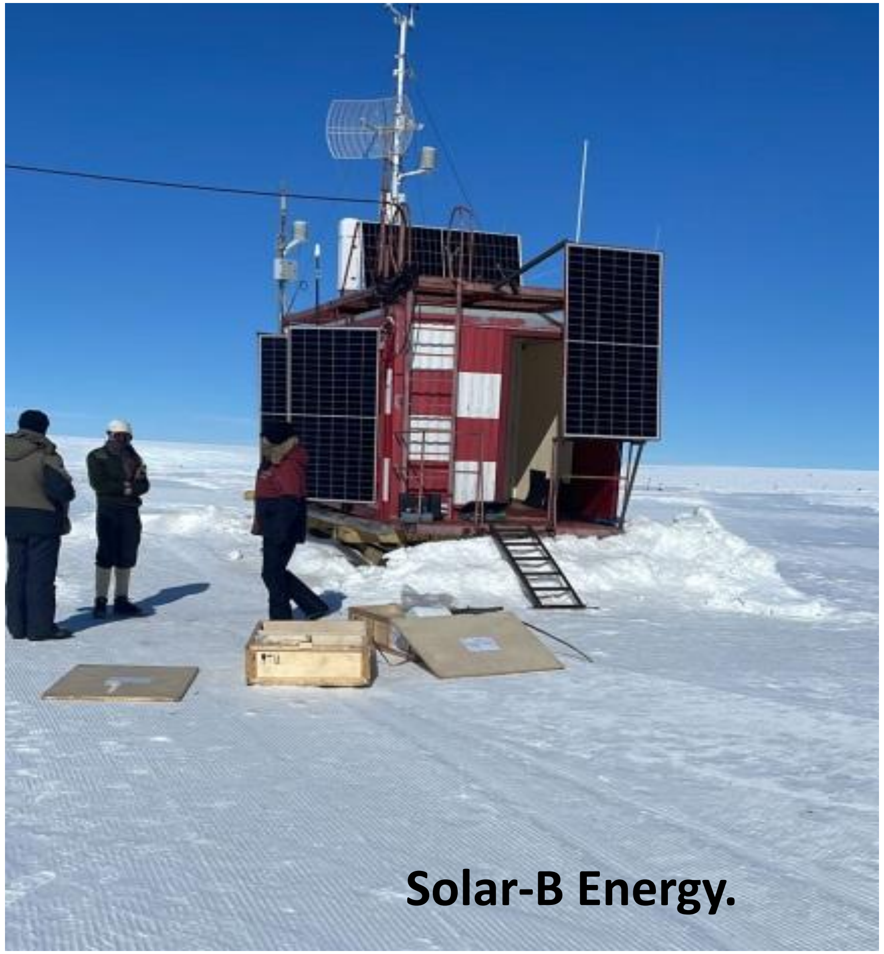
Hybrid power plants based on renewable resources

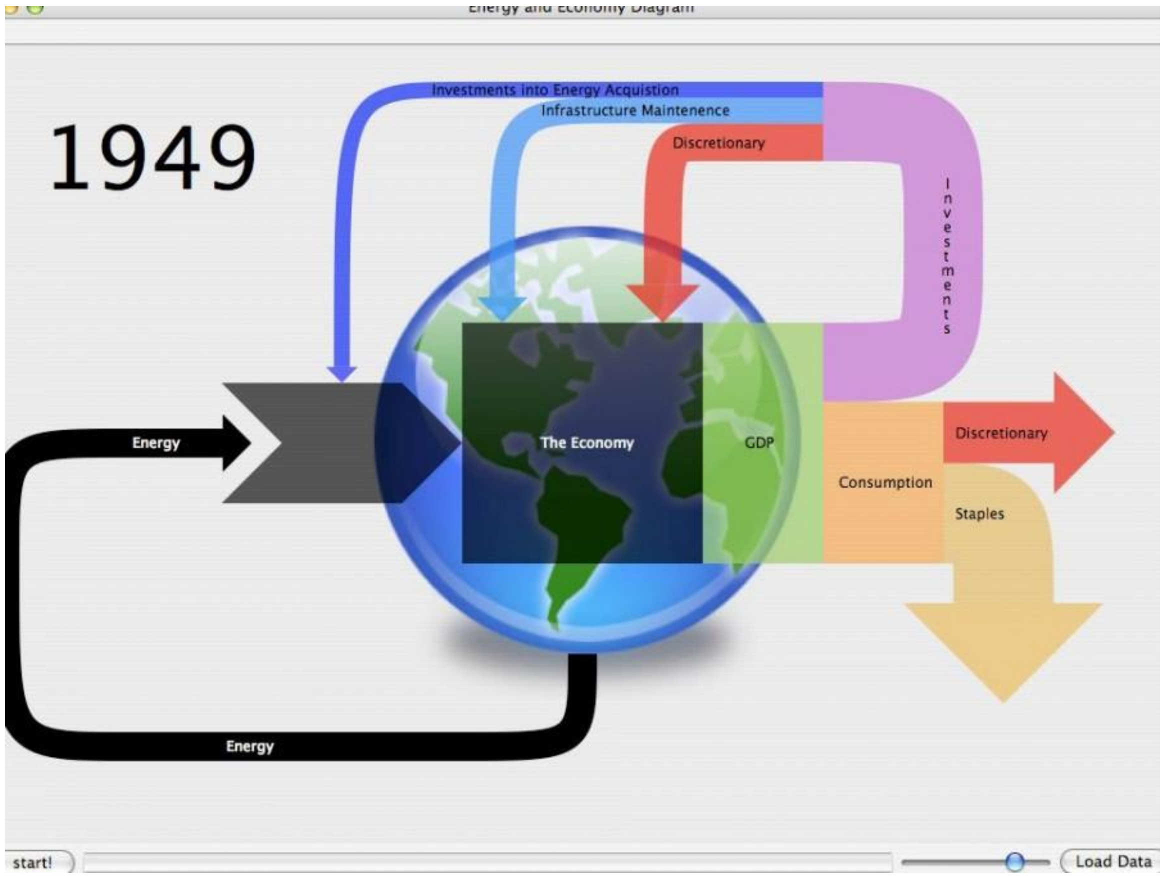

Solar-B Energy.

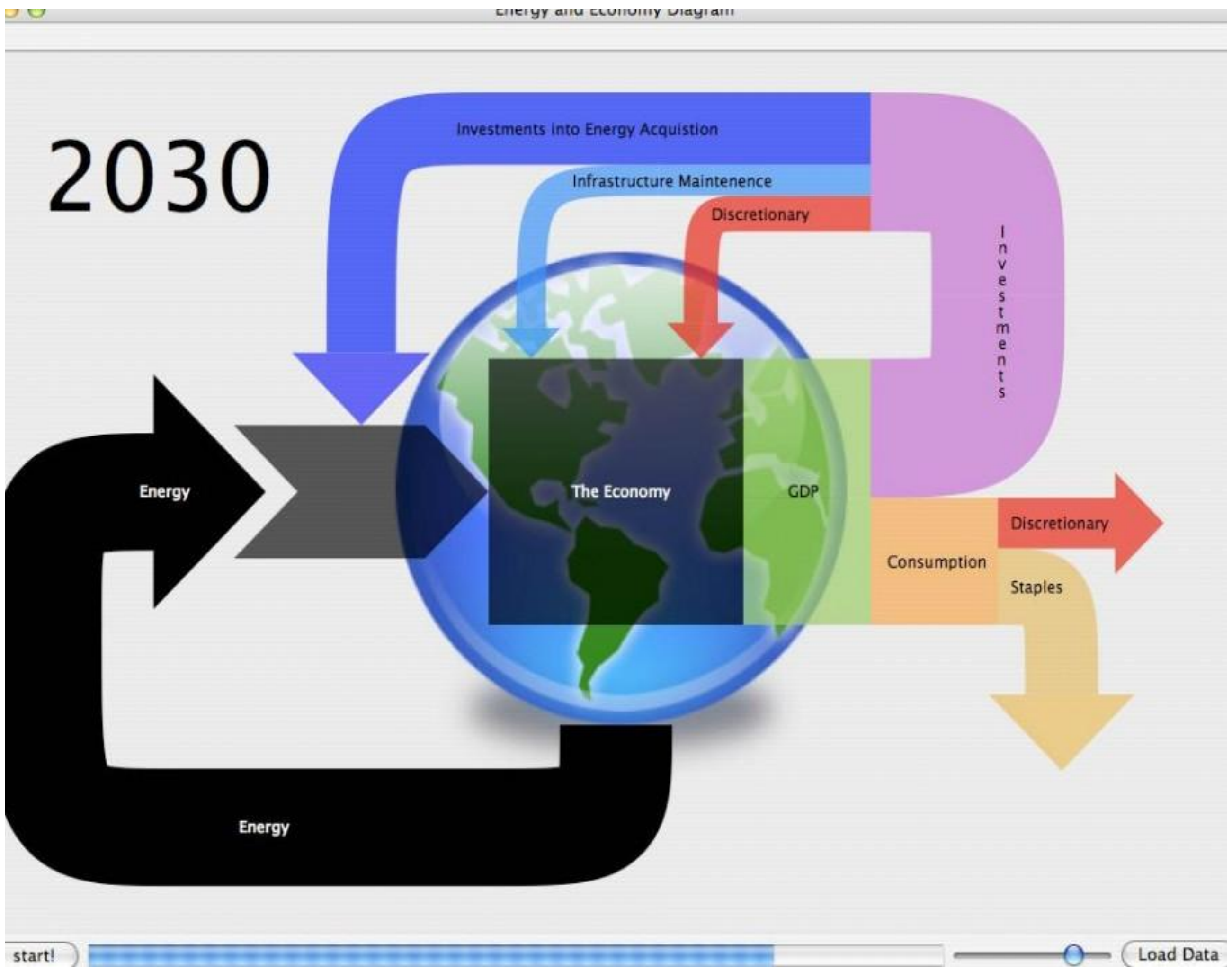
Yevgeny GASHO,

Professor, National Research University Moscow Power Engineering Institute,

Academician-Secretary, Power Engineering Division, Russian Academy of Engineering

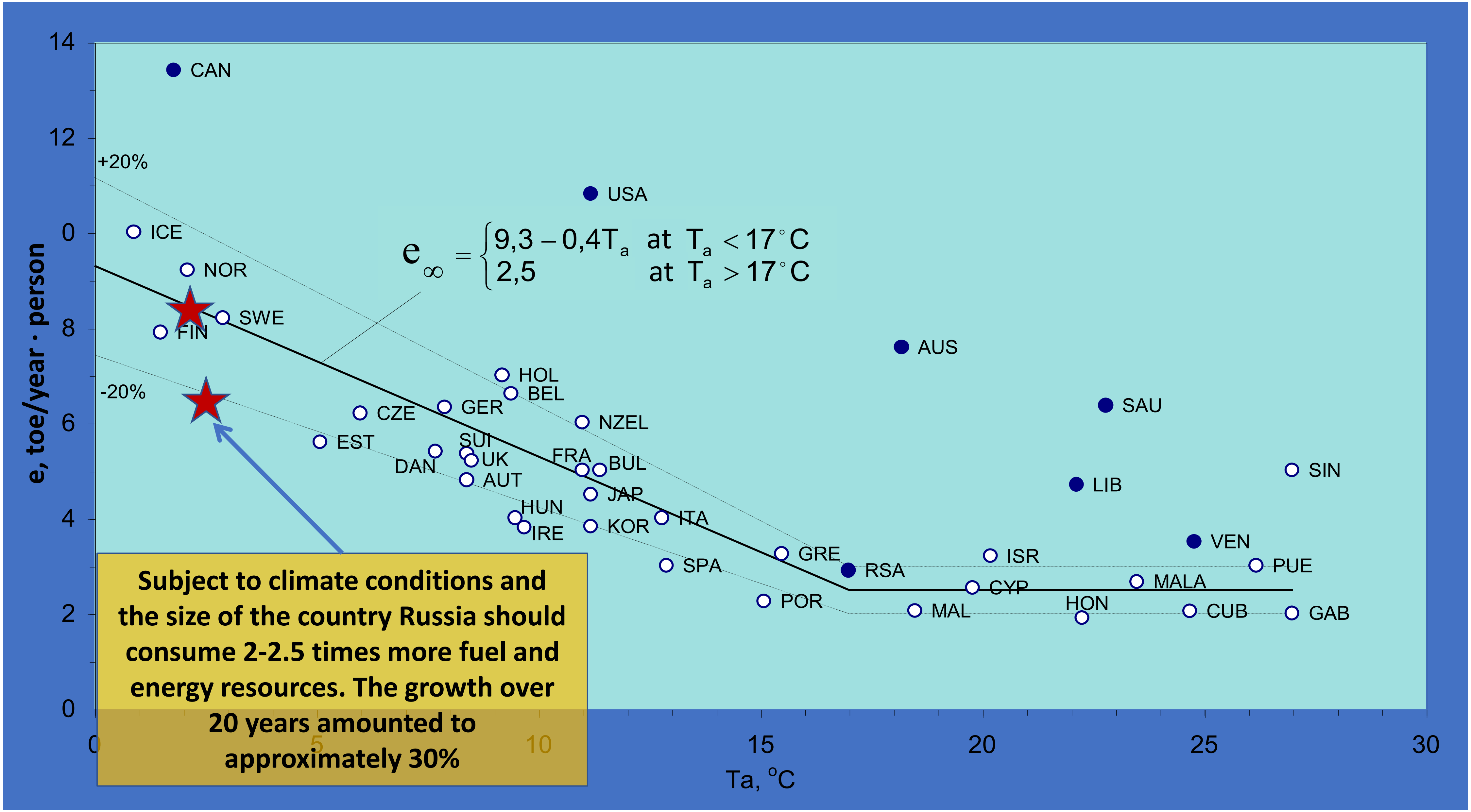
Global Changes in Energy Sector of the World and Our Country





- More and more energy is needed;
- Energy is becoming harder to produce;
- Quality (density) thereof is decreasing;
- Ecological costs are growing;
- Large part of the world is energy poor…

Dependence of Specific Energy Consumption on Average Air Temperature by Countries



Research Laboratory of Global Energy Problems, Moscow Power Engineering Institute

Actual Problems and Challenges: Answer to Question – What Is Energy Transition For, What Is It About?

The world (~ 5-6 billions of people) and Russia need considerably more energy

The world (Russia, PRC, India etc.) needs more high-quality and concentrated energy

Power supply systems should provide required flexibility and storage

Energy sources and related infrastructure should be environmentally safe

75% of Russia's territory needs modern reliable hybrid power supply systems

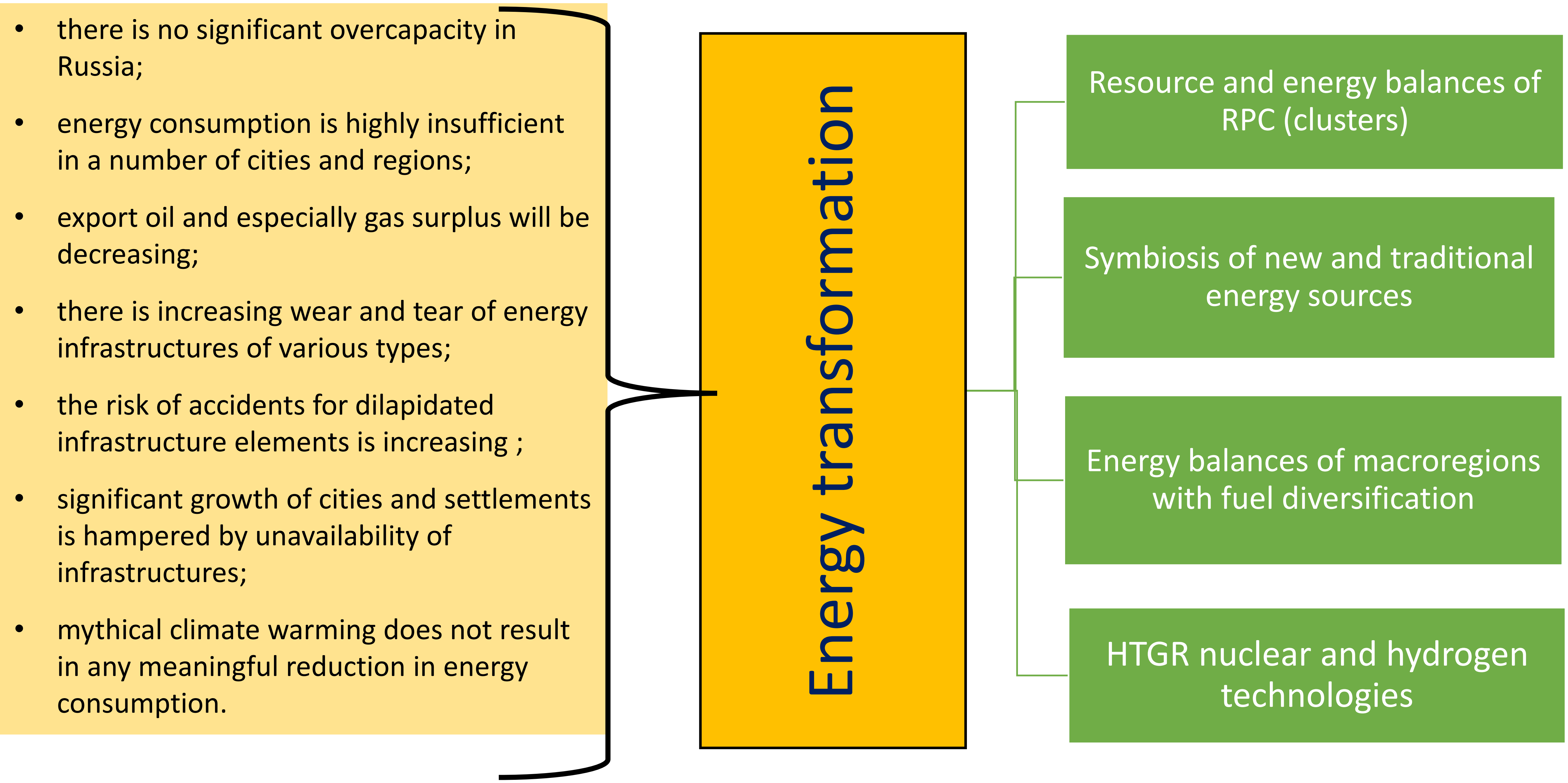
Huge Differences Between Regions of Russia in Terms of Size, Population, Energy Sector

- By climate(heating degree-day) – **5 times**
- By specific energy consumption – by **5 times**
- By size – **120 times**
- By population – **140 times**
- By energy – **100 times**
- By density – **1500 times**

These differences make a picture of enormous unevenness in population density and development of the expanse of the country

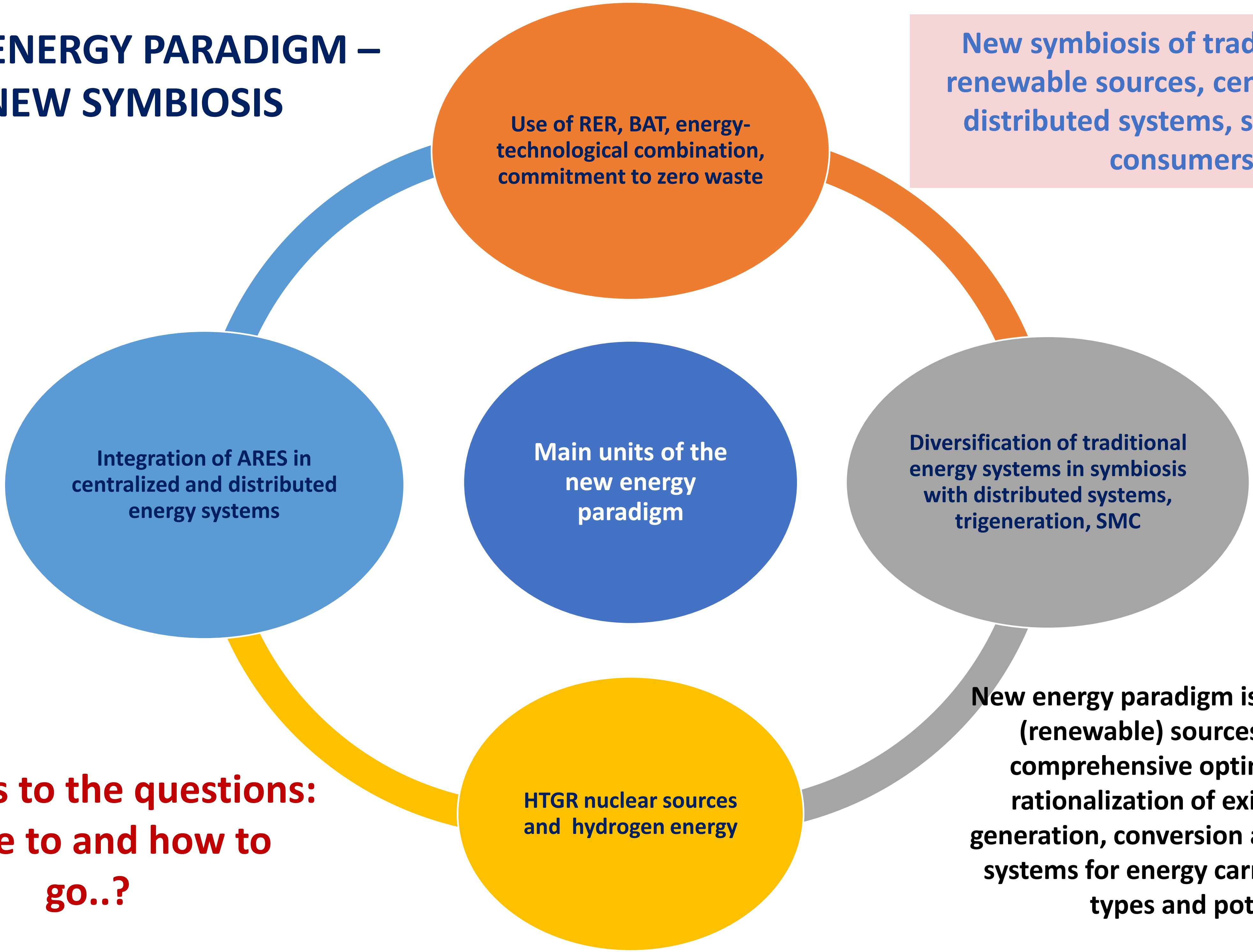
Russia is the largest state on the planet with the greatest differences between its constituent parts

Prerequisites and Priorities of Russia’s Energy Development



NEW ENERGY PARADIGM – NEW SYMBIOSIS

New symbiosis of traditional and renewable sources, centralized and distributed systems, sources and consumers



New energy paradigm is not about new (renewable) sources, but about comprehensive optimization and rationalization of existing energy generation, conversion and distribution systems for energy carriers of various types and potential

Answers to the questions: where to and how to go..?

To Fill the Country's Space: New Types of New Settlements to Develop New Territories and Resources

TYPE OF SETTLEMENTS	INFRASTRUCTURE	ENERGY SOURCES
Processing of various types of raw materials	Preparation and processing production chains	Furnaces, ETU with energy-technological combination (HTGR)
Transport hubs (NSR), communication	Infrastructure of road and railroad pipelines, communication lines	GPU, GTU, CHP, fuel cells
Tourism, recreation and valeology	Small settlements, including the ones in hard-to-reach areas	Mini CHP, hybrid systems, fuel cells
Defense	Outposts, military towns, dedicated facilities	Mini CHP, hybrid systems, fuel cells
RES..?.. hydrogen	Infrastructure supporting RES of different capacity	RES of different capacity, standby power supply sources, NPEP

LOW-COST AND EFFICIENT ENERGY INFRASTRUCTURE IS A KEY ELEMENT IN THE ESTABLISHMENT AND GROWTH OF NEW SETTLEMENTS

Promising Technologies and Designs of Future at EXPO Exhibitions

http://www.energosovet.ru/bul_stat.php?idd=653#:~:text=%D0%92%D1%8B%D1%81%D1%82%D0%B0%D0%B2%D0%BA%D0%B0%20%D1%80%D0%B0%D1%81%D0%BF%D0%BE%D0%BB%D0%BE%D0%B6%D0%B8%D0%BB%D0%B0%D1%81%D1%8C%20%D0%BD%D0%B0%20%D1%8E%D0%B6%D0%BD%D0%BE%D0%B9%20%D0%BE%D0%BA%D1%80%D0%B0%D0%B8%D0%BD%D0%B5%D0%B6%D0%B8%D0%BB%D1%8B%D0%B5%20%D0%BF%D0%BE%D0%BC%D0%B5%D1%89%D0%B5%D0%BD%D0%B8%D1%8F%20%D0%B8%20%D0%B8%D0%BD%D1%84%D1%80%D0%B0%D1%81%D1%82%D1%80%D1%83%D0%BA%D1%82%D1%83%D1%80%D0%BD%D1%8B%D0%B5%20%D0%BE%D0%B1%D1%8A%D0%B5%D0%BA%D1%82%D1%8B.

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Обсуждение справочного документа организовано при поддержке и участии
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