

Country Perspectives: Russian Federation

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The Energy Research Institute of the Russian Academy of Sciences

Regional Workshop on Low Carbon Pathways (RER2018)

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Achievements Under the Project: Improvements in energy modelling and planning processes

Key National Innovation Project: The Unified System for Monitoring Climatically Active Substances

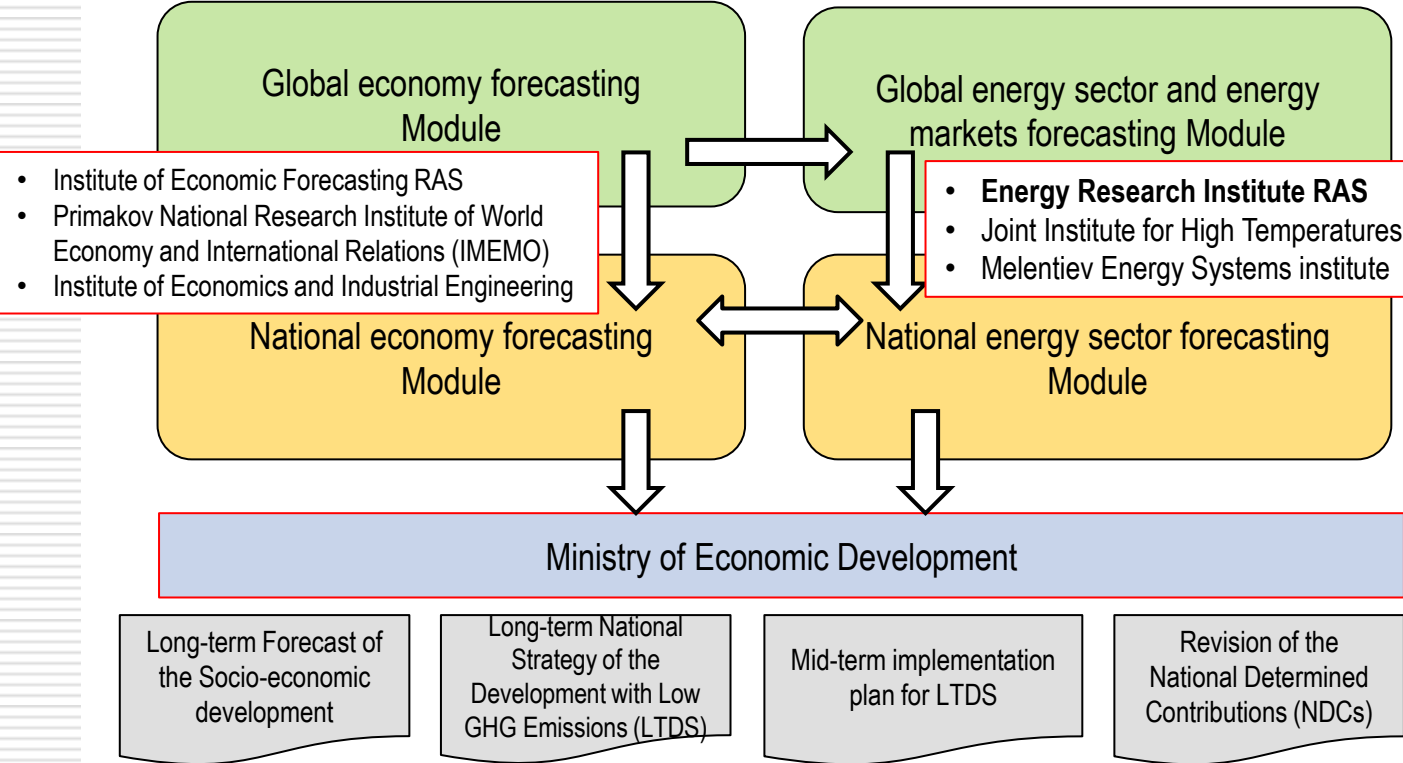
2022 – 2025

55 organizations formed 6 consortia

Consortium 5: Economics of Climate (6 organizations)

ERI RAS Contribution:

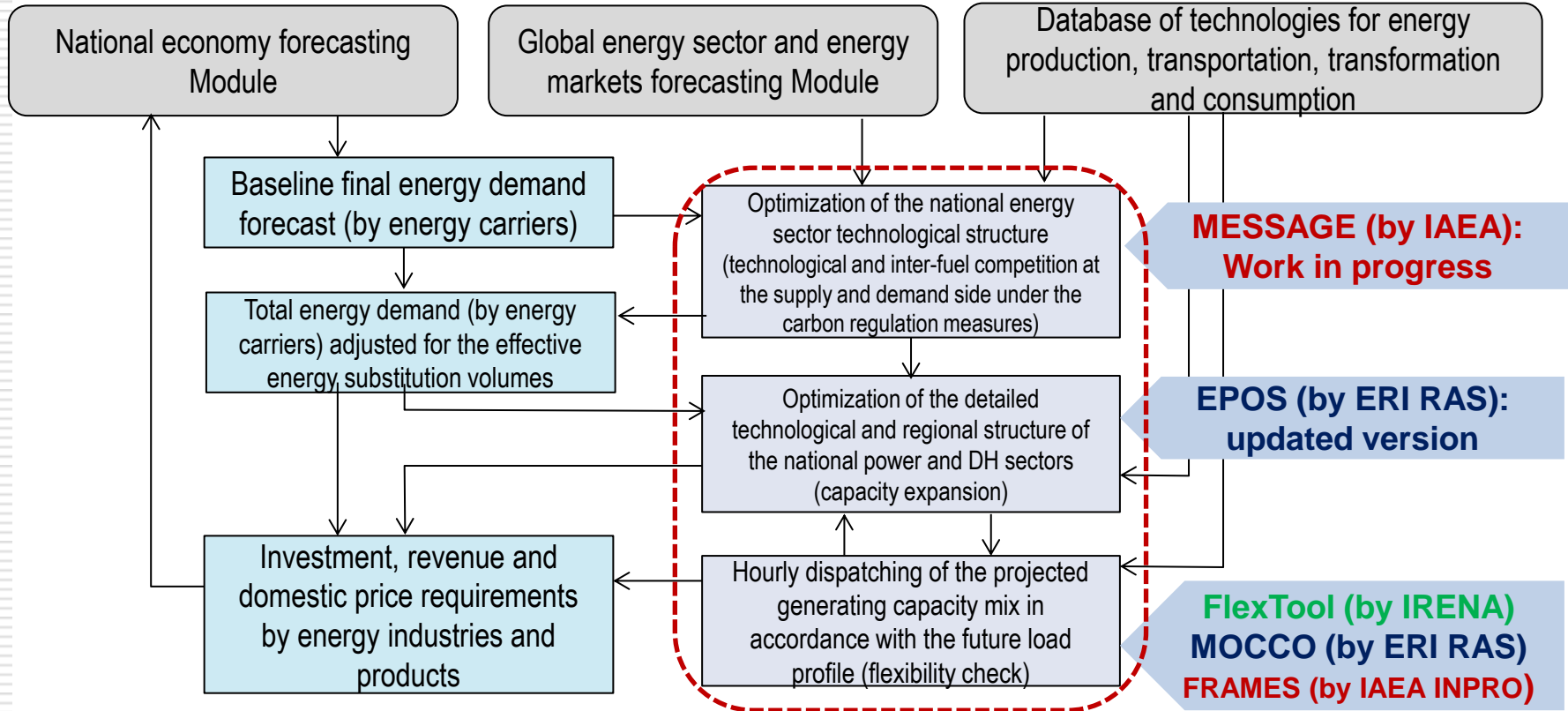
- Global & Russian Energy Modeling
- Impact Assessment of Low-Emission Solutions & Climate Policies in Energy Sector



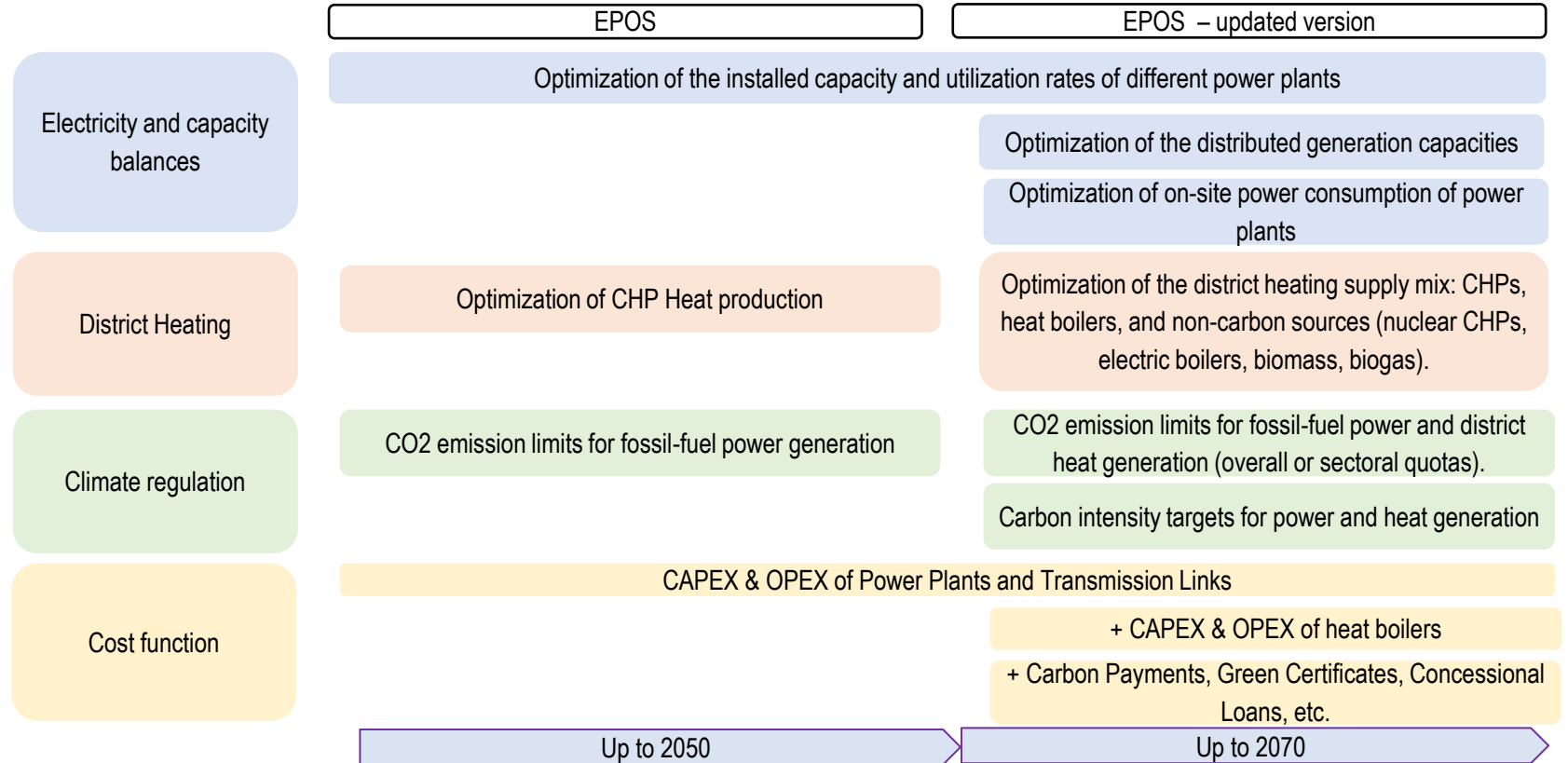
Achievements Under the Project: Strengthening data systems

- Streamlined processes for gathering energy statistics (enhanced workflow with ministries, statistics office, other organizations).
- Generated hourly output profiles for diverse wind and solar power plants, based on advanced climate data analysis.
- Established a robust database of technical and economic parameters for energy technologies (current and forecast up to 2060)

Achievements Under the Project: Adoption and integration of new energy system assessment tools

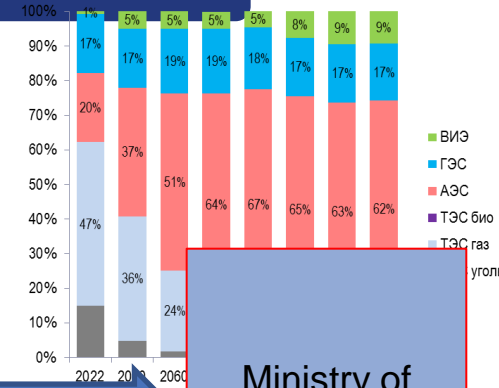


Achievements Under the Project: Adoption and integration of new energy system assessment tools

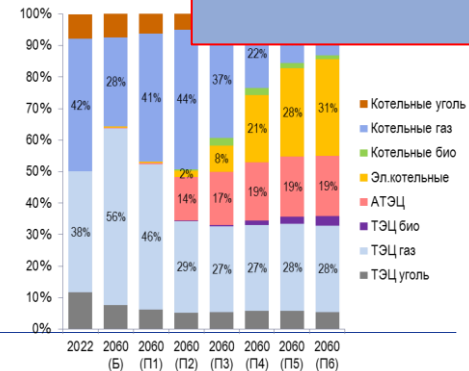


Achievements Under the Project: Policy Impact

- Estimation of CO2 emission reduction for thermal power plants and district heating without carbon regulation measures
- Investment, total costs and price impact of different emission quota levels / carbon price levels (including scenarios with “new electrification”)
- Analysis of various combinations of carbon regulation measures and the associated decarbonization costs for consumers and the national economy as a whole.
- The study highlights the risks of implementing a direct CO2 emissions fees for thermal power and district heat generation (given the country’s high heat demand), including an integrated assessment of the multiplicative effects of increasing energy investments and prices on GDP, inflation, and overall economic investment activity.



Ministry of Economic Development



ERI RAS's Center for Energy Modeling tackles strategic planning by combining IAEA tools with our proprietary in-house models:

- MESSAGE for modelling of the whole Russian energy sector development
- EPOS for power sector development
- FlexTool / MOCCO for flexibility check of power sector scenarios

RER2018 project was highly valuable for us:

- Exchanging ideas and modeling methodologies
- Building practical modeling experience
- Defining new research areas for low-emission pathways

Institutional and organizational challenges:

- Challenge: Limited inter-agency collaboration (science & government).
*Solution: Key national innovation project enabled **enhanced coordination among research bodies** to build integrated low-emission scenarios for Russia, aligned with global decarbonization pathways.*
*It also strengthened **collaboration between science and the Ministry of Economic Development**, the key actor for Russia's Low Emission Strategy and Paris Agreement NDCs*

Data-related challenges:

- Challenge: Limited availability, completeness, and consistency of energy statistics, grid operation data, equipment specifications, and capacity status.
Solution: In the absence of comprehensive datasets, we conduct extensive searches, aggregation, and verification of distributed information from open sources.
- Challenge: Lack of data on hourly renewable energy (RES) generation profiles.
Solution: We have conducted dedicated scientific research to develop these profiles.
- Challenge: Defining accurate technical and economic parameters for technologies.
Solution: ERI RAS utilizes its in-house expertise, supported by the analysis and verification of heterogeneous data from companies, equipment suppliers, and industry regulators.

Use of models / tools beyond the training sessions:

- The use of IAEA tools remains limited so far. Priority is given to applying in-house models (for demand and capacity structure), while the complementary use of IAEA tools is constrained by time and human resources.
- Nevertheless, we are considering the complementary application of MAED for mid-term demand forecast.
- Work is also underway to develop an inter-sectoral, multi-regional energy sector model based on MESSAGE.

Funding limitations (Resource constraints to support analytical and modelling work):

- To advance its work on low-emission power scenarios, ERI RAS has secured support from key national institutions: the Russian Science Foundation, the Ministry of Education and Science, and Rosatom affiliates.
- *Furthermore, there is hope regarding the continuation of work under the Key National Innovation Project project next year.*

Future Steps and Needs



Ideas for strengthening regional networks:

Strengthen cross-border cooperation between Eurasian Economic Union / CIS countries by developing power-sector (or even energy) model of this region, given promising plans for nuclear and RES development.

Possible participants: *Russia, Belarus, Armenia, Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Georgia, ...*

Key Messages

Key Achievements

- Further developing of national modeling system combining in-house and IAEA tools.
- Enhanced coordination for low-emission scenario development.
- Provided policy analysis on decarbonization costs, carbon pricing risks, and macroeconomic impacts.

Key Challenges

- Data gaps and fragmentation, requiring extensive verification.
- Limited inter-agency collaboration between science and government.
- Resource constraints (time / experts / funding)

Future Cooperation Ideas

- Develop a regional EAEU / CIS power system model.
- Advanced training programs on energy modelling.
- Initiate another round of regional collaborative project (RER).

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Thank You for Attention!