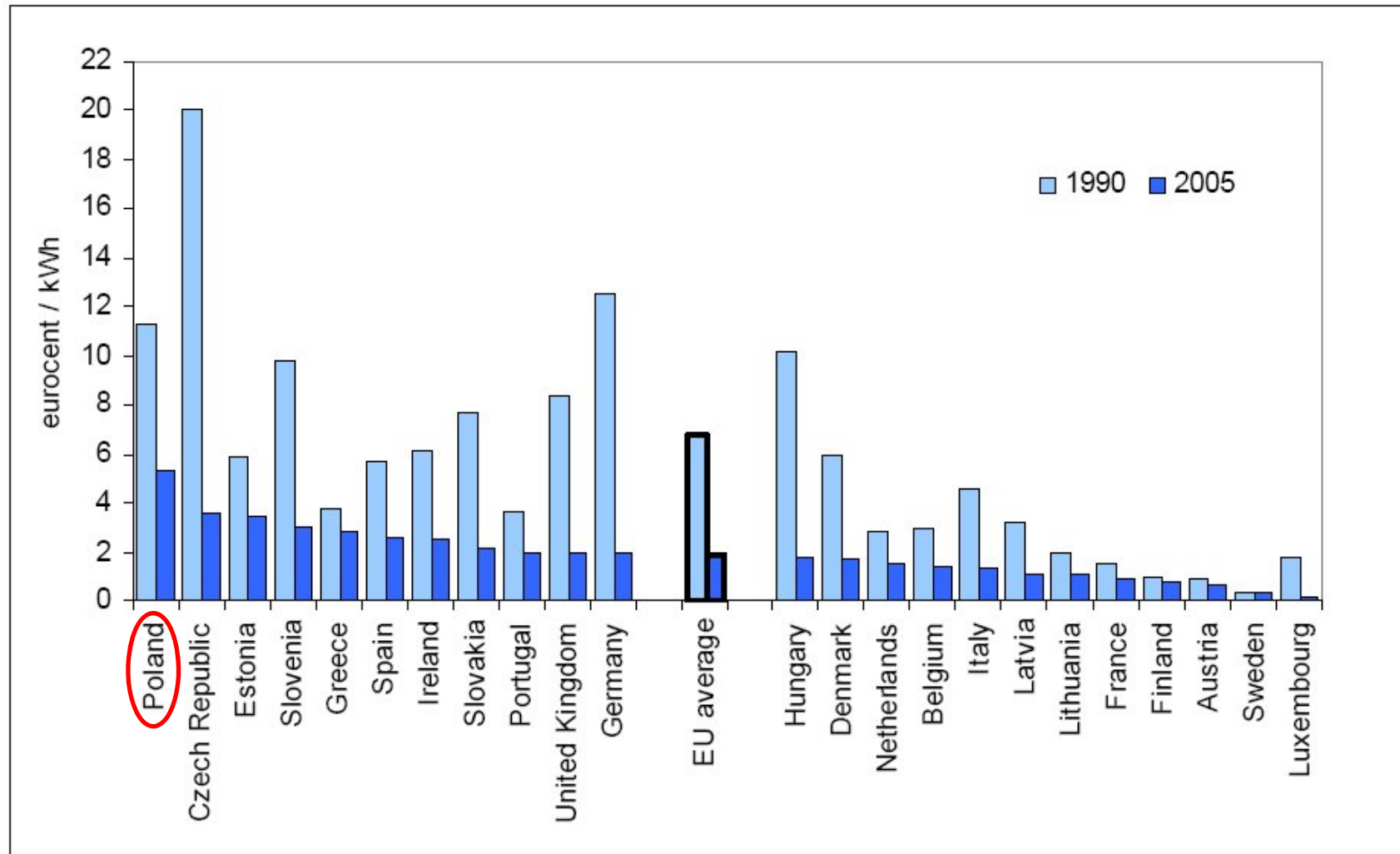
PC – Pulverized Coal ; PL – Pulverized Lignite ; CFB – Circulating Fluidized Bed

sources: utility's environmental declarations, EIAs (for new units), corporate websites



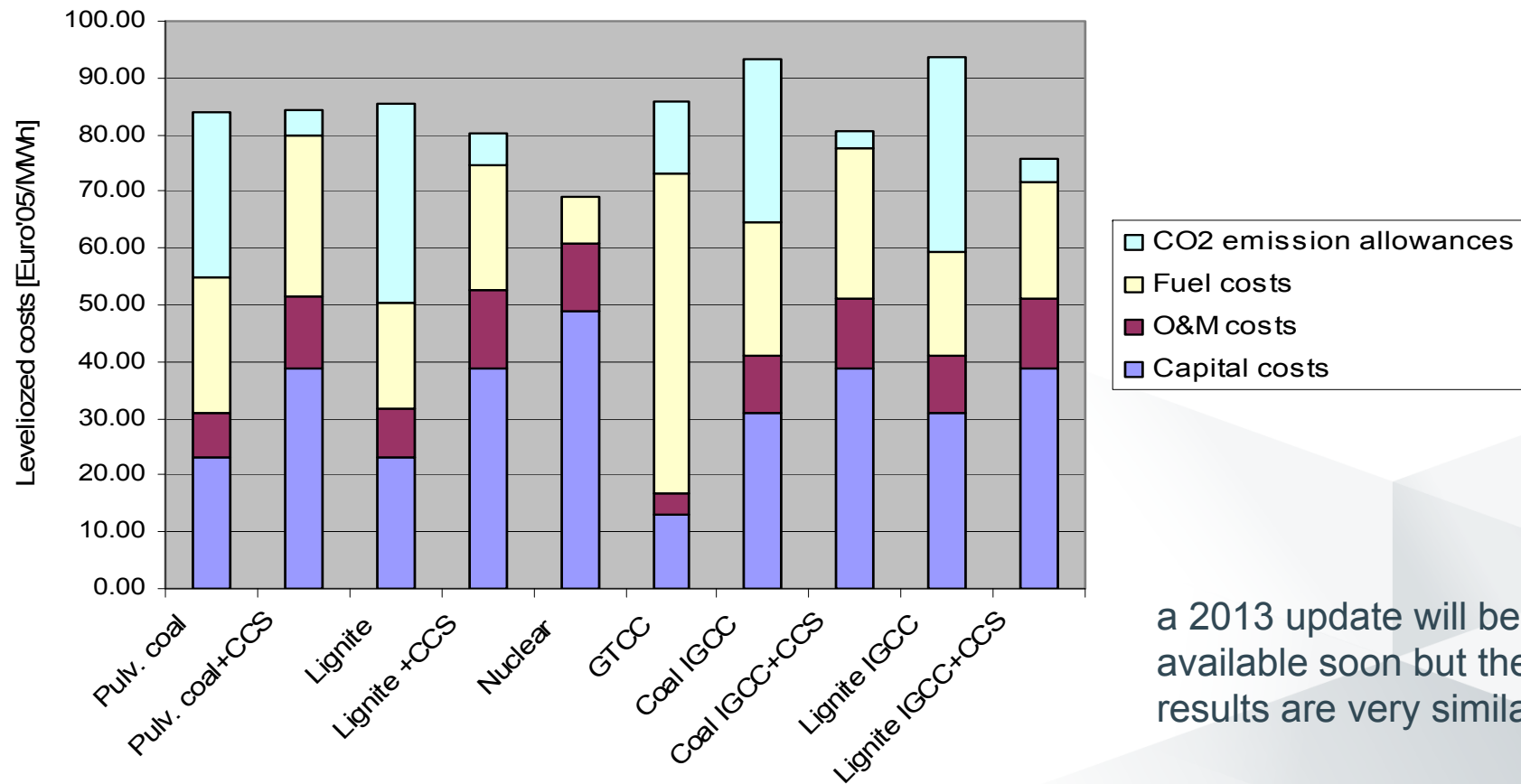


## External costs of electricity production in EU (low estimate)



source: European Environment Agency, 2010

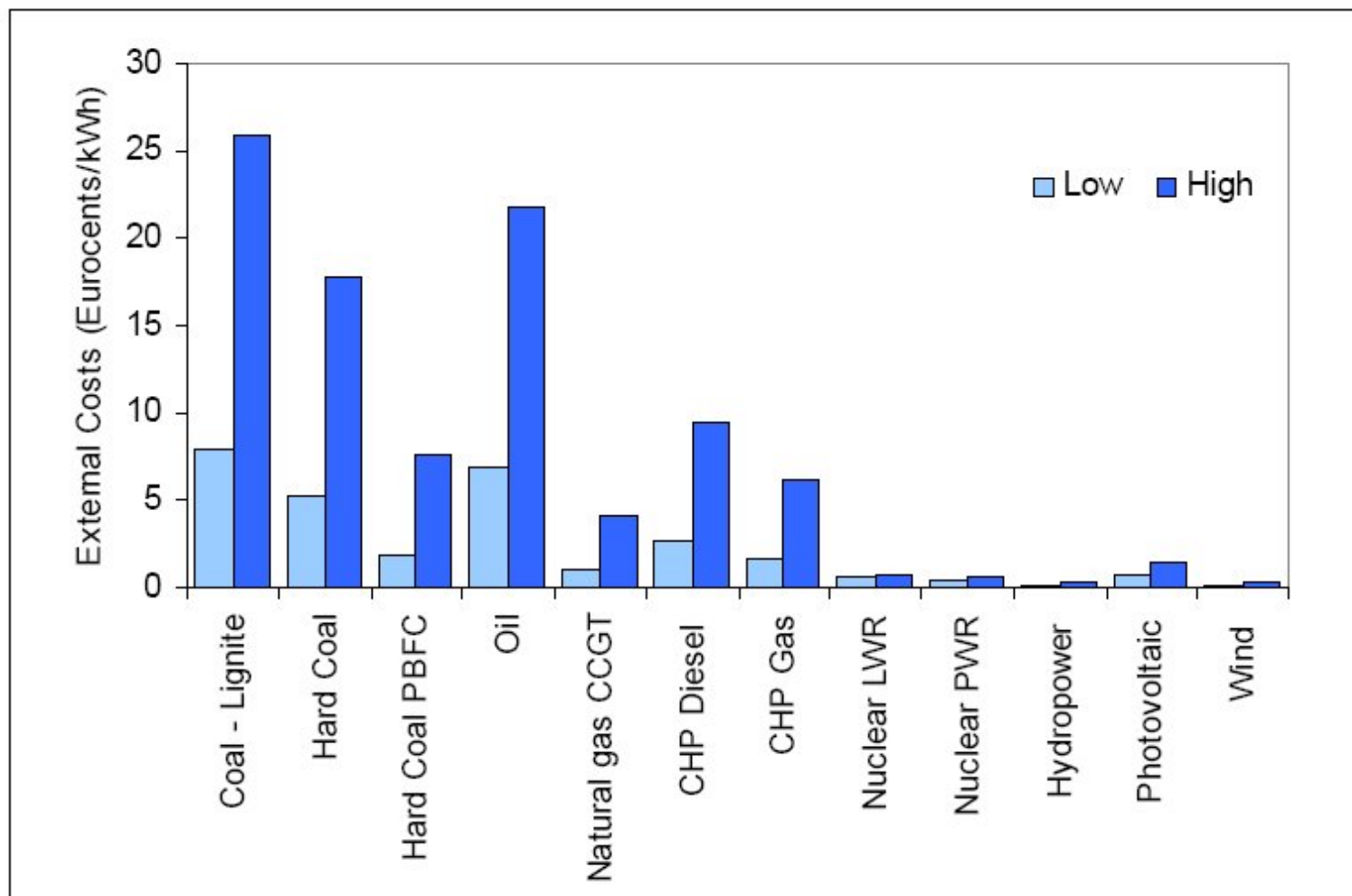
## A low electricity generation costs maintain a low costs of the national economy



Source: Update of prognosis of fuels and energy demand, EMA, July 2011

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## External costs of electricity production by power plant type

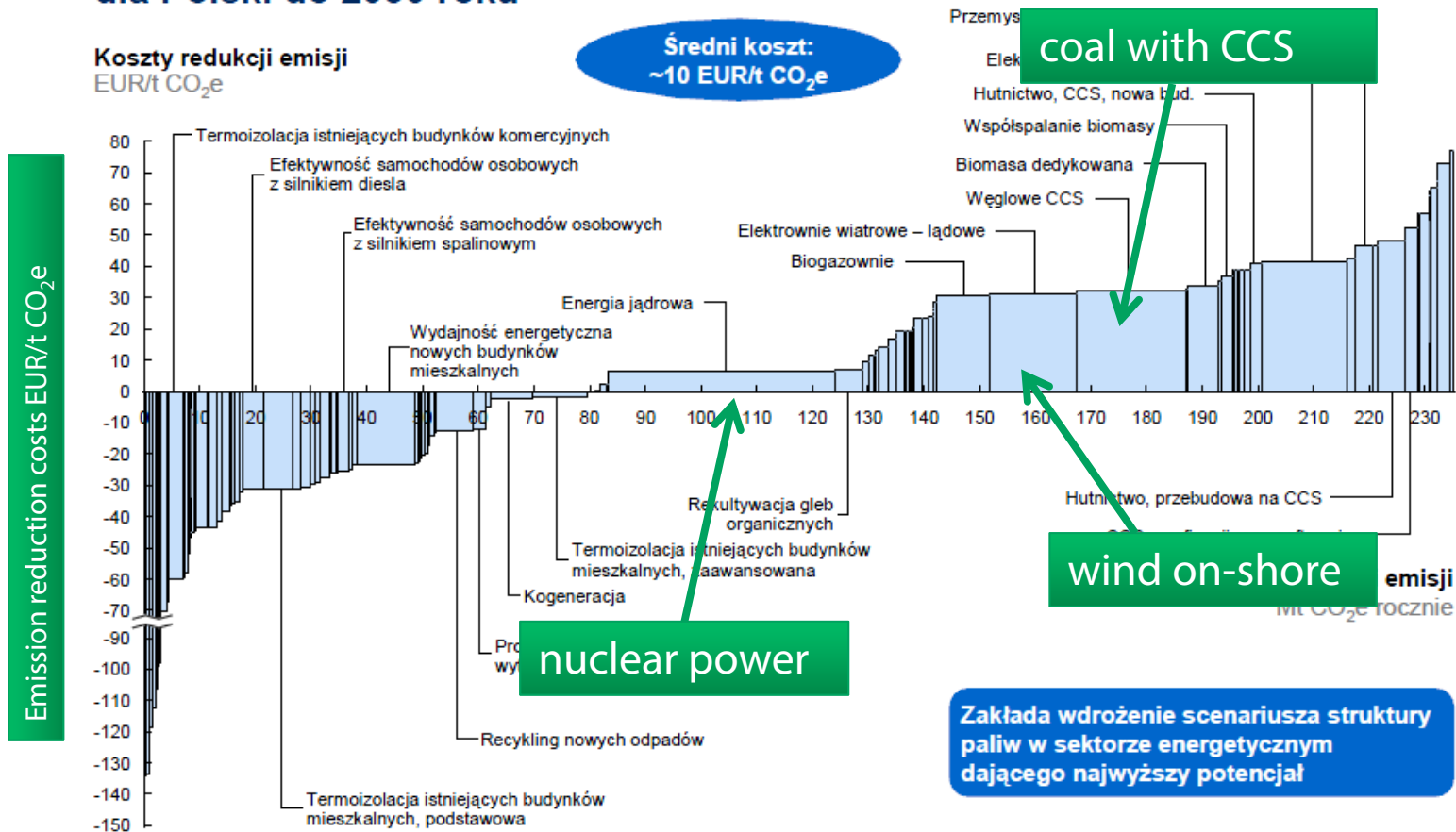


source:  
European  
Environment  
Agency, 2010

# McKinsey's curve of GHG reduction costs for Poland up to 2030

Assumed price of 1 t CO<sub>2</sub>: EUR 10

dotyła POLSKI DO 2030 ROKU<sup>1</sup>

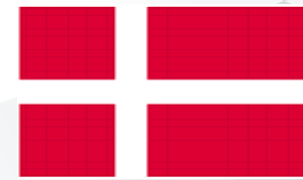


<sup>1</sup> Wymieniono nazwy tylko metod redukcji emisji o największym potencjale

ŹRÓDŁO: Krzywa McKinsey redukcji emisji gazów cieplarnianych w Polsce

## Transboundary EIA of the Program

- TEIA is based on:
  - Directive 2001/42 EC on the assessment of the effects of certain plans and programs on the environment
  - Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a crossboundary Context (Kiev Protocol)
- Transboundary consultations - 10 countries invited: Lithuania, Latvia, Estonia, Sweden, Denmark, Germany, Austria, Czech Republic, Slovakia and Finland
- Bilateral meetings with Slovakia, Austria, Denmark and Germany
- TEIA of Nuclear Power Program - **first of that kind!**



Thank you for your attention

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