

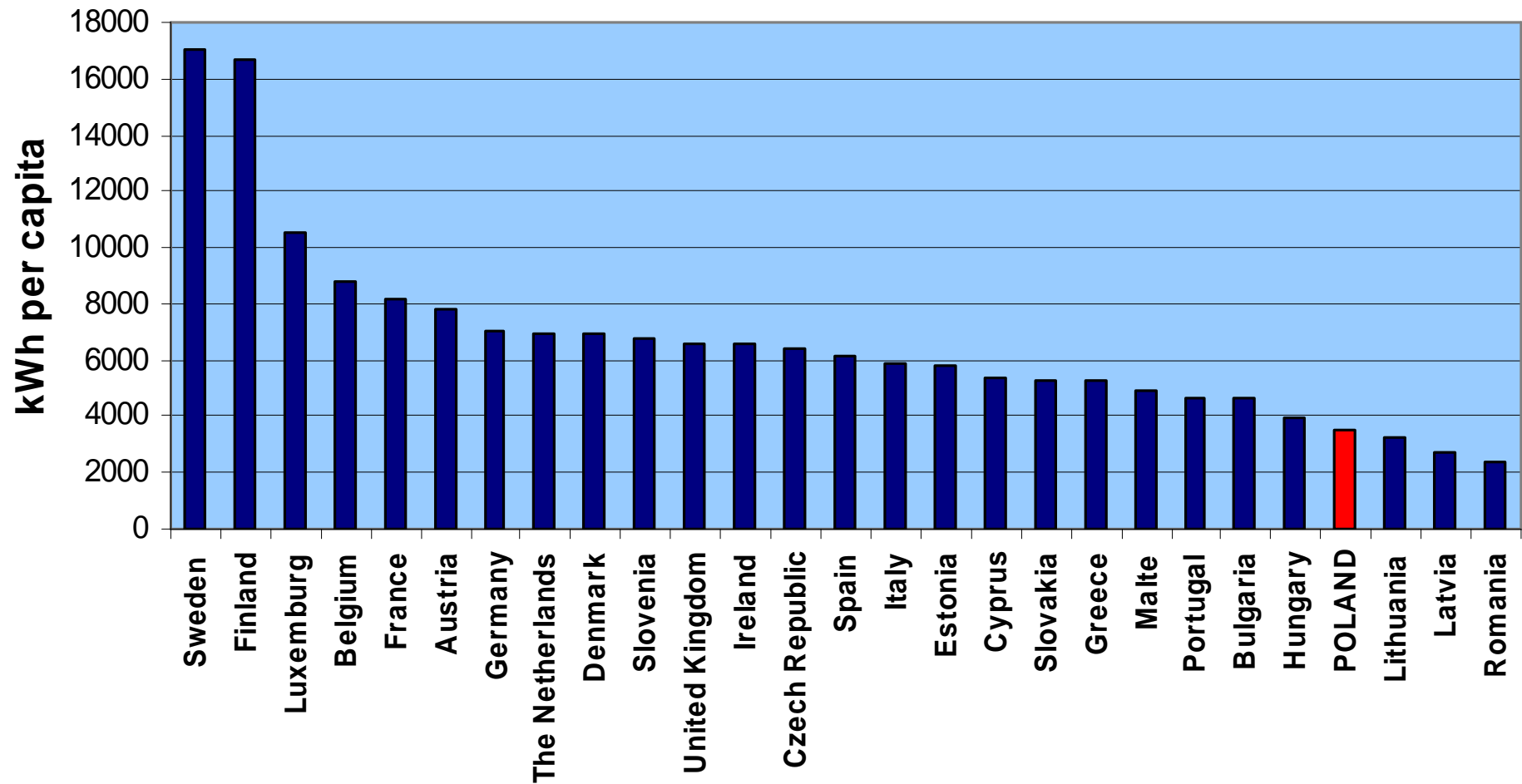
NUCLEAR ENERGY FOR POLAND?

Jerzy Niewodniczański



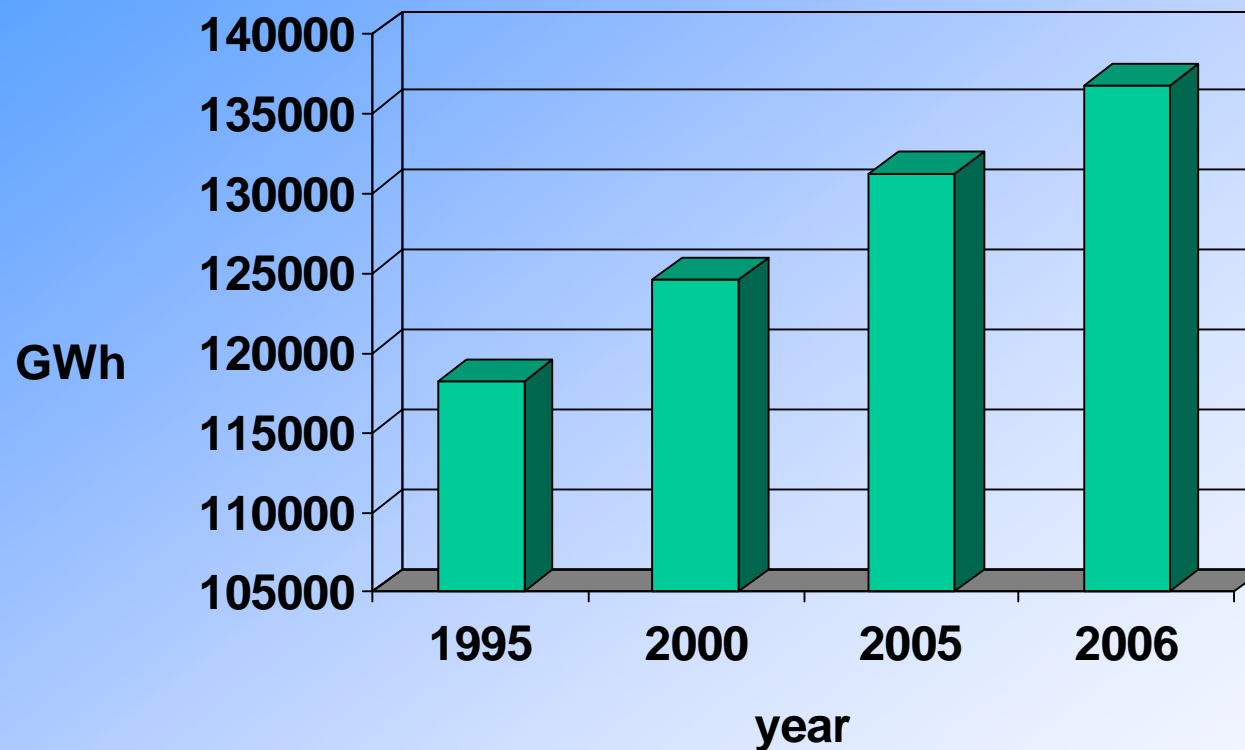
*National Atomic Energy Agency
Krucza 36, 00-522 Warszawa, POLAND*

Electrical energy consumption in European Union



Based on UNDP „Human Development Report 2005”

CONSUMPTION OF ELECTRICITY IN POLAND



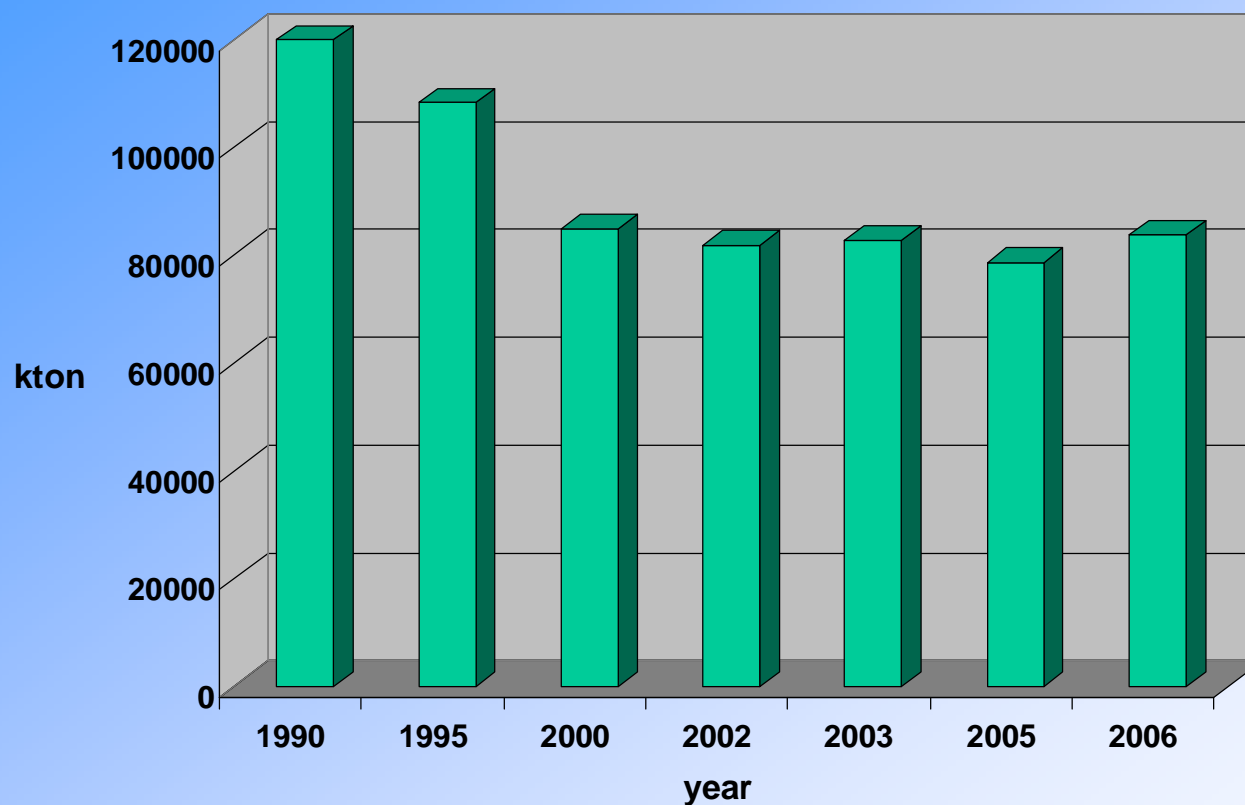
BALANCE OF ELECTRICITY IN POLAND

<i>ELECTRICITY in GWh</i>	<i>2000</i>	<i>2006</i>
<i>supply</i>	<i>148473</i>	<i>166532</i>
<i>from domestic sources:</i>	<i>145183</i>	<i>161743</i>
<i>public thermal power plants</i>	<i>133831</i>	<i>150245</i>
<i>hydro + other renewables</i>	<i>4151</i>	<i>3392</i>
<i>import</i>	<i>3290</i>	<i>4789</i>
<i>domestic consumption</i>	<i>124576</i>	<i>136736</i>
<i>export</i>	<i>9663</i>	<i>15775</i>

GROSS INSTALLED CAPACITY IN POWER PLANTS IN POLAND - 2006

Type of power stations	Capacity (MW)
Thermal power plants	33 248
<i>public thermal</i>	30713
<i>hard coal</i>	20 629
<i>lignite</i>	9 216
non-public thermal	2535
Hydroelectric public	2 259
<i>pumped-storage</i>	1 330
renewables (wind, biogas)	208
TOTAL	35 715

DOMESTIC CONSUMPTION OF HARD COAL



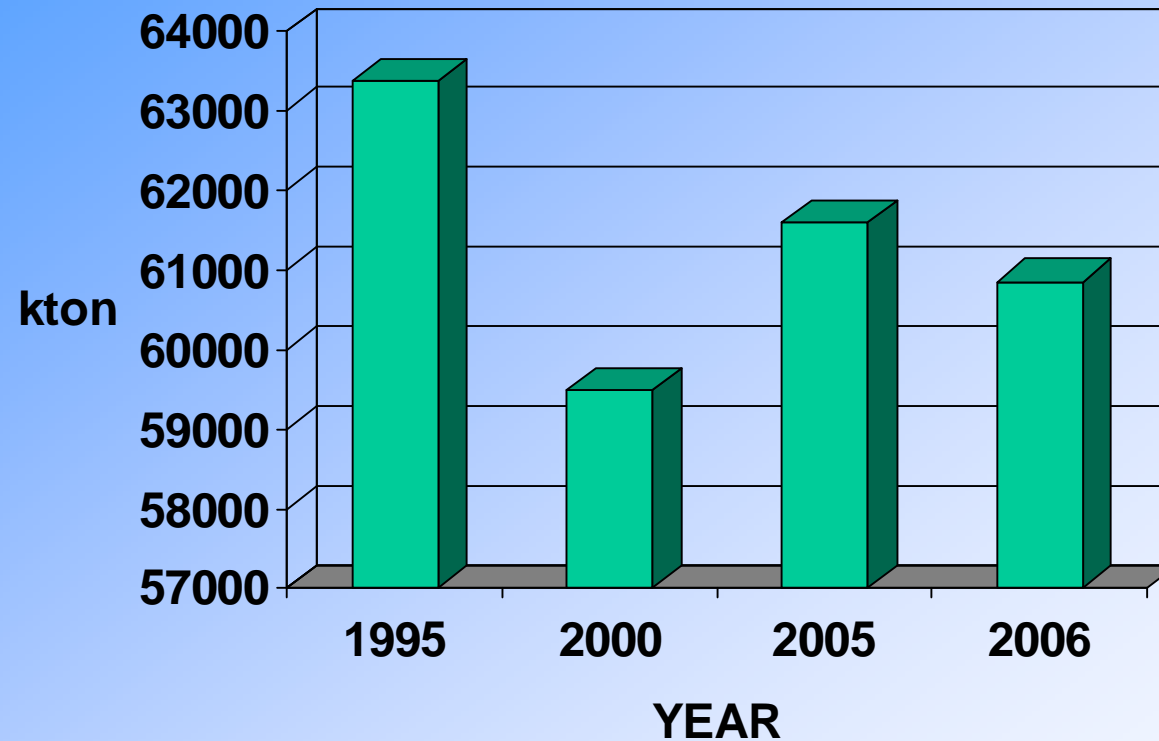
HARD COAL PRODUCTION: 1995 – 137106, 2000 – 103331, 2006 – 95223 kton

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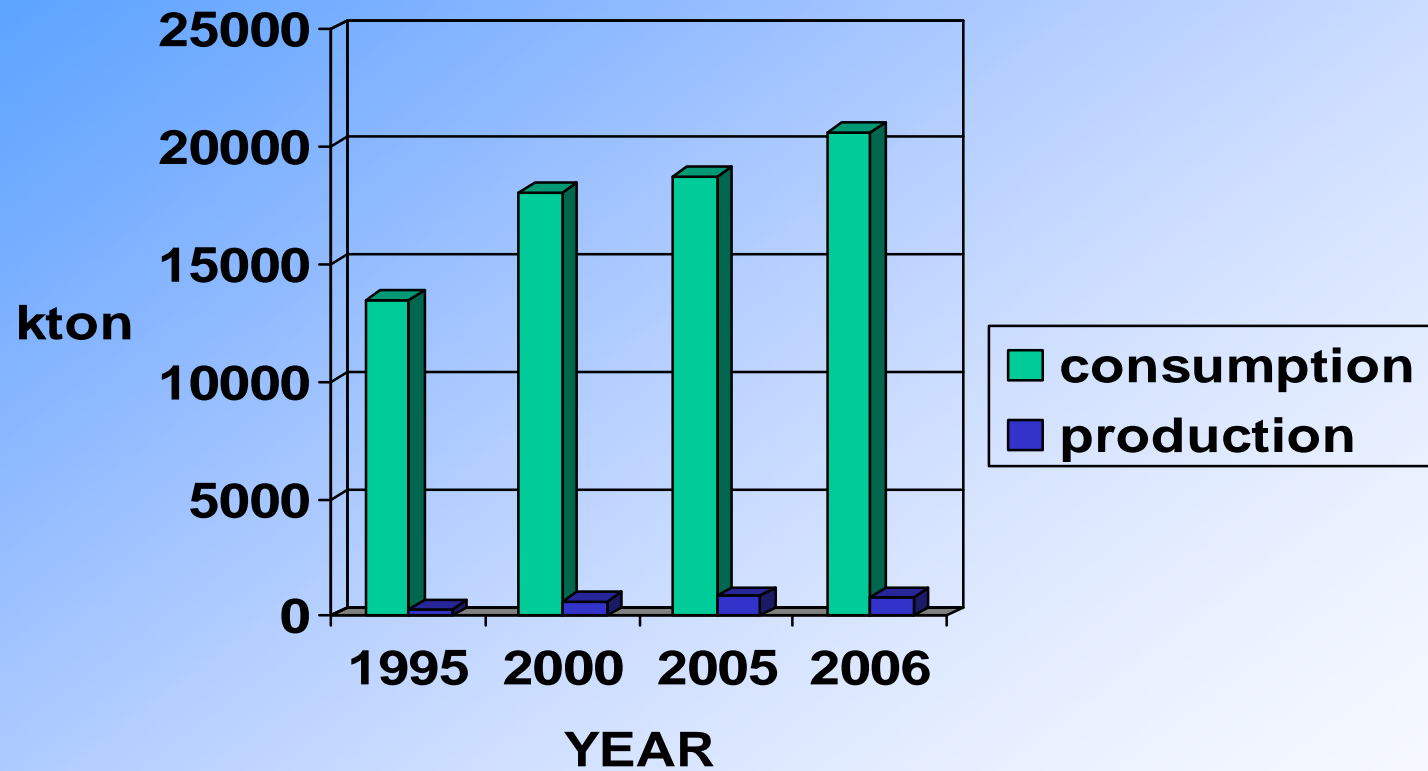
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DOMESTIC CONSUMPTION OF LIGNITE

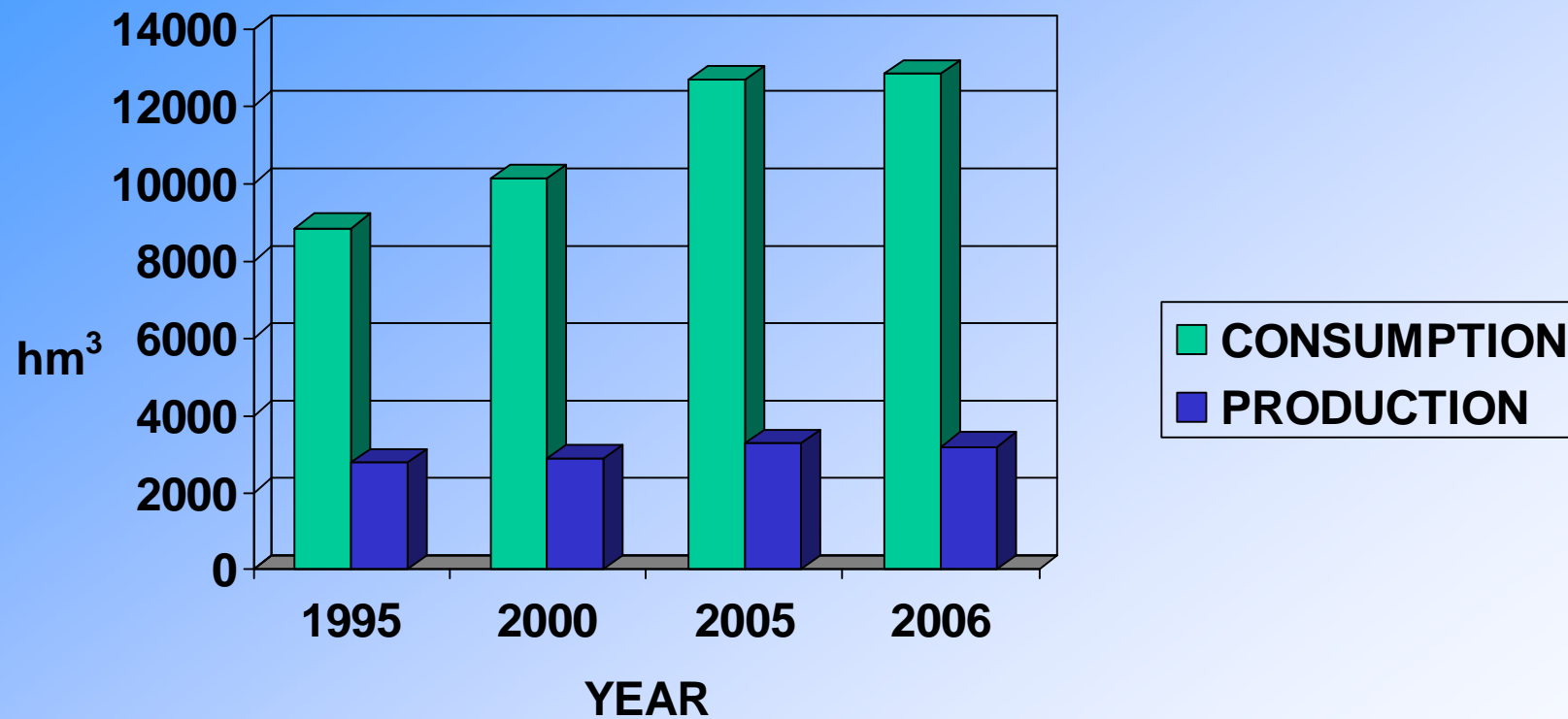


LIGNITE PRODUCTION: 1995 – 63547, 2000 – 59484, 2006 – 60845 kton

PRODUCTION AND DOMESTIC CONSUMPTION OF OIL



DOMESTIC CONSUMPTION AND PRODUCTION OF HIGH-METHANE NATURAL GAS



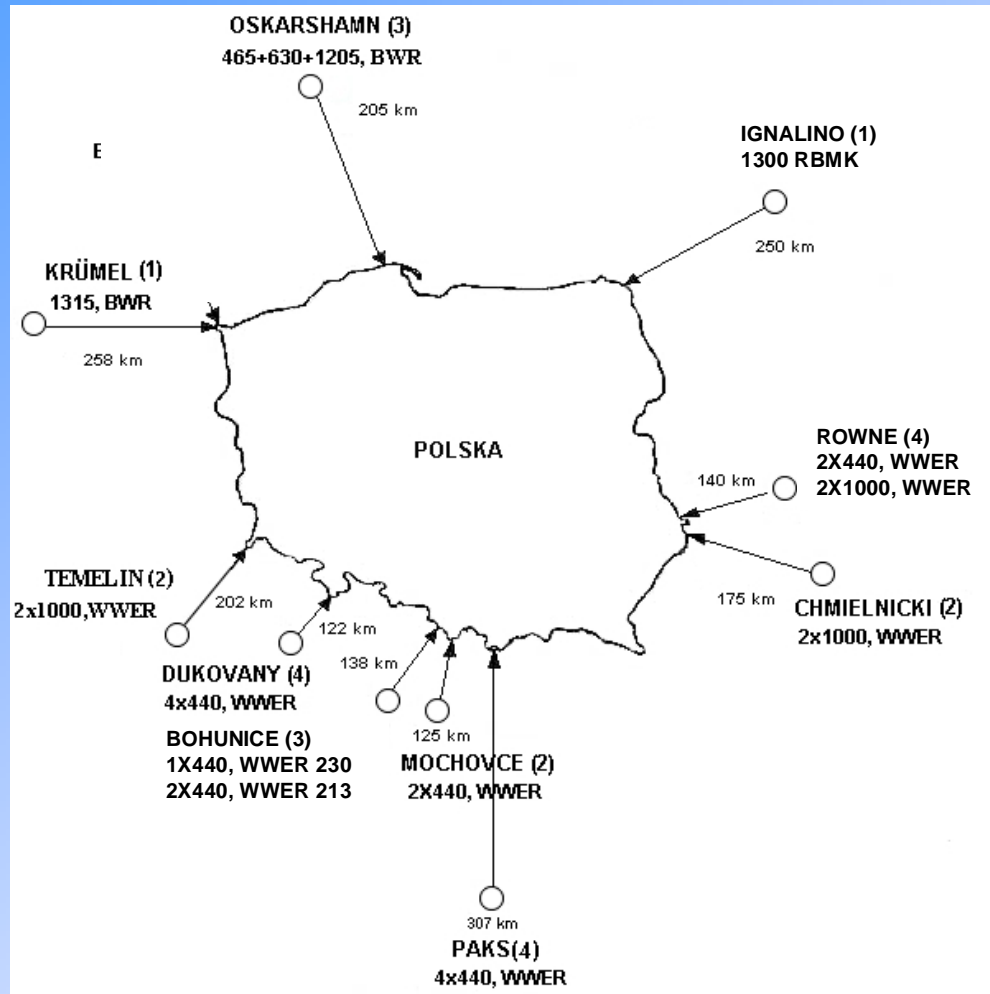
***POLAND IS „A NON-NUCLEAR ISLAND” IN THE
CENTRAL EUROPE, SURROUNDED BY NUCLEAR
POWER PLANTS IN NEIGHBORING COUNTRIES:***

***within 310 km from the Polish border there are 26
nuclear power units of 18 GWe total capacity***

and construction of other 14 (16?) has been decided

***- in Belarus, Czech Republic, Hungary, Lithuania,
Russian Federation (Kaliningrad Region), Slovakia and
Ukraine***

NUCLEAR POWER REACTORS SURROUNDING POLAND



ELECTRICITY GENERATION THROUGH NUCLEAR POWER WILL ENABLE POLAND:

- TO DIVERSIFY ENERGY SOURCES***
- TO MEET KYOTO REQUIREMENTS AND EU OBLIGATIONS***
- TO INCREASE ENERGY INDEPENDENCE***

It will also provide financial resources for construction of radioactive waste repositories (including the HLW and spent nuclear fuel), and to intensify nuclear R&D and educational programmes

In January 2005 the Polish government decided to include nuclear power into considerations on electricity production in Poland planned to be available for the electricity grid by 2021 – 2022

Since then three different consecutive governments declared their readiness to start the nuclear power programme in Poland, however, no final decision has been taken

The decision is expected in 2009, the draft of that document says about 8 – 10 GWe from NPPs in 2030

Nuclear & atomic legal system in Poland:

***ACT OF PARLIAMENT „Atomic Law”
of 29 November 2000 (amended)
+ over 30 regulations of lower rank***

The legal system based on the Act takes into account all the EU decisions and directives as well as all international obligations of Poland (Poland is a party to all international conventions in the field)

Both our legal system, from the point of view of nuclear safety/security and radiological protection, as well as the regulatory procedures, practically do not need to be adjusted when Poland restarts its nuclear energy programme.

However, for a successful construction of the first nuclear power plant in Poland a special legal act and the long term strategy for safe management of spent nuclear fuel and radioactive waste have to be established

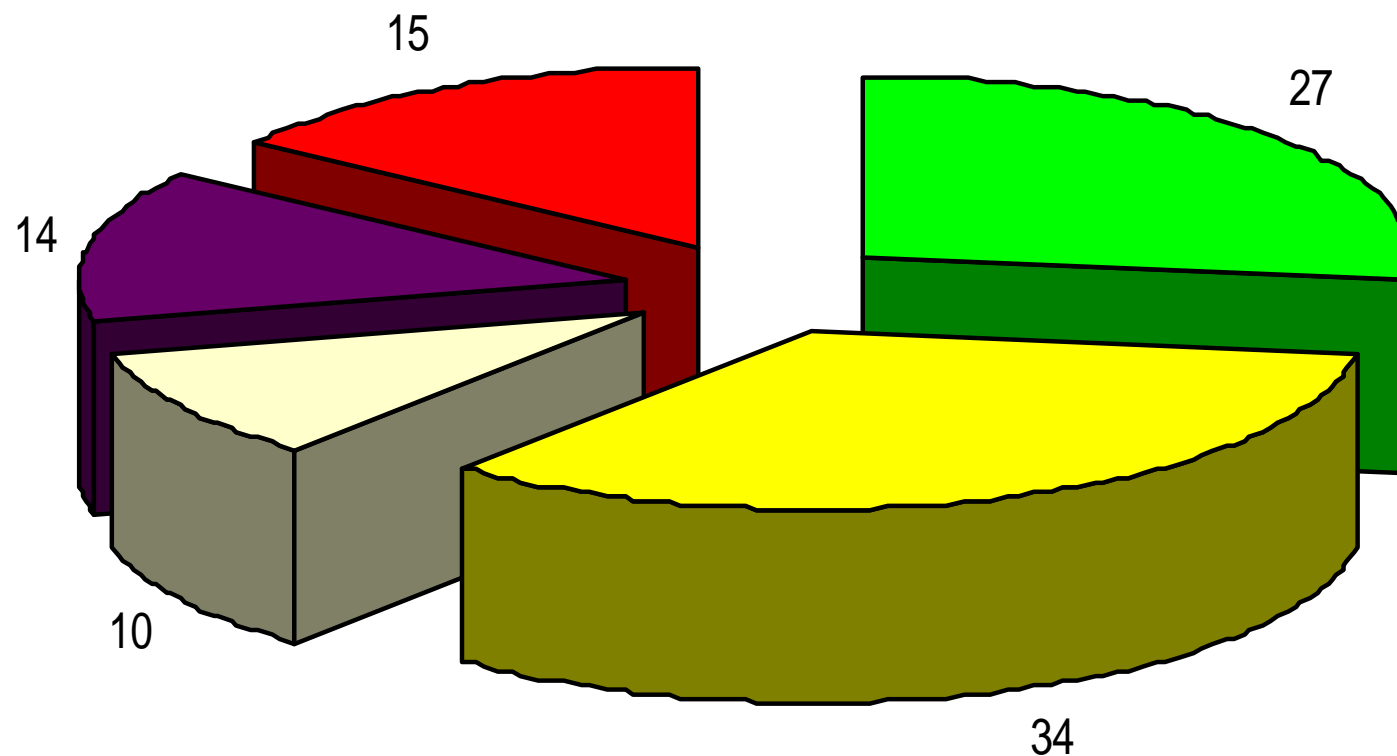
ONCE THE DECISION ON NUCLEAR POWER PROGRAMME IS TAKEN, FROM THE POINT OF VIEW OF NUCLEAR REGULATORY BODY EDUCATION/TRAINING FOR NUCLEAR INDUSTRY HAS TO BE INITIATED AS SOON AS POSSIBLE AND TO BE ORGANIZED IN THREE SEPARATE GROUPS:

- 1. EDUCATION OF EDUCATORS**
- 2. TRAINING OF NUCLEAR INSPECTORS**
- 3. EDUCATION/TRAINING OF NUCLEAR POWER STAFF (at the beginning – for the construction period, later – for the NPP operation)**

TO RUN SUCH EDUCATION/TRAINING ACTIVITIES, WE NEED TO HAVE:

- SPECIAL NUCLEAR ENGINEERING COURSES AT THE UNIVERSITIES,***
- NUCLEAR R&D PROGRAMMES AT THE UNIVERSITIES AND AT THE RESEARCH LABORATORIES,***
- AN ASSISTANCE FROM THE INTERNATIONAL ORGANIZATIONS (IAEA, NEA/OECD) AND FROM THE ADVANCED NUCLEAR POWER COUNTRIES***

POLES ON NUCLEAR POWER, Nov. 2006, 1016 respondents



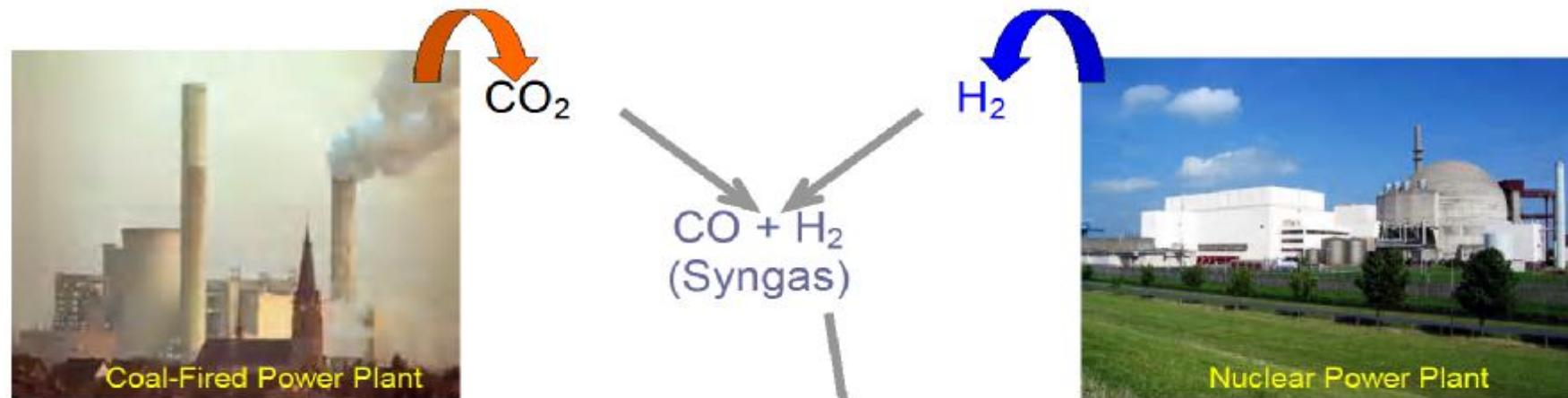
■ yes ■ rather yes □ no opinion ■ rather no ■ no

COAL - NUCLEAR SYNERGY ?

Nuclear power as the CO₂ zero - emission source of:

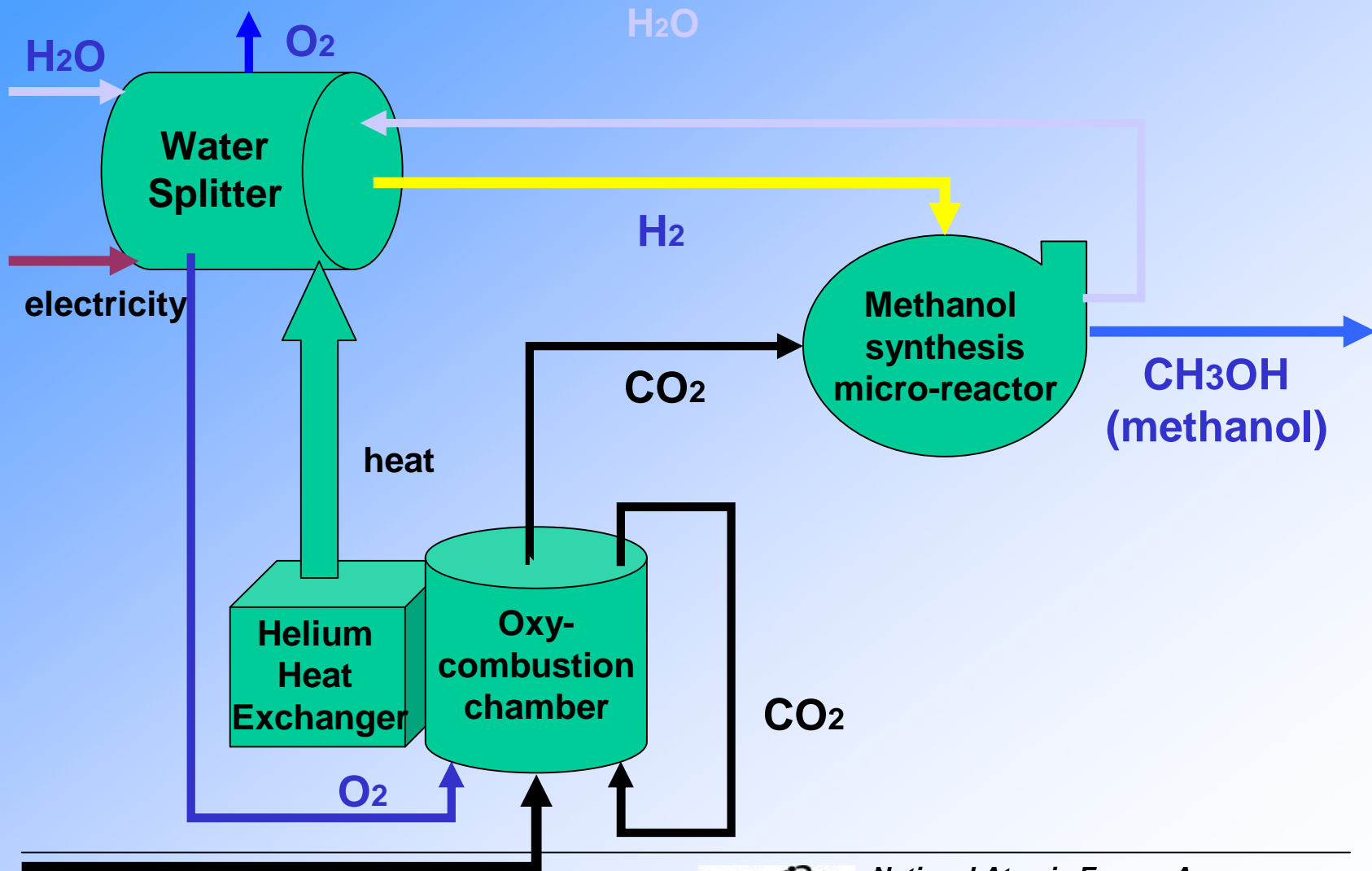
- cheap electricity for production of synthetic liquid fuels***
- high temperature heat for underground gasification of coal (+ electricity)***
- cheap electricity and high temperature heat for hydrogen/oxygen production for coal processing***

CO₂ Recycling with Nuclear Power for Synthesis of Hydrocarbons



- × Hydrocarbons are better fuels than H₂ (energy content, safety, transport etc.)
- × no H₂ infrastructure required
- × NPP produces locally H₂ from water (electrolysis or thermochemical)
- × CO₂ sequestration can be dropped
- × Total CO₂ emission halved
- × works also with CO₂ extraction from air
- × economically attractive even more so with CO₂ tax

Carbon Dioxide Recycling Facility



Jerzy Niewodniczański CH_4
(natural gas)



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