World Economic Dynamics (WED) Model: Gas consumption modeling and forecasting

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Economic modeling and forecasting

Primary energy modeling and forecasting

Electricity output modeling and forecasting

Oil consumption modeling and forecasting

Gas consumption modeling and forecasting

Coal consumption modeling and forecasting
Why consumption modeling and forecasting is important in case of natural gas?

Considering today's gas supply possibility (traditional sources, shale plays, coal bed methane, shelf production etc) and transportation possibility (wide gas pipeline network and LNG shipping), we can assume that the future of gas will be determined by gas demand.
Gas consumption review

mln toe

- **Others**
- **Canada**
- **Iran**
- **Ukraine**
- **Japan**
- **EU**
- **Russia**
- **USA**
- **China**

Years:
- 1990
- 1995
- 2000
- 2005
- 2010
- 2013
Natural gas consumption balance

Unit cost coefficient of electricity production

Residential per capita gas consumption

Others sectors unit gas consumption coefficient
Unit cost coefficient of electricity production: methodology

General assumption: Unit cost coefficient on electricity production – should decline everywhere

To forecast the coefficient we use linear regression coefficient for historical data of growth rates. This way we estimate future growth rate until 2024. From 2025 y. we use accumulation function, which will lead us to very slow decline of growth rate at the end of the period (target 0.999).
Unit cost coefficient of electricity production: results

Graph showing the unit cost coefficient of electricity production for EU, CHN, and RUS from 1990 to 2044. The graph indicates a downward trend for all regions, with the EU having the highest initial coefficient and the CHN having a lower and more stable coefficient compared to RUS.
To forecast growth rate of this coefficient, we use linear regression’s coefficients until 2019y., than we use accumulation function, which will lead us to very slow growth of growth rate at the end of the period (target 1).
Share of gas power generation: results

[Graph showing the share of gas power generation for different countries from 1990 to 2044]
Unit cost coefficient of electricity production and share of gas power generation in total generation

![Graph showing unit cost coefficients and share of gas electricity for various countries.](image)
6-step methodology: preparing data, analyzing data, checking for correlation between per capita consumption costs growth rates and GDP per capita growth rates, regression and calculation of annual growth rates, calculation of per capita cost coefficient, calculation of residential gas consumption forecast.
Residential per capita gas consumption: results
4-step methodology: preparing data, analyzing data, checking for correlation between per capita consumption costs growth rates and GDP per capita growth rates, regression and calculation of annual growth rates, calculation of per capita cost coefficient, calculation of residential gas consumption forecast.
Last step

Gas consumption forecast in a specific country

= Electricity output*Electricity unit production cost coefficient*share of gas power generation
+ Population*Residential per capita consumption
+ GDP* other’s sectors unity consumption cost coefficient
Gas consumption outlook

[Graph showing gas consumption outlook with data points for various years and countries, including China, USA, EU, Ukraine, Japan, Russia, Iran, and Others.]
Thank you for your attention!
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