



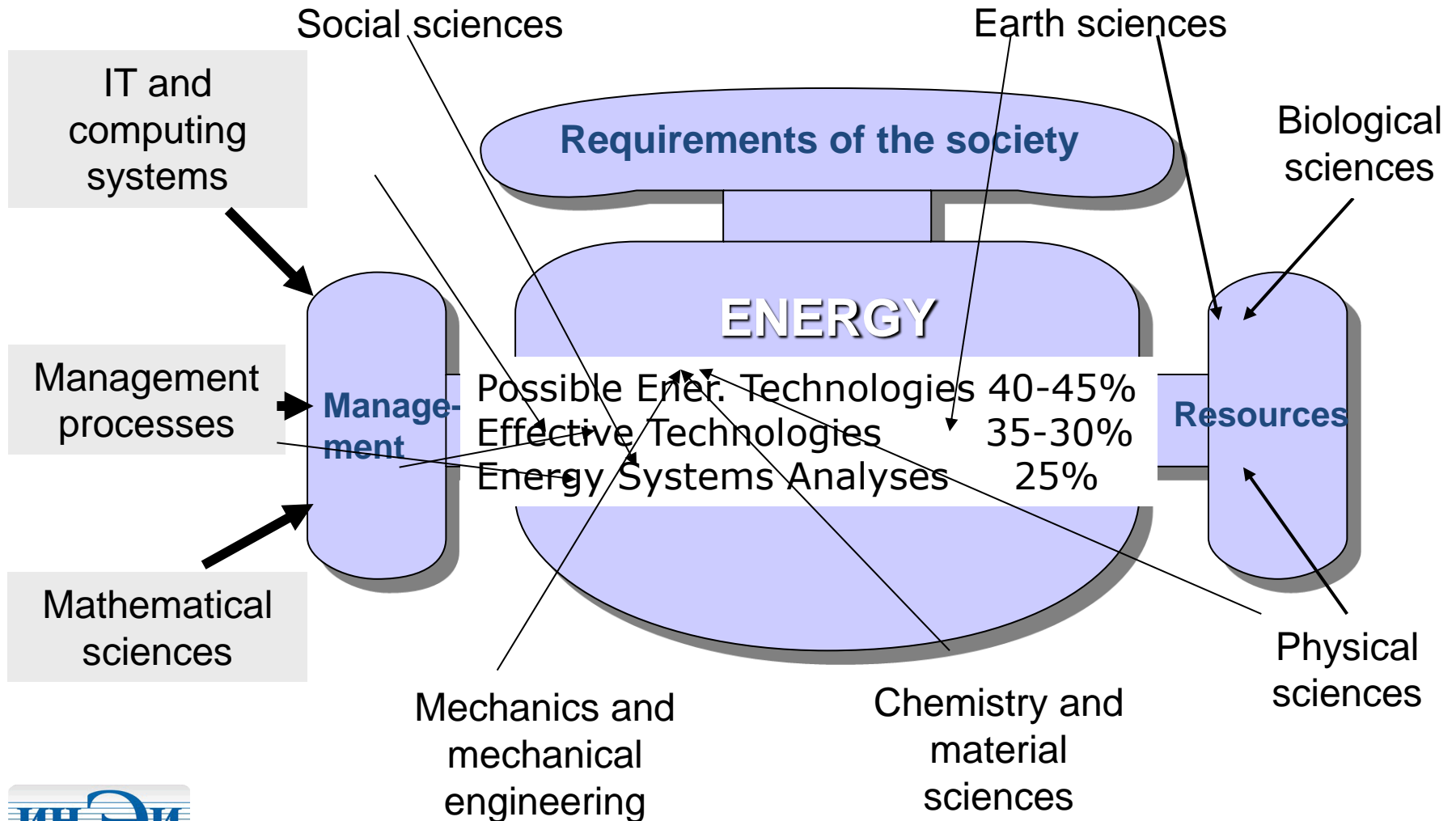
# **Opportunities for cooperation with the Russian Academy of Sciences in the sphere of energy**

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Member of the Presidium RAS  
Scientific Lieder of ERI RAS**



Nice, November 2016

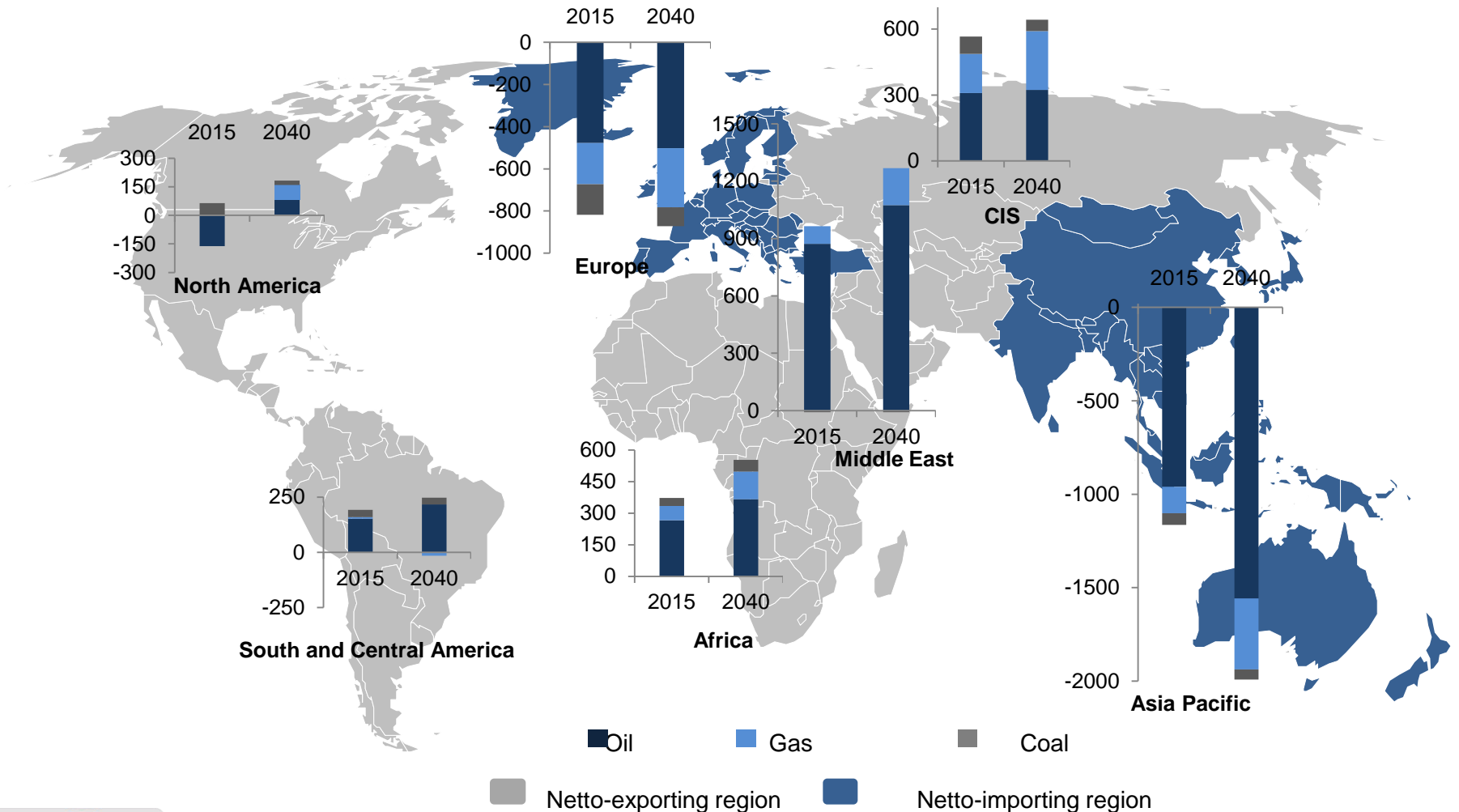
# Energy as interdisciplinary science



# Possible topics for cooperation with RAS in the sphere of energy system analyses

- **Investigation of possibilities for harmonization of energy relations between Russia and the European Union** - Institute of World Economy & International Relations RAS, Institute of Europe RAS, Energy Research Institute RAS, Energy Systems Institute, Siberian Branch of RAS.
- **Analysis of the effectiveness of large-scale production, transportation and technological energy projects (new gas transportation systems, electric power systems integration, solar, nuclear, and bioenergy and others.)** - Oil and Gas Institute RAS, Energy Systems Institute, Siberian Branch of RAS, Nuclear Safety Institute RAS, United Institute of High Temperatures RAS, Energy Research Institute RAS and others.
- **Development of the theory and methods of smart energy systems development** - Energy Systems Institute, Siberian Branch of RAS, Institute of Control Sciences RAS, Energy Research Institute RAS.

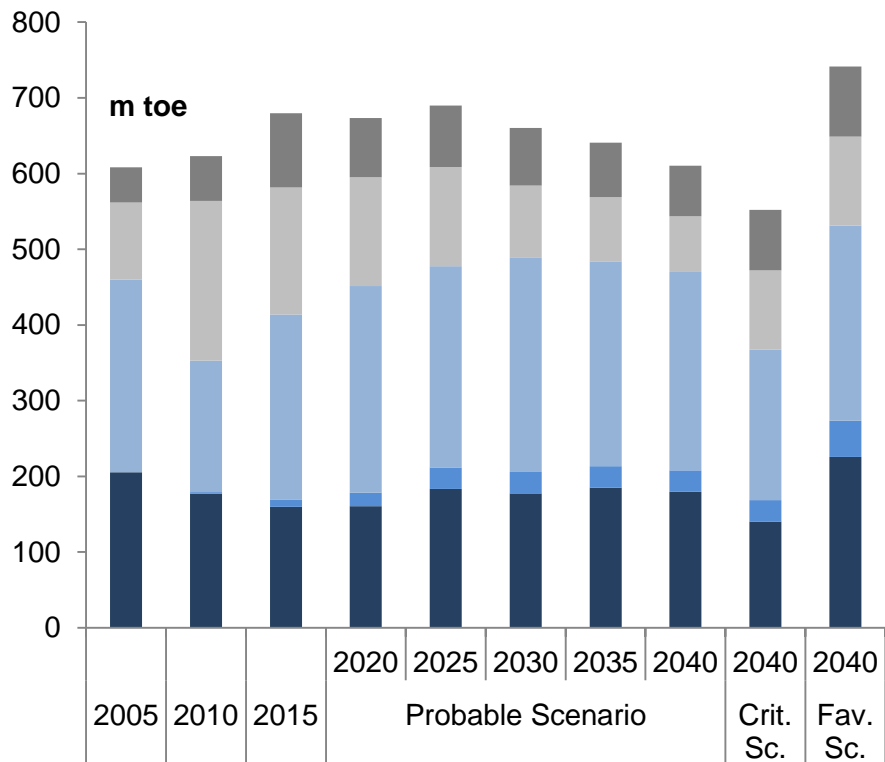
# International fossil fuel trade outlook by 2040



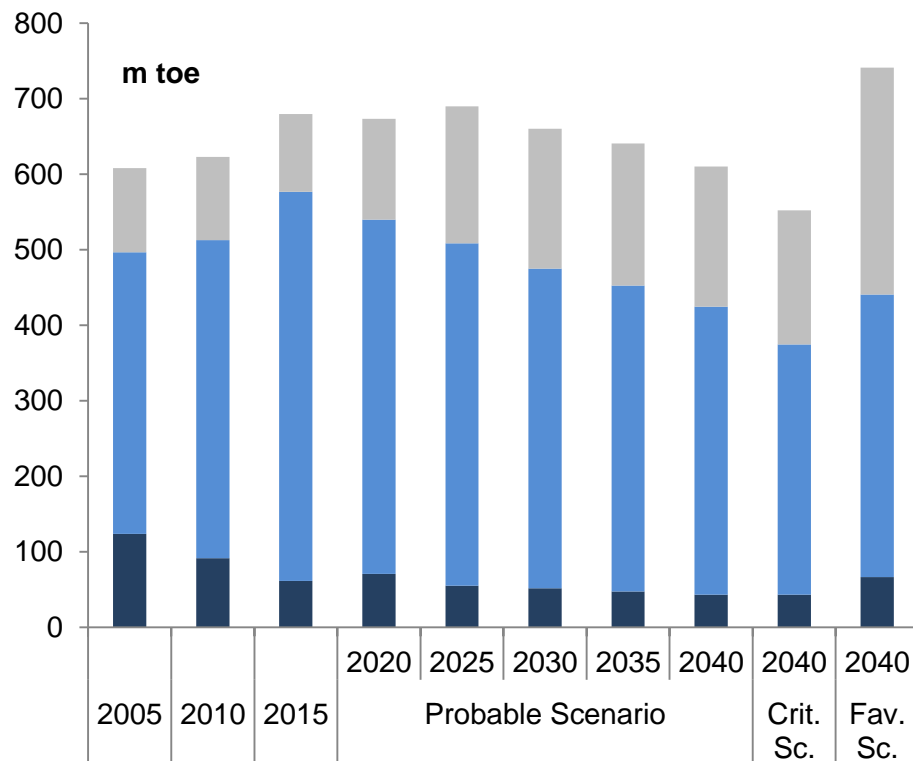
Source: Global and Russian Energy Outlook-2016, ERI RAS-AC

# Russian energy export: pivot to the East

## Russian energy export by product



## Russian energy export by destination



- Pipeline gas
- Oil
- Coal and electricity
- LNG
- Petroleum products

- CIS
- Europe
- Asia



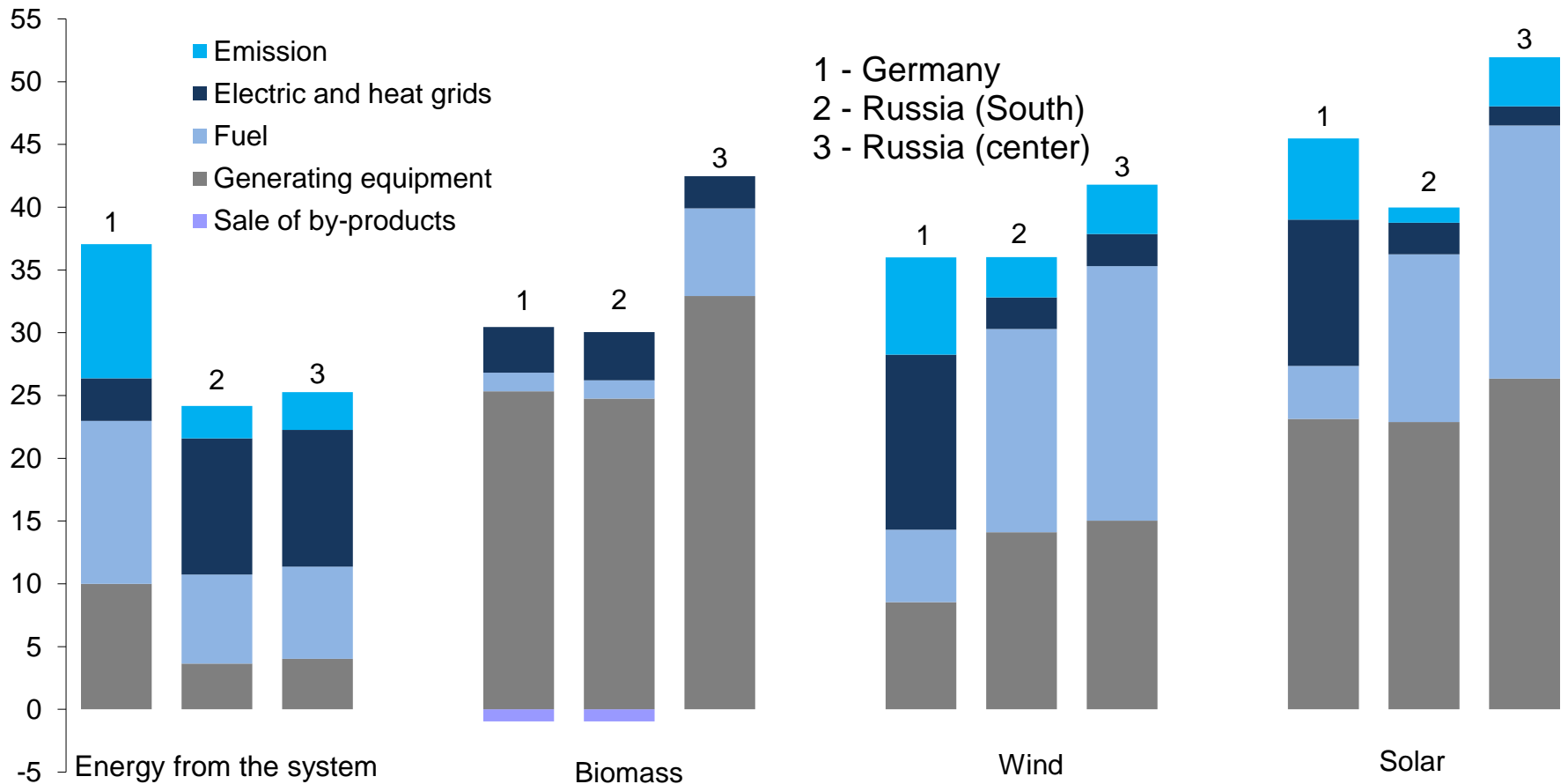
Source: Global and Russian Energy Outlook-2016, ERI RAS-AC

# Possible topics for cooperation with RAS in the sphere of energy system analyses

- **Analysis of the public & commercial effectiveness of large-scale production, transportation and technological energy projects (new gas transportation systems, electric power systems integration, solar, nuclear, bioenergy and others.)** - Oil and Gas Institute RAS, Energy Systems Institute, Siberian Branch of RAS, Nuclear Safety Institute RAS, United Institute of High Temperatures RAS, Energy Research Institute RAS and others.
- **Development of the methods & tools for smart energy systems development** - Energy Systems Institute, Siberian Branch of RAS, Institute of Control Sciences RAS, Energy Research Institute RAS.

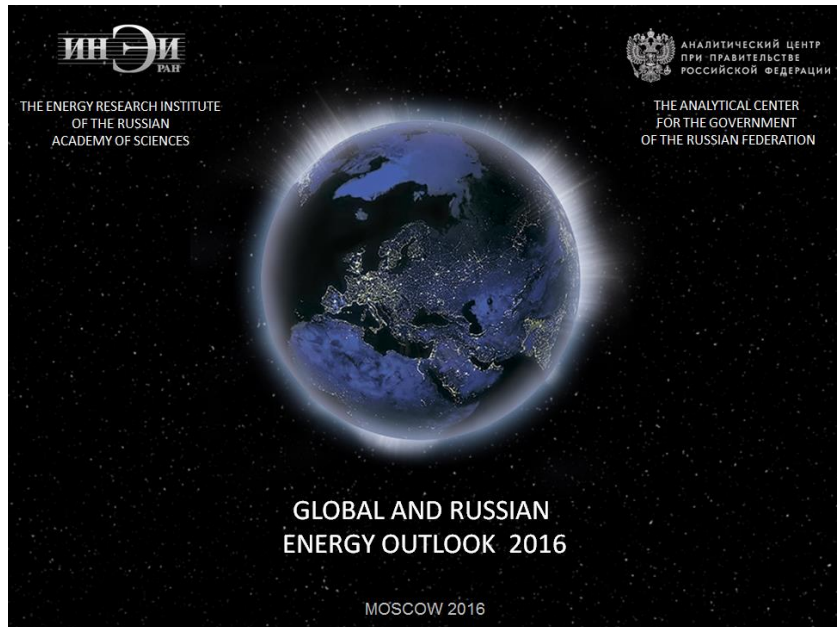
# Russia has specific conditions for the renewable energy development

Costs of energy supply for the distributed consumers, mln USD



# THANK YOU FOR ATTENTION

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# Russian energy sector has several important features

❑ **Russian economy has 2,5 higher energy intensity than the world average, it`s energy investments share in GDP is 3-3,5 higher (5% of GDP compared to 1,5% world average) and it is less sensitive to the climate change**

- High availability of relatively cheap energy - 15% of world reserves and just 2.8% of the global population
- The coldest and extended (11 time zones) country with a low population and energy infrastructure density (4 and 7 times less respectively than the US)
- Relatively cheap energy at the price of capital which is 2-3 times higher

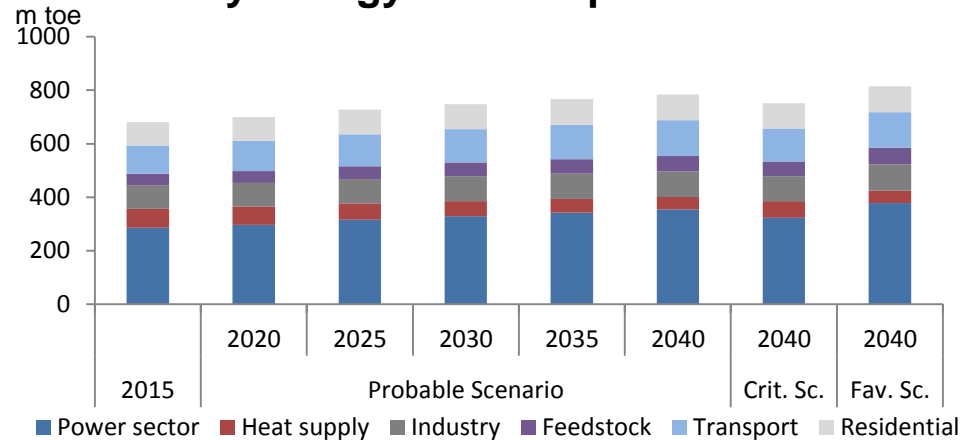
❑ **Russian technological priorities in the energy sector:**

- Energy efficiency and energy saving
- Less capital intensive technologies
- Distributed energy
- Efficient ways of energy resources transportation and transmission
- Moderate limitation of emissions

❑ **Russian energy outlook for 2015-2040**

- Energy consumption growth by 10-20%
- Energy production growth by 0-15%
- Energy export growth by -10% - +10%

## Primary Energy Consumption in Russia



## Primary Energy Production in Russia

