Polish energy policy – Challenges of current energy mix

Polish Ministry of Environment

Structure

I. Current energy policy
II. Polish energy policy vs. EU
III. External factors
IV. Assessment and revamp

I.
Current Energy Policy

vs. reality

Guiding Paper - Energy Policy of Poland 2030

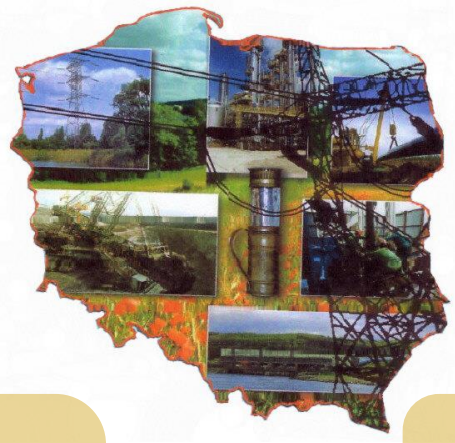
- Adopted by the Government Nov 2009
- Based on estimates and data pre-2009
- Addresses main challenges facing Polish energy sector
- Consistent with the energy policy of the European Union and its objectives

Main challenges for the Polish energy

High demand for final energy

Coal dominating power mix

Insufficient generation and transmission infrastructure

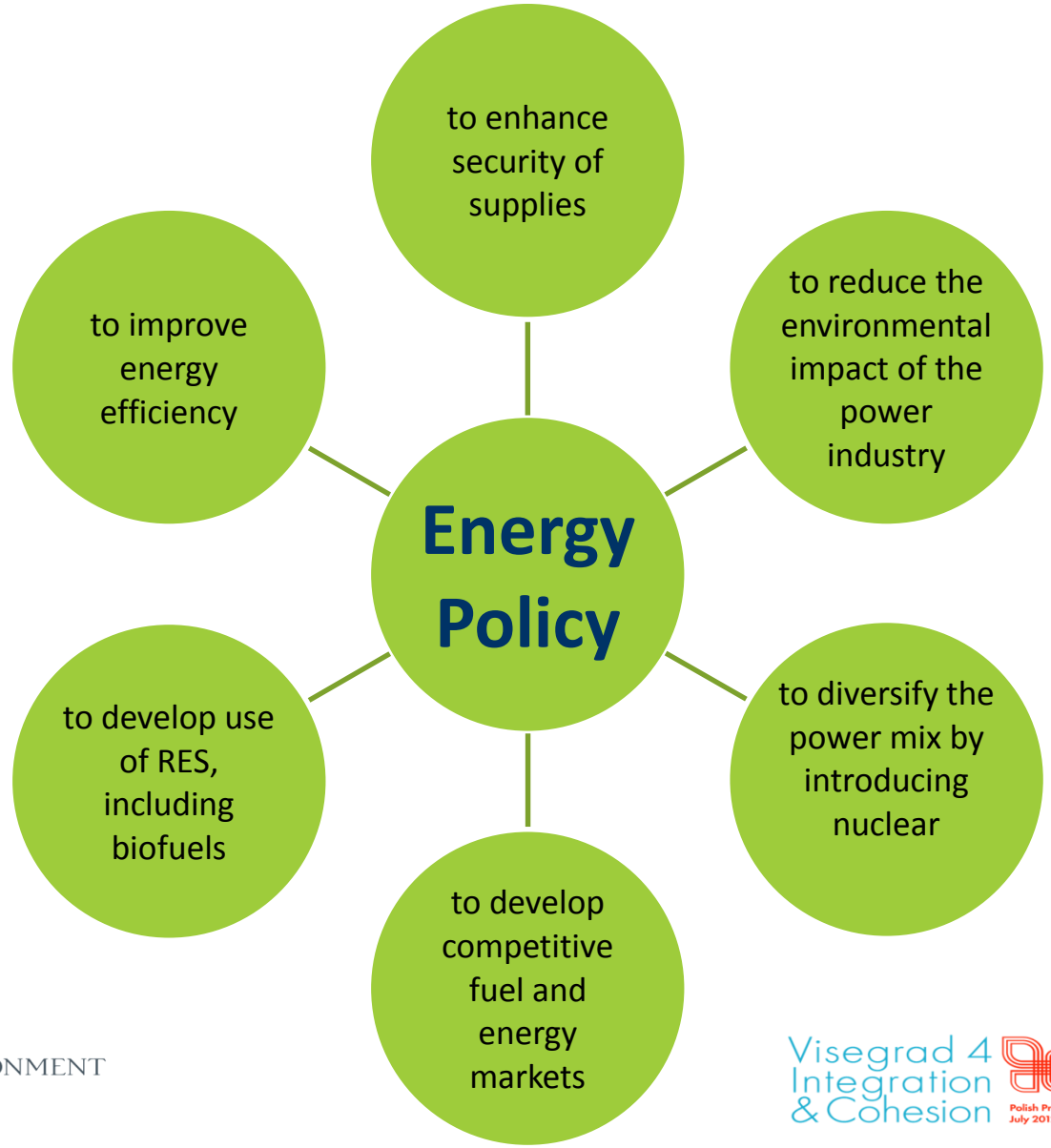


Significant dependence on external suppliers of natural gas

Commitments on environment and climate protection

Nearly full dependence on imported crude oil

Main pillars of Energy Policy until 2030



1. Energy efficiency

Main targets:

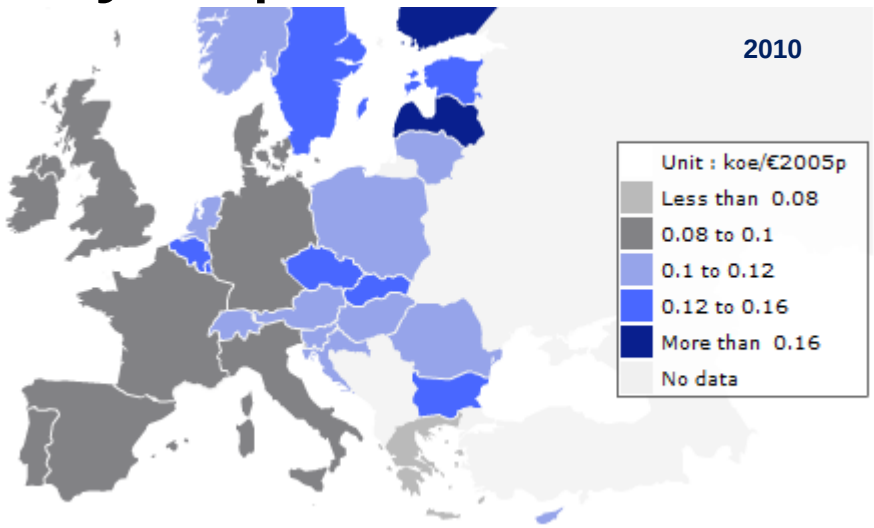
- To achieve development of Polish economy without increase in primary energy demand; „zero-energy growth”,
- Reducing the energy intensity of Polish economy to the EU-15 level (in 2005 figures).

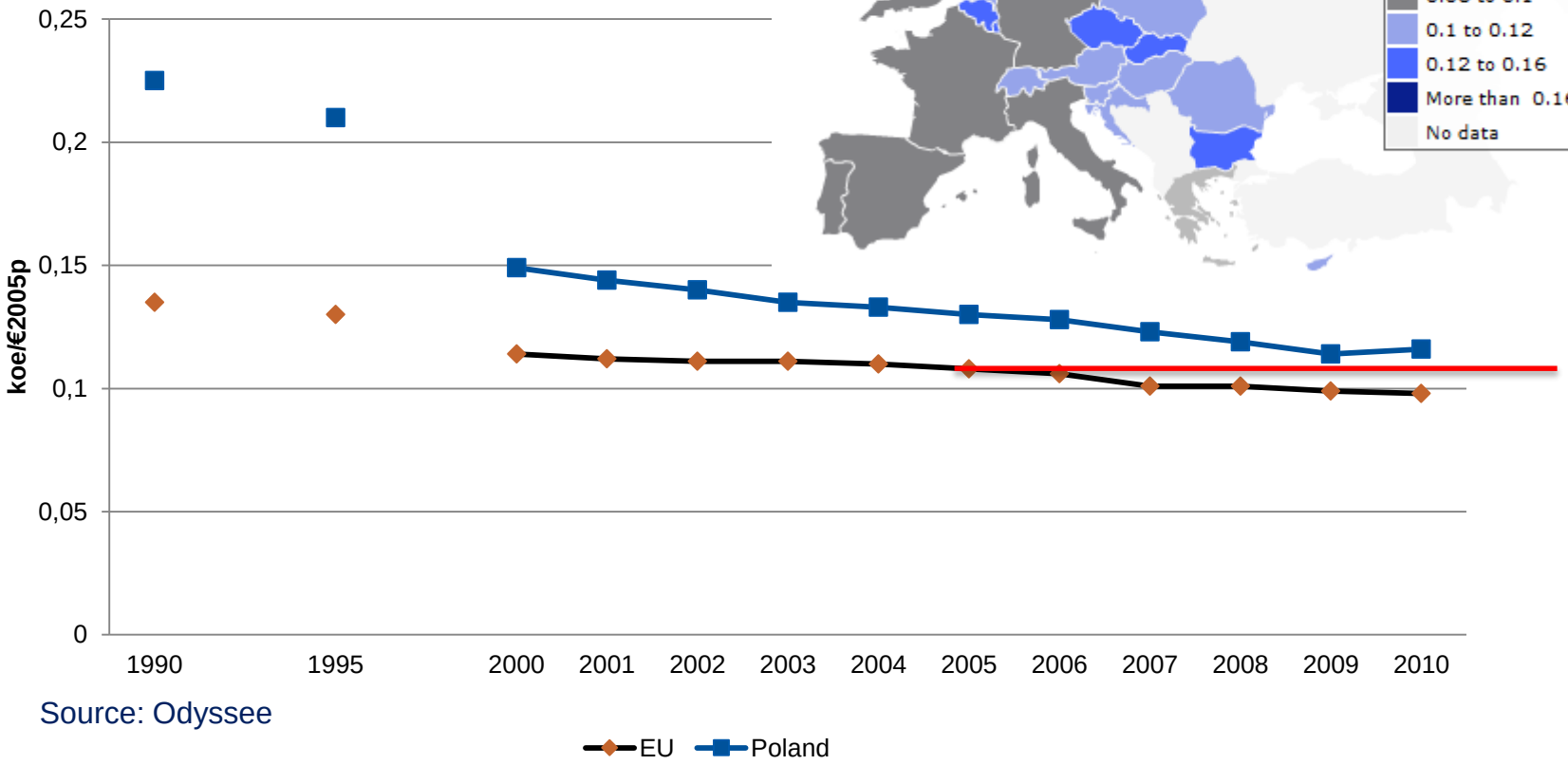
How?

- Implementation of a white certificate system,
- Developing efficient co-generation,
- Reducing transmission losses,
- Leading role of public sector.

Energy efficiency improvement

Final energy consumption per unit of GDP (at ppp)

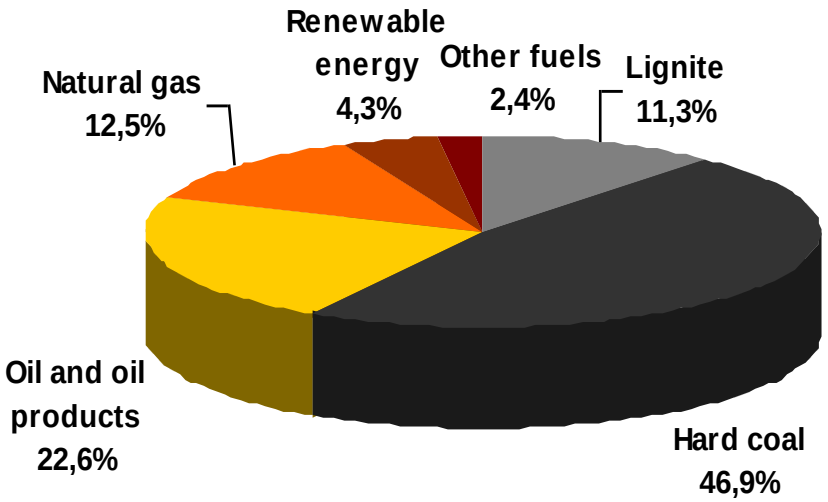




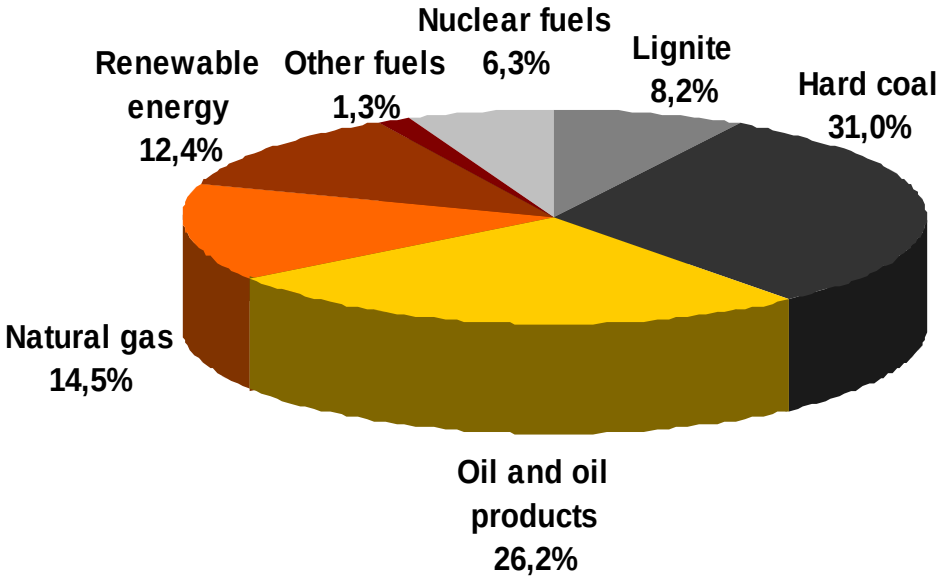
Source: Odyssee

„Current” and estimated demand

2010 ~ 100 Mtoe



2030* ~ 118 Mtoe



** Source: Projection of demand for fuels and energy until 2030, ARE*

MINISTERSTWO ŚRODOWISKA

White certificates scheme

- Objective – energy saving of 2.2Mtoe until 2016
- Electricity, heat and fuel suppliers with obligation to hold white certificates or pay substitution fee >5MW
- Certificates eligible from 3 areas covering min 10toe:

  - EE improvement by end-consumers,
  - EE improvement in installations for electricity of heat generation;
  - Limiting transport losses in electricity, heat or natural gas

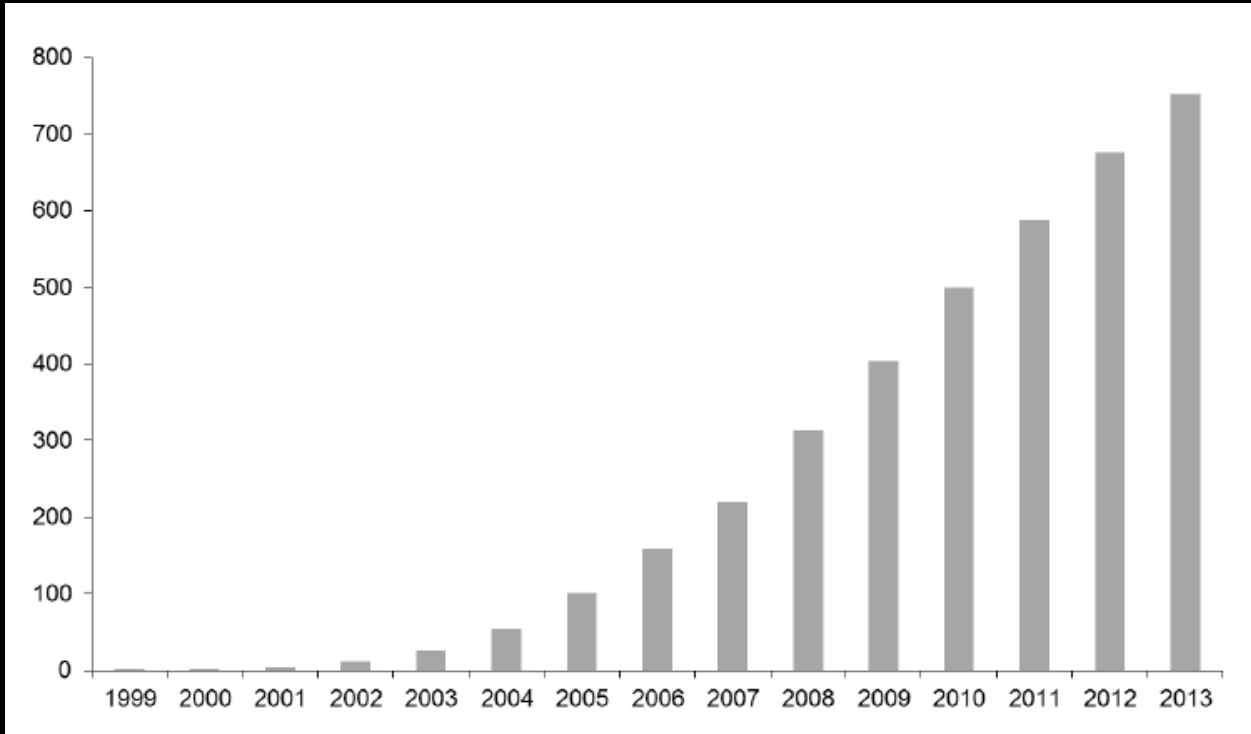
- Certificates generated if tender won – cost-efficiency
- Slow start – lerning period –second tender published

MINISTERSTWO ŚRODOWISKA

Termomodernisation

- Dedicated fund functioning since 1999
- Total budget – 400M euro

- Total savings in M PLN



2. Improvement of security of supply

Security of energy supply based on:

- **Domestic energy resources**
- **Diversification of oil and gas supplies**
- **Development of electricity generation capacity**
- **Development of transmission infrastructure**
- **Development of new technologies for gas and fuel production**

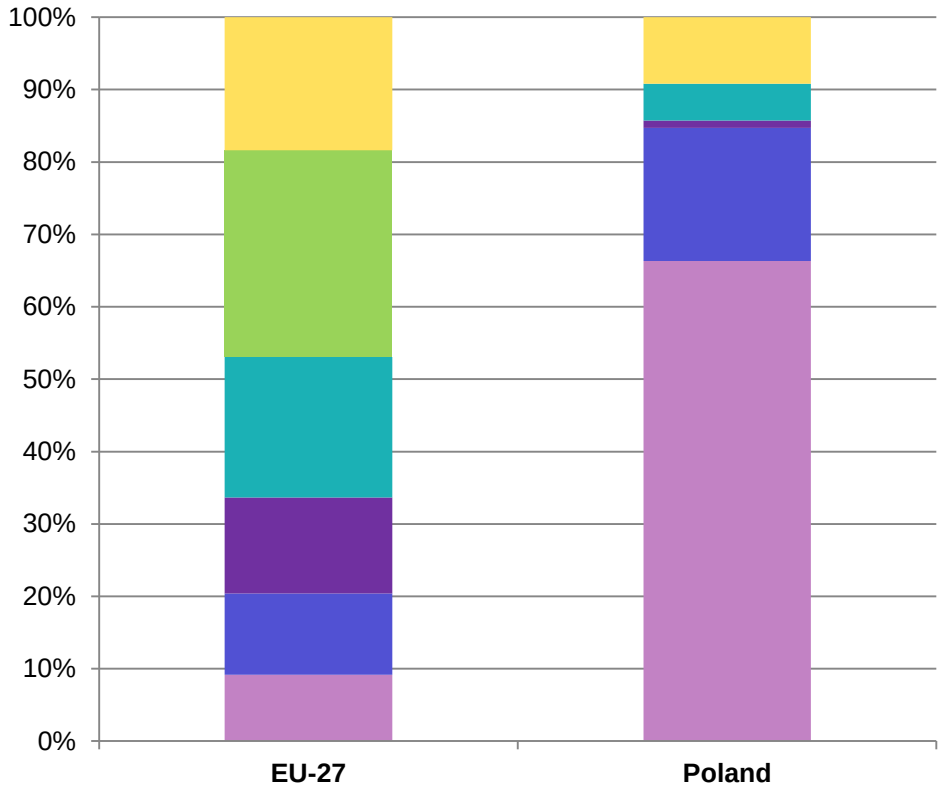
Electricity sector 2013

- Installed generation capacity: 37.4 GW
- Available generation capacity: 37.0 GW
- Maximum demand: 26.0 GW
- 45% installations >30 years old
- 77% installations >20 years old

- Gross output: 162 TWh
- Gross consumption: 157 TWh
- Consumption per capita: 4134 kWh
- Electricity consumers (.000): 16 482

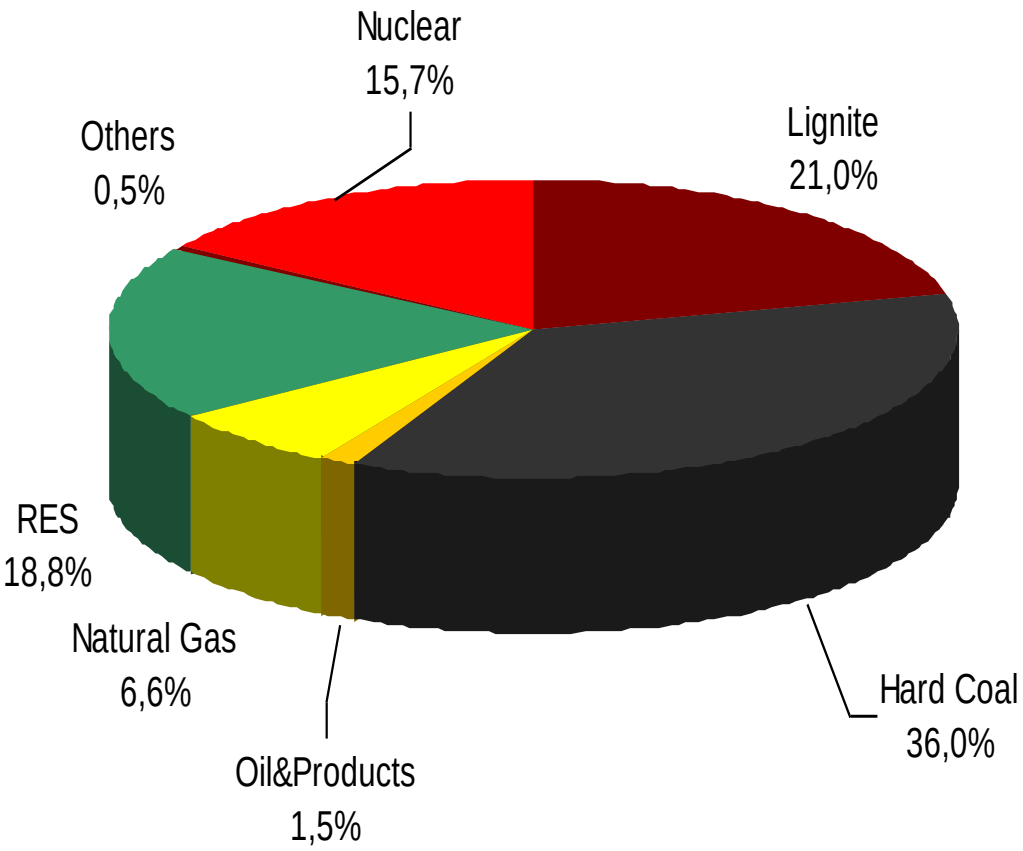
- Length of transmission lines: 13.500 km
- Length of distribution lines: 829.100 km

Power mix today

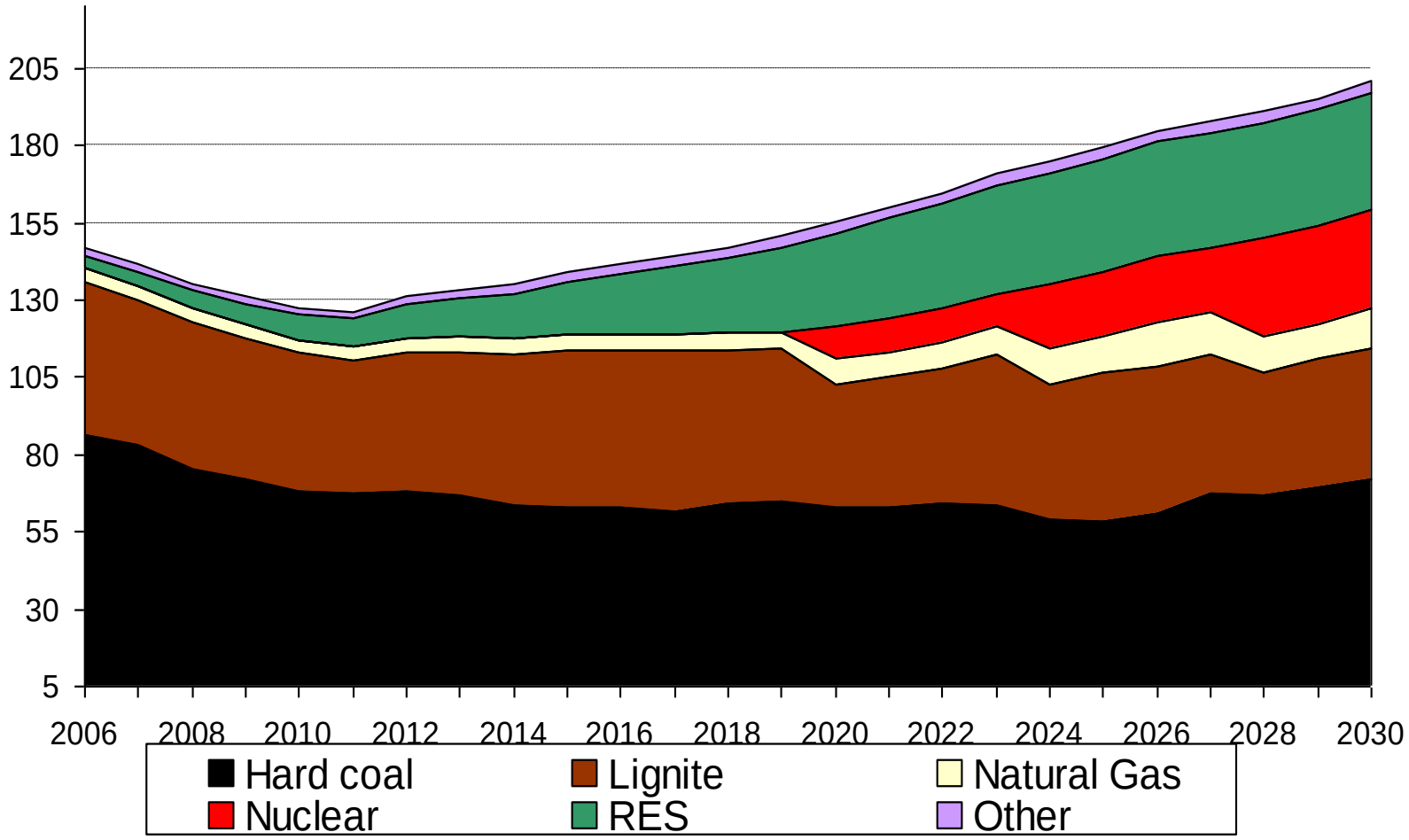


Source: Eurostat

Desired power mix in 2030

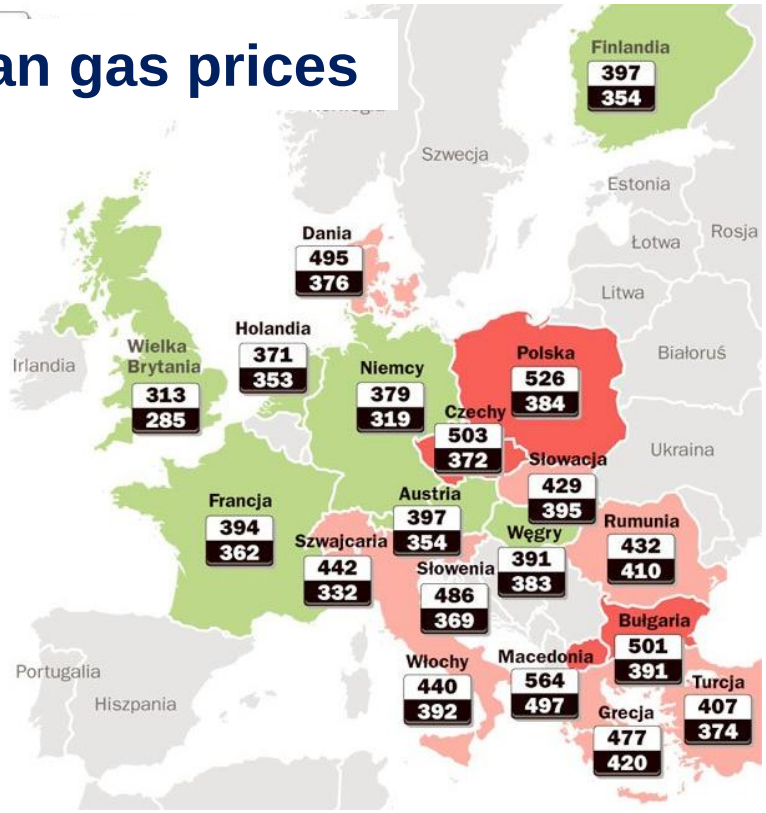


Power mix (TWh)

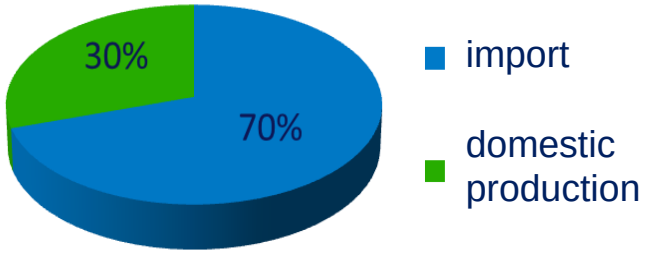


Natural gas

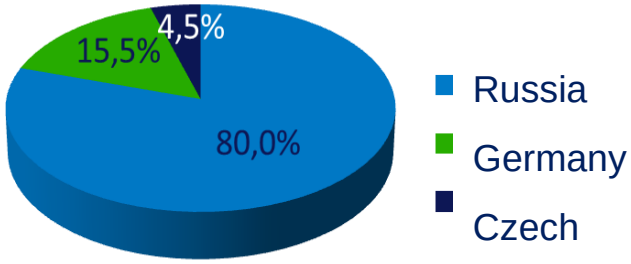
Russian gas prices



Natural gas supply



Natural gas import structure in Poland



Natural gas supply interruptions (1990-2013):

January 2009 (19 days), January 2006 (7 days), February 2004 (3 days), January 1995 (10 days), January 1994 (5 days), January 1993 (11 days), January 1992 (6 days), January 1991 (5 days)

Infrastructure

Electricity

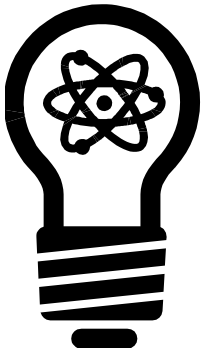
- PL-DE links – 2 projects
- Pump and storage station
- PL-LT connection
- PL-SE improvement

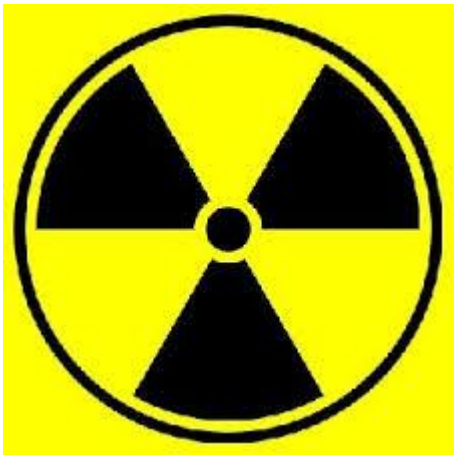
Gas

- **LNG terminal** – 2015 – 5bcm
- Jamal reverse – 2.3bcm
- PL-CZ – 0.5 bcm
- PL-DE – in progres
- PL-SK – in progres
- Gas storage

3. Nuclear energy

- Original plan – 2 blocks x3000MWe with first block before 2020
- Status – First block around 2024
- Technical advisor chosen, consortium in place PGE,KGHM,ENEA, Tauron





Government tasks:

- Legislation, human resources, infrastructure;
- Gaining public suport;
- Ensuring appropriate conditions for investors.

4. Renewable Energy Sources

- Beneficial to the energy security and to the emission reduction.

Main goals

- 15% share in final energy consumption in 2020 (**11% today**)
- 10% share of bio-fuels in fuel market in 2020

Main measures:

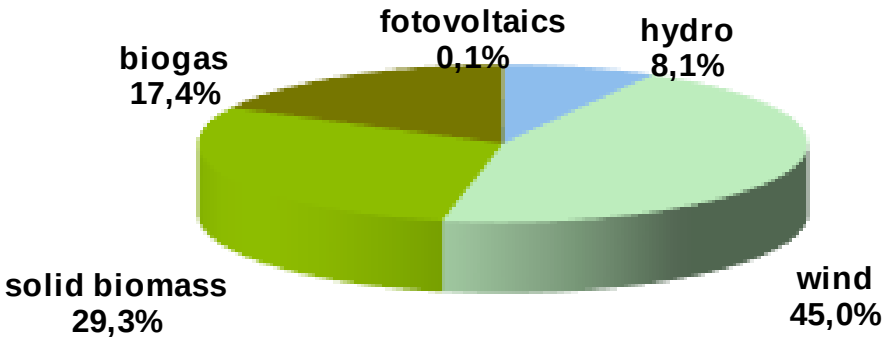
- Green certificate scheme
- Additional measures
- Co-firing covered
- Support from European Funds for CAPEX

RES in power mix

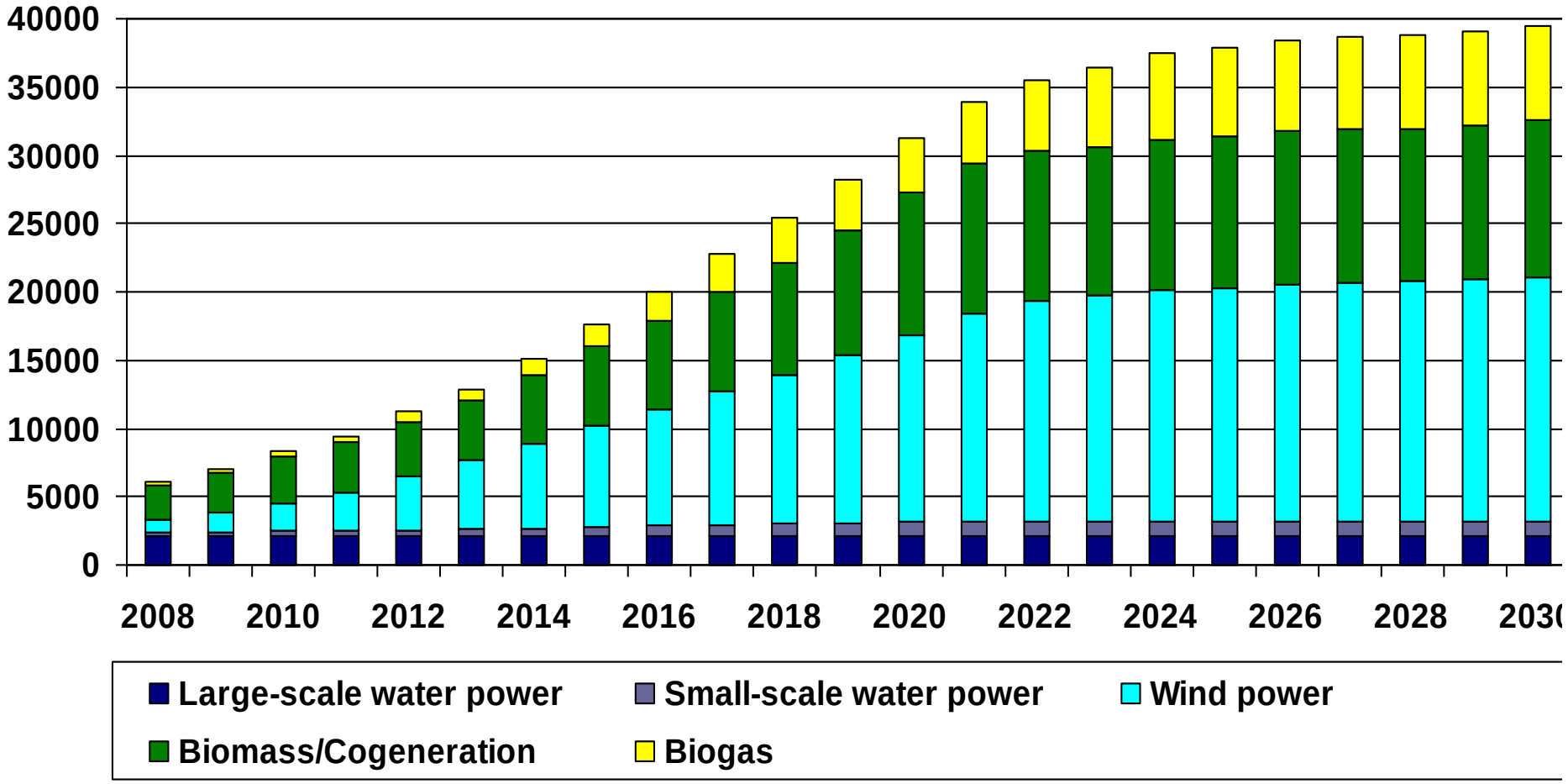
Share of RES in electricity generation

2008: 4,2% → **2030: 18,2%**

Expected RES mix in electricity generation for 2030



Projected evolution of RES power mix 2008 – 2020 [GWh]



Case study: solar panels

Beneficiaries:

- mainly private users

Budget:
Subsidy - 450M PLN 2010-2014

Results 09.2010 – 06.2013:

- 42 k. of installations
- 280M PLN subsidy
- 281M m² of installed panels
- in future – calculation of CO2 saved

- ***Loan up to 100%***
- ***Subsidy 45%***

OBJECTIVE: CO_2 cuts through installation of solar panels for private users

5. Development of competitive fuel and energy markets

Development of competitive fuel and energy markets

- New shape of energy market (more commodities' markets) **Gas – 40%, electricity – 80%**
- Simplification of switching suppliers
- Protection of vulnerable consumers
- Smart metering

6. Reduction of environmental impact of energy sector

Main actions:

- Improving air quality
  - RES
  - High efficiency CHP
  - Nuclear energy
- Development of Clean Coal Technologies
  - 2 CCS demo plants, (Belchatow, Kedzierzyn)
  - CBM for energy generation

CCS Projects 2010

- PC
- IGCC
- OXY

European Energy Programme for Recovery

Hatfield, UK
900 MW

Bełchatów, PL
250MW

Rotterdam, NL
250MW

Jänschwalde, DE
300MW

Compostilla, ES
323MW

Porto Tolle, IT
250MW

MINISTRY OF THE ENVIRONMENT

Visegrad 4 Integration & Cohesion
Polish Presidency of the Visegrad Group July 2012–June 2013

II.
Polish Energy Policy vs EU

friends or foes?

EU Targets for 2020

ON TRACK

20% reduction GHG (ref.1990)

20% RES in overall energy mix

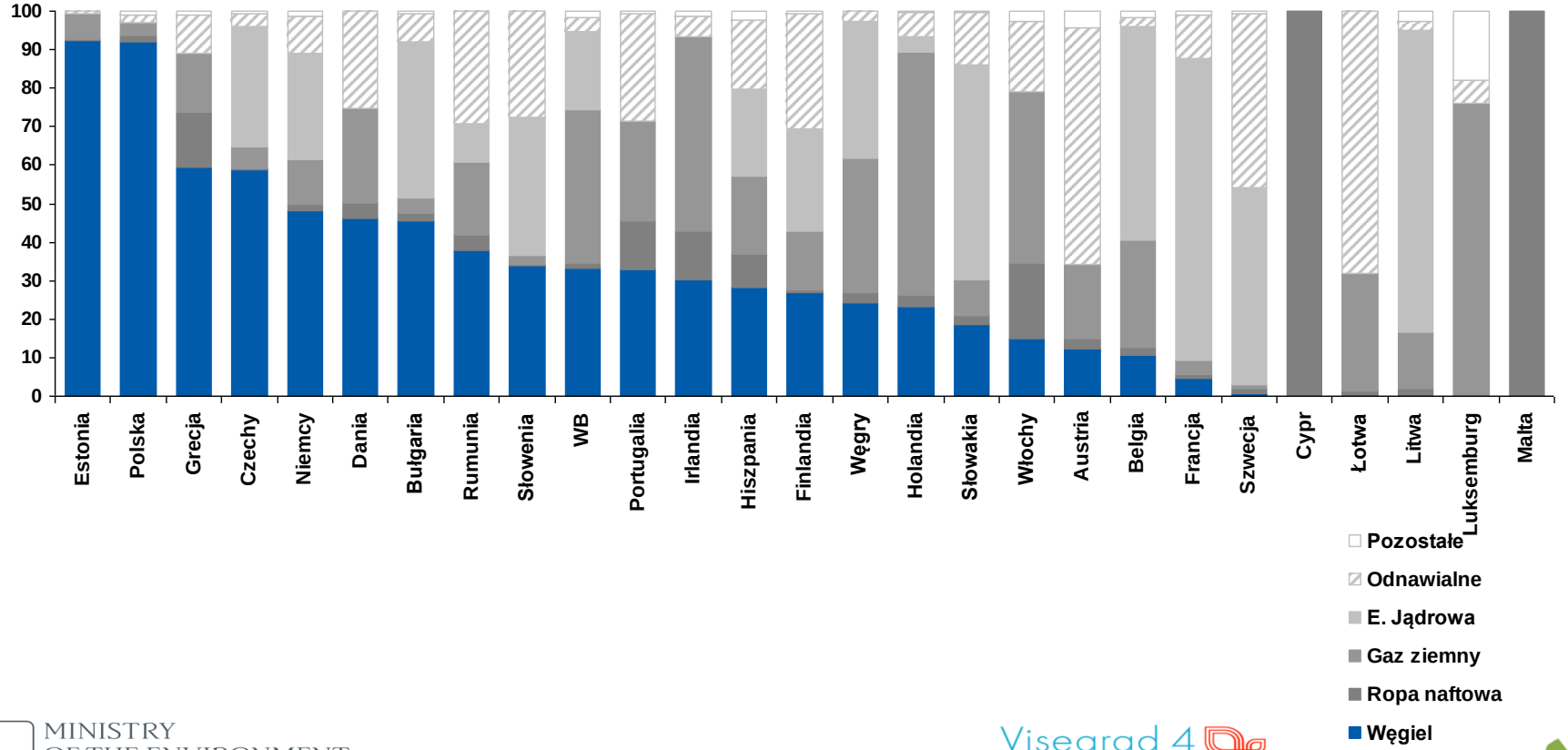
ON TRACK with 15%

20% Improving energy efficiency

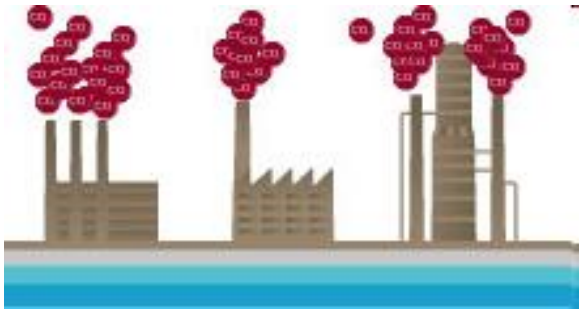
MAYBE ON TRACK

Polish „Special case”

- Differences in power mix



GHG Emissions



- Reductions under Kyoto 30% vs. 6% target
- ETS ignores power mix legacy and burdens Polish economy
- Significant share of industry in GDP puts energy cost high on agenda
- 10% of home budget spent on energy borders energy poverty
- Coal sector legacy
- Next clean thing after coal – imported gas

Renewables

On track to meet EU target of 15% (**2011 r. –10,8 %)**,

Work on a new suport scheme on-going factoring in EU lessons learned.

- Cost for consumers – long-term
- Fnancial sustainability
- Technology push
- Avoiding monocultures

Energy efficiency

- Driving force behind EE Directive
- Aspiring to GDP-energy consumption decoupling
- Experimenting with white certificates
- Feasible way to reduce CO2 footprint
- Technologies available in PL

Energy market & security of supply

- Difficult birth of gas market
- Difficult birth of electricity market
- Huge infrastructure needs
- Low supplier switch rate
- Smart metering potential
- Driving force behind strong SoS policy – Energy Union

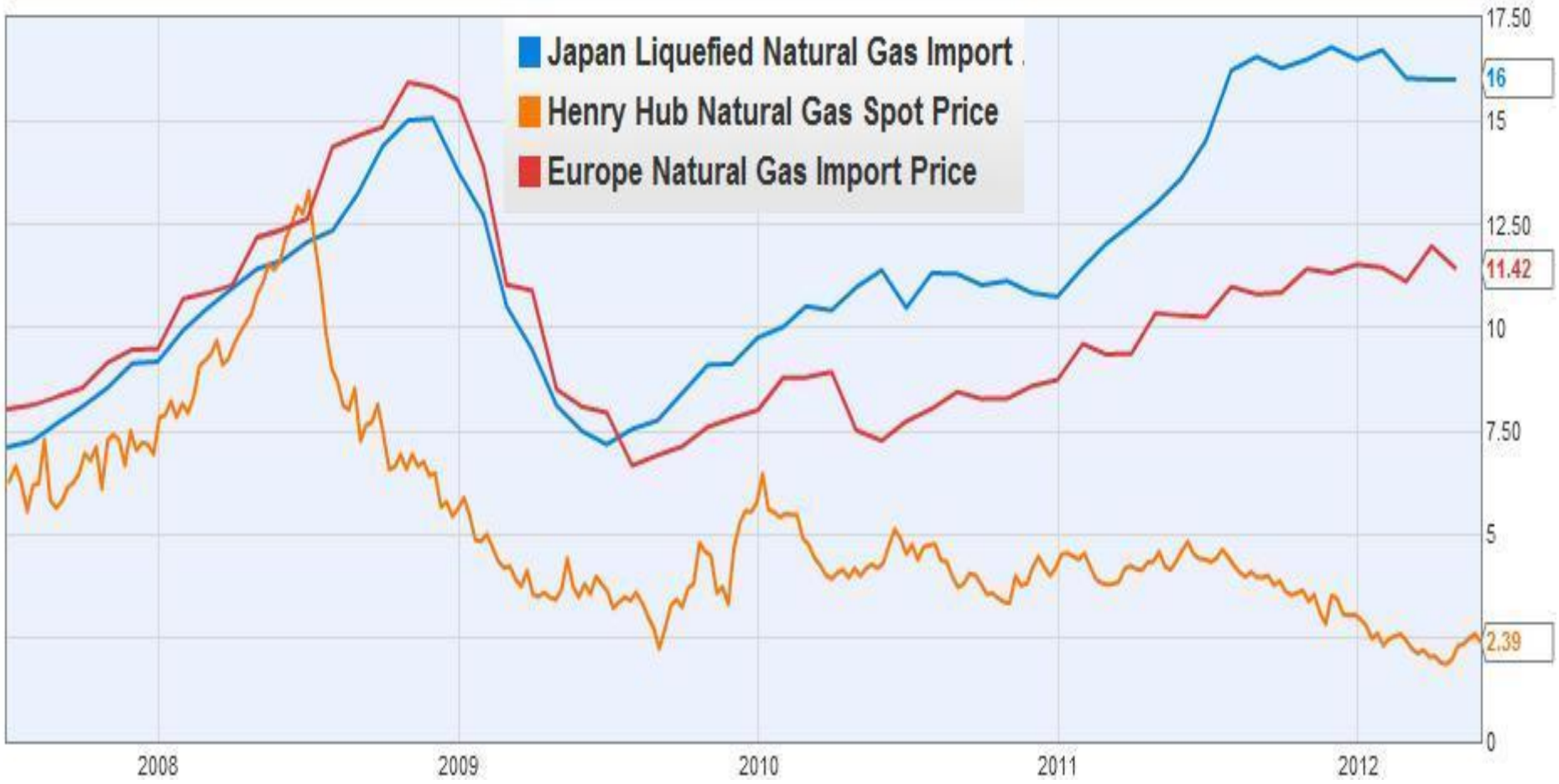
III.
External Factors
predictably unexpected

1. Shale gas revolution in US

	Natural gas production share		Jobs		GDP share	
2010	(27%)	53%	(0,6 mln)	1 mln	(76 bln $)	
2015	(43%)		(0,87 mln)	1,5 mln	(118 bln $)	197 bln $
2035	(60%)	79%	(1,6 mln)	2,4 mln	(231 bln $)	332 bln $

Numbers on the left (in brackets) – **shale gas**, numbers on the right – **natural gas from unconventional sources** (shale gas, tight gas and CBM).
Source: IHS Global Insight reports

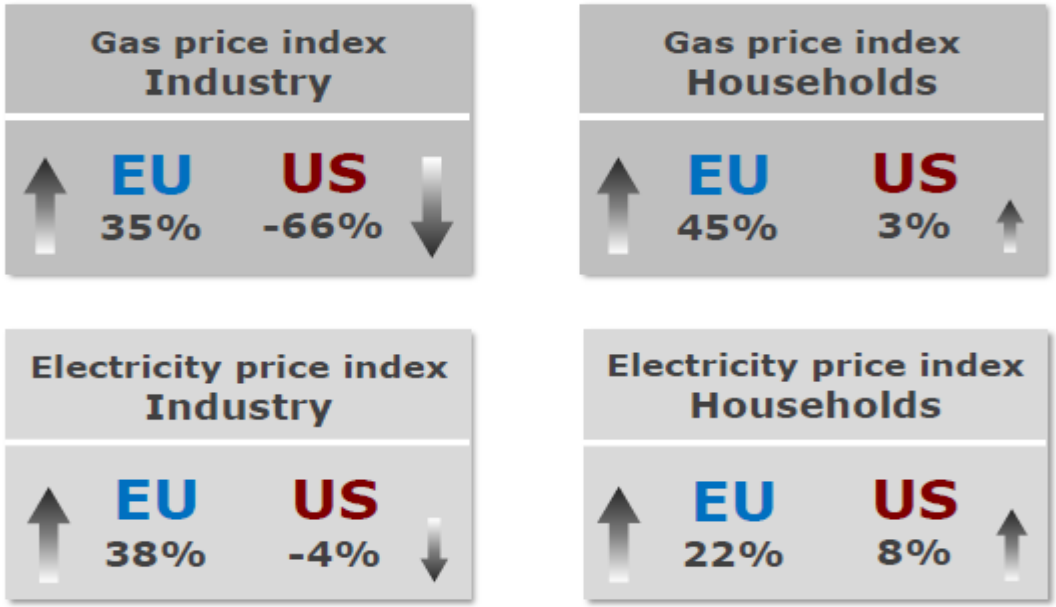
Competition advantage running away



Competition advantage running away

Prices affect competitiveness

Trends in energy price indexes 2005-2012



Presentation of J.M. Barroso to the European Council, 22 May 2013

Source: IEA

Shale gas resources in Poland

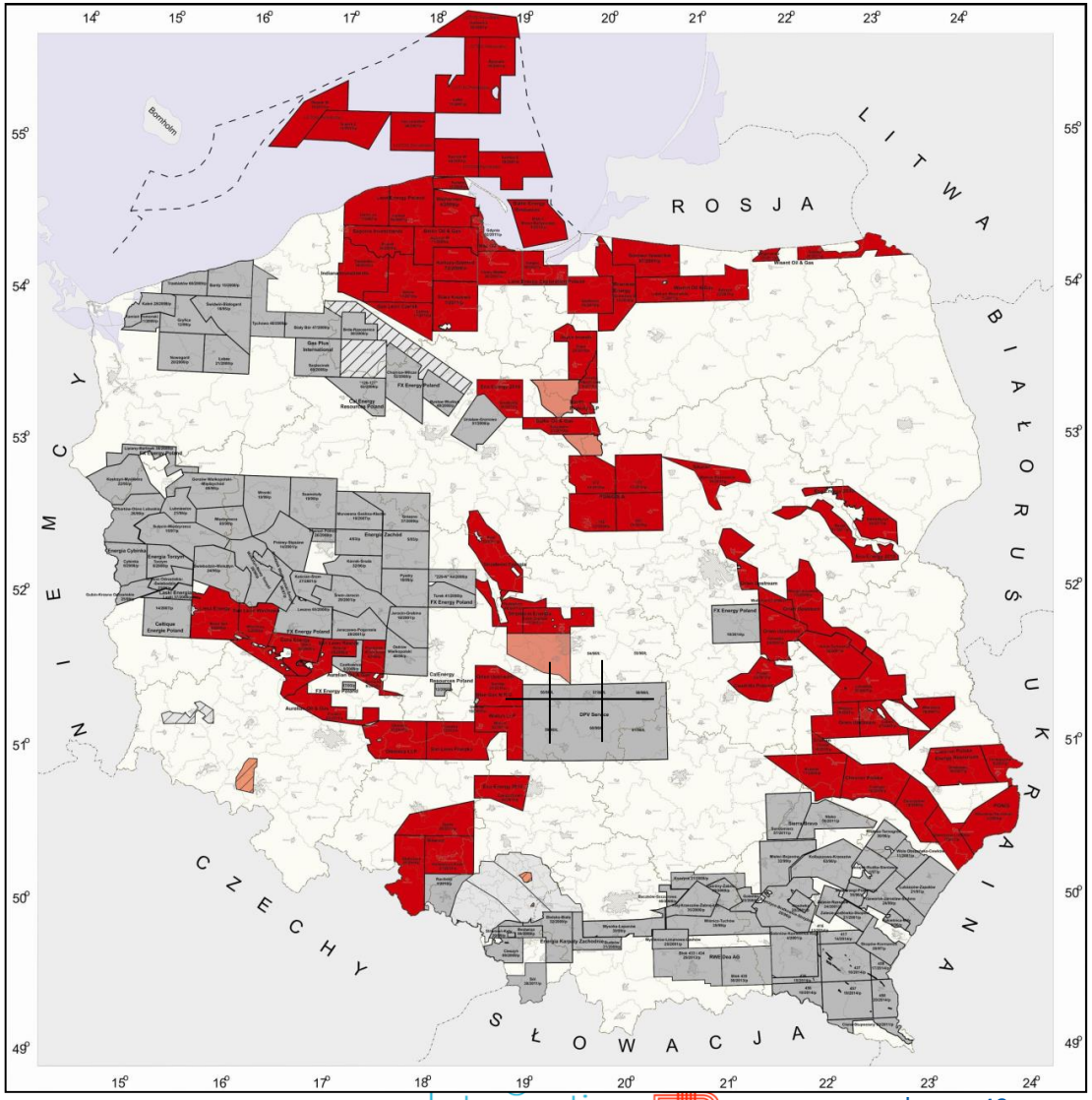
Shale gas exploration

68 prospection and exploration licenses

18% of territory covered by licenses

0 extraction licenses

September 2014



MINISTRY OF THE ENVIRONMENT

Shale gas exploration

66 exploration wells

51 vertical

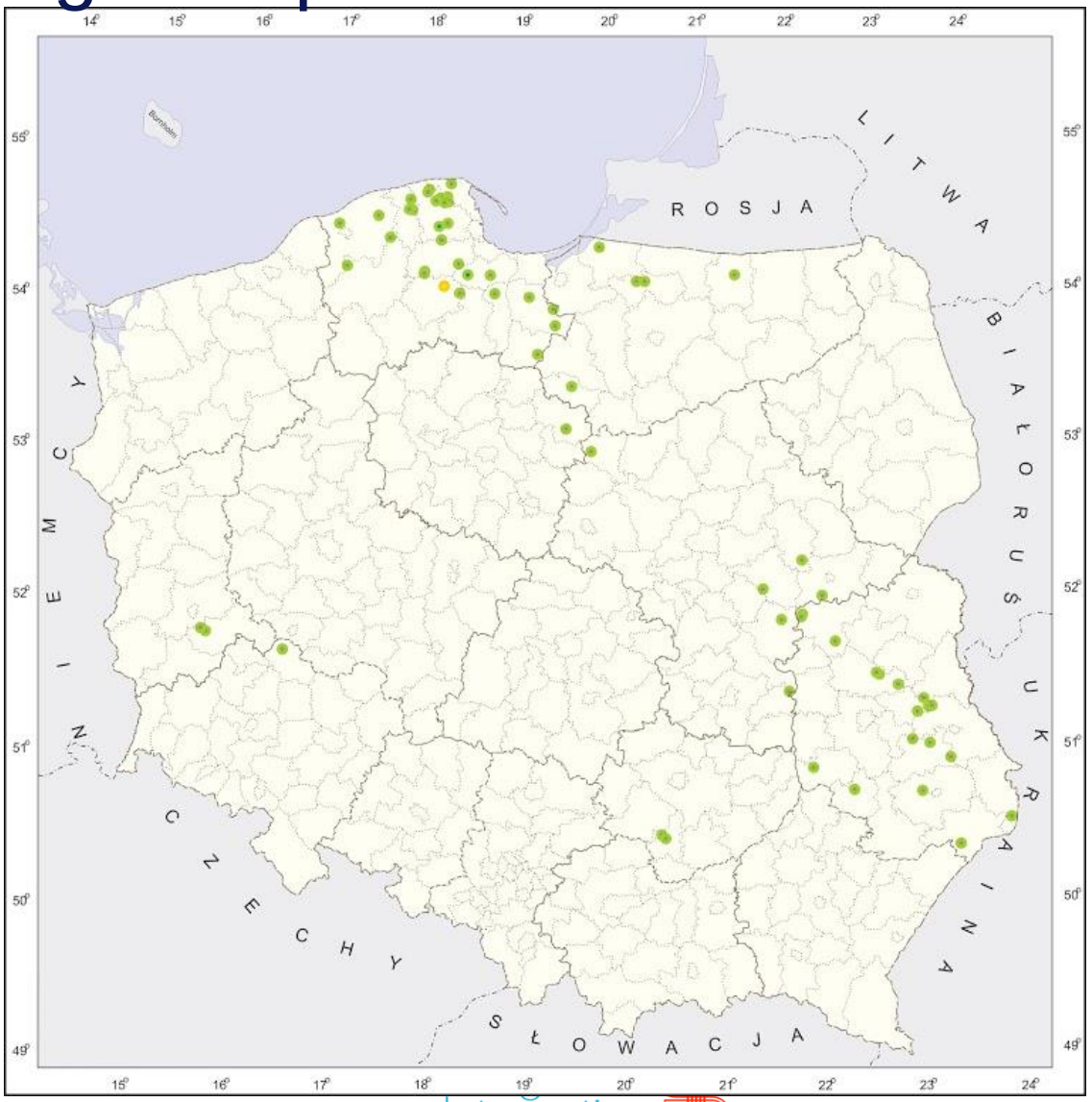
15 directional

28 fracturing

17 vertical

11 directional

September 2014



MINISTRY OF THE ENVIRONMENT

Integration & Cohesion
Polish Presidency of the Visegrad Group
July 2012–June 2013

Shale gas studies and research

ENVIRONMENT:

Environmental aspects of hydraulic fracturing treatment performed on the Łebień LE-2H Well – Polish Geological Institute – 2012

The environmental risk assessment of the prospecting, exploration and exploitation of unconventional hydrocarbons – General Directorate for Environmental Protection – 2012 → 2015

BLUE GAS – Polish shale gas – R&D programme for industry and academia – 2012-2022

RESOURCES:

Assessment of shale gas and shale oil resources of the Lower Paleozoic Baltic-Podlasie-Lublin Basin in Poland – Polish Geological Institute – 2012

Assessment of tight gas resources – Polish Geological Institute – tbp in 2014

Assessment of shale gas and oil resources – Polish Geological Institute – tbp in 2015

ECONOMY:

Report on economic effects of shale gas in Poland, United Kingdom and across the EU – tbp in 2014

2. Energiewende spill-over

- Grid defficiencies pushing electricity from N-DE to S-DE through PL;
- Subsidies will make DE power cheper long-term;
- Huge subsidies advanced some technologies;
- DE industry off the hook

3. Ukraine

Key gas pipelines in Ukraine

Source: East European Gas Analysis, National Gas Union of Ukraine

- RU deliveries to Ukraine stopped;
- Transit through UA threatened;
- Reverse flow helps UA, not EU;
- Energy Union project.

4. Economic crisis

- Sustaining crisis in eurozone;
- Investment conditions in Europe not ideal;
- Energy prices - low, infrastructure – old;
- Global companies run away

IV. Assessment & Revamp

do we know what we want?

Assessment – main points

- Energy efficiency: white certificates system smart but too complicated;
- Security of supply: big investments follow deadline fallacy - LNG terminal late. Nuclear delayed before site decided;
- RES: support scheme created co-firing and broke down;
- Competitive markets: It's just hard;
- Environment: where is clean coal?

Energy Policy 2050 will…

- Cautious approach – 2030 objectives still apply;
- **Coal** will stay as important and dominant ingredient of energy mix but it's role will fade;
- Diversification will invite **nuclear** to the mix;
- Diversified and cheaper **gas** could also enter the fray;
- **Shale gas** exploration continues under careful eye of Brussels;
- **Renewables** without support beyond 2030;
- **Climate** policy remains difficult as aspirations grow.

Conclusions

- Energy policy could be made without making tough choices;
- Betting on energy mix and following through is like gambling;
- Energy can create GDP or assist. Both at the same time difficult;

- Climate policy position – legacy issue, SoS issue, social issue;
- Energy policy still close to national security.


Thank you
for your attention