

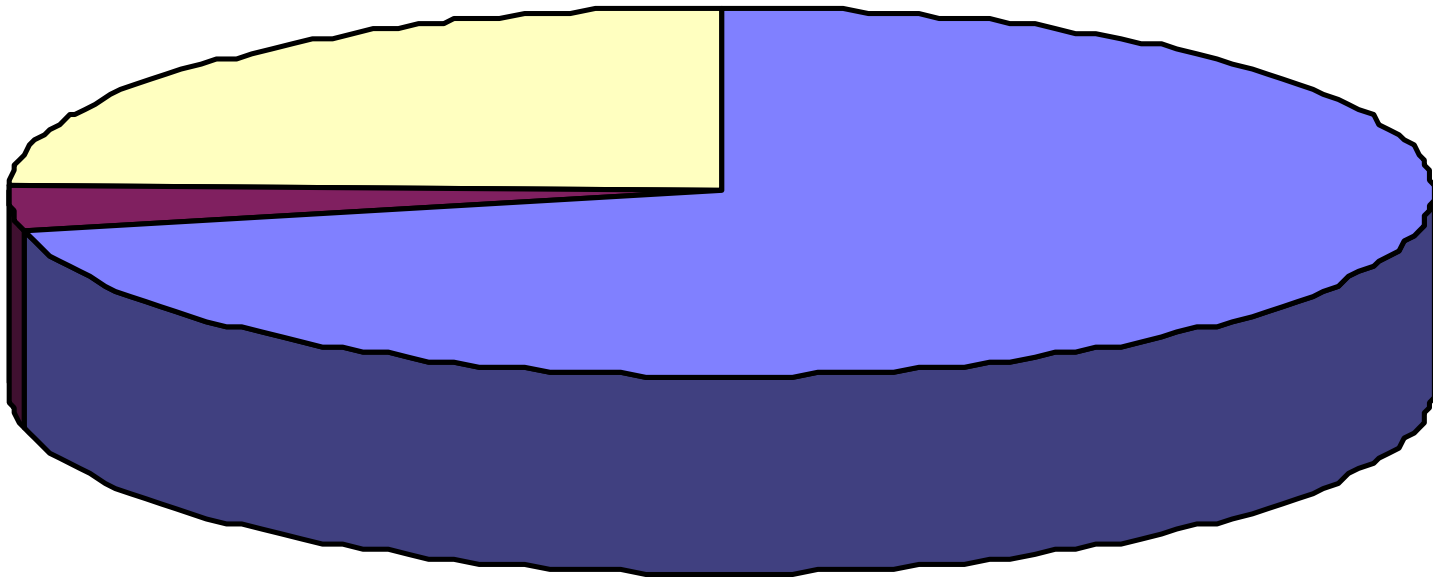
# Energy Policy of the Czech Republic

**František Janouch**

Royal Institute of Technology, Stockholm  
Institute of Nuclear Physics, Řež near Prague

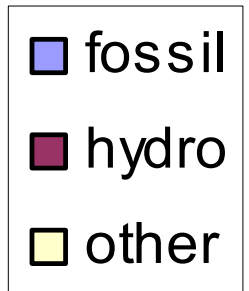
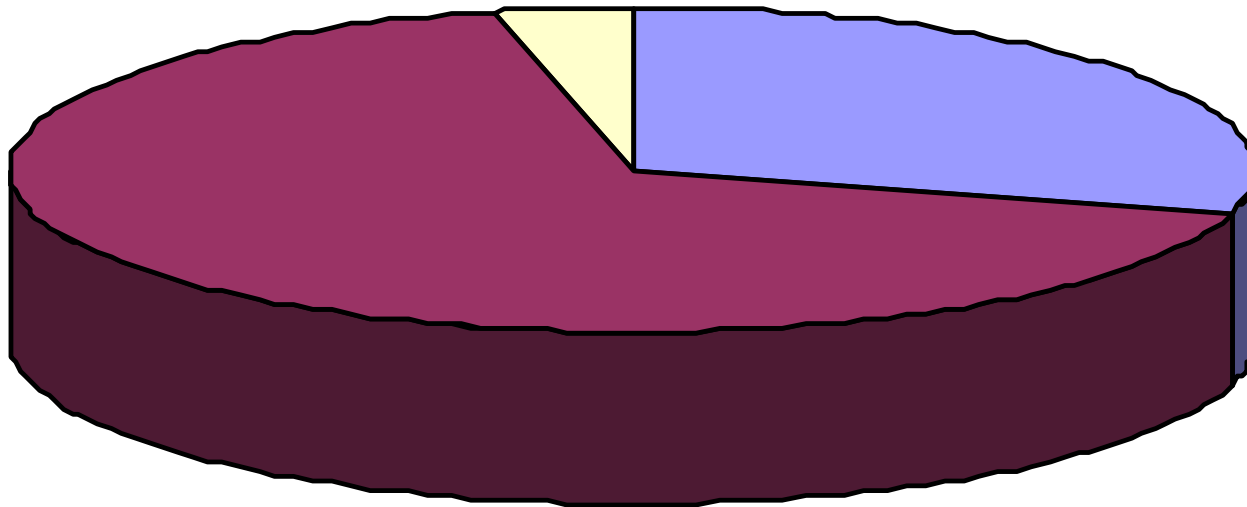
The Charta 77 Foundation, Prague

# Electricity Production ČR 2002



■ Thermal ■ Hydro ■ Nuclear ■ Wind

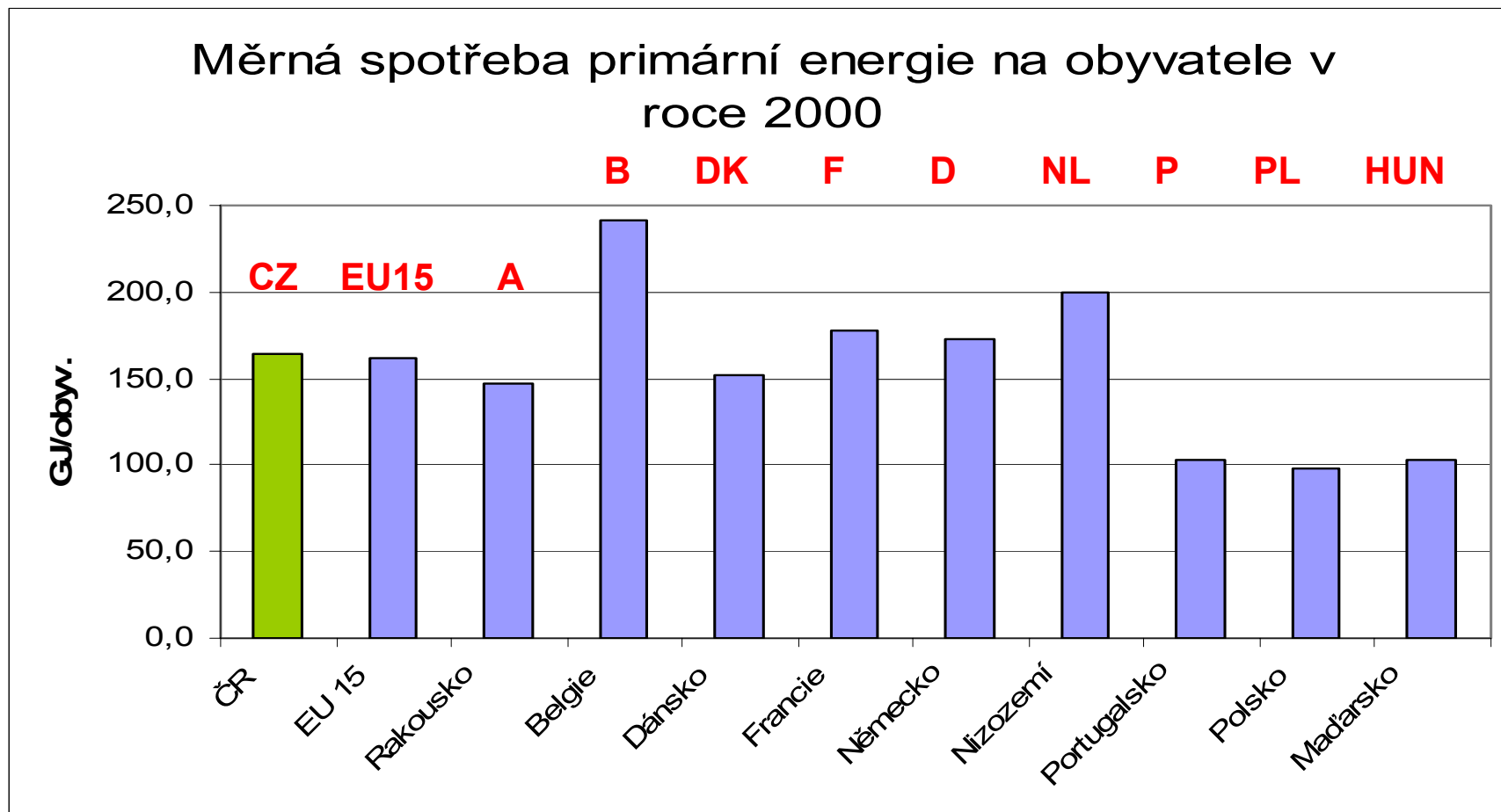
# Electricity Production Austria 2002



# Electricity Production ČR, 2002 (GWh)

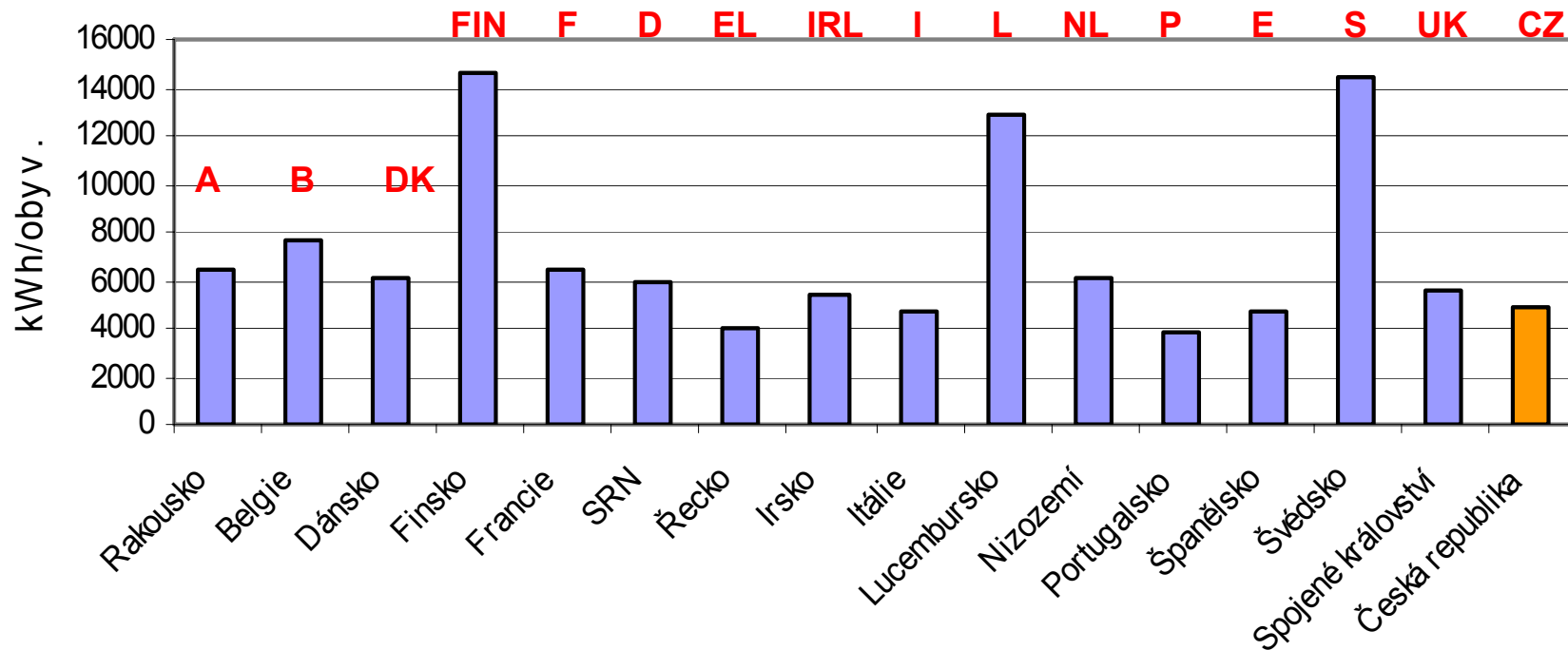
Thermal	5476.2
Nuclear	18738.2
Hydro	2845.5
Wind	1.6
<b>Total</b>	<b>76348.1</b>

# Primary Energy Consumption per cap, 2000



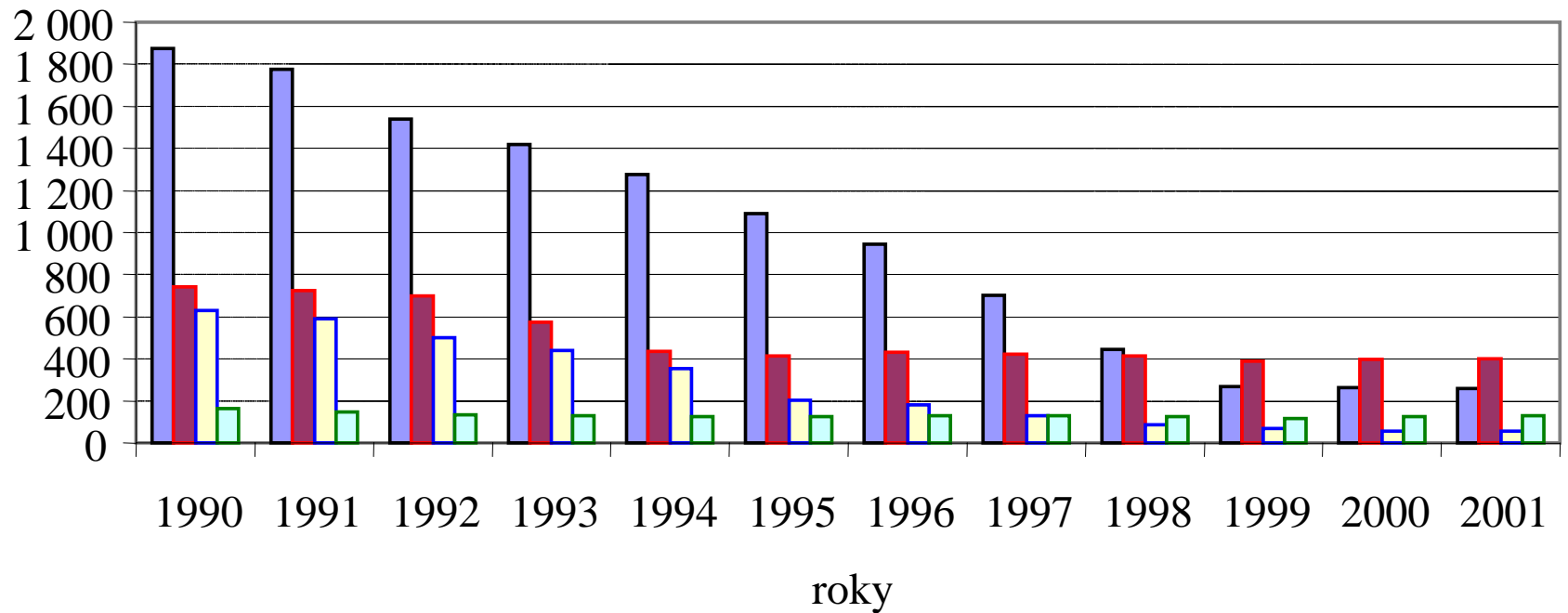
# Electricity consumption per capita, 2000

Měrná spotřeba elektřiny na obyvatele v roce 2000



# Emissions in the Czech Republic

Vývoj hlavních druhů emisí škodlivin



■ SO2 tis. tun ■ NOx tis. tun ■ tuhé látky tis. tun ■ CO2 mil. tun

## Average Energy costs/household in % of income

F	D	USA	CZ Average Family	CZ Retired
3-4 %	4,5%	4 -5%	11,7 %	16,7 %

**...we renew our commitment that no household in  
Britain should be living in fuel poverty by 2016-18.  
Tony Blair, March 2003**

Ministerstvo Průmyslu a Obchodu ČR  
(Ministry of Industry and Trade, ČR)

**MPO**

Ministerstvo Životního Prostředí ČR  
Ministry of Environment, ČR

**MŽP**

**The Czech legislation requires (Law No. 406/2000 Sb. *On Energy use*) that the Czech Republic Energy Policy is formulated in documents, approved periodically by the Czech Government.**

***“The state energy policy is a principle document expressing targets in field of energy management in concordance with the needs of economical and social development including the protection of environment. It is elaborated as an open ended document by the Ministry of Industry and Trade for the perspective of 15-20 years and approved by the Government. From the Czech Government decision No. 50 from Jan 12, 2000”.(Unofficial translation).***

Government decision No. 50/2000 is a relatively short document (8851 words, 53900 characters) dealing mostly with legislative goals and problems.

**The following version of the Czech Energy doctrine was approved with a considerable delay, only a month ago, on March 10, 2004 (Czech Government Decision No 211/2004) after many postponements and profound discussions among the specialists, in the mass media and in the public. The delay was no doubt influenced by several high level Energy doctrines, published during the last three years.**

- I. **The US National Energy Policy**, May, 2001, in which “Reliable, Affordable, and Environmentally Sound Energy for America’s Future” was sought by the Energy group, consisting of the Vice-President, 7 Secretaries of State and several Directors of Federal Agencies.
  
- II. **The EU Green Paper – Towards a European Strategy for the Security of Energy Supply**, EU 2001.
  
- III. **The UK Energy White Paper** (Our energy future - creating a low carbon economy), March 2003, With Foreword of Prime Minister Tony Blair.

# **The MPO vision is trying to achieve:**

## **1. Maximal Independence**

- **Independence on foreign energy sources**
- **Independence on energy sources from risk regions**
- **Independence on reliability of supply of foreign energy sources**

## **2. Maximal Security**

- **Security of energy sources including nuclear security**
- **Reliability of supply of all types of energy**
- **Rational decentralization of energy systems**

## **3. Maximal Sustainable development**

- **Protection of Environment**
- **Economical and social development**

# **The MPO and MZP proposals differ in several points:**

**The level of Energy consumption in 2030**

**The continuation of the exploitation of the North-Bohemian Brown Coal mines**

**The role of Nuclear Energy**

**The role of Renewables**

**The role of Natural gas**

# **“Fundamentalist” approach of the MZP.**

**MZP just favors renewables and dislikes nuclear energy and thermal power plants on domestic brown coal.**

**They believe (without offering proof or arguments) that renewables will even provide enough labor opportunities. The future deficit of the energy supply in the MZP proposal will be covered by import of electricity and increasing import of natural gas with no mentioning how this will affect the economy and trade balance**

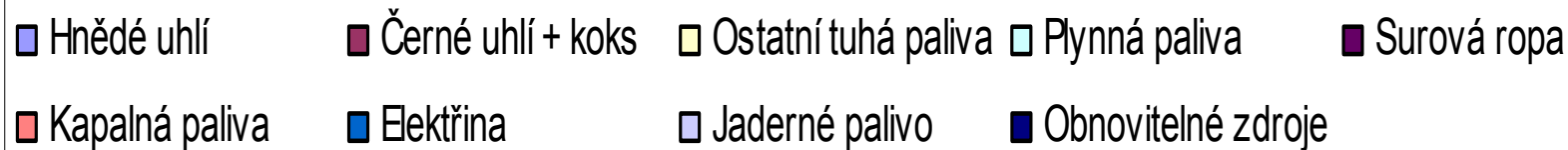
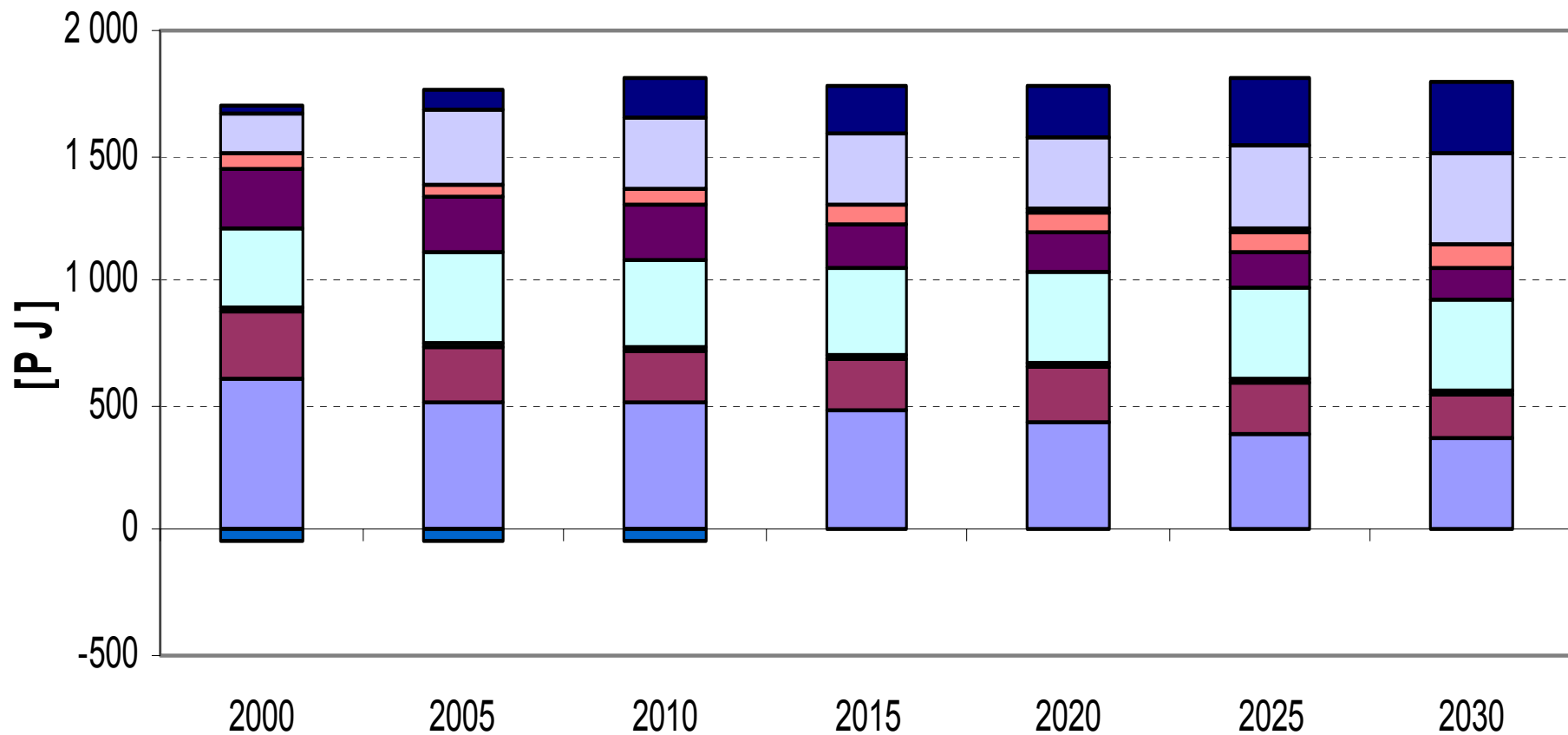
- 1 Chebská pánev
- 2 Sokolovská pánev
- 3 Severočeská hnědouhelná pánev

SITUOVÁNÍ PODKRUŠNOHORSKÝCH HNĚDOUHELNÝCH PÁNÍ

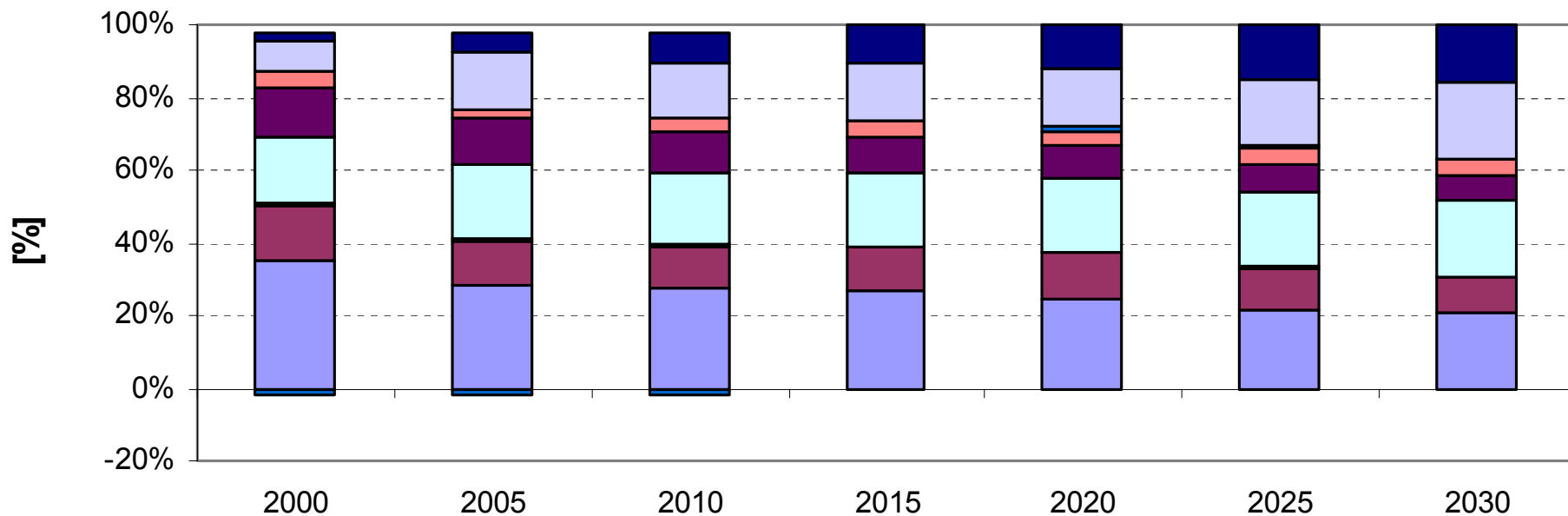
# SRN GERMANY



# Tuzemská spotřeba prvotních palivoenergetických zdrojů [PJ] - korigovaný zelený scénář



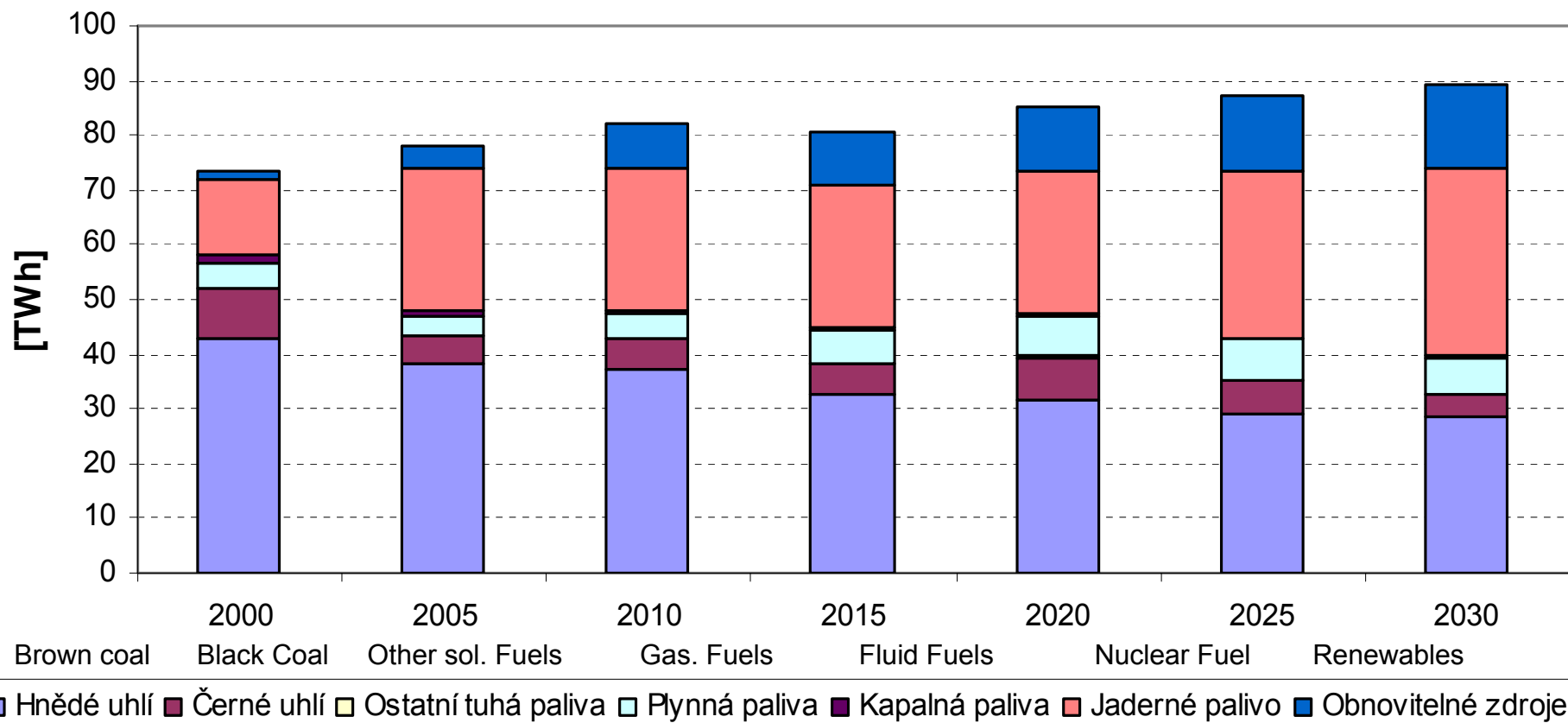
## Tuzemská spotřeba prvotních palivoenergetických zdrojů [%] - korigovaný zelený scénář



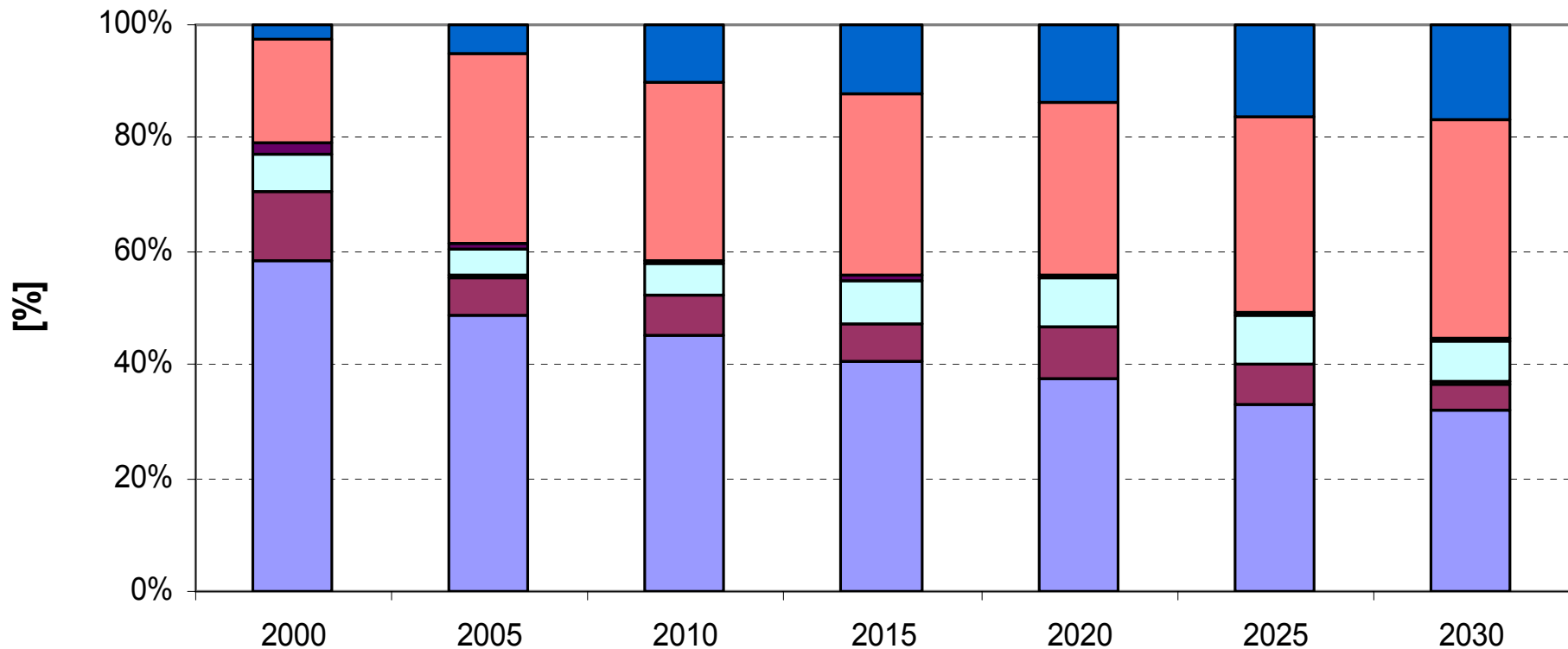
- |                |                   |                     |                    |             |
|----------------|-------------------|---------------------|--------------------|-------------|
| Hnědé uhlí     | Černé uhlí + koks | Ostatní tuhá paliva | Plynná paliva      | Surová ropa |
| Kapalná paliva | Elektřina         | Jaderné palivo      | Obnovitelné zdroje |             |

## Struktura výroby elektřiny [TWh] - korigovaný zelený scénář

### Electricity production [TWh] –corrected green scenario



## Struktura výroby elektřiny [%] - korigovaný zelený scénář

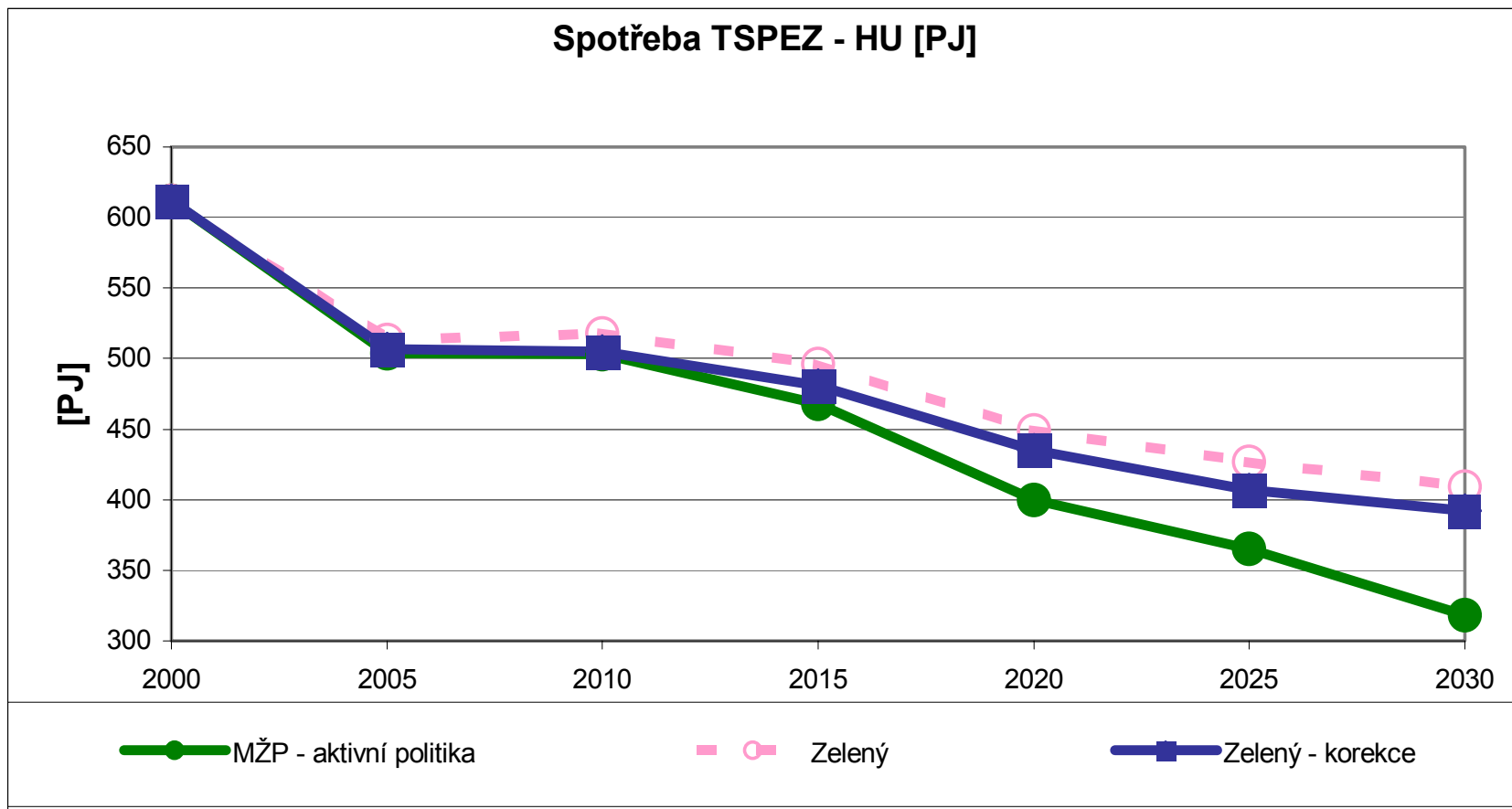


■ Hnědé uhlí ■ Černé uhlí ■ Ostatní tuhá paliva ■ Plyná paliva ■ Kapalná paliva ■ Jaderné palivo ■ Obnovitelné zdroje

# Porovnání energetických scénářů

## Domestic Primary Consumption of Brown Coal

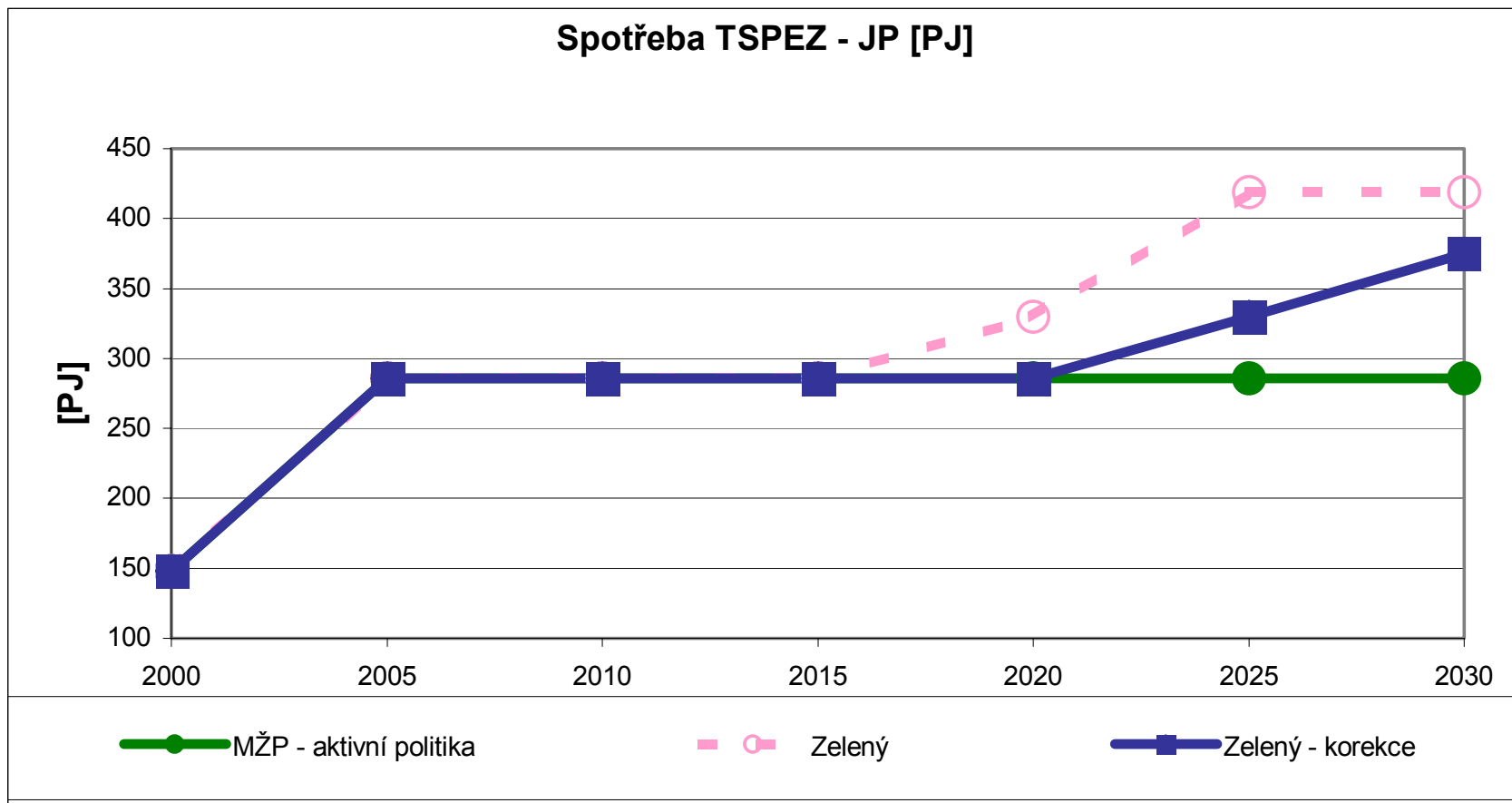
Spotřeba TSPEZ - HU [PJ]



# Porovnání energetických scénářů

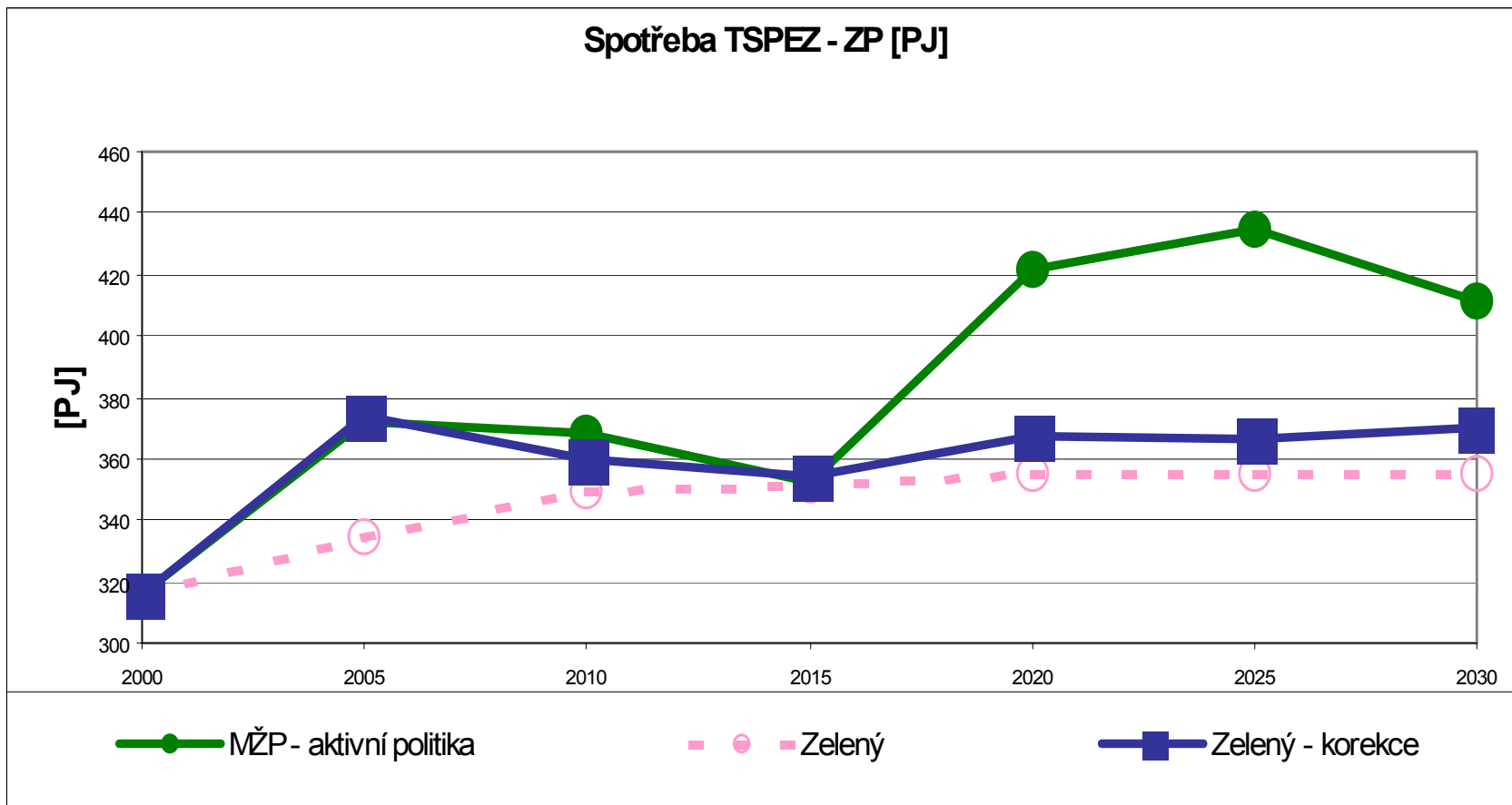
## Nuclear Fuel

### Spotřeba TSPEZ - JP [PJ]



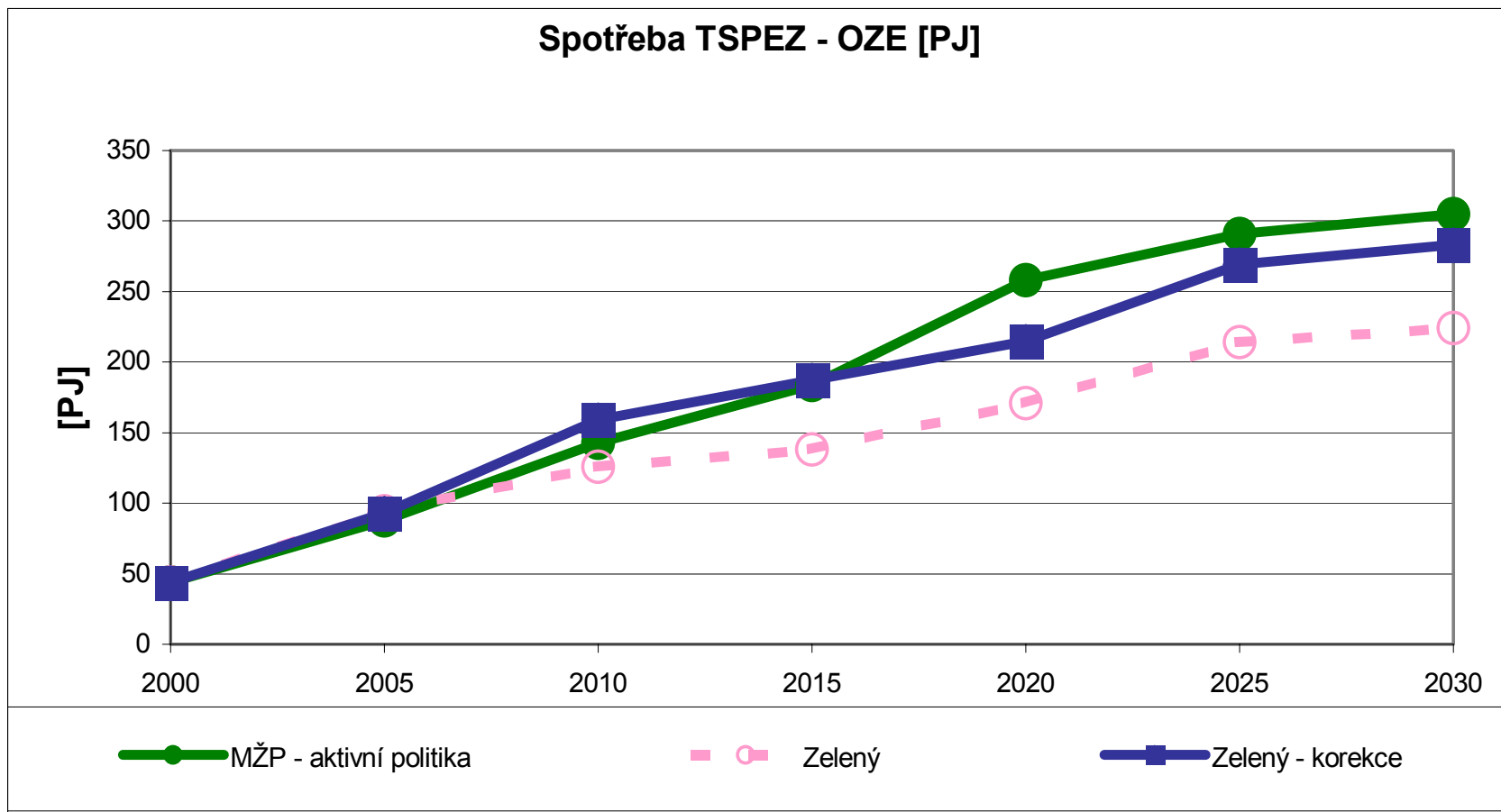
# Porovnání energetických scénářů

## Light Natural Gas



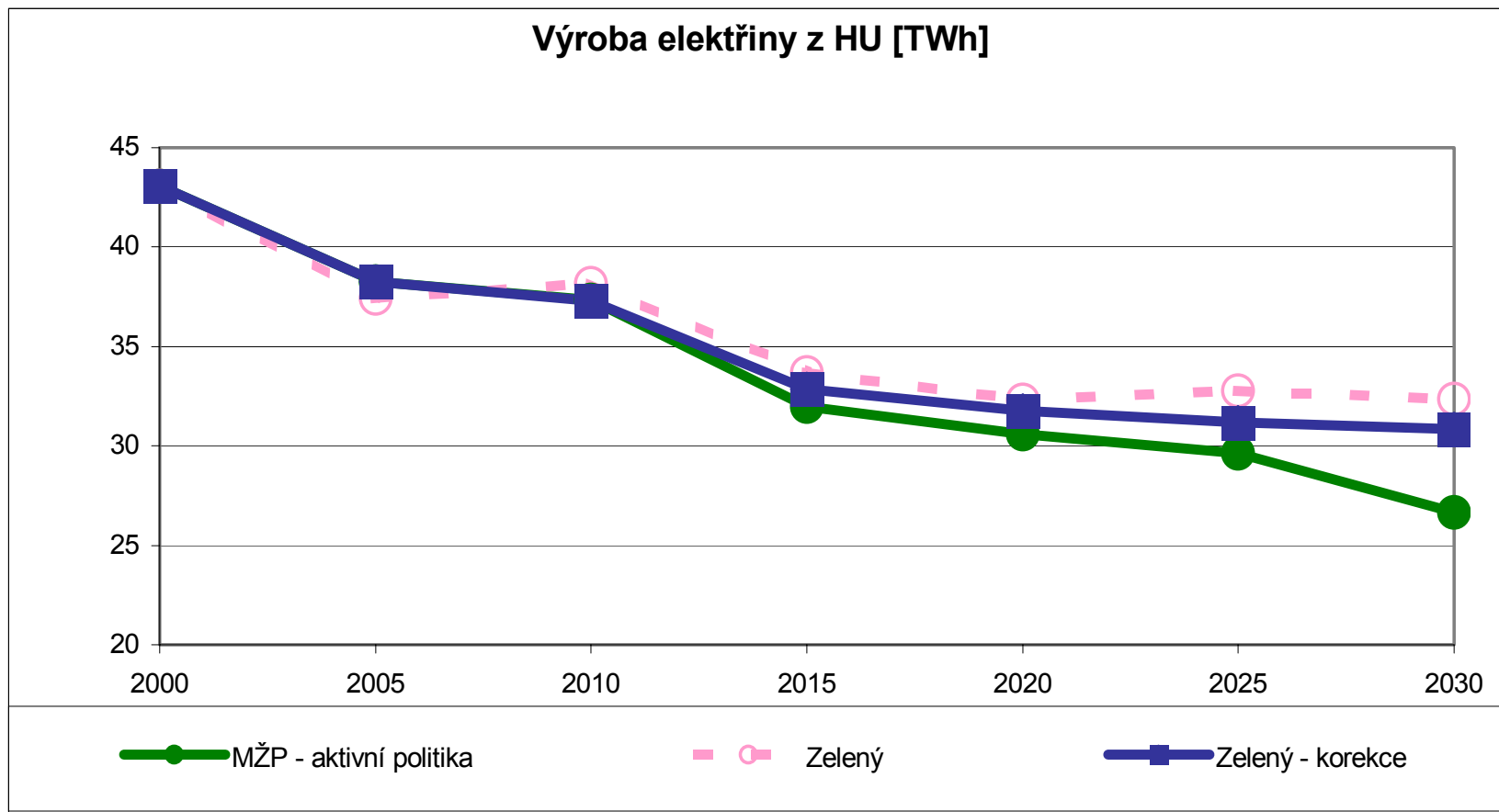
# Porovnání energetických scénářů

## Renewables



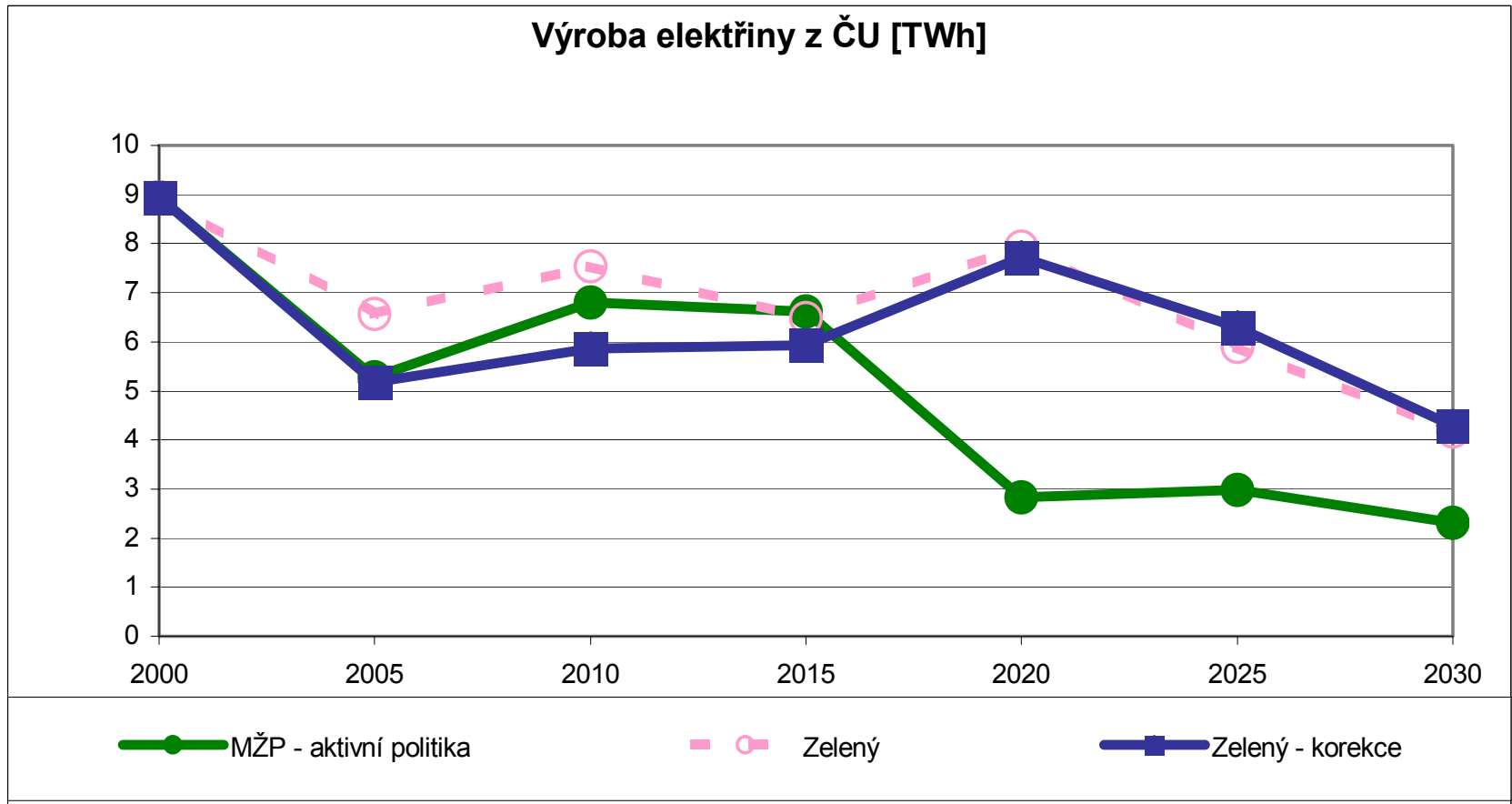
# Porovnání energetických scénářů

## Electricity production from Brown Coal



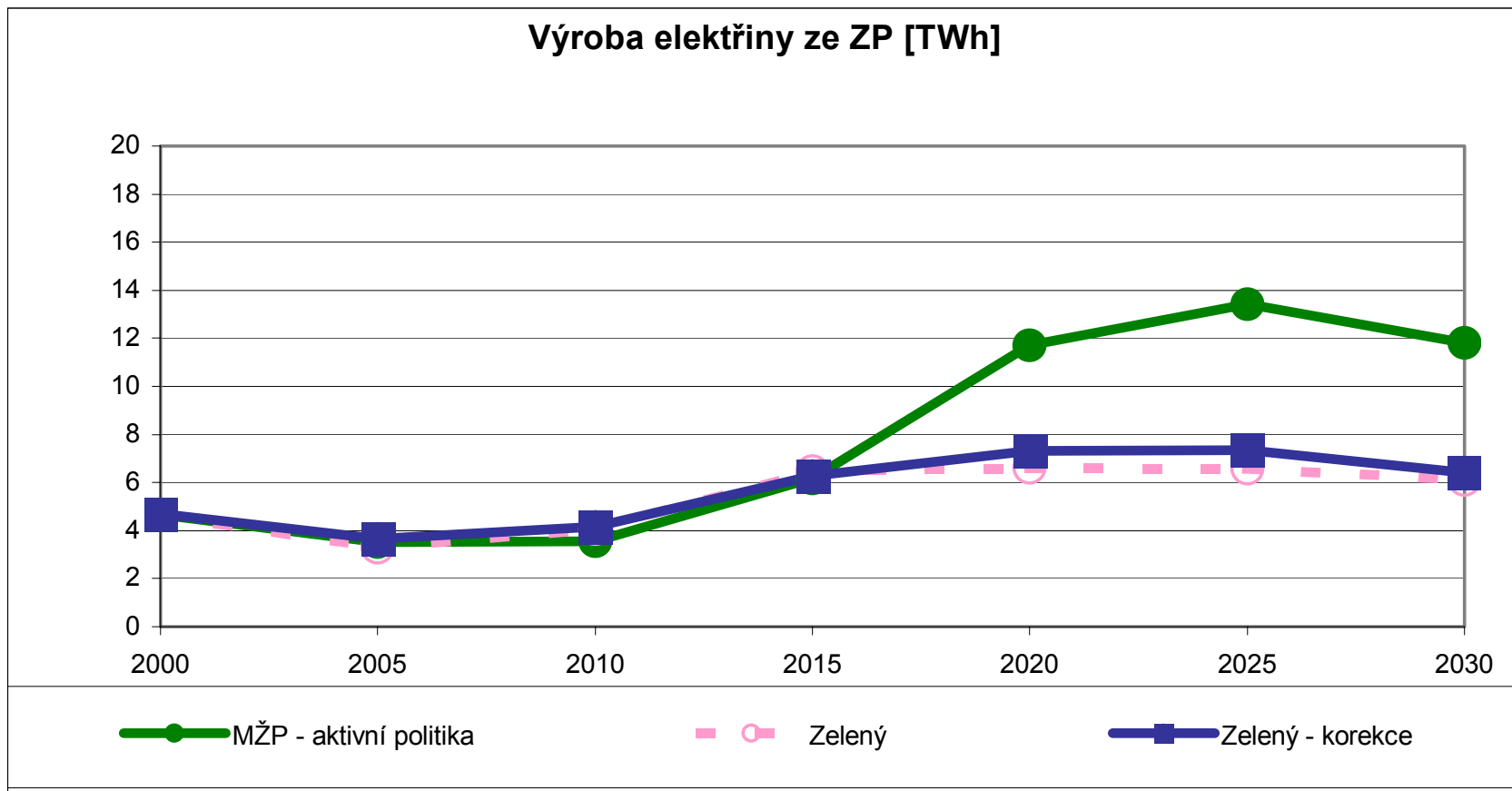
# Porovnání energetických scénářů

## Electricity Production from Black Coal



# Porovnání energetických scénářů

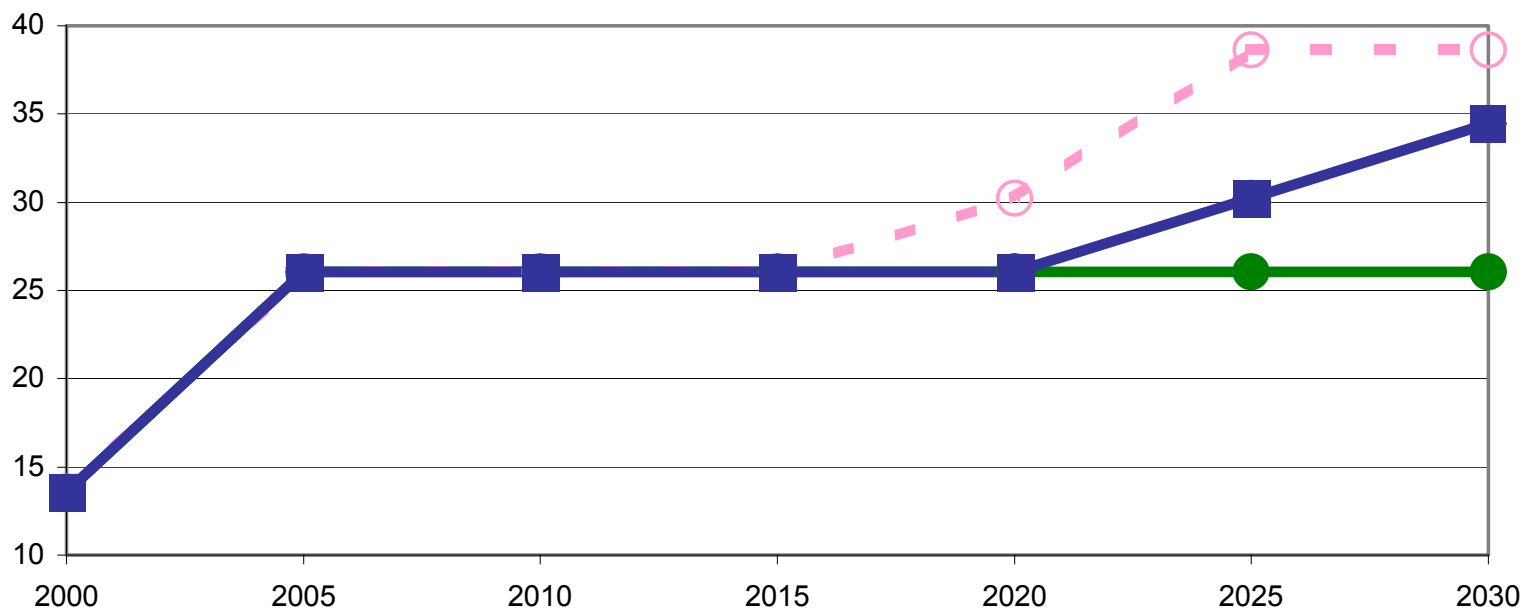
## Electricity production from LNG



# Porovnání energetických scénářů

## Production of Electricity from Nuclear Fuel

Výroba elektřiny z JP [TWh]



—●— MŽP - aktivní politika

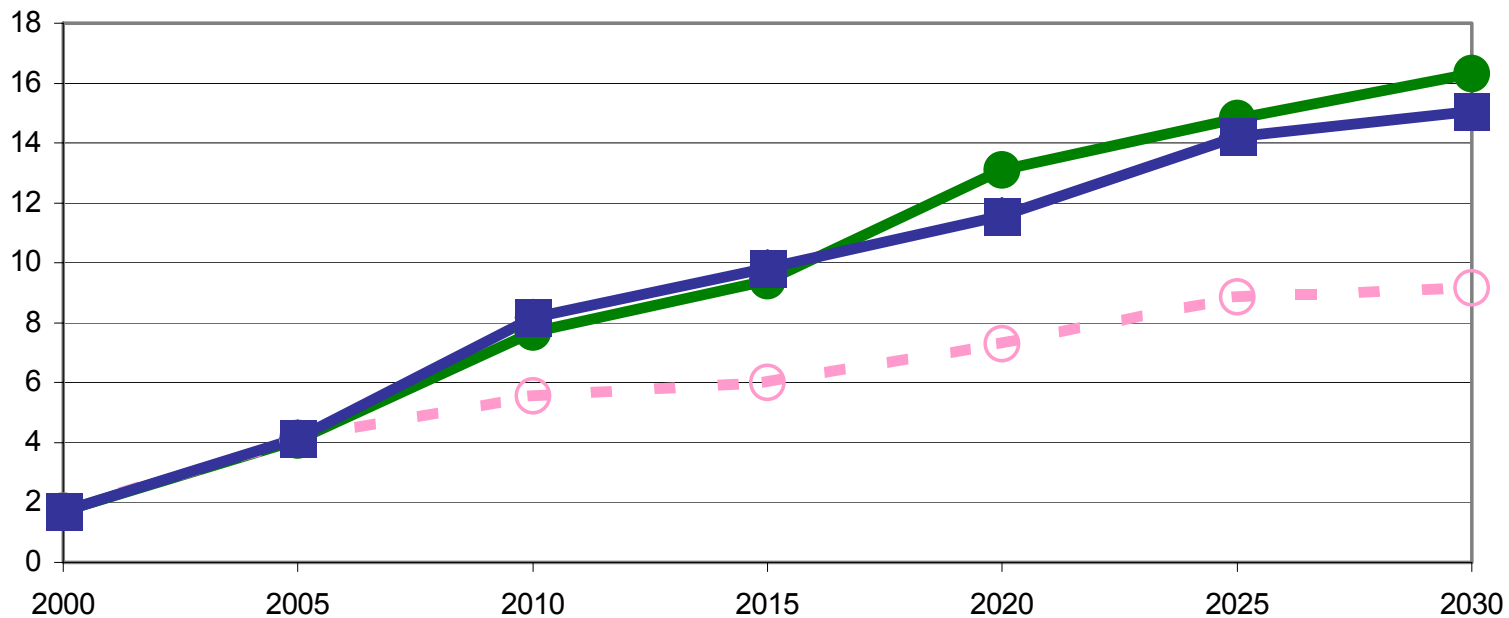
- - -○- Zelený

—■— Zelený - korekce

# Porovnání energetických scénářů

## Renewables

Výroba elektřiny z OZE [TWh]



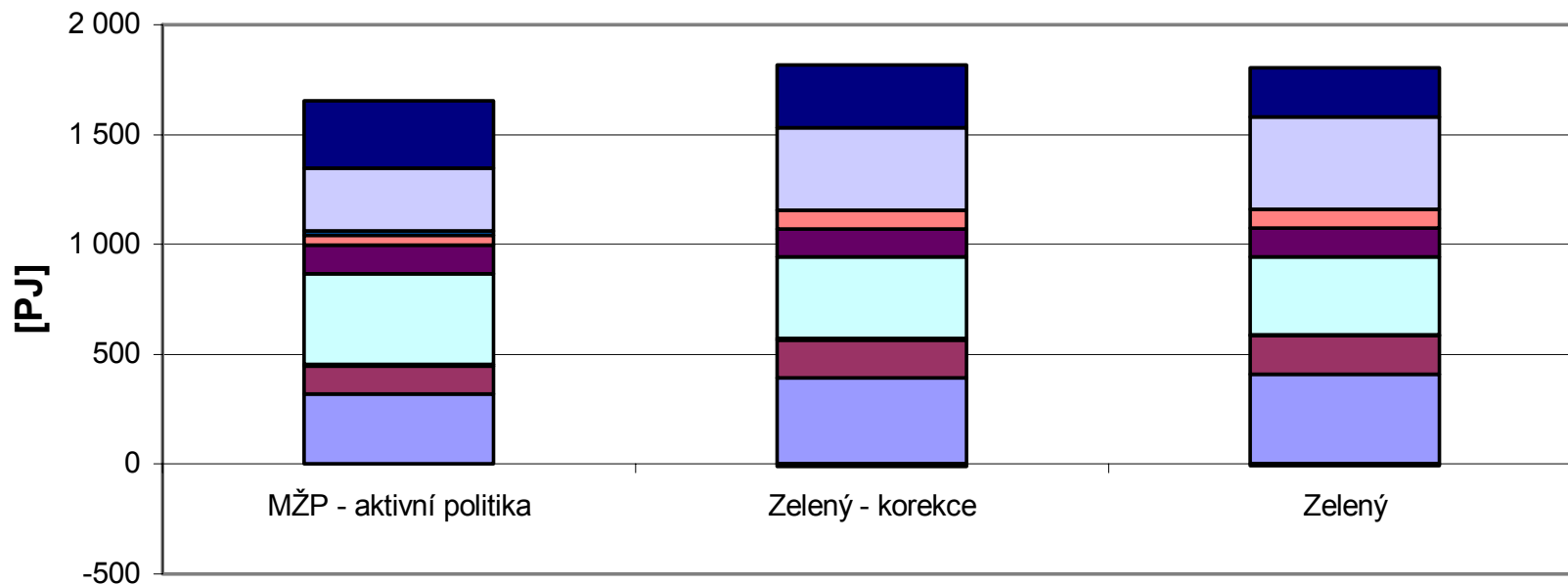
—●— MŽP - aktivní politika

- - -○- - - Zelený

—■— Zelený - korekce

# Porovnání energetických scénářů

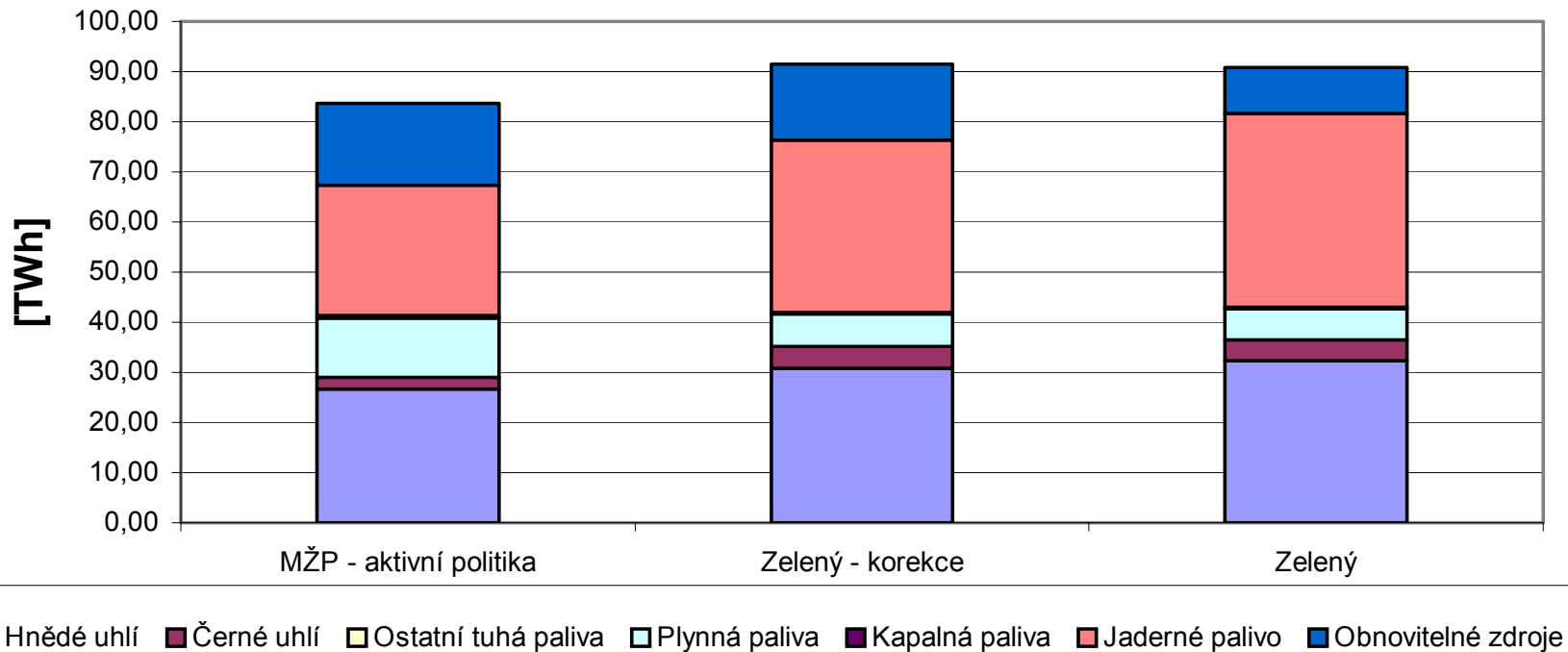
Struktura spotřeby TSPEZ v roce 2030 [TJ]



■ Hnědé uhlí      ■ Černé uhlí + koks      ■ Ostatní tuhá paliva      ■ Plynná paliva      ■ Surová ropa  
■ Kapalná paliva      ■ Elektřina      ■ Jaderné palivo      ■ Obnovitelné zdroje

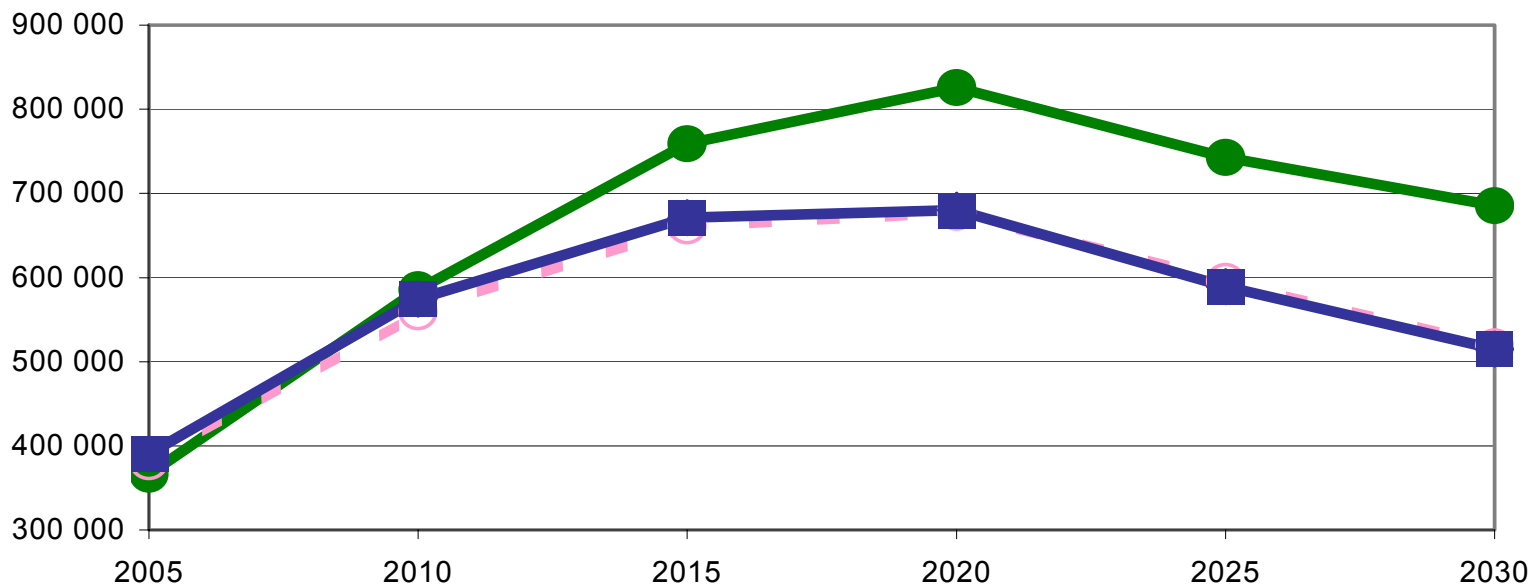
# Porovnání energetických scénářů

Struktura výroby elektřiny v roce 2030 [TWh]



# Porovnání energetických scénářů

## Diskontované investiční náklady [mil. Kč]

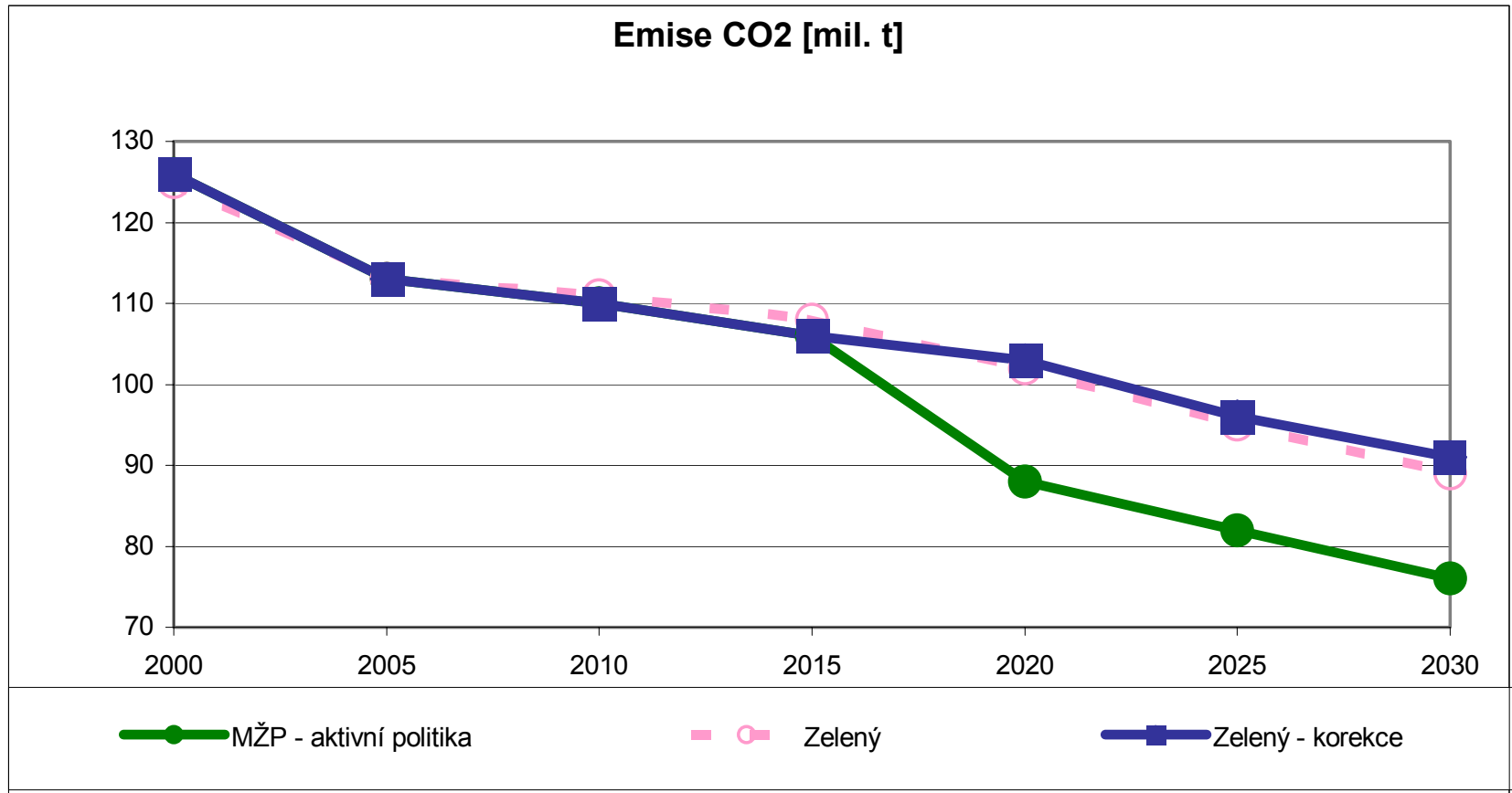


—●— MŽP - aktivní politika

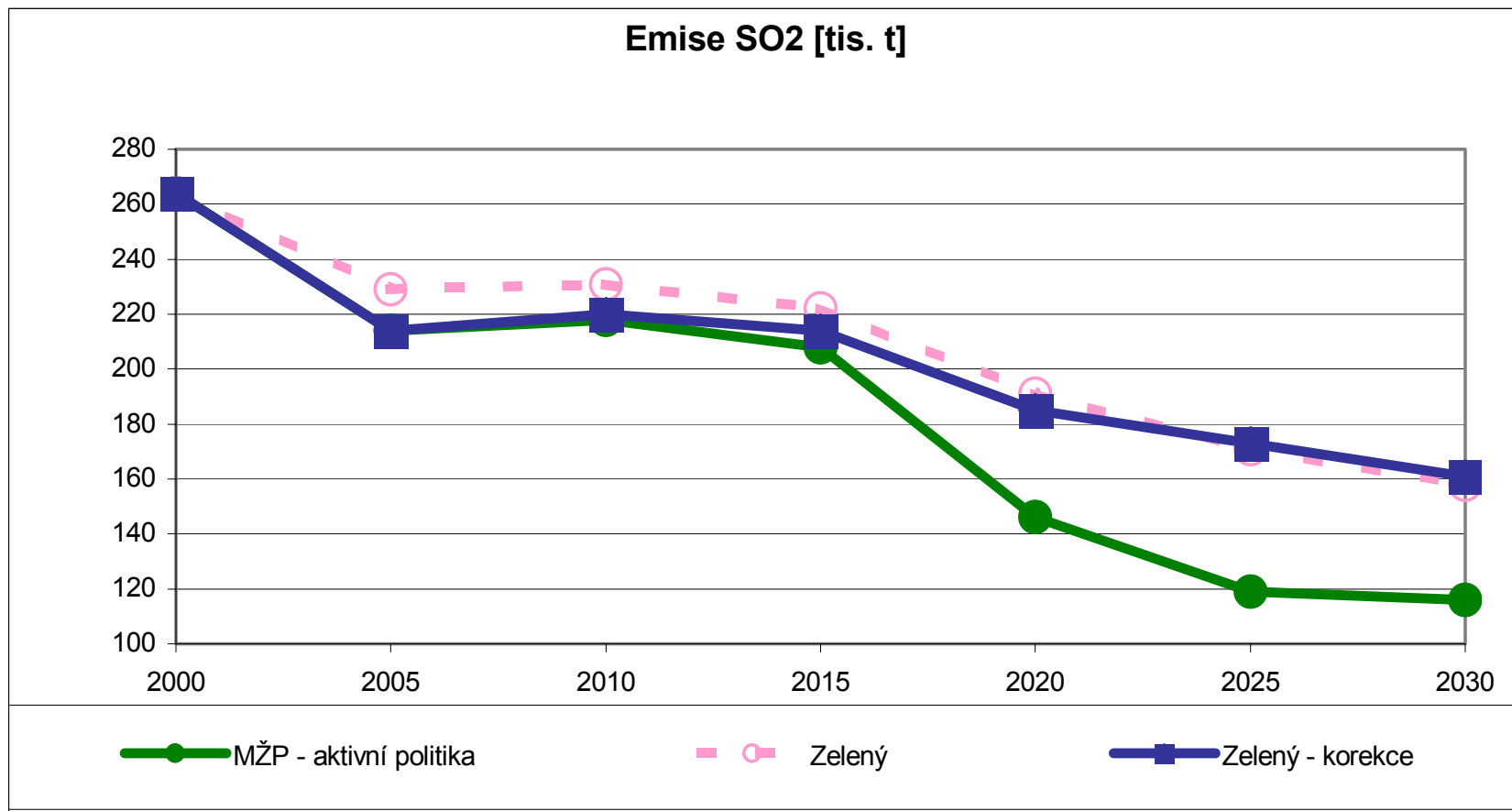
- - -○- - - Zelený

—■— Zelený - korekce

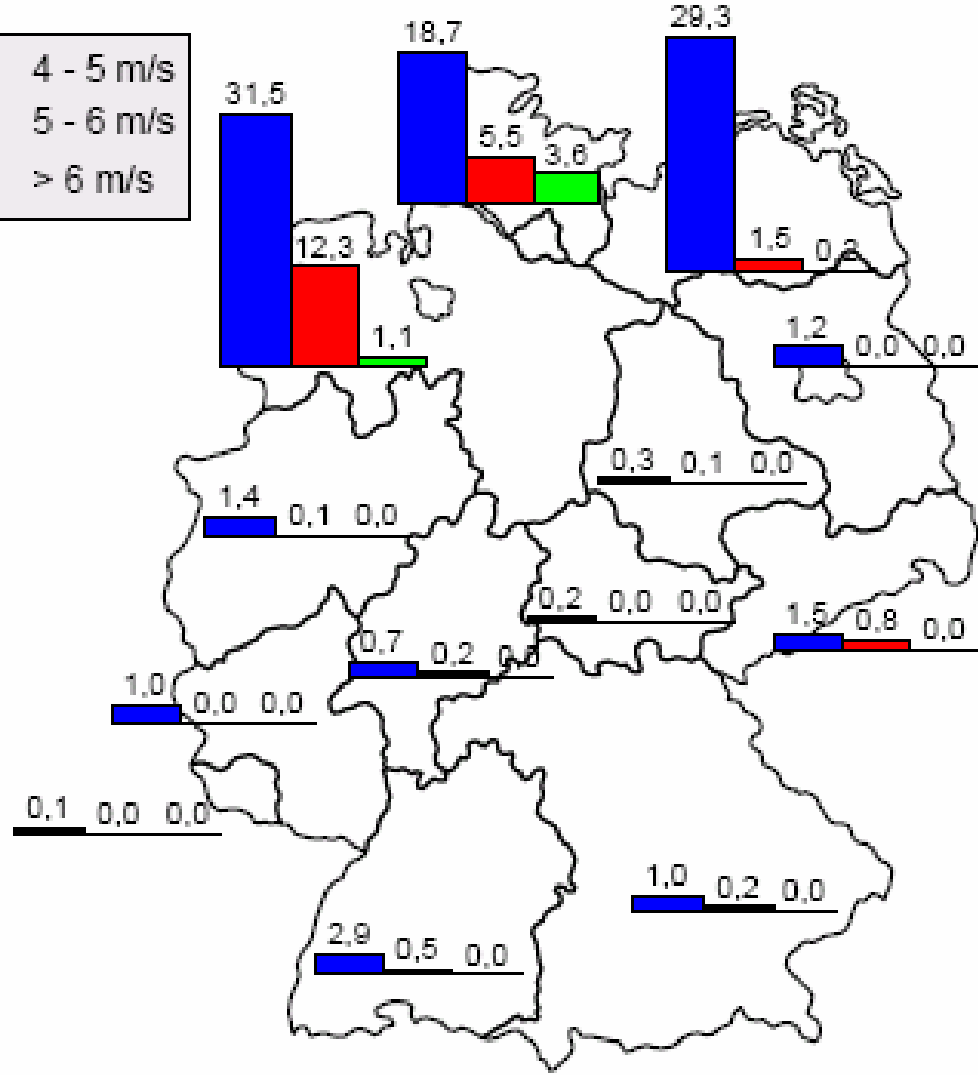
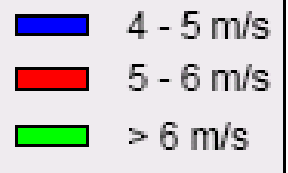
# Porovnání energetických scénářů



# Porovnání energetických scénářů



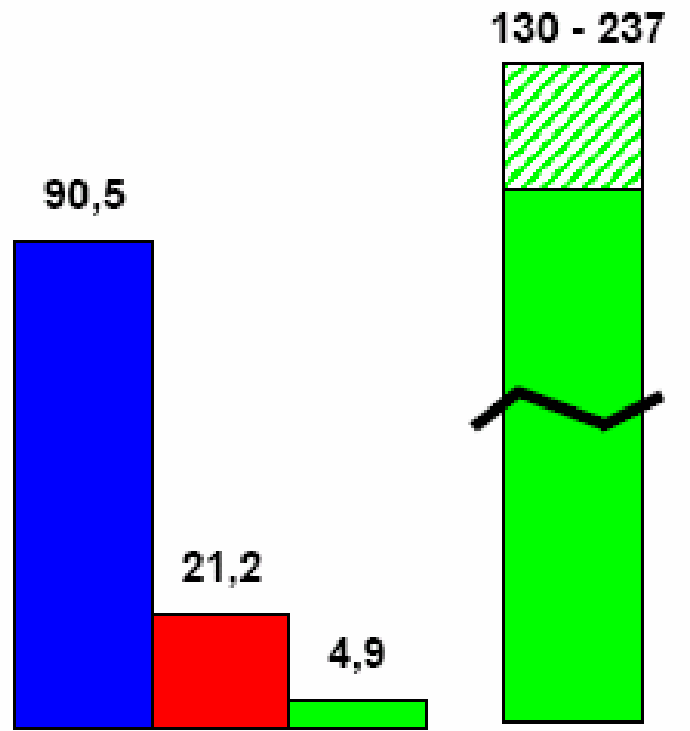
# Technische Potenziale der Windenergieerzeugung in Deutschland



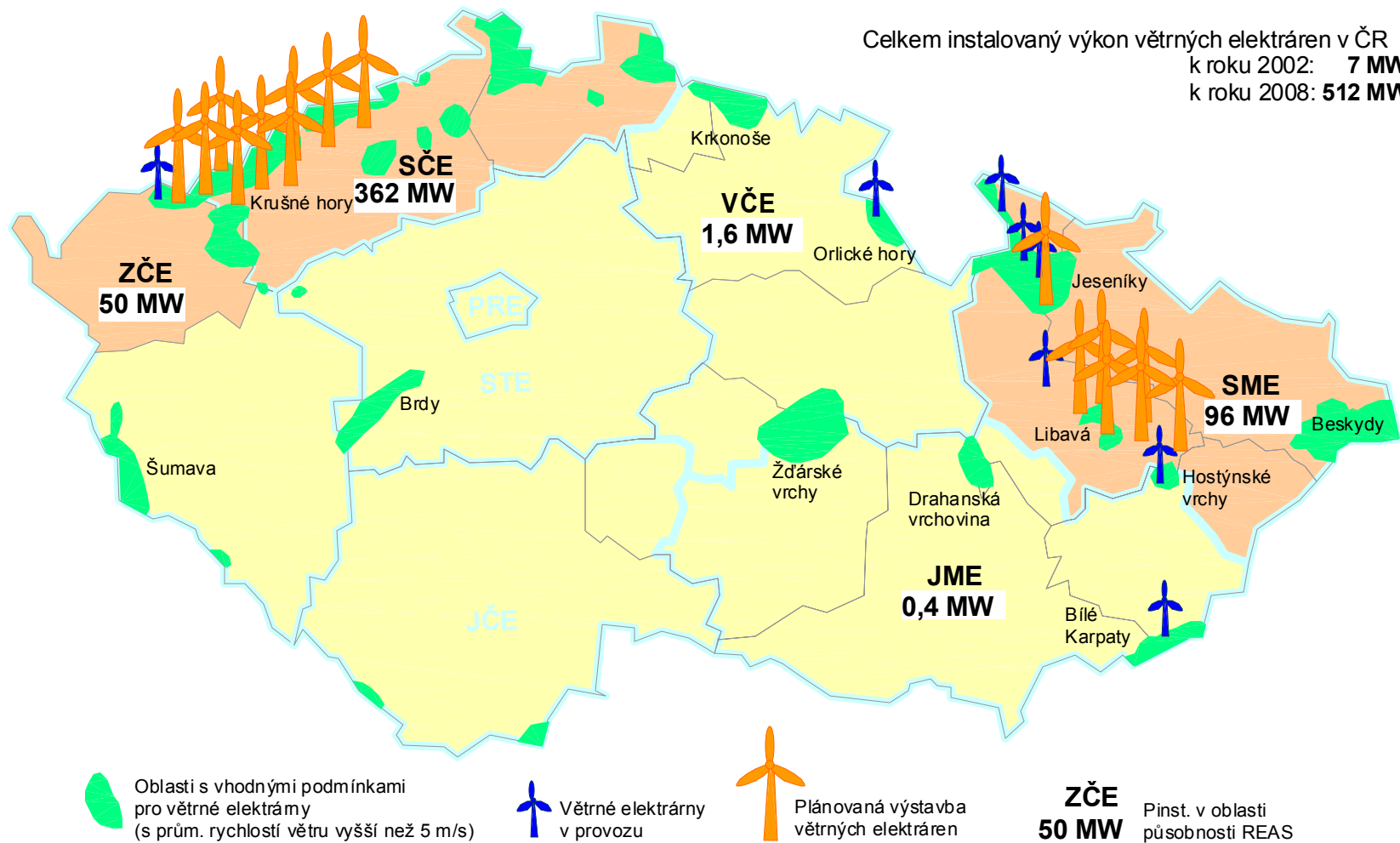
Angaben in TWh/a

Onshore Potenziale

Offshore Potenziale



**Současné a předpokládané lokality umístění větrných elektráren do roku 2008  
s vyznačením větších oblastí s vhodnými podmínkami pro jejich výstavbu**

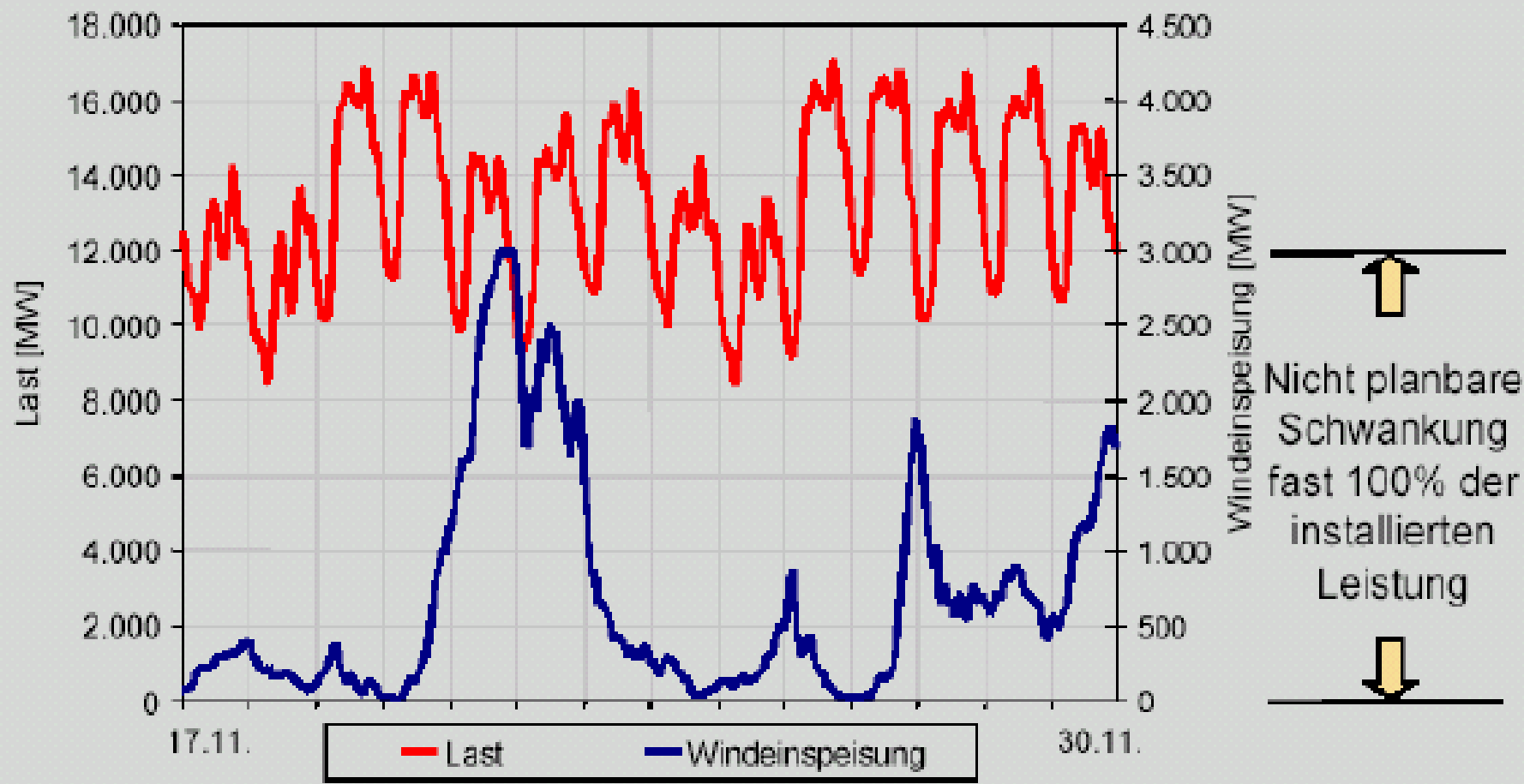


## Gesamter Rohstoff- und Materialaufwand

	<b>Eisen</b> [kg / GWh <sub>el</sub> ]	<b>Kupfer</b> [kg / GWh <sub>el</sub> ]	<b>Bauxit</b> [kg / GWh <sub>el</sub> ]
<b>Steinkohle</b> (43 %)	2.308	2	20
<b>Braunkohle</b> (40 %)	2.104	8	19
<b>Erdgas GuD</b> (57,6 %)	969	3	15
<b>Nuklear</b> (DWR, dir. Endlagerung)	445	6	27
<b>PV</b> poly	6.708	251	2.100
(5 kW) amorph	8.153	338	2.818
<b>Wind</b> 5,5 m/s	5.405	66	54
(1 MW) 4,5 m/s	10.659	141	110
<b>Wasser</b> (3,1 MW)	2.430	5	10

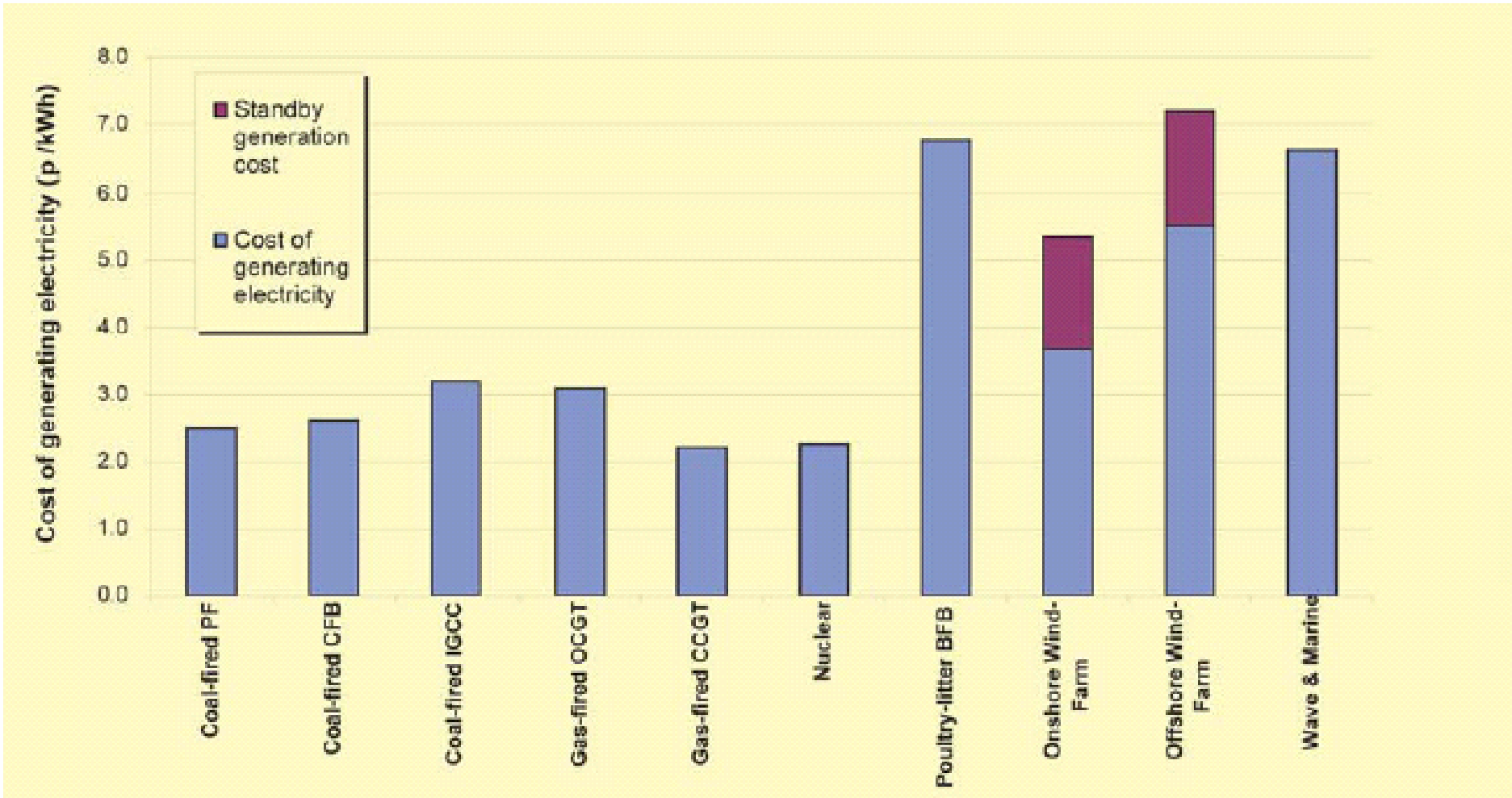
## Charakteristik des Windenergieangebots

Windeinspeisung und Stromabgabe in der E.ON Netz Regelzone im November 2001



Quelle: Elsässer 2002

Figure 1.1 – Cost of generating electricity (pence per kWh) with no cost of CO<sub>2</sub> emissions included.



# Green House Gases

# GREENHOUSE GASES AND GLOBAL WARMING POTENTIAL VALUES

EXCERPT FROM THE *INVENTORY OF U.S. GREENHOUSE  
EMISSIONS AND SINKS: 1990-2000*

U.S. Greenhouse Gas Inventory Program  
Office of Atmospheric Programs  
U.S. Environmental Protection Agency

April 2002

**Table 2: Global Warming Potentials (GWP) and Atmospheric Lifetimes (Years) Used in the Inventory**

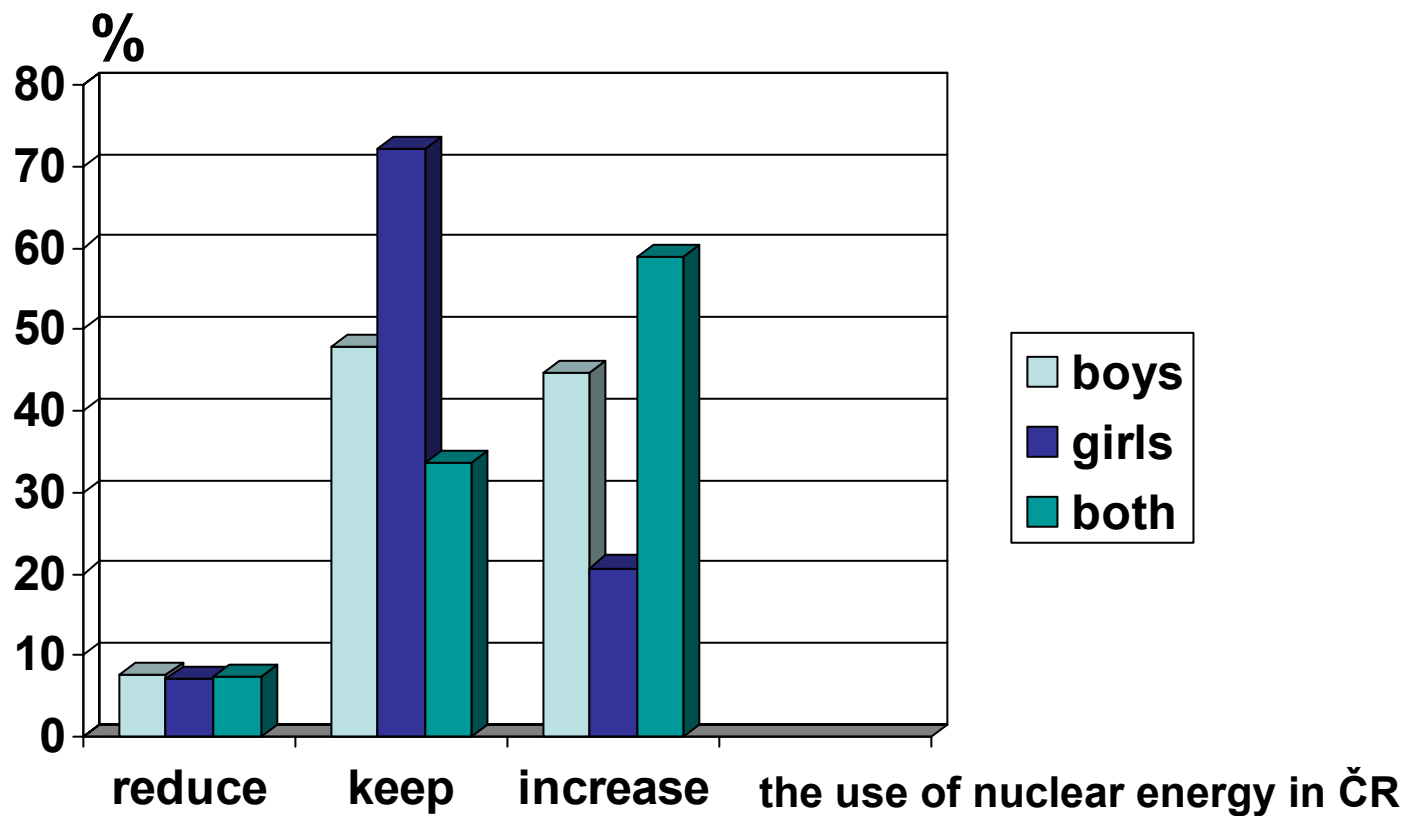
Gas	Atmospheric Lifetime	100-year GWP <sup>a</sup>	20-year GWP	500-year GWP
Carbon dioxide (CO <sub>2</sub> )	50-200	1	1	1
Methane (CH <sub>4</sub> ) <sup>b</sup>	12±3	21	56	6.5
Nitrous oxide (N <sub>2</sub> O)	120	310	280	170
HFC-23	264	11,700	9,100	9,800
HFC-125	32.6	2,800	4,600	920
HFC-134a	14.6	1,300	3,400	420
HFC-143a	48.3	3,800	5,000	1,400
HFC-152a	1.5	140	460	42
HFC-227ea	36.5	2,900	4,300	950
HFC-236fa	209	6,300	5,100	4,700
HFC-4310mee	17.1	1,300	3,000	400
CF <sub>4</sub>	50,000	6,500	4,400	10,000
C <sub>2</sub> F <sub>6</sub>	10,000	9,200	6,200	14,000
C <sub>4</sub> F <sub>10</sub>	2,600	7,000	4,800	10,100
C <sub>6</sub> F <sub>14</sub>	3,200	7,400	5,000	10,700
SF <sub>6</sub>	3,200	23,900	16,300	34,900

Source: IPCC (1996)

<sup>a</sup> GWPs used here are calculated over 100 year time horizon

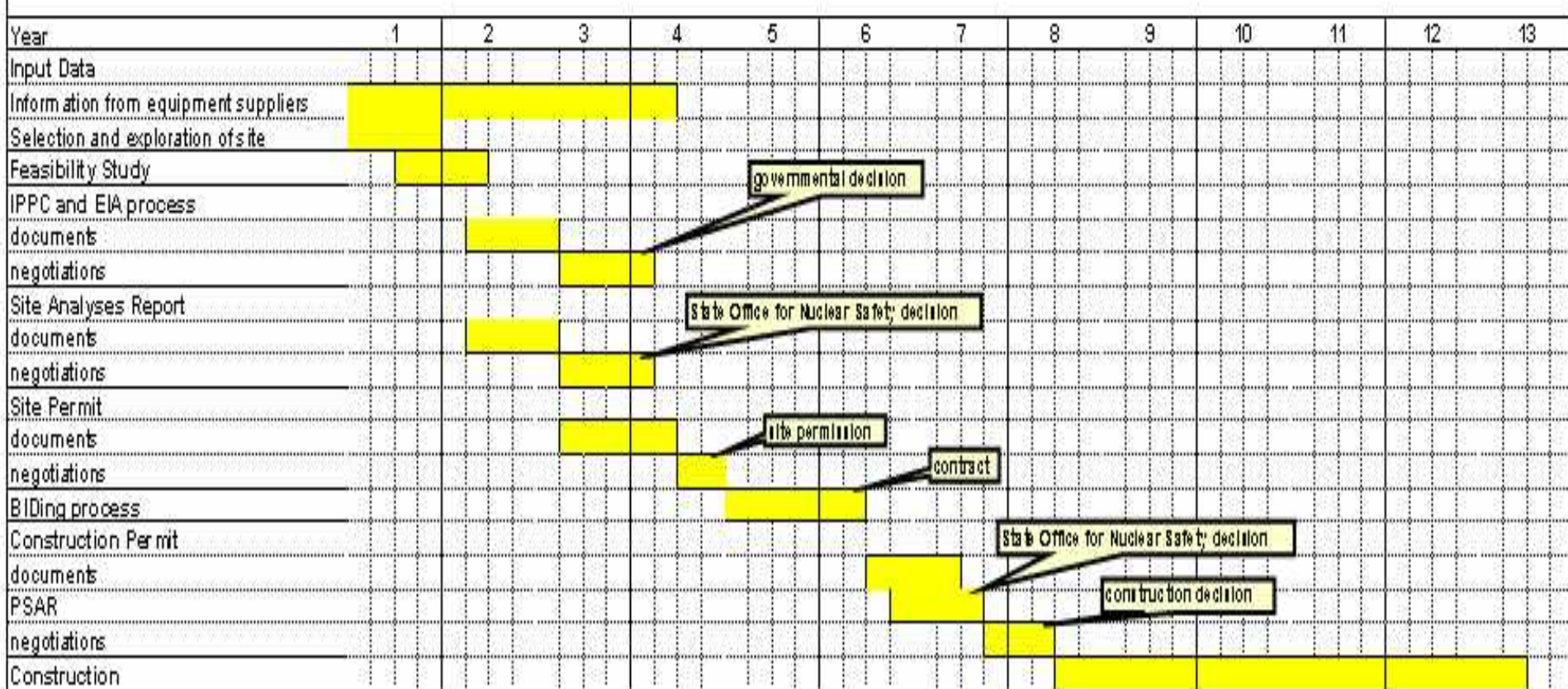
<sup>b</sup> The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO<sub>2</sub> is not included.

**NUCLEAR ENERGY**



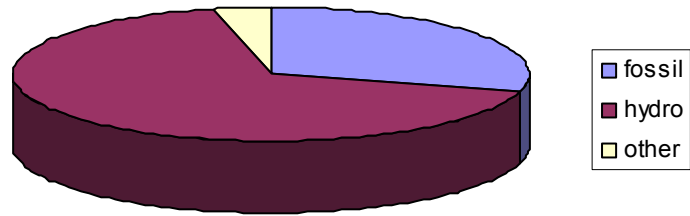
**2573 teenagers in over 100 schools mostly in small towns,  
2003-2004  
Czech Republic**

## Pre Start-up Activities for New NPP in Czech Republic





**Austria 2002**



**Czech Republic 2002**

