

**2372-21**

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**The role of nuclear energy in the Central and Eastern European Region  
Sustainable Development perspectives**

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# The role of nuclear energy in the Central and Eastern European Region

## *Sustainable Development perspectives*

ICTP/IAEA Workshop on  
Sustainable Energy Development  
Trieste, October 2012

*Csontos, Kinga*



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# Outline

- Introduction
- Country nuclear fuel cycle profiles
- EU strategy – National strategies
- Sustainability implications
- Conclusions and recommendations

# Area of Focus

Figure 30. Soviet-Designed Nuclear Power Plants



Czech Republic  
 Hungary  
 Poland  
 Slovakia

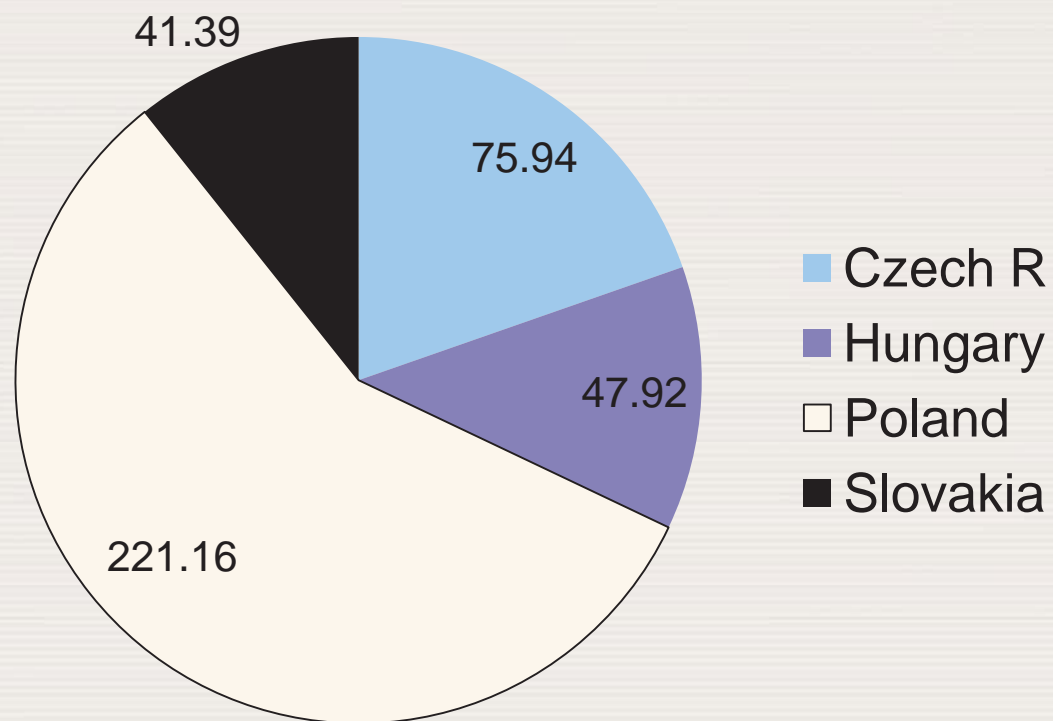
# Introduction

- At historical beginning of the use of nuclear
- Soviet reactors
- EU countries since 2004
- GHG
- Strong commitment to future of nuclear power



# Economic & Social Indicators

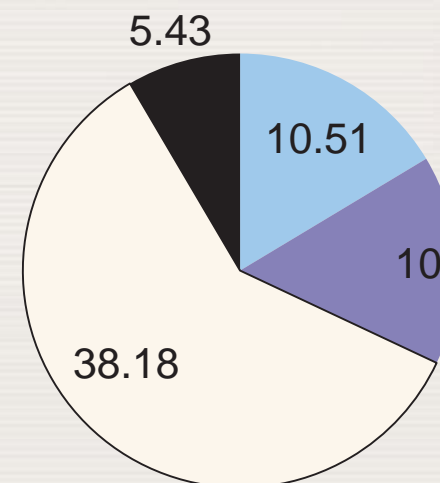
**GDP production in 2010 (billion US\$'00)**



**GDP growth rate (2011)**

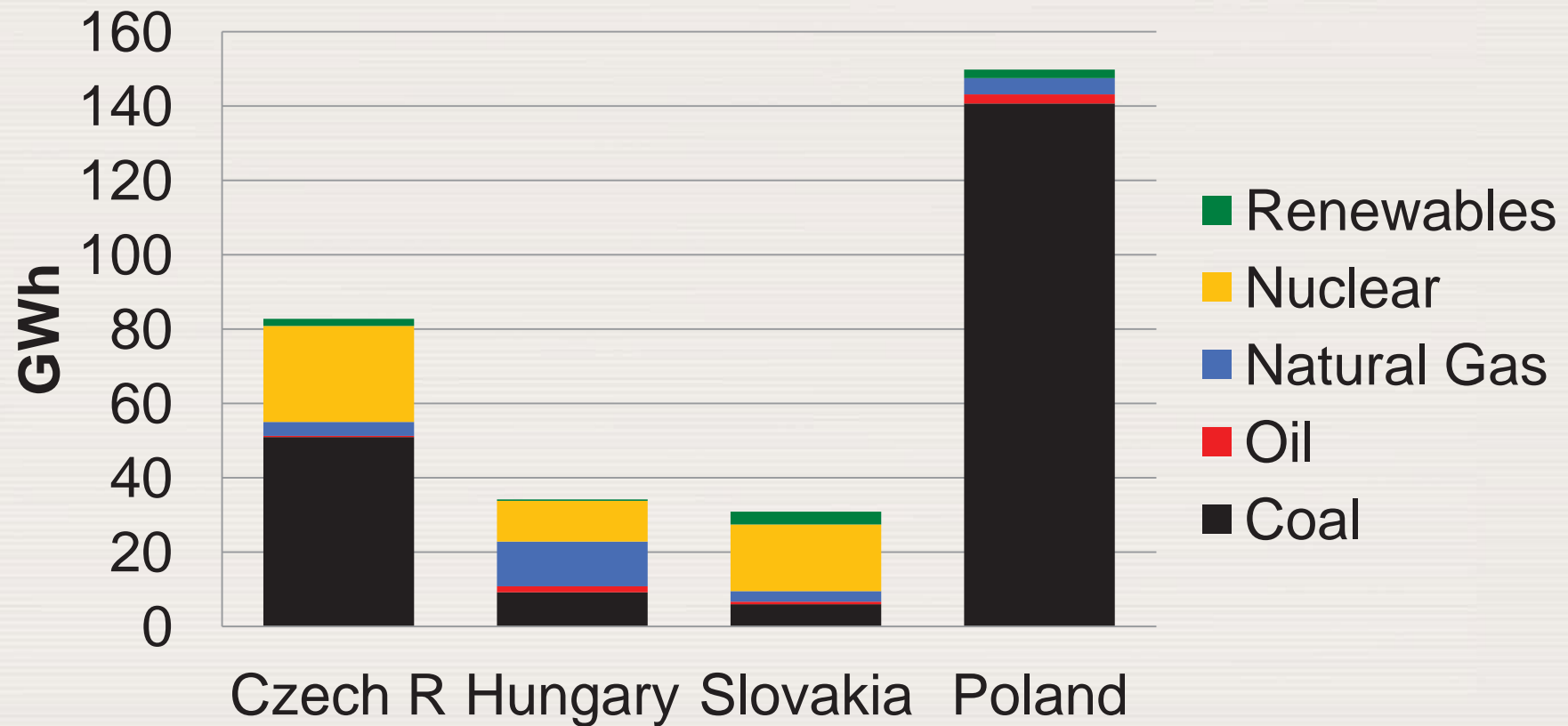
Czech Republic	1.65%
Hungary	1.69%
Poland	4.35%
Slovakia	3.35%

**Population (millions) in 2010**



# GWh electricity production

## Electricity generation



(Source: Eurostat)

# Nuclear energy for green growth

- Countries disagree in questions related to nuclear energy – but not in CEE
- Nuclear power can be a source of sustainable energy for the future
  - i. Stable, predictable and **competitive costs** of generation
  - ii. **Security of supply**: of energy – abundant fuel (U, Th)
  - iii. **Reliability, availability**
  - iv. **Low externalities**
  - v. **Safety record**, mature technology commercially available

*“Green growth is about fostering economic growth and development while ensuring that the natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities.” (GGKP)*





# European energy strategy regarding nuclear power

Pathways along the Energy 2020 Strategy



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# European Union Energy Strategy

- Role, acceptance, position of nuclear in national energy strategies
  - **Energy Roadmap 2050:** “Nuclear energy as an important contributor”
  - 2010: “*The contribution of nuclear energy, which currently generates around one third of EU electricity and two thirds of its carbon-free electricity, must be assessed openly and objectively.*” **Energy 2020 Strategy**, COM(2010) 639
  - post-Fukushima, more diverse nuclear politics in the EU. Export markets: Germany and Austria don't favour nuclear
  - EU safety decision: decommissioning of 1<sup>st</sup> generation reactors in Slovakia.

# Nuclear energy in the focus areas of the European energy strategy

## Sustainability – combat climate change

- GHG emission reduction
- No other airborne emissions
- Externalities addressed in generation costs
- Handling of waste is technologically solved

## Competitiveness in the market

- Competitive prices
- Existing powerful industry

## Security of supply – international context

- Reducing reliance on imported fuels
- Low dependence on fuel, storage is possible

# Status of nuclear power in V4 countries

Sustainable Development perspectives



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# “CEZ Republic”



- **State Energy policy from 2004:**
  - Building of 2 new reactors to compensate Dukovany in the future (**construction start no later than 2016**),
  - Target share 38.6% in the electricity production by 2030
- Dukovany and **Temelin**, operational until 2025 and 2043



- CEZ: to become regional power exporter. Temelin key in CEZ strategy –German markets.



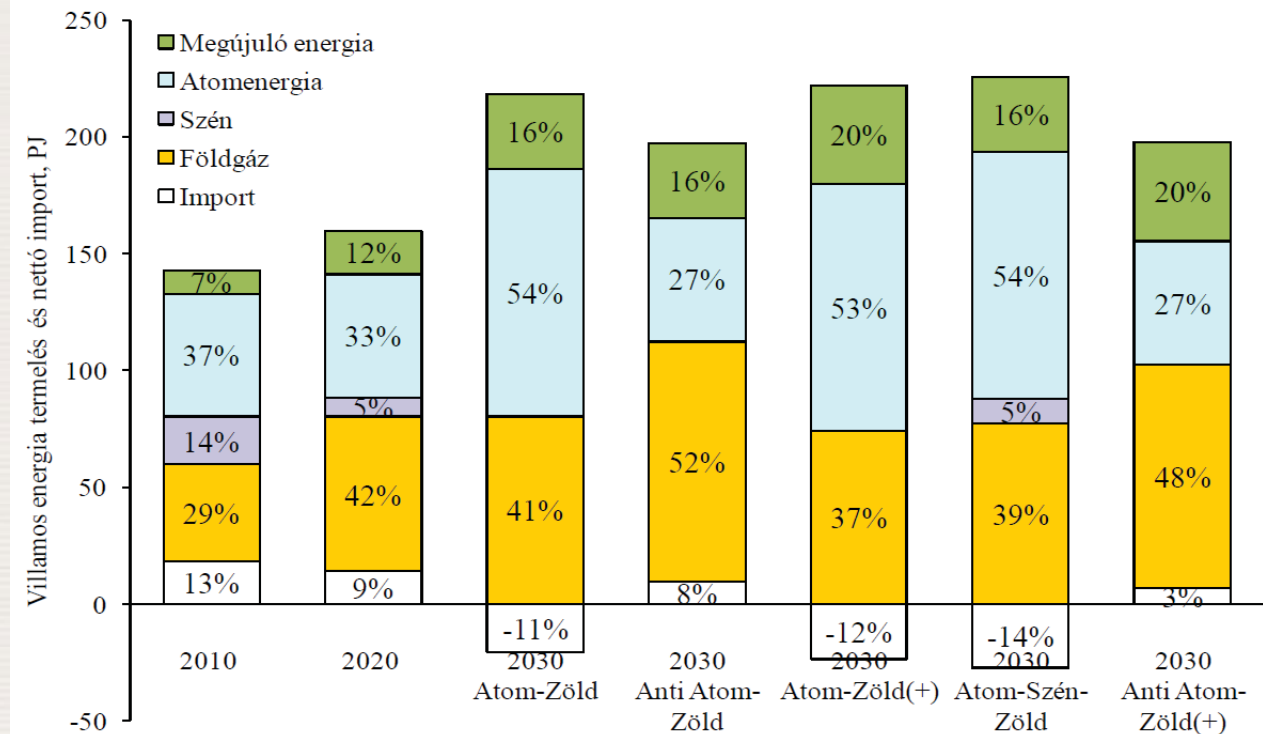
- “Austria to ban import of nuclear fuelled energy”
  - Effect on ČEZ remains uncertain as experts question feasibility of plant”  
(Prague post)



# Hungary – Strategy 2030



- Decision (2012) about new capacities 2x 1000 MW, Paks 5-6 forecasted online 2025-2030 – maximum nuclear capacity in 2030, from 2032 declining, max. **4000 MW nuclear capacity**
- Calls for finding permanent solution for radioactive waste disposal

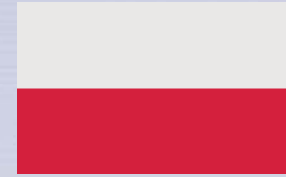


(Hungarian National Energy Strategy 2030)

- Different Scenarios until 2030
- Until 2020 Renewable Action plan
- 6000-8000 MW new capacity by 2030
- *Regional nuclear electricity exporter?*



# Poland



- 92-94% of electricity based on coal. Next 2 decades: renewables, gas and nuclear (Polish energy policy to 2030)
- Plan of action in Poland: power diversification through the construction of nuclear power plants (18%)
- Long history of nuclear plans (Zarnowiec)
- In 2005 revised nuclear plans. Until 2020 1<sup>st</sup> nuclear block start in Poland, 6000 MW



# Slovakia



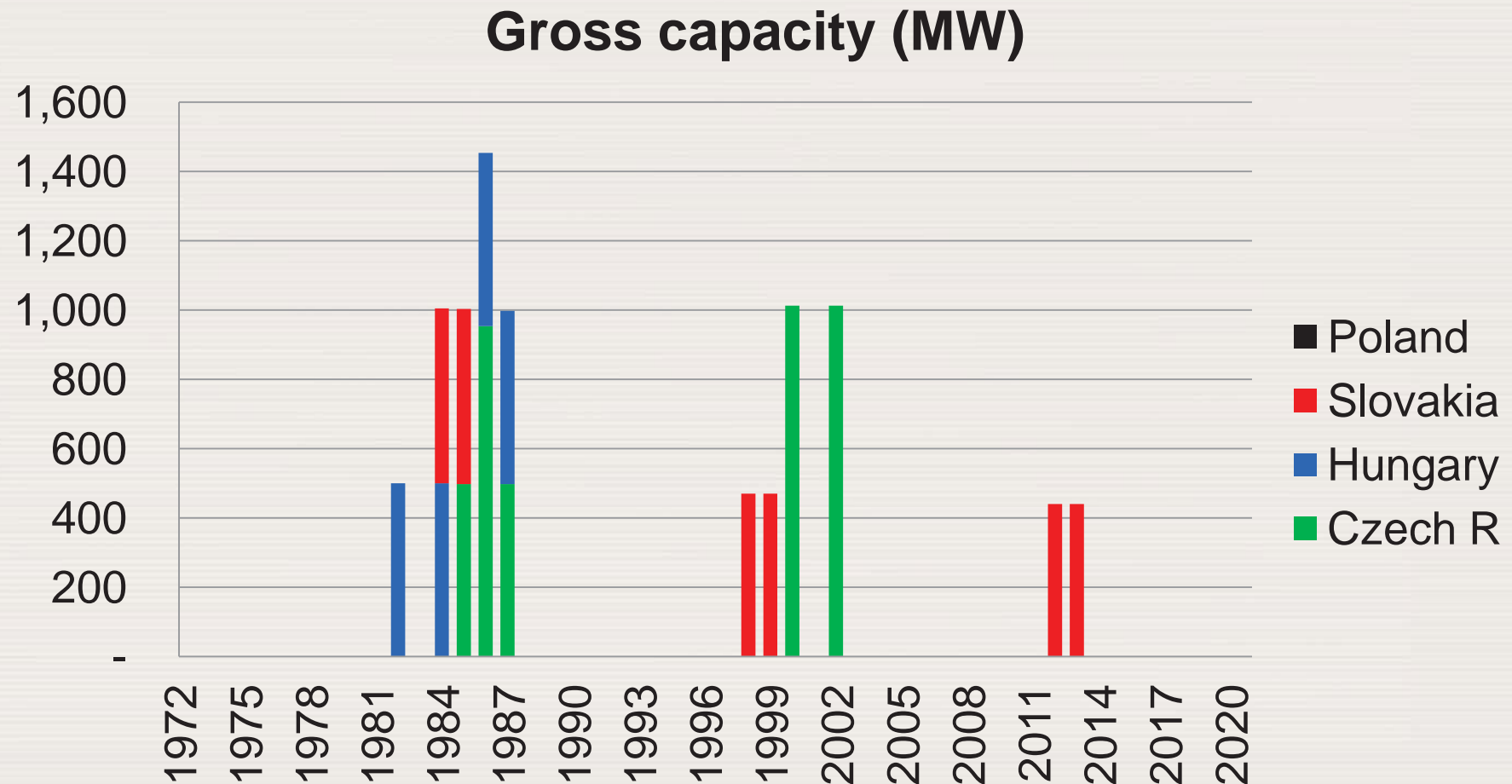
- EU (2008): the reactors will be in line with Euratom measures of safety
  - *Before B1-2 reactors shut down **SK was net electricity exporter, now importer.***
- **Energy Strategy 2006**
  - Completion of Mochovce 3-4 (will start operation from 2013)
  - 2 more construction planned online from 2025 – to **become net electricity exporter**
- **“Strategy of Energy Supply Security” 2007 (up to 2030)** *Importance of renewables and **nuclear** energy in order to maximize supply security*



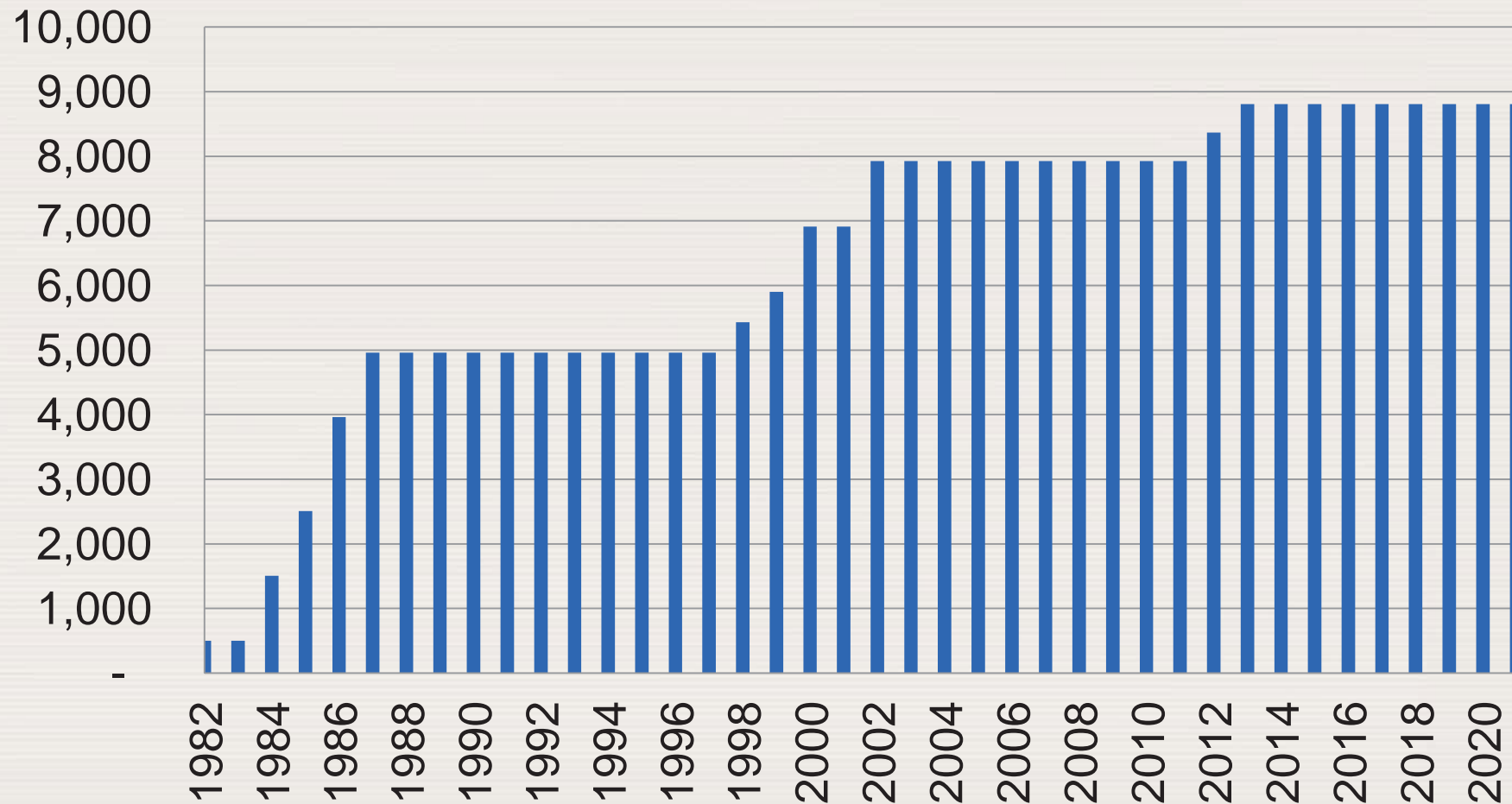
# Current share of nuclear electricity per country (data: IAEA PRIS)

	Number of reactors (PWR)	End of license	Installed capacity (MW)	Total Electricity Generated (GWh) (2011)	Share in electricity (2011)
Czech Republic	6	2025-2043	3 766	26 696	33%
Hungary	4	2032-2037	1 889	14 707	43%
Slovakia	4 (2)	2025-2030	1 816	14 342	54%
Poland	0	-	0	0	0%
<b>Total in region</b>	<b>14</b>	<b>-</b>	<b>7 471</b>	<b>55 745</b>	<b>43%</b>
Total in world	435	-	370 003	2 517 980	17%

# Nuclear capacity in the Visegrad Group



# Total capacity in operation (MW)



(Source: PRIS)

# Competitiveness of nuclear power

- Stable and competitive prices
- Nuclear power generation impacts on electricity price in long term (LC)
- Nuclear energy in post-transition electricity markets – state support - role of government

# Other options

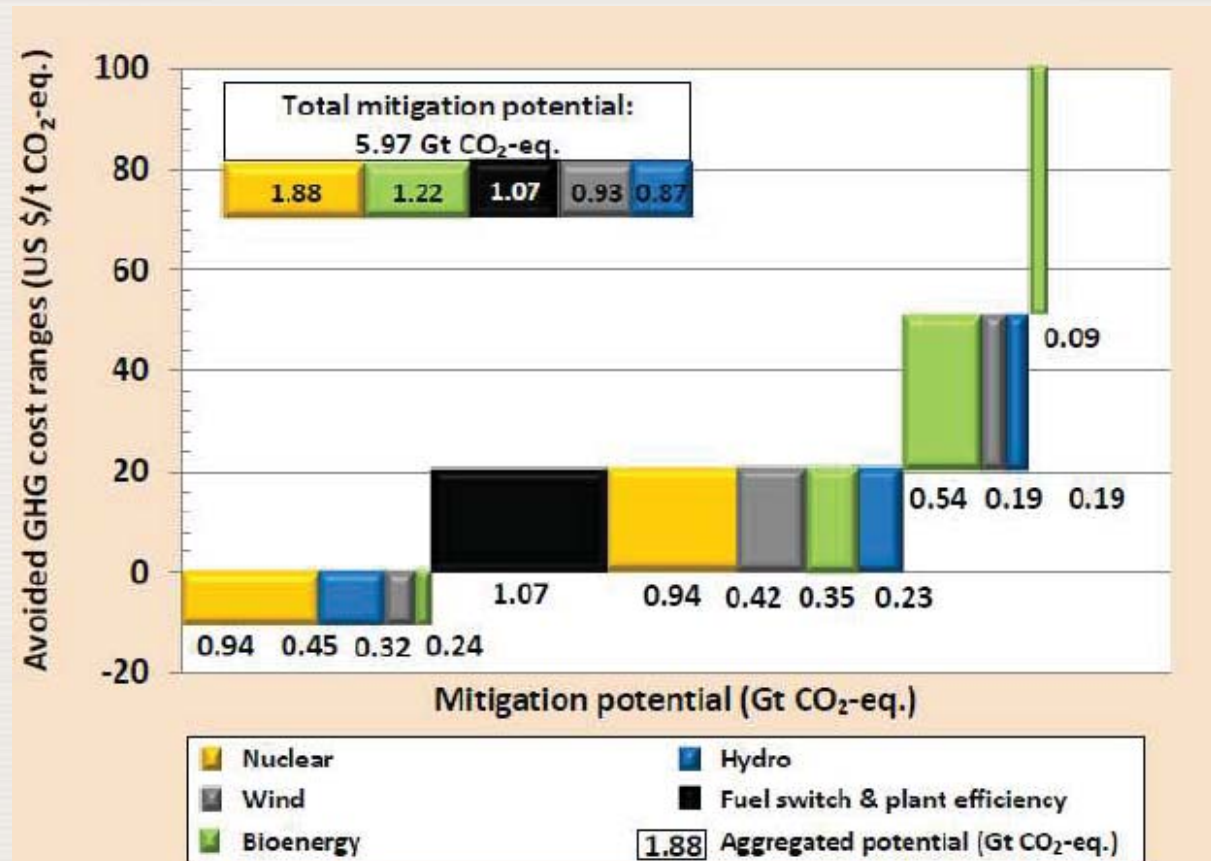
- Currently no alternative to nuclear power in the region – no technological alternative backed with political dedication (vs. Germany)
- Gas and renewables: as a part of the energy mix, not as substitutes. (GHG, imports, funding)
- Renewable targets for 2020 and 2030 – actual share of renewables – economy?
  - Biomass heat markets expanding in Europe; Hungary and Poland

# Sustainability – Climate change

CO <sub>2</sub> emission trend	2000	2010	2020	2030
EU electricity (%)	100	102.1	116.8	134.5

- Nuclear in the competences of countries to mitigate carbon emissions

IPCC estimation:



# Spent fuel management

- New nuclear technologies with less nuclear waste and higher efficiency and safety
- Spent fuel management – agreement with USSR
- The question of final disposal still needs to be addressed
- Geological disposal - regional agreement with countries ?



# Public acceptance

- **Historically high in the region**
  - Czech: 86% would like to maintain or increase the share of nuclear
  - Hungarians: the European citizens most favourable to nuclear power, 63% support
  - Poland: 70% would like to maintain or increase the share of nuclear
- **Reasons:**
  - Jobs
  - Large share in electricity generation
  - Safety culture

(data: Eurobarometer)



Source: opinion poll, FORATOM



# How can nuclear power help the development in the V4 ?

- ☺ Bring down generation costs
- ☺ Emissions related health impacts reduction of high energy intensity economies
- ☺ Electric vehicles powered by nuclear. Cleaner urban air
- ☺ Energy security, dependence from foreign NG and oil
- ☹ Large scale nuclear power, one electricity provider: prices are likely to go high (Czech example)
- ☹ Need for financial support from state for nuclear and renewable investments: competing technologies for money
- ☹ Nuclear – increasing construction cost threatens the “renaissance” holding back investors

# Concluding remarks

- Importance of improving transparency, public awareness

What is shown by the region:

- With the given infrastructure and safety culture (preconditions): the **political** willingness and **public** acceptance become the most important additions to a nuclear programme.

**Thank you for your attention!**



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