



НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ
УНИВЕРСИТЕТ

Paris Agreement and Northeast Asia region

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Paris Agreement: the goals for deep decarbonization

- Art. 4.1. Parties aim to reach global peaking of greenhouse gas emissions as soon as possible... and to undertake rapid reductions thereafter... to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century...
- Art. 4.19. All Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies...



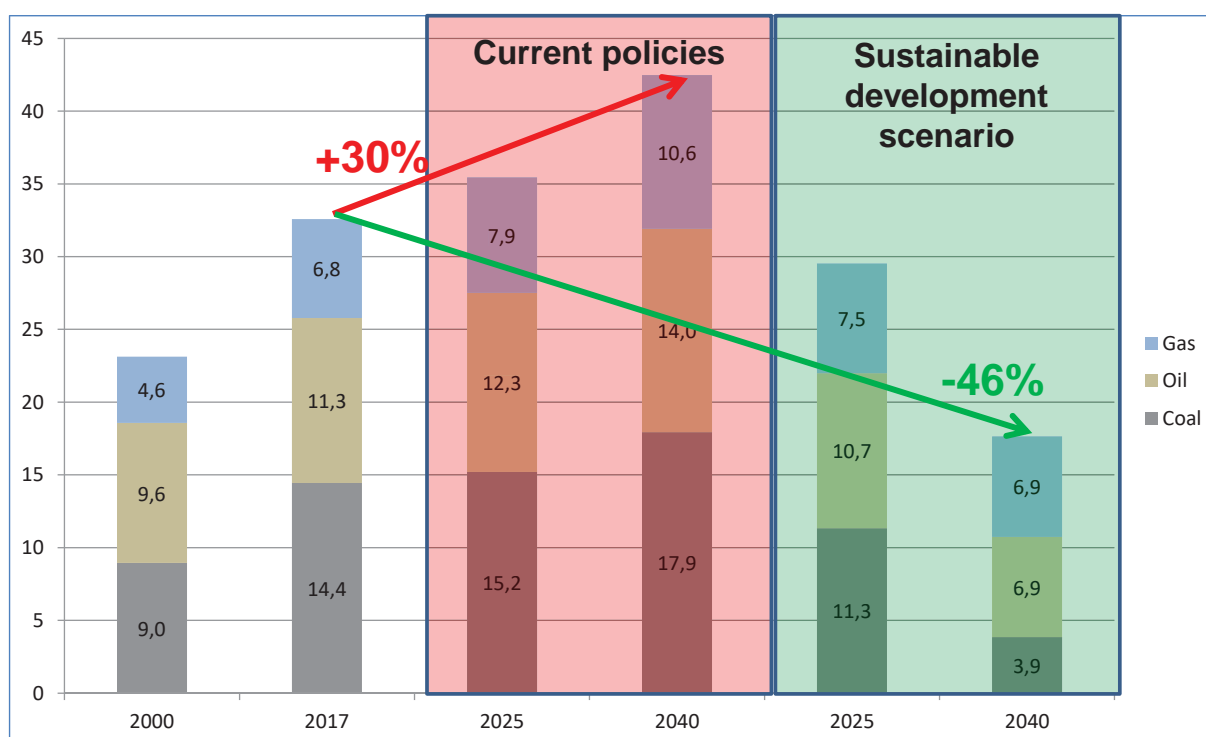
COP21 • CMP11
PARIS 2015
UN CLIMATE CHANGE CONFERENCE

Special 1.5 Report by IPCC

- Comparison of the climate change impacts of 1.5°C and 2°C warming
- Substantial differences, need for urgent action to secure the world economy

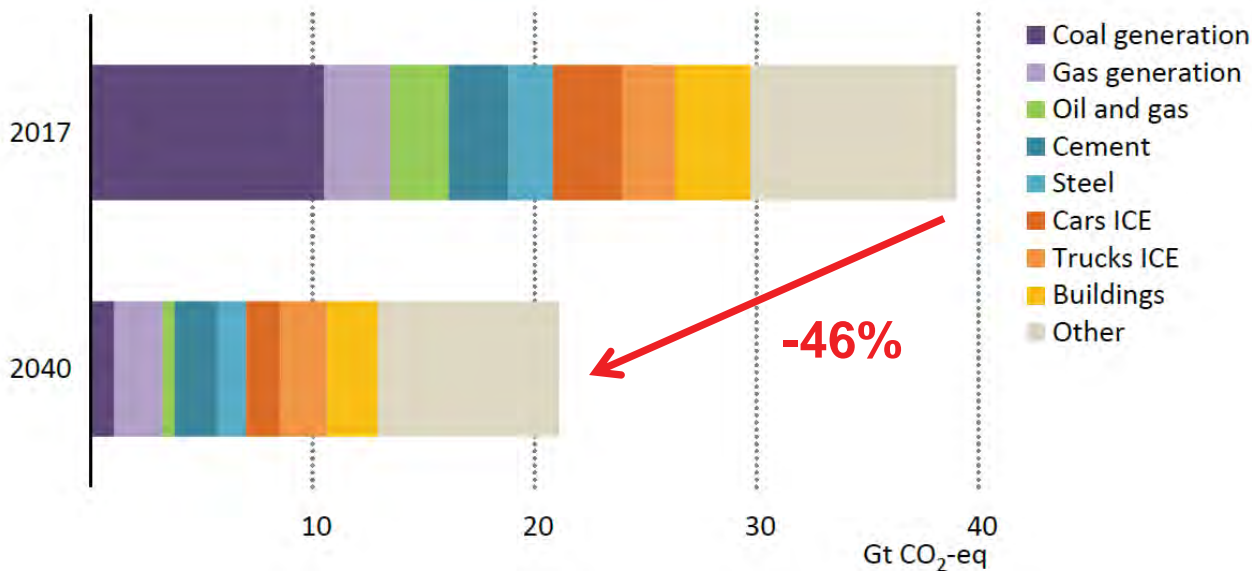


World energy emissions, GtCO2



Source: IEA, World Energy Outlook 2018

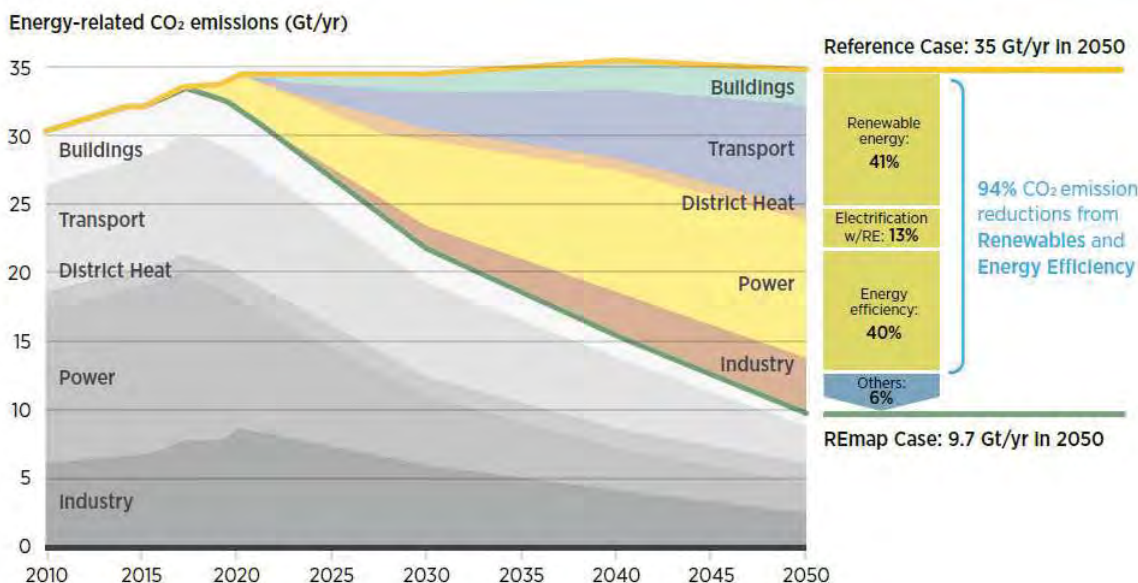
Global GHG emissions from selected sources Sustainable Development Scenario



Source: IEA, World Energy Outlook 2018

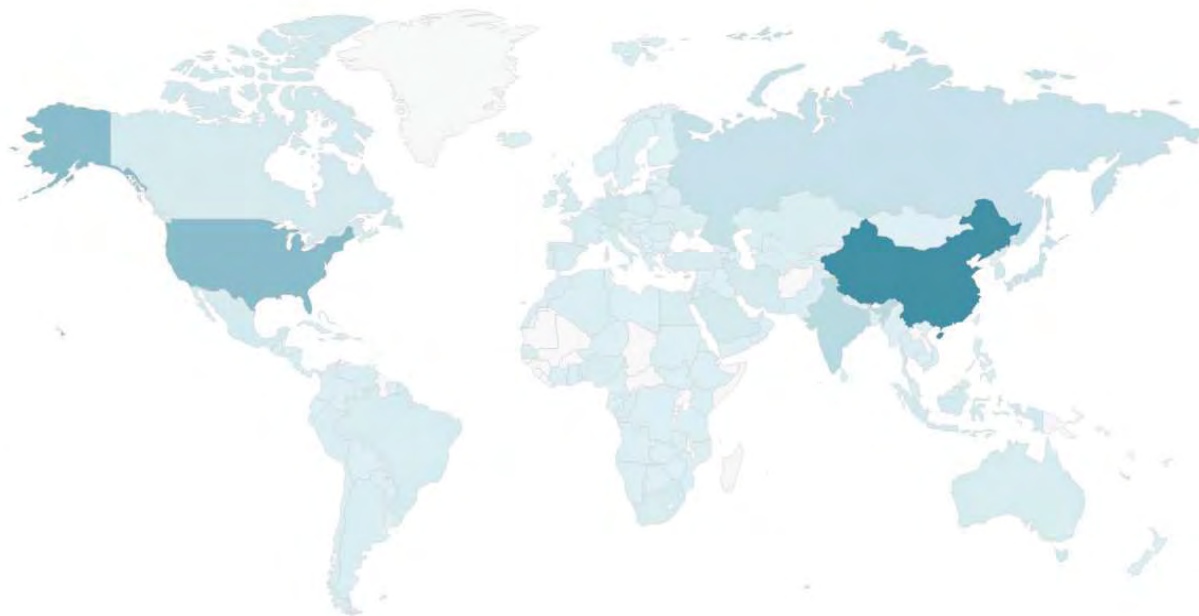


The role of renewables in decarbonization



Source: IRENA, Global Energy Transformation: A Roadmap to 2050, 2018

Emission trends: Global vs NEA economies



CO2 emissions, 2016

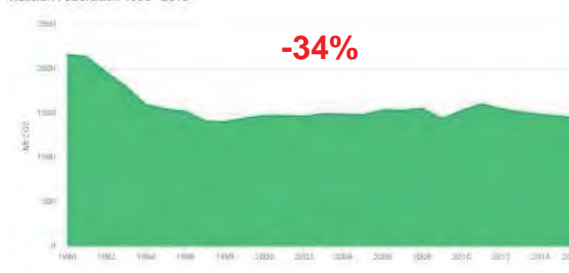
IEA World Energy Balances 2018 © Natural Earth

CO2 emissions from fuel combustion in NEA, 1990-2016, MtCO2

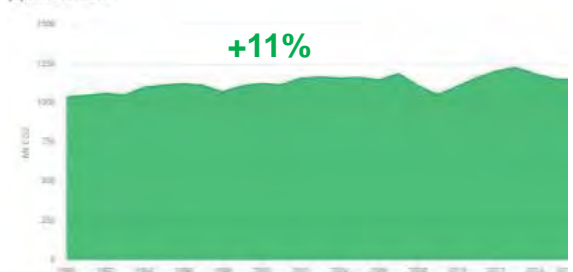
China, People's Republic of 1990 - 2016



Russian Federation 1990 - 2016



Japan 1990 - 2016



Mongolia 1990 - 2016



Korea 1990 - 2016

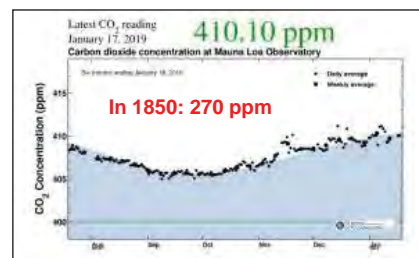


Korea, Democratic People's Republic of 1990 - 2016



Unsustainable “fossils”

- Climate change impacts are worsening and becoming more and more tragic worldwide
- Besides that, CO2 emissions from fuel combustion are accompanied by:
 - PM10, PM2.5 pollution (most harmful for health)
 - SOx, NOx pollution
 - Mercury, lead, arsenic, carcinogenic, radioactive and numerous other impacts on health and environment
- Coal dust pollution in Nakhodka is a very close example too!

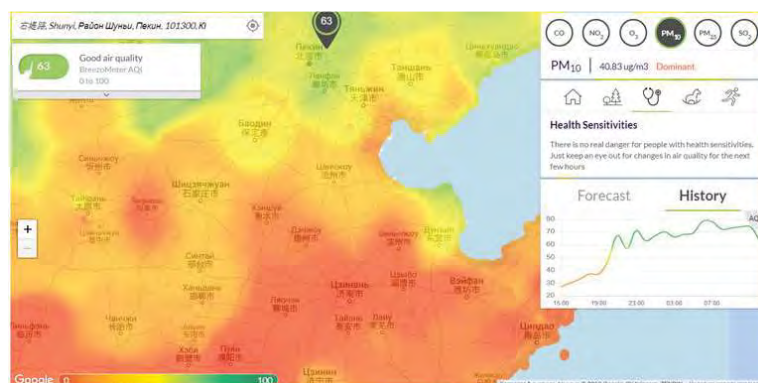


Is the fossil fuel our “dream” source of energy?

Air pollution by hazardous substances in China

- Yancheng City
- Beijing City and surroundings

Mainly from fuel combustion



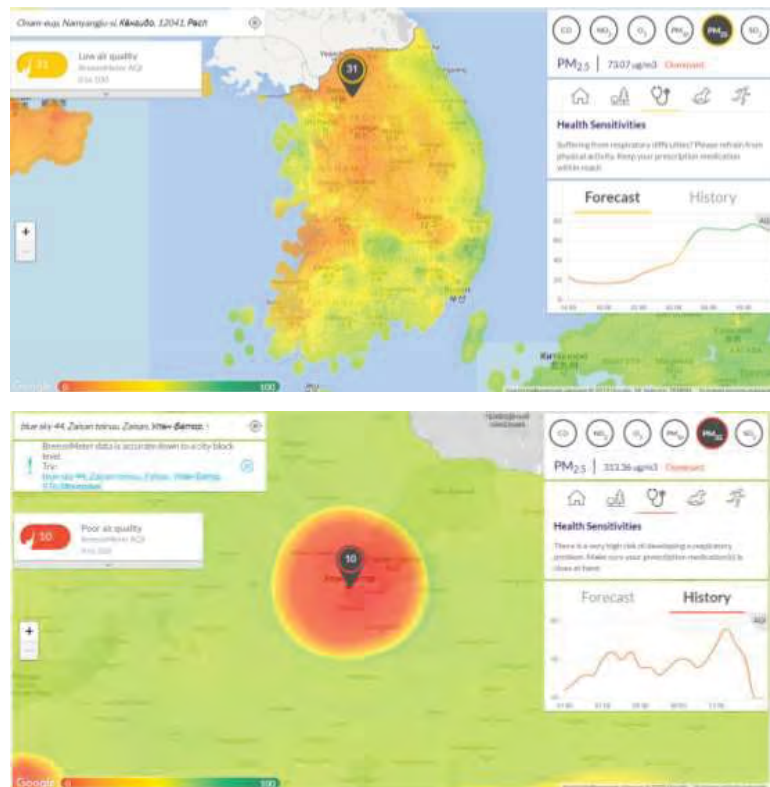
Is the fossil fuel our “dream” source of energy?

Air pollution by hazardous substances in ROK and Mongolia

- **Seoul City**

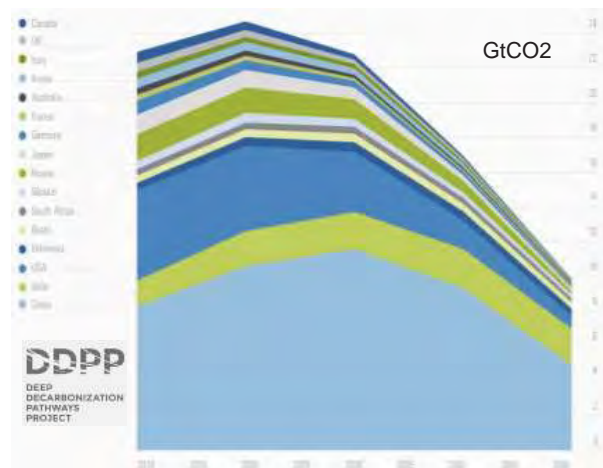
- **Ulan-Bator City and surroundings**

Mainly from fuel combustion



Are there ways to change the emission trends towards deeper emission reduction?

- The recent studies confirm: **“YES”**
- The Northeast Asia economies are capable of deep decarbonization at relatively low costs
- Relevant research projects: DDPP, CD-LINKS, ENGAGE, COMMIT, etc.

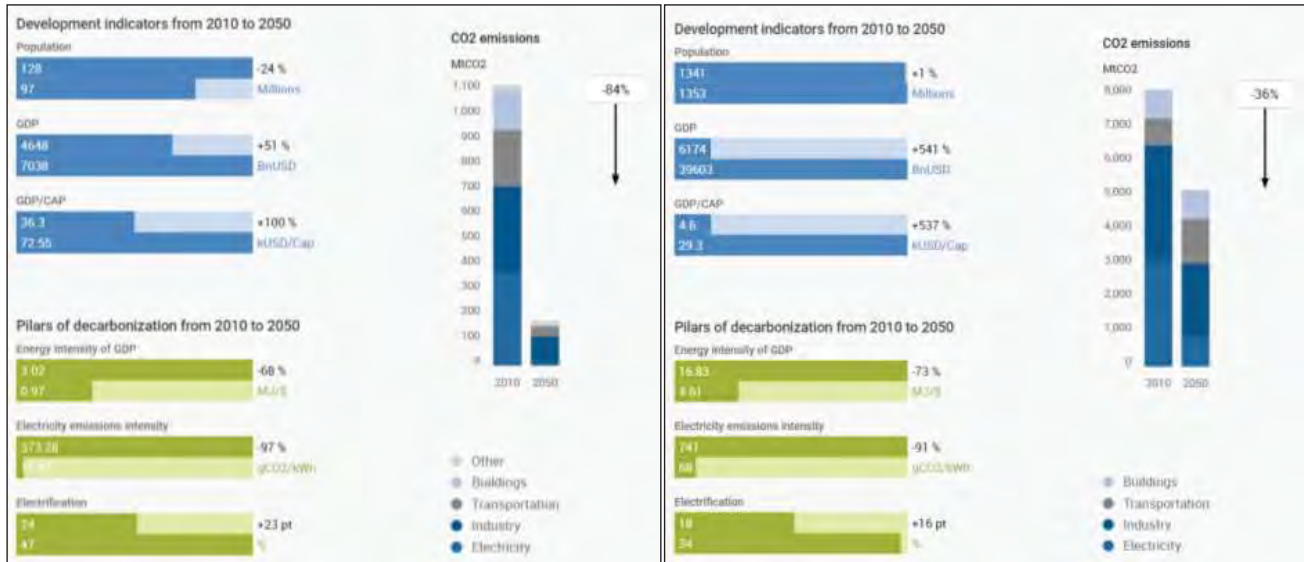


Source: <http://deepdecarbonization.org>

Deep decarbonization options for NEA economies-1

Japan

China

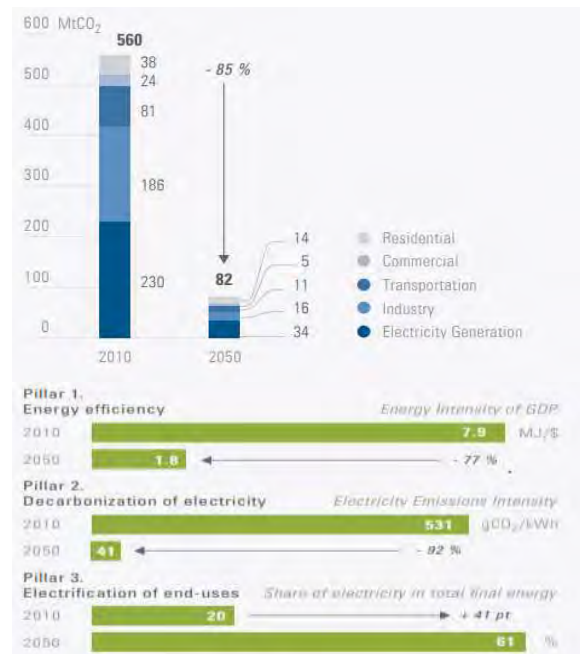
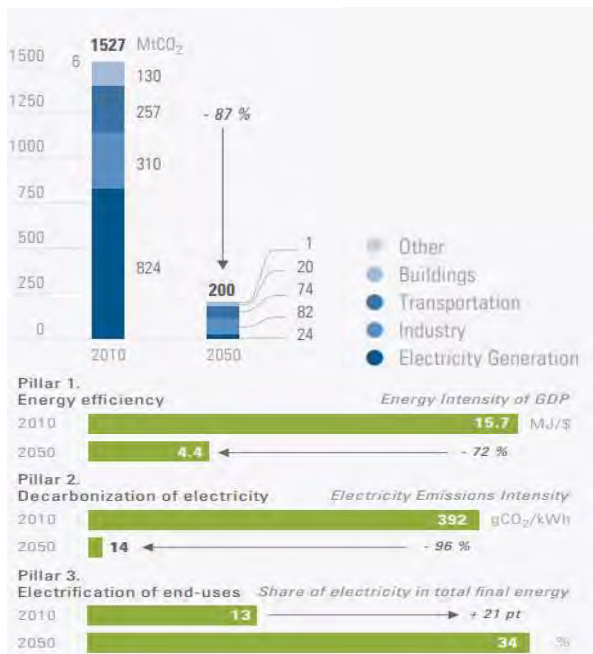


Source: <http://deepdecarbonization.org>

Deep decarbonization options for NEA economies-2

Russia

Rep. of Korea



Source: <http://deepdecarbonization.org>
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Carbon lock-in situation

- Continuing the fossil fuel based development poses significant risks for national economies
- Investments in long-term projects may conserve carbon intensive production for 40-50 years (carbon lock-in)
- In case of carbon pricing at \$30-50 and more per tCO₂, economic feasibility of “traditional” energy would be undermined dramatically



Example: the Russian Energy Strategy-2035 implies substantial increase of coal, oil and gas production and consumption

Increase of fossil fuel-based power generation

Expansion of fossil fuel exports, ports and infrastructure

The case of Russia

Coal infrastructure in Russia



Gas infrastructure in Russia

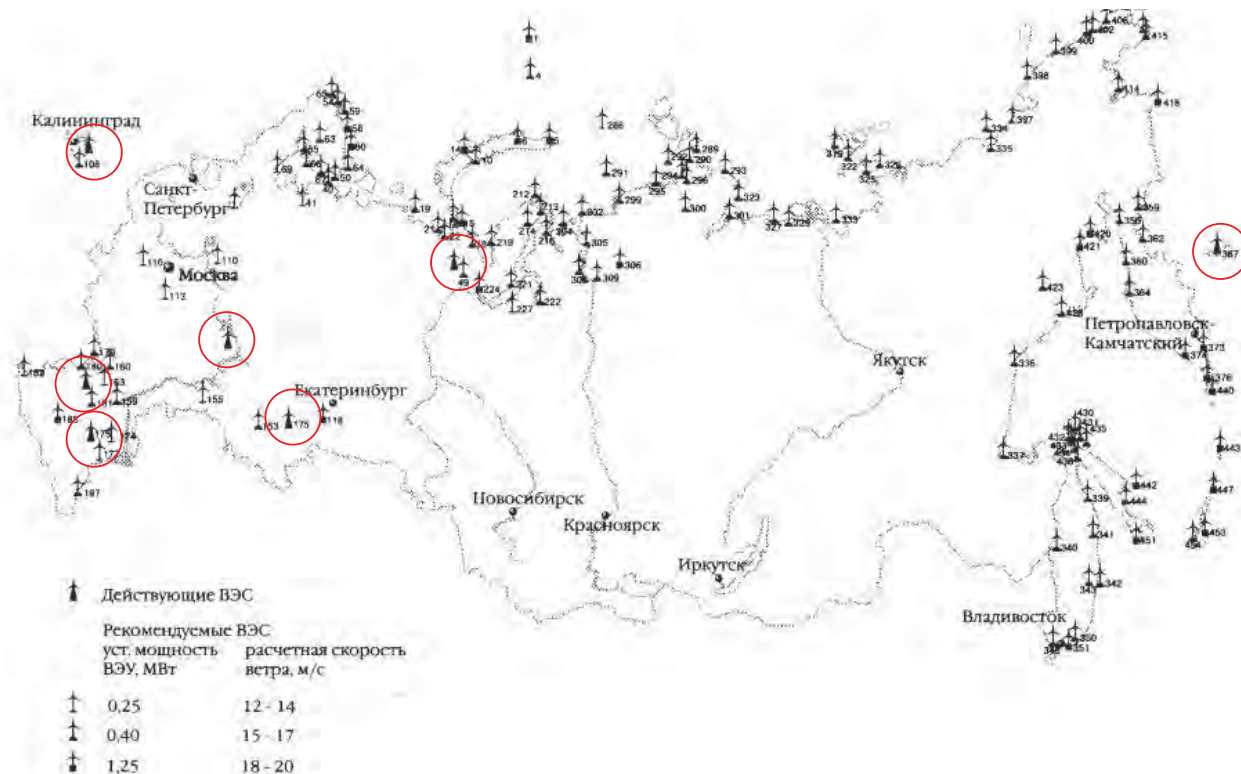


Oil infrastructure in Russia



Russia's renewable energy potential

Wind energy potential in Russia

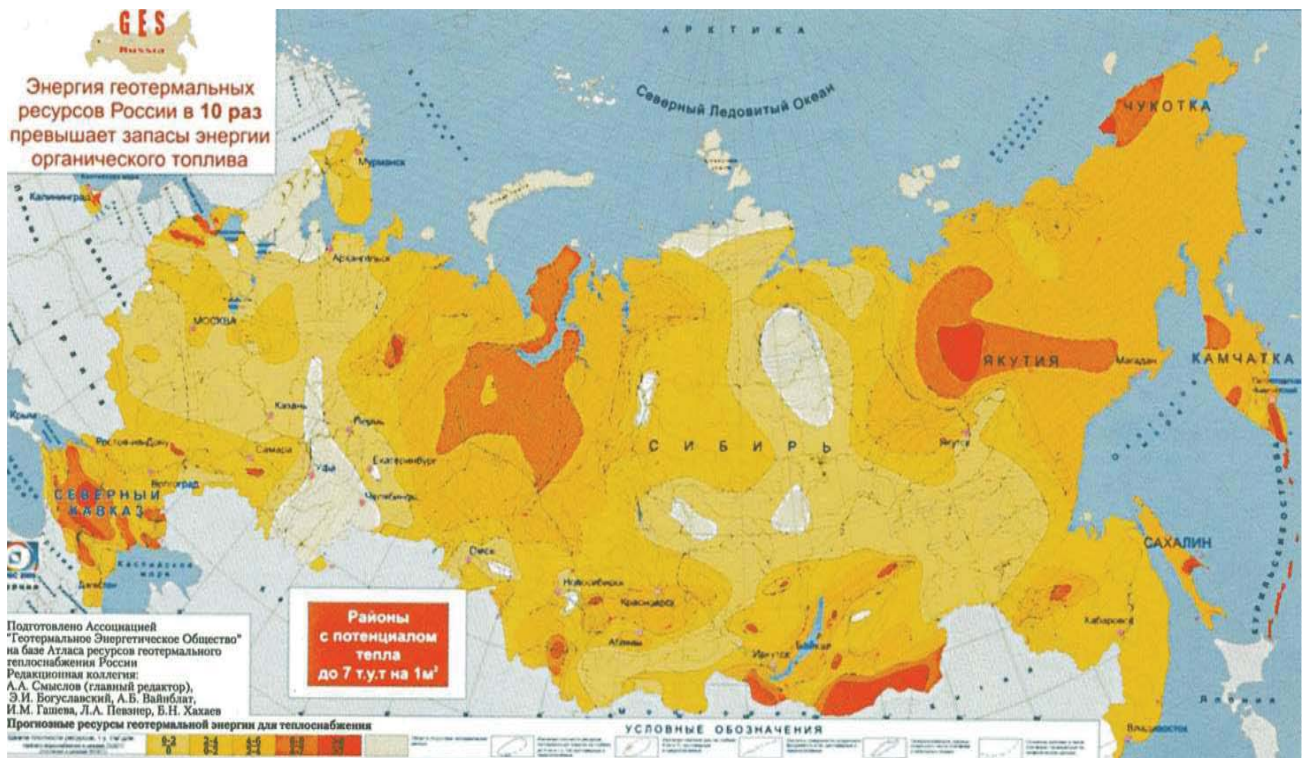


Source: Estimates of Institute of Energy Strategy, Russian Academy of Engineering, Union of Scientific and Engineering NGO (2007)

Solar energy potential



Geothermal energy potential



Source: Russian Association of Geothermal Energy Society

Forestry as a source of bioenergy resources

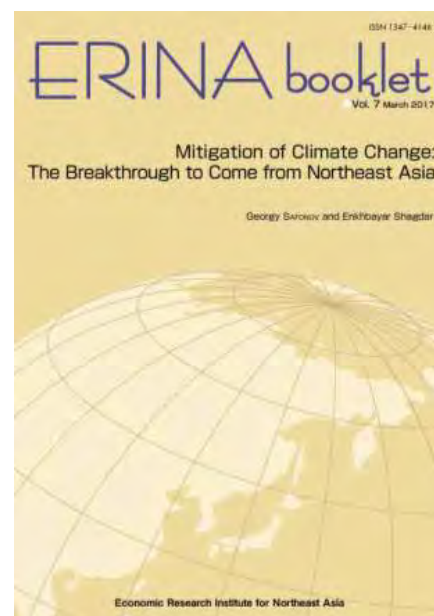


Agricultural waste as bioenergy potential



Natural resources and technologies for green innovation

- Meaningful progress in many NEA countries so far, but much more to be done
 - Russia: huge green energy resources available
 - China: leadership in solar and wind
 - Japan: energy efficiency, hydrogen
 - ROK: tidal energy, transport solutions
 - Mongolia: renewables, Asia Super-grid
- Cooperation in NEA can speed-up the global process of decarbonization and green growth





Спасибо за внимание!

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