

# European Energy Market 8

## Energy mix

**Studia niestacjonarne II stopnia**  
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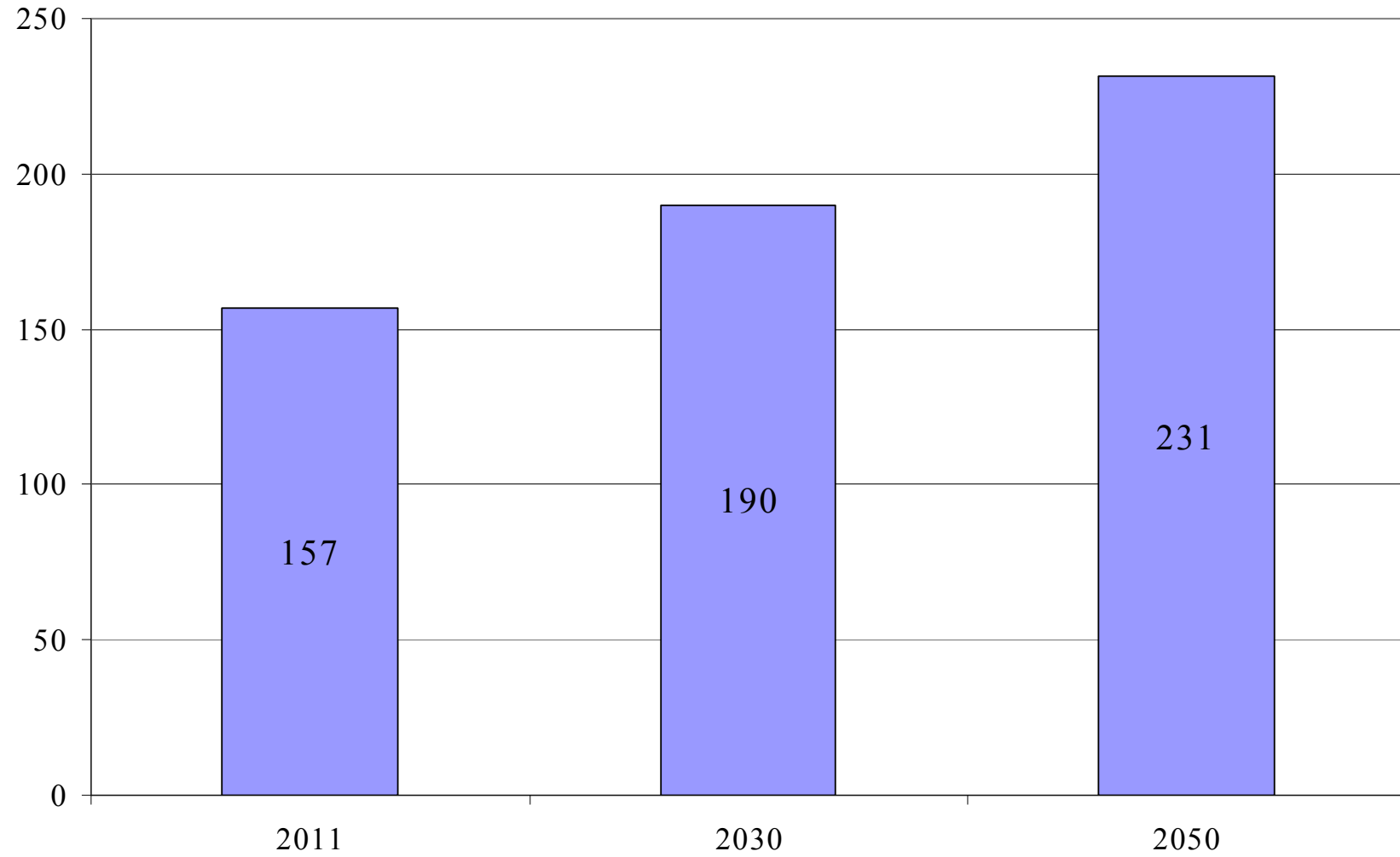
***[www.i15.p.lodz.pl/~mielczarski/](http://www.i15.p.lodz.pl/~mielczarski/)***

<b>Lp</b>	<b>List of lectures</b>
1	European Energy Markets
2	Polish Power System
3	Main Market Rules - Balancing
4	Electricity Trade - Power Exchange
5	Customers - TPA
6	Subsidized Markets
7	Cost of Electricity
8	Energy Mix
9	EU Emission Trade System
10	Cross border trading

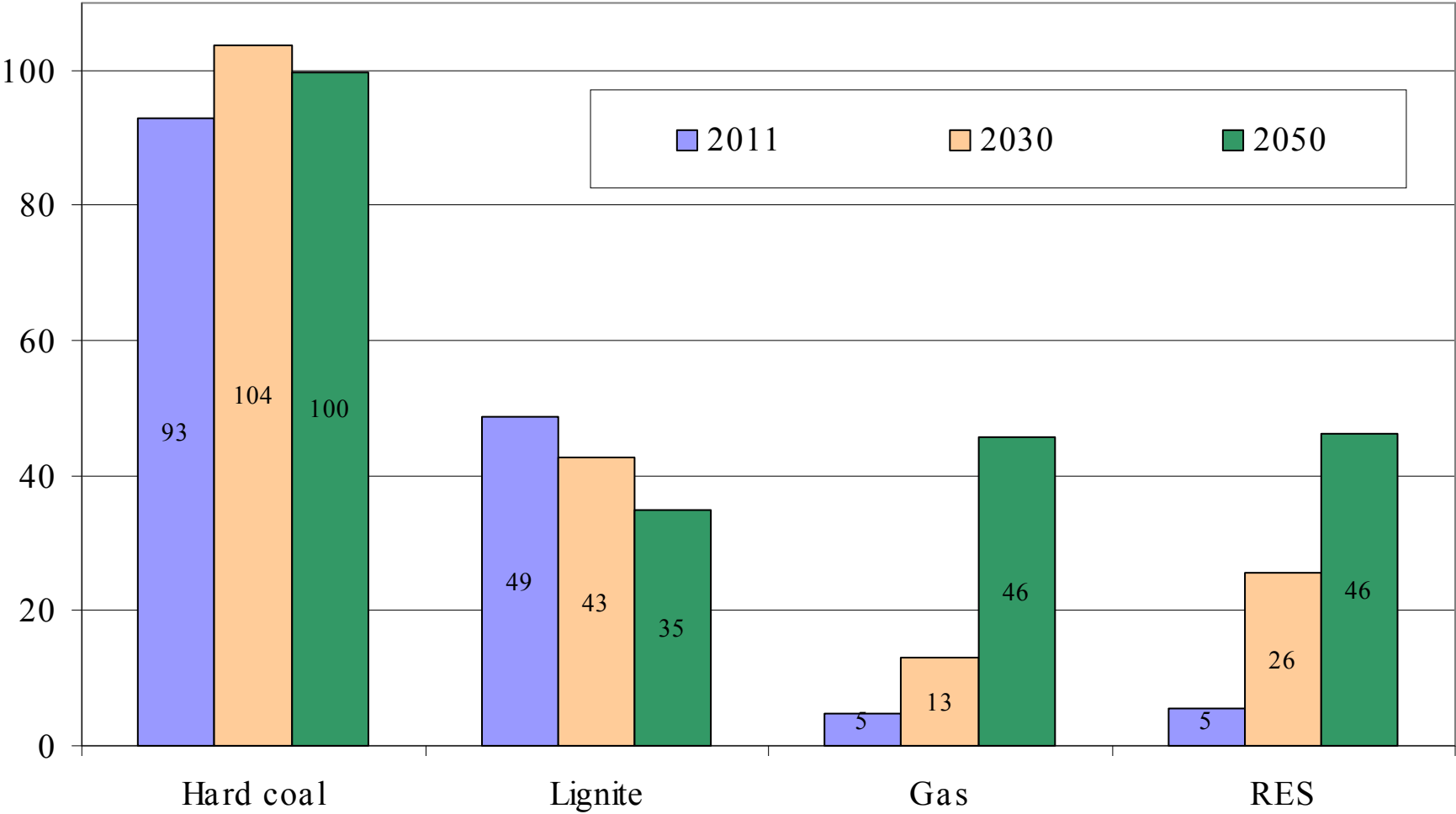
# Forecasting the energy demand

- There are two main methods of demand forecasting:
- **Bottom up approach.** Energy use is built up by prediction of consumption of particular sectors: industries, commercial & residential
- **Top down.** Energy use depends on the economy growth GDP.
- Increase of electricity use per 1% of GDP growth: China-1,7%, Spain-1,3%, Ireland-0,7%, **Poland-0,5-0,3%**
- **Electricity demand growth assumed – 1%/a**

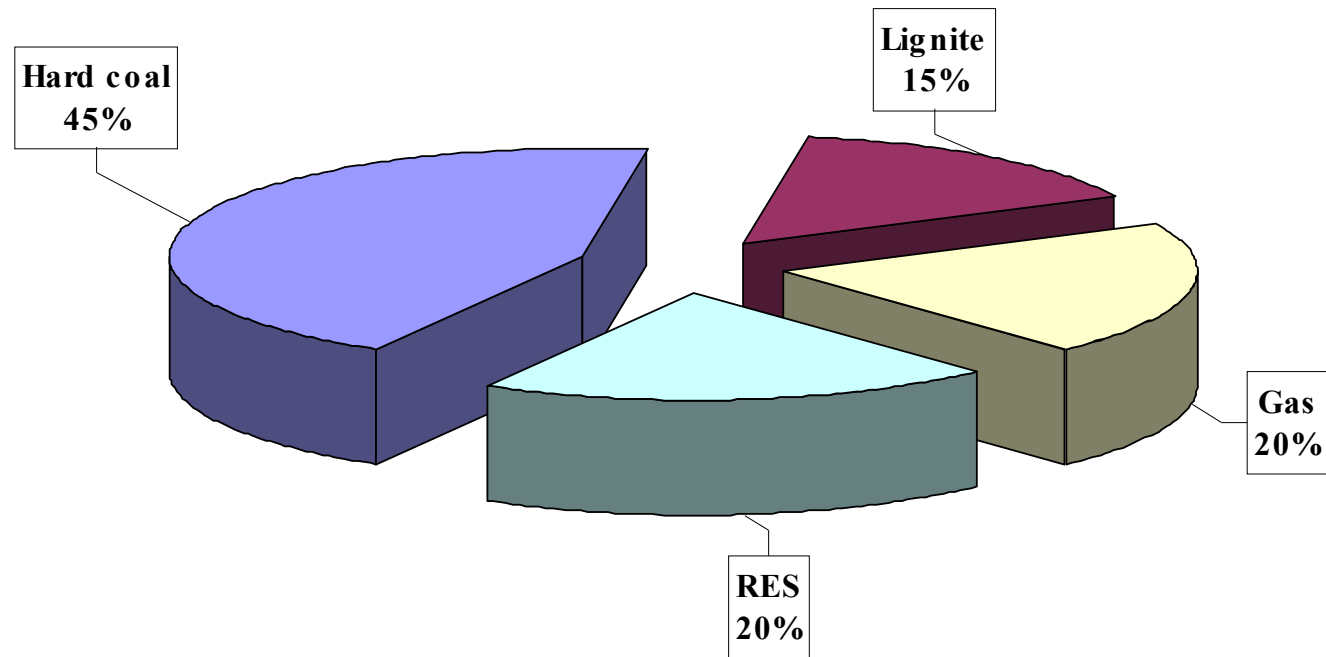
**Forecast of demand for electricity (gross) in TWh - annual growth 1%**



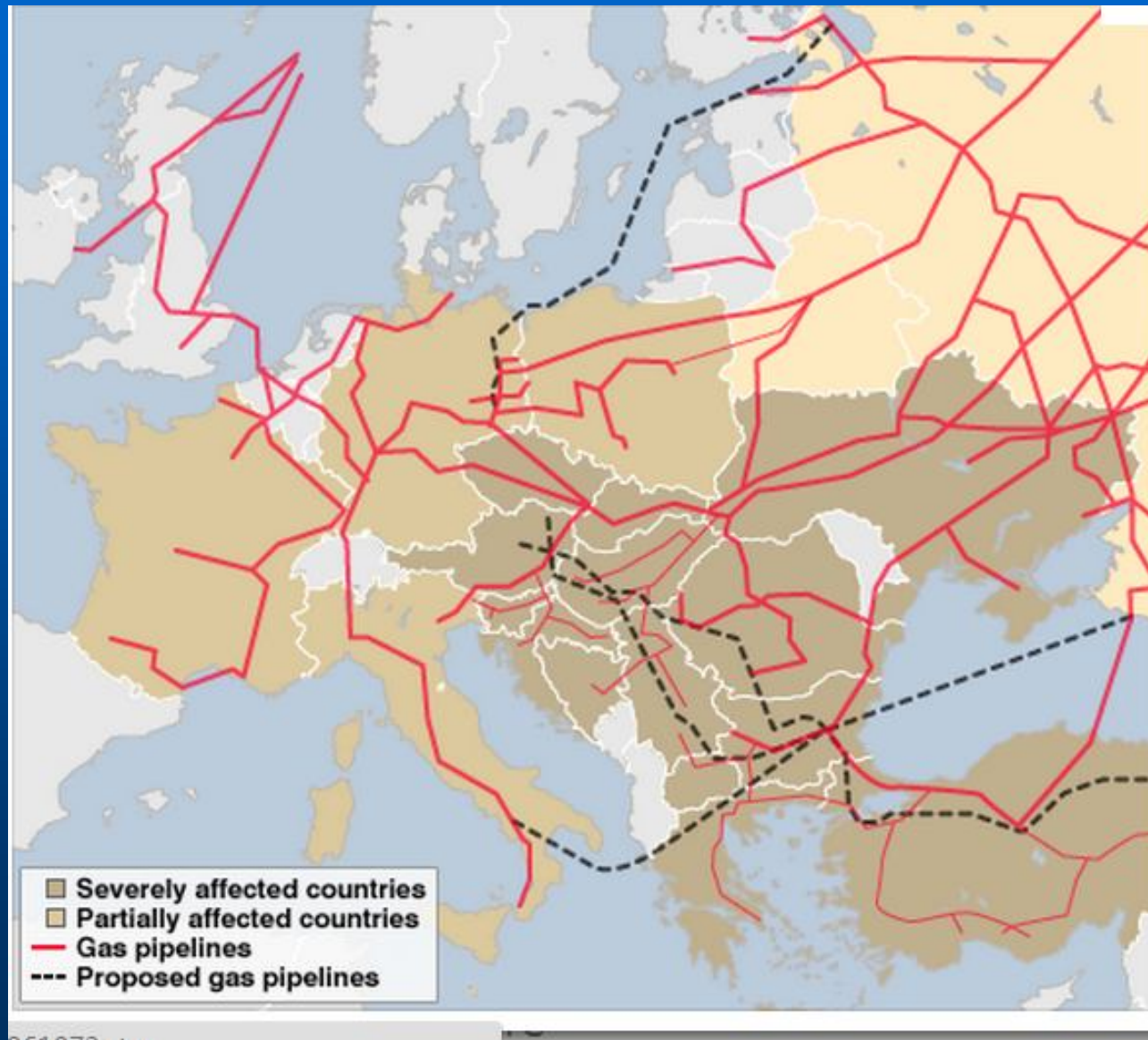
### Production of electricity in TWh in 2050



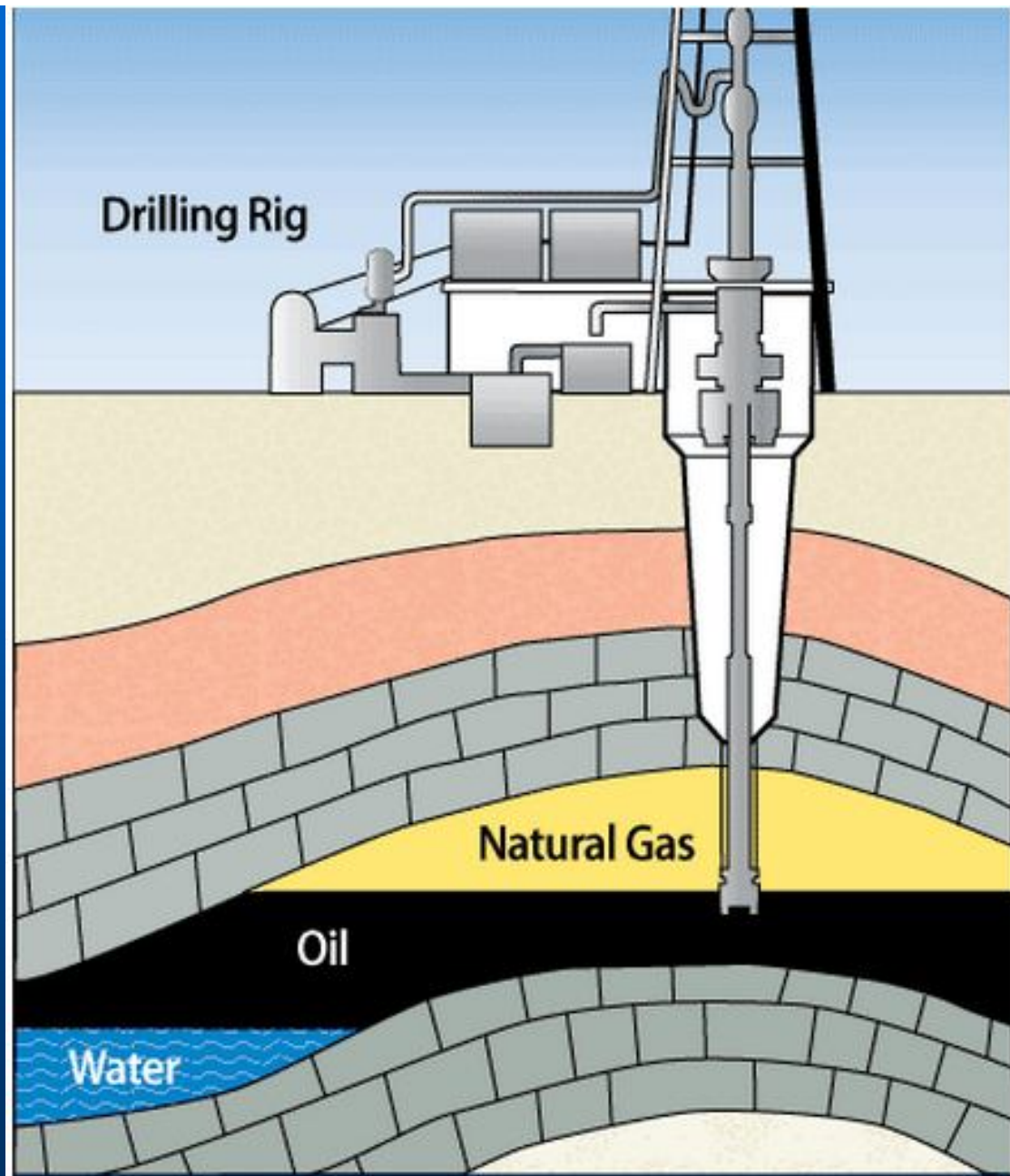
## Shares of various fuels in electricity production in 2050



# Gas pipelines in Europe

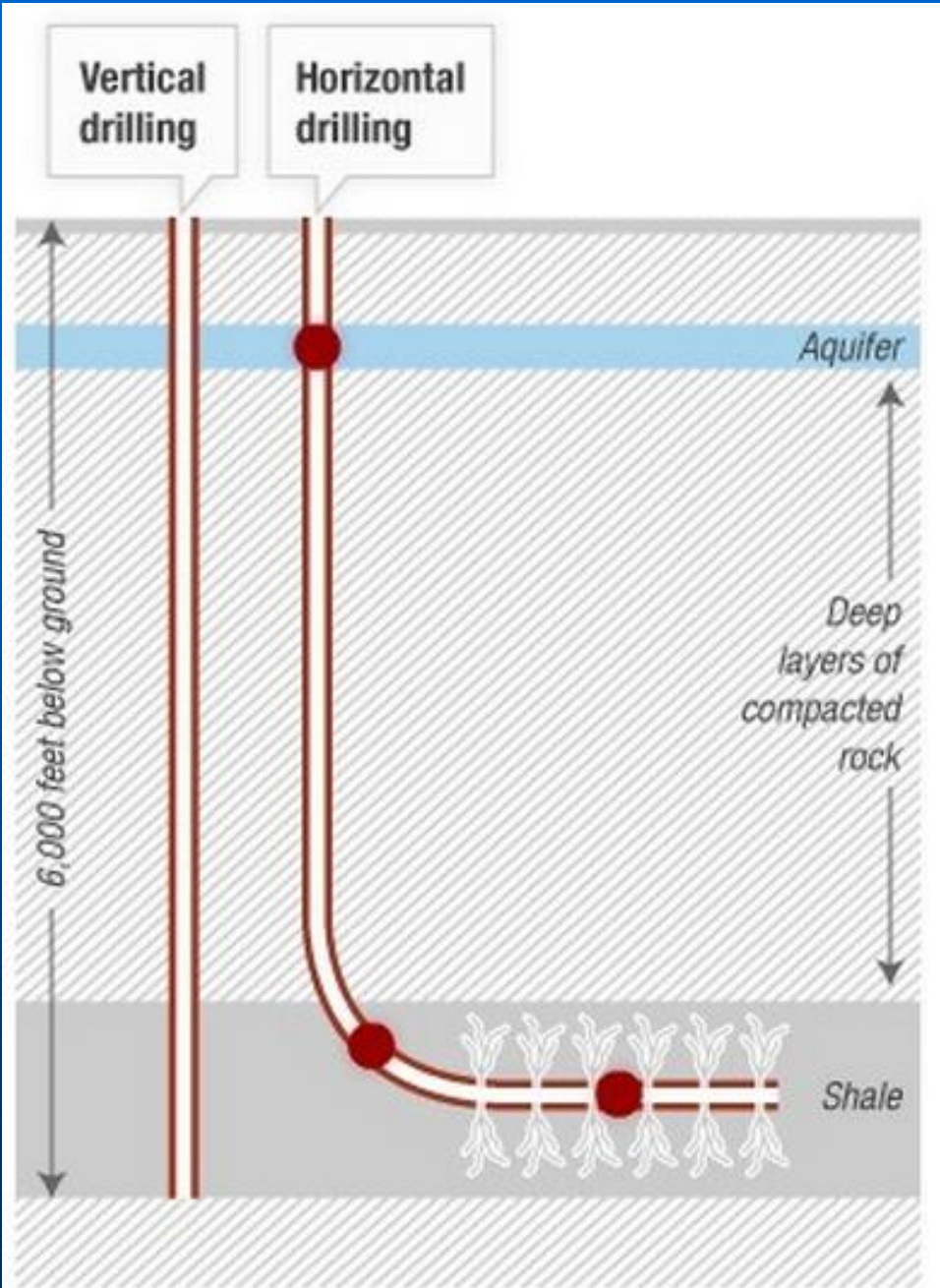


Source: [news.bbc.co.uk](http://news.bbc.co.uk)



Source: U.S. Energy Information Administration.





# Drilling for shale gas

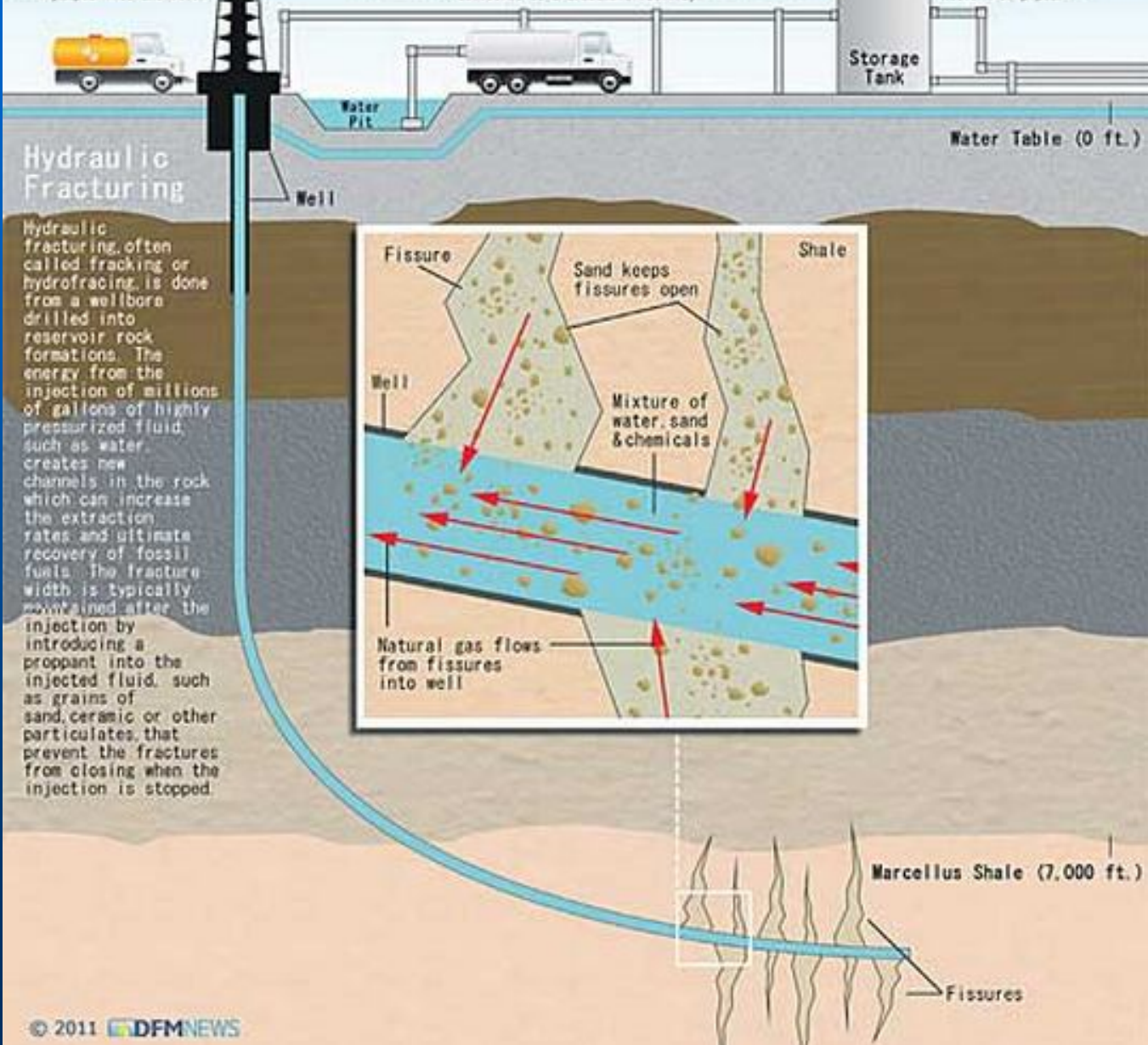
Credit: Tom Gjelten, Alyson Hurt and Avie Schneider/NPR

# Hydraulic Fracturing

Water is delivered, mixed with sand and chemicals and pumped into the well.

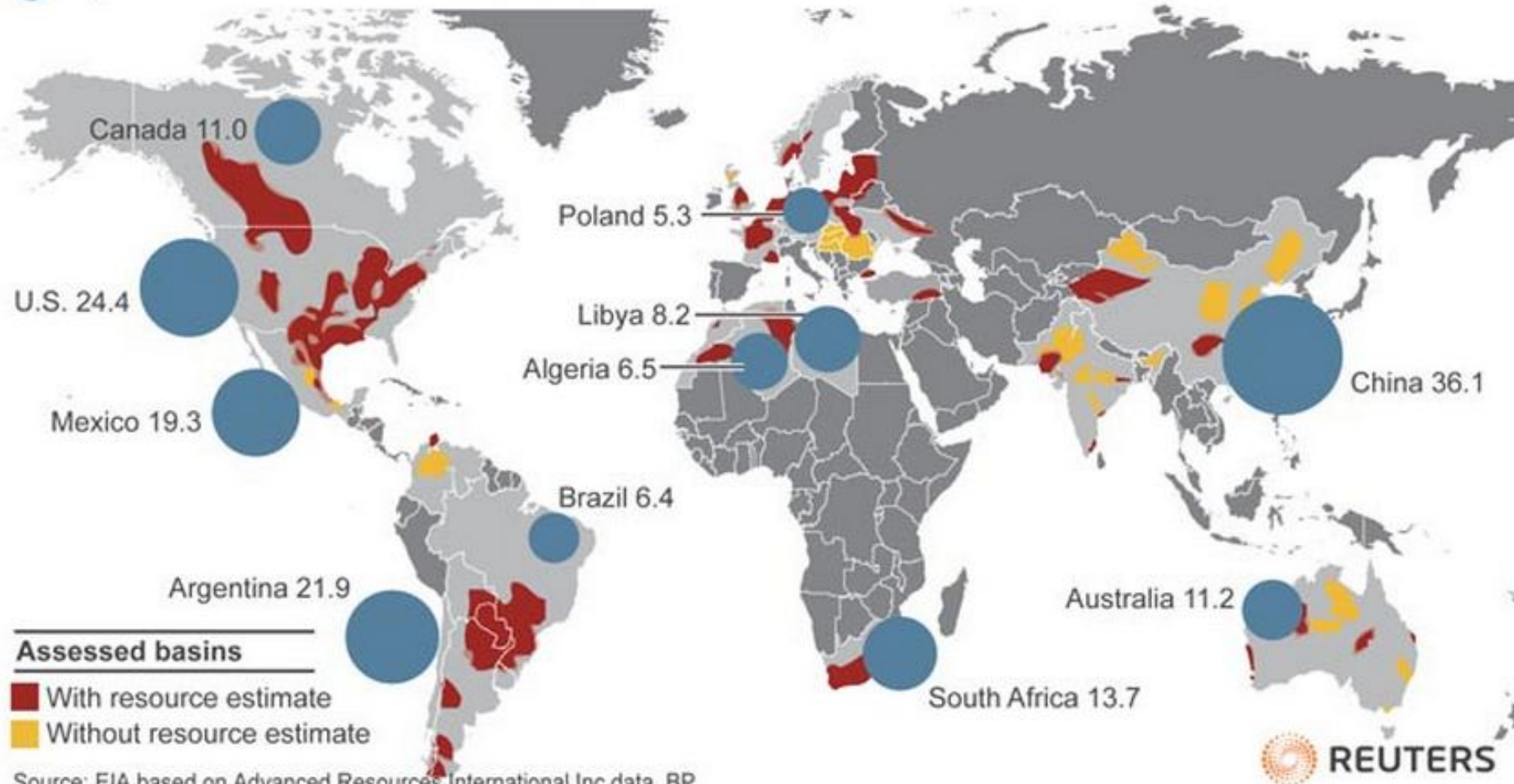
Natural gas flows out of the well and into storage tanks. Meanwhile, the recovered water is stored in open pits and then delivered to a treatment facility.

The stored gas is then sent to market via a network of pipes.



# Global shale gas basins, top reserve holders

● Top reserve holders 200 - Trln cubic metres



Reuters graphic/Catherine Trevethan

# Main gas pipelines in Poland

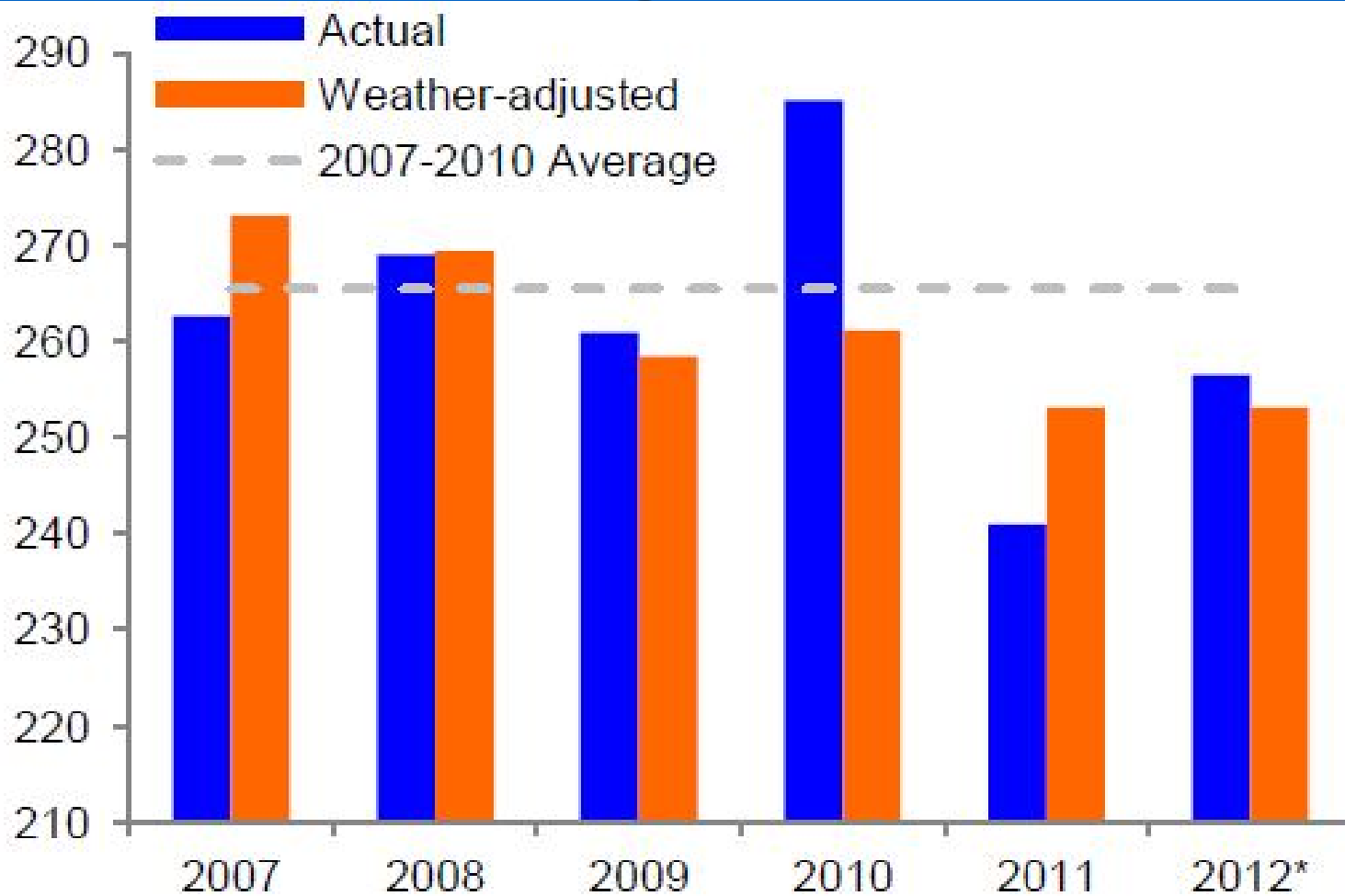


**Source:  
Gaz  
System**

# Gas consumption and reserves in Poland

- Current gas consumption in Poland counts for about 14 billion m<sup>3</sup>
- Import from Russia is 10 billion m<sup>3</sup>. Contract „take-or-pay” to 2022. Current price ~ 500USD/1000m<sup>3</sup>
- Domestic supply ~ 4 billion m<sup>3</sup>
- Estimated shale gas deposits count for 400 – 800 billion m<sup>3</sup>. Some estimates indicates ~ 3 000 billion m<sup>3</sup>.

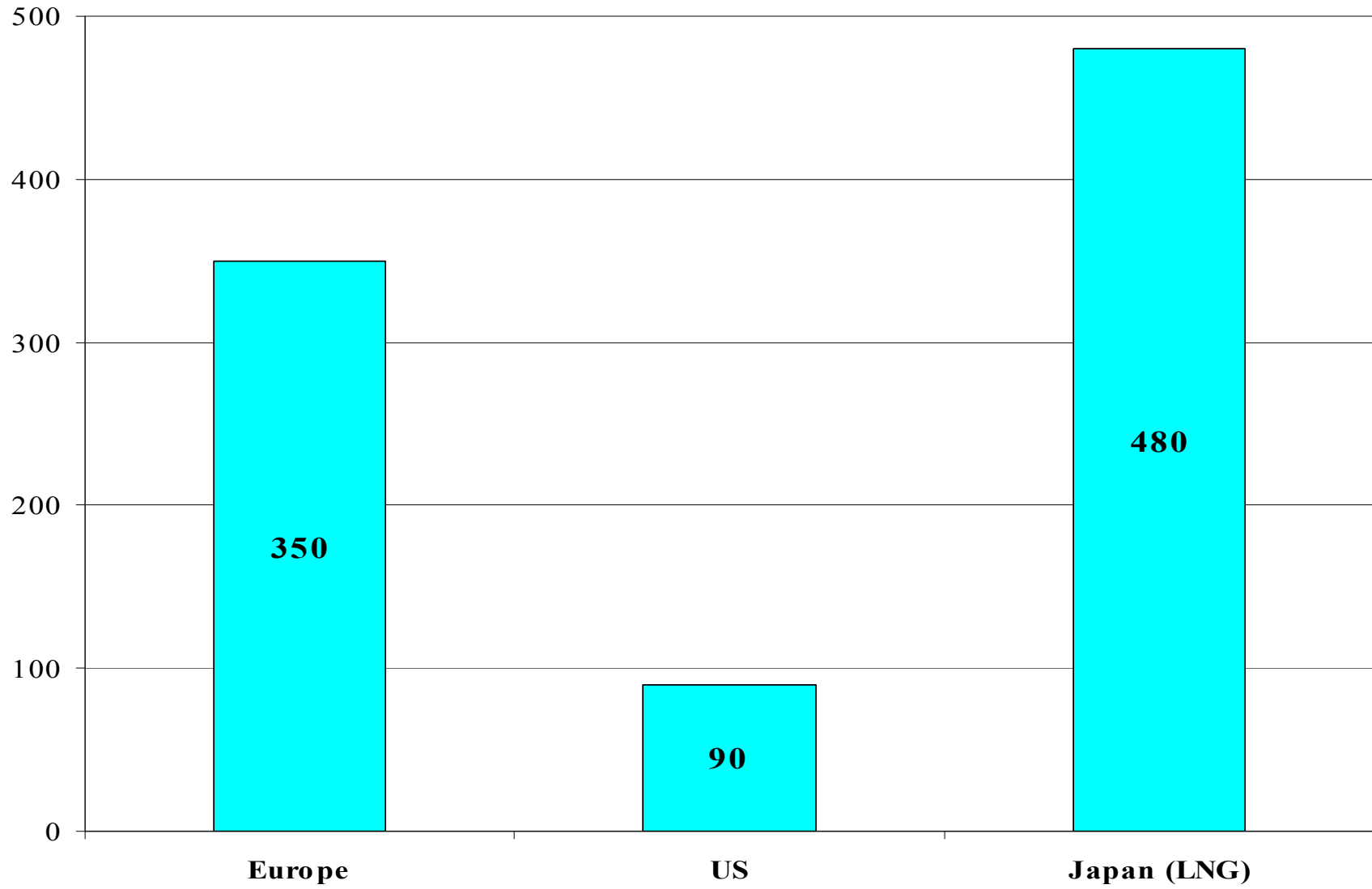
# Weather adjusted European demand for gas [bcm]



Source: Deutsche Bank

\*2012 figure is annualised using the ratio of normal demand in the first seven months relative to the whole year.

### Prices of gas in Europe, US and Japan in USD/1000m3



# Gas supply delivery

- **Poland** – Yamal gas pipeline + Reverse on Yamal from Germany + LNG in Świnoujście gas port 5 bcm/a
- **Europe** – Yamal, North Stream + South Stream ? + LNG ports
- **the US** – ban for gas export; several LNG ports are reconstructed from import to export. Cancellation of gas contracts from Middle East. In 2-3 years, the US will be ready to deliver substantial amount of gas to Europe.