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RUSSIA ON THE ENERGY EFFICIENCY TRAJECTORY

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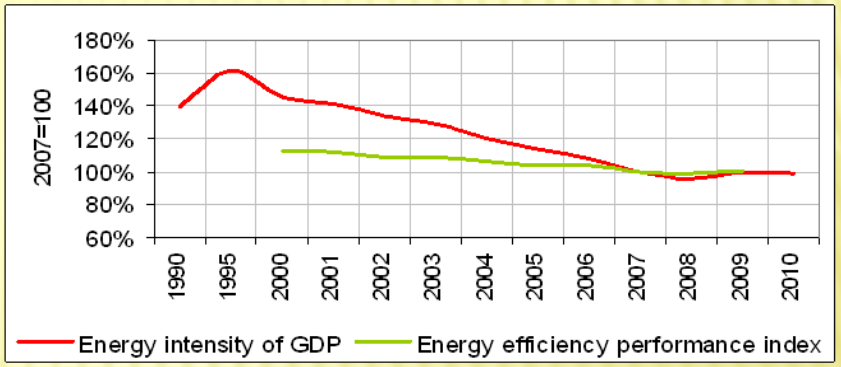
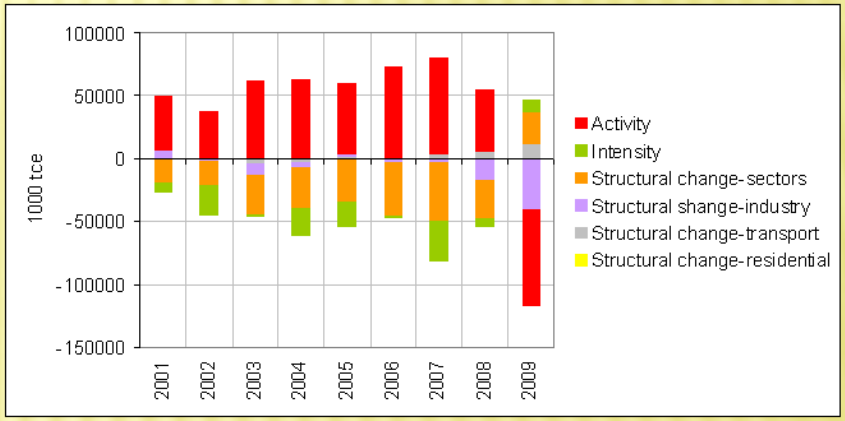
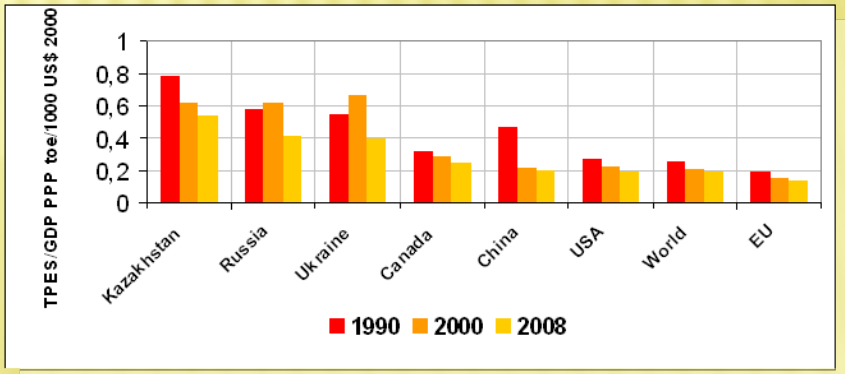
IN 2000-2008, ENERGY INTENSITY OF RUSSIA'S GDP WAS DECLINING BY 5% PER ANNUM

- Revival of Russia's economy was accompanied by dynamic reduction of GDP energy intensity
  - In 2000-2008, it was down by 34%, or by AAGR 5% per annum
  - In 2000-2008, EEPI was down by only 12%
- Economic crisis temporarily blocked this impressive progress
  - In 2009, GDP EI went up by 3,5%
  - In 2010, it was down by only 0,3%
- With no federal energy efficiency policy until 2008, the technological gap with the most advanced countries accumulated in the Soviet era was not bridged:
  - Contribution of the technological factor to the GDP energy intensity decline was limited to only 1% per annum, with the rest provided by: changes in the activity structure and industrial product mix, capacity load variations, energy prices growth and weather impacts, etc.
- Despite recent progress, Russia is still ranking among the least energy efficient economies
- In the long-term Russia's energy inefficiency will undermine sustainability of its economic growth and energy security

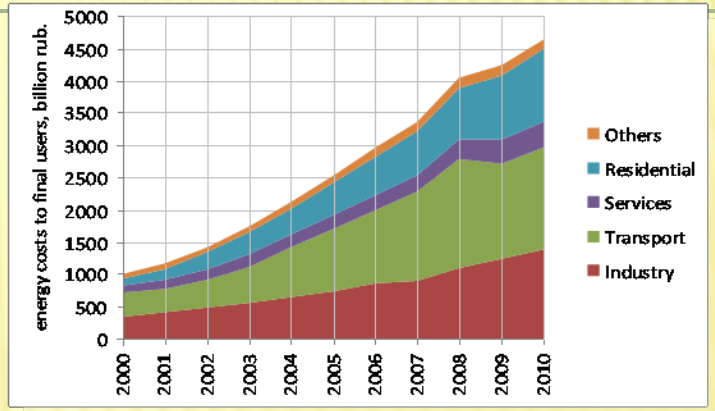


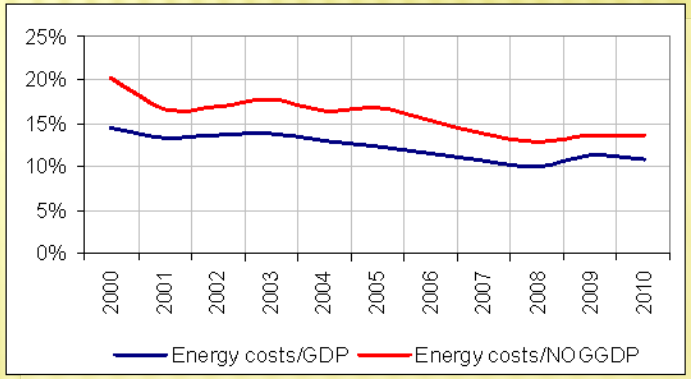


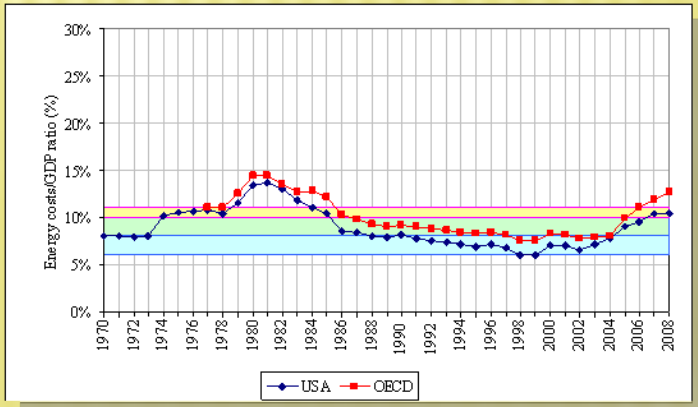


IMPROVED ENERGY EFFICIENCY PROVIDED SUBSTANTIAL REDUCTION OF ENERGY COSTS, WHILE GROWING ENERGY PRICES KEEP THEM CLOSE TO THE AFFORDABILITY HURDLES

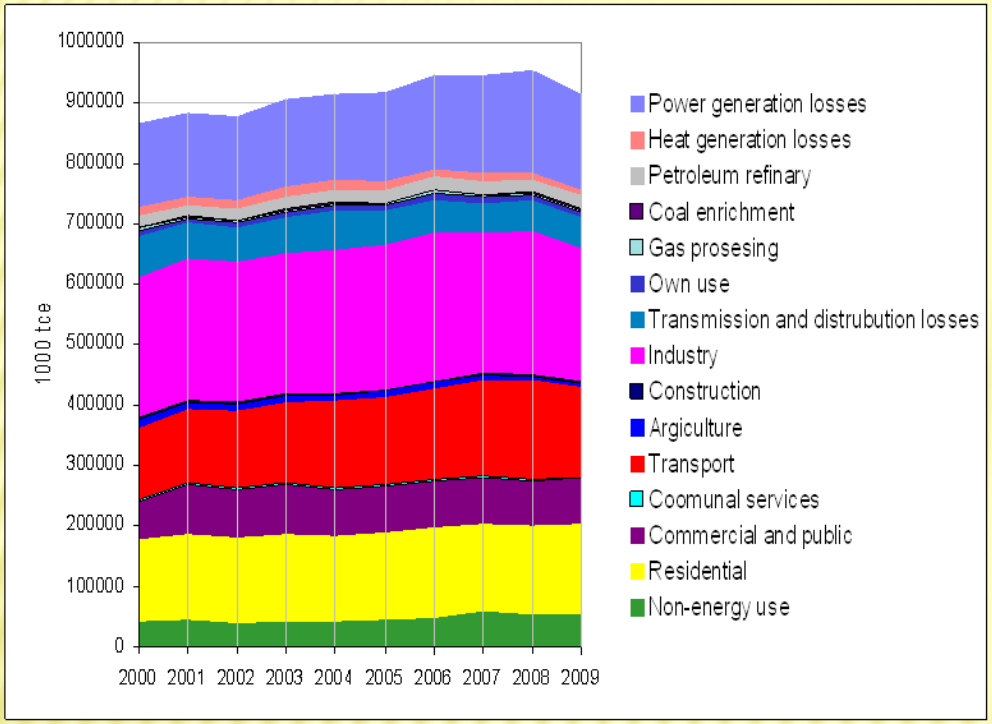
- In 2000-2010, end-use energy costs more then quadrupled and reached 5 trillion rubles
- Nevertheless, due to efficiency improvements energy costs to GDP ratio declined from 14,5% in 2000 to 10,8% in 2010
- Comparison of energy costs to non-oil and gas GDP also shows impressive progress; but the ratio is quite high
- The ratio of energy costs to industrial shipments varied in 2005-2010 in the range of 7-9%, staying much above the values for many advanced economies (4-5%) and undermining the competitiveness of Russia's industry
- In the long-term, energy costs to income ratios are relatively stable with only a very limited range of sustainable variations
- In the USA, the sustainable range of energy costs to GDP is 8-10%, and 9-11% for the OECD countries
- When these thresholds are considerably exceeded, the economic activity slows down
- In many countries, the ratios of housing energy costs to personal income and of personal transport fuel costs to personal income (before tax) vary in the range of 2-4%. In Russia, in 2009 these two ratios were 3,5%, leaving little room for further price growth not mitigated with the EE improvements

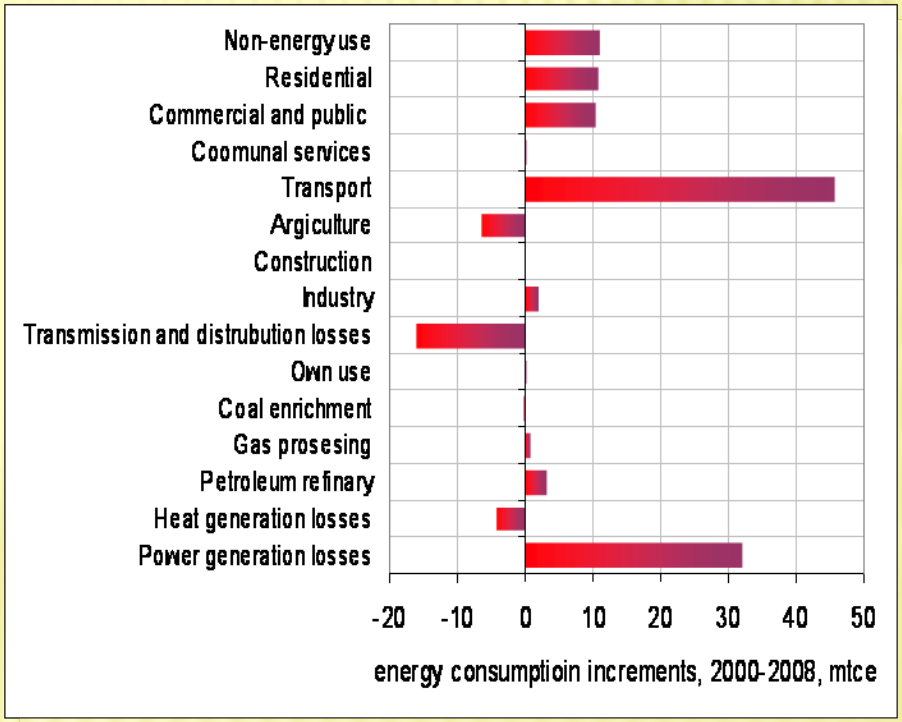






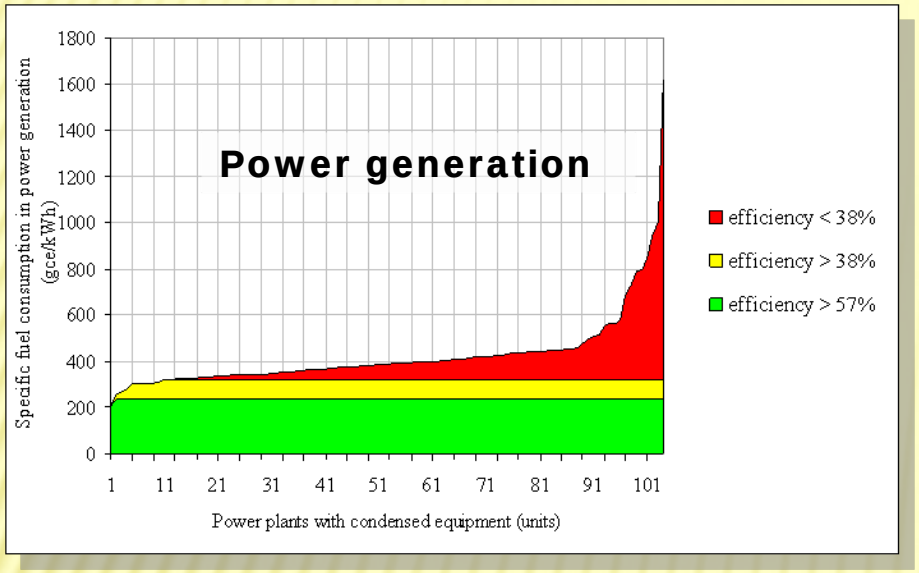
IN 2000-2008, MOSTLY TRANSPORT AND POWER GENERATION PUSHED ENERGY DEMAND UP

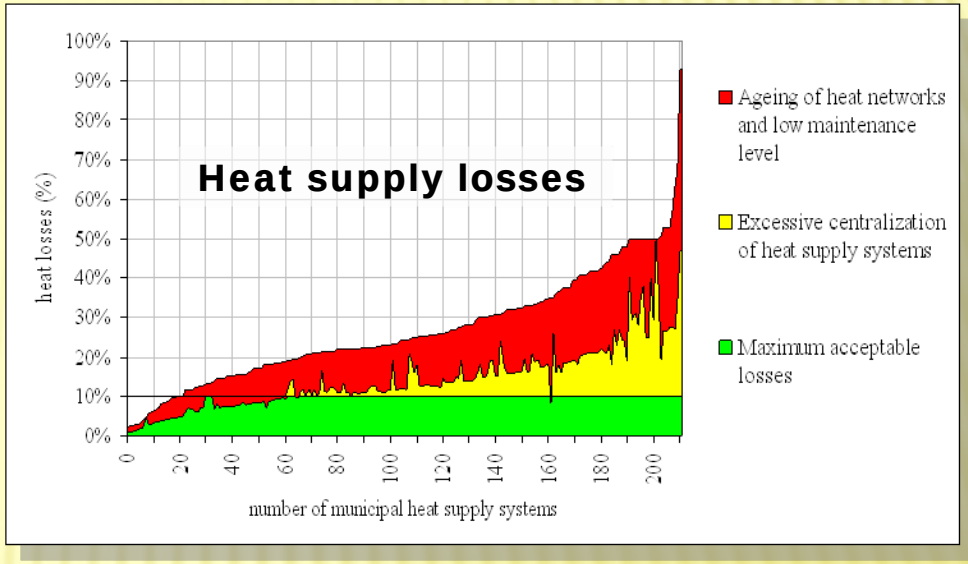


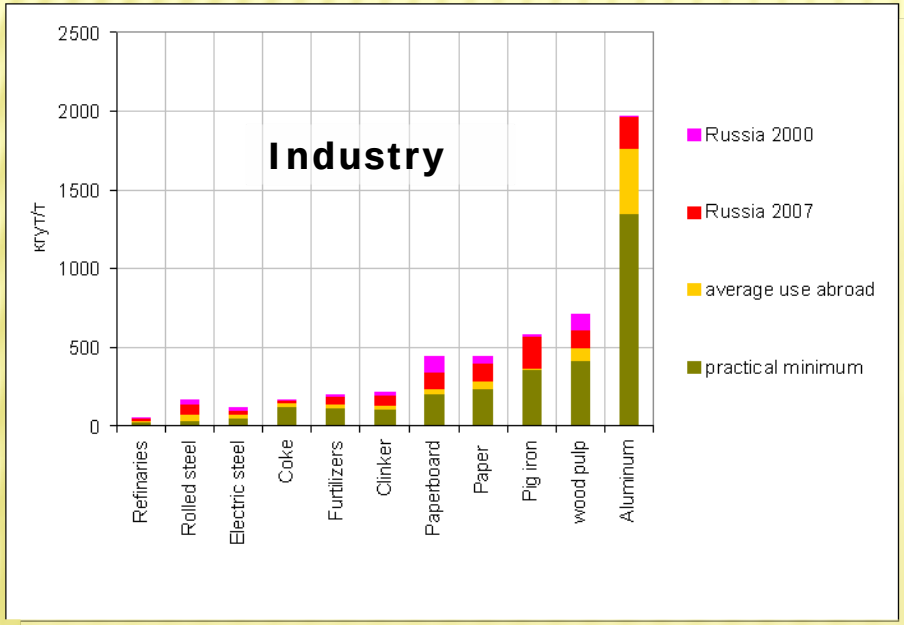


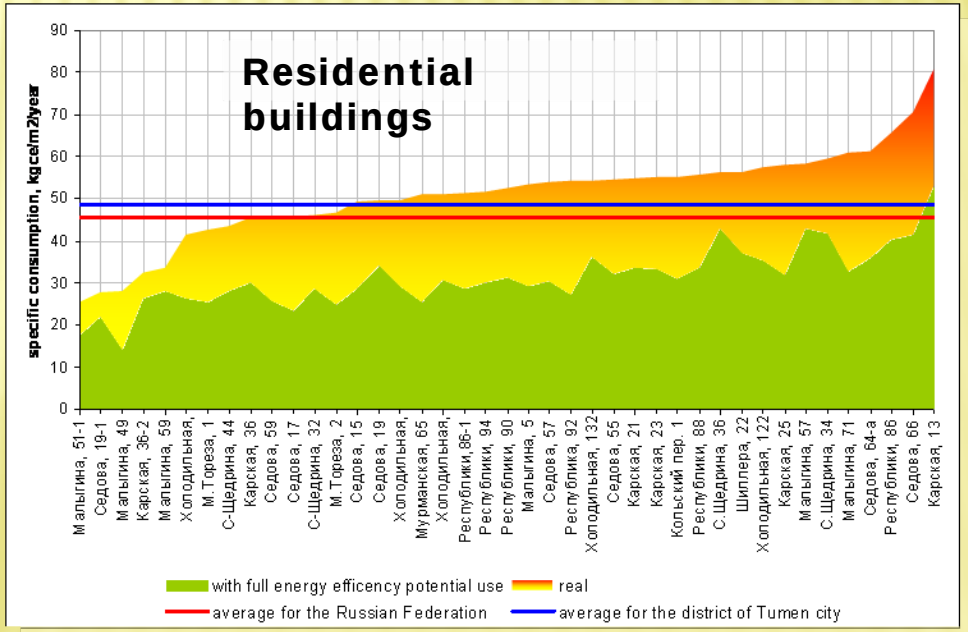
- Improving Russian statistical data on energy consumption is a key to energy policy success in general, as well as to energy efficiency policy development and implementation
- In Russia's Federal Program "On energy conservation and improving energy efficiency until 2020" for the fist time ever an IEA-like energy balance table developed by CENEF was published
- In recent years, energy balance tables have been created for many Russia's regions
- Still much more effort is needed to melt away the statistical mist and to make the energy demand picture clearer

RUSSIAN RED-AND-YELLOW ENERGY INEFFICIENCY HILLS ARE AN UNTAPPED ENERGY EFFICIENCY RESERVE



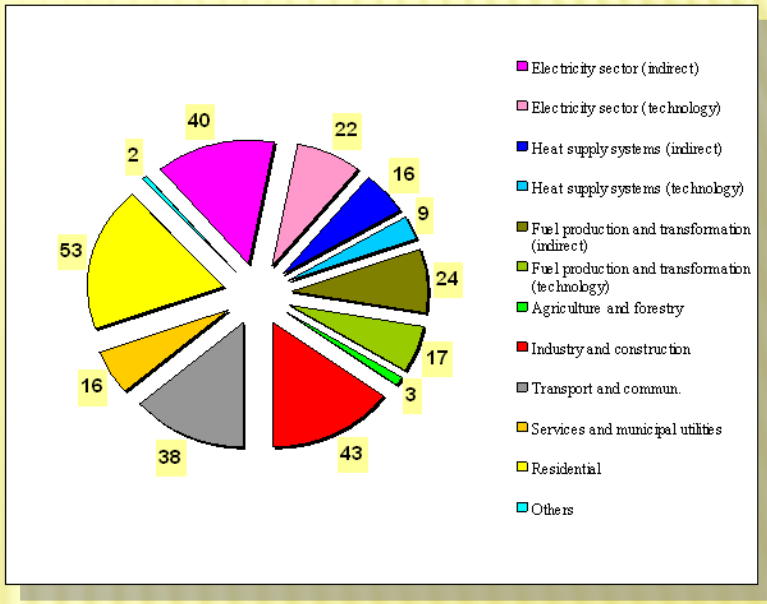


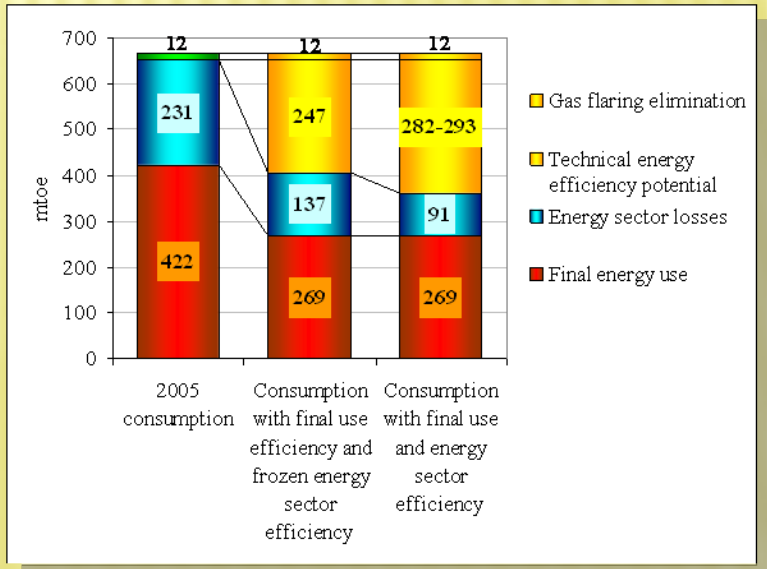




THE SCALE AND STRUCTURE OF RUSSIA'S ENERGY EFFICIENCY POTENTIAL

- The assessment made by CENEf for the World Bank has shown, that:
  - Russia's energy efficiency potential amounts to 45% of primary energy consumption, or to 282 mtoe (293 mtoe with an account of gas flaring)
  - The potential to improve final energy consumption (FEC) totals 154 mtoe
  - Improving the efficiency of electricity use allows it to reduce power consumption by 340 billion kWh, or by 36%
  - Improving the efficiency of final district heat use and reduction of distribution losses leads to potential reduction of heat consumption by 844 million Gcal, or by 53%
  - Natural gas consumption reduction potential equals 240 billion m3, which is more than half of domestic consumption and by far exceeds Russia's natural gas export

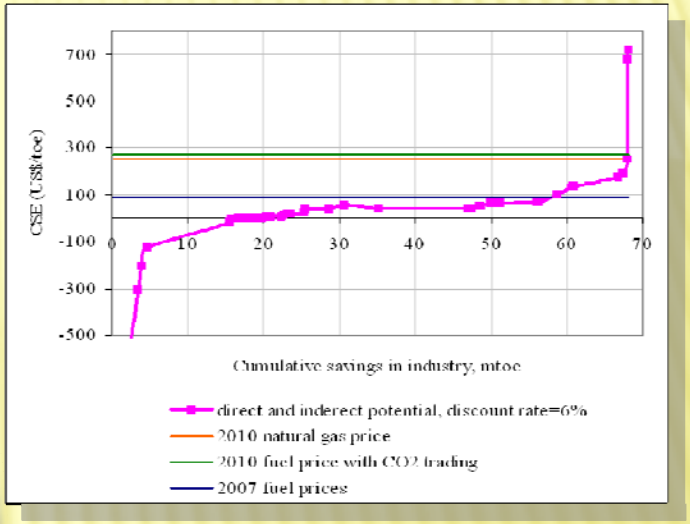


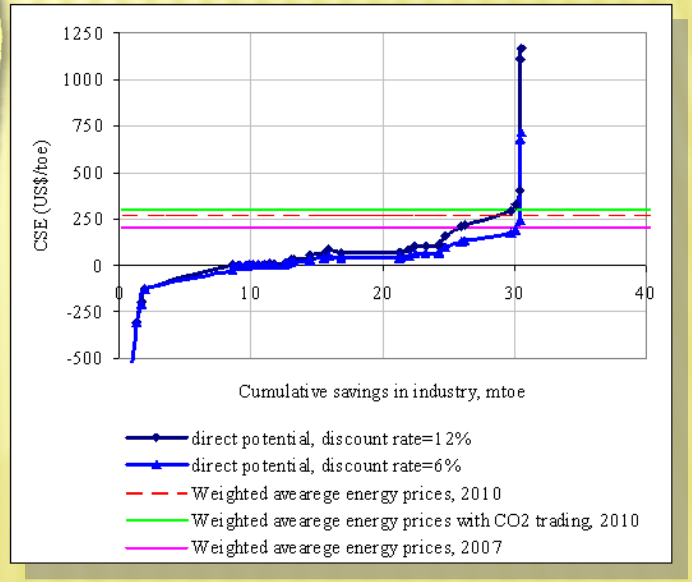


COSTS AND BENEFITS OF MINING RUSSIAN ENERGY EFFICIENCY POTENTIAL

- Incremental investments to fully implement the potential equal USD 324-357 billion
  - 1 toe of primary energy generated by energy efficiency improvements requires on average 2-3 times less capital, than the same amount of additional supply
  - If only cost-effective incremental investments in energy efficiency improvements are accounted for, this ratio scales up 4-6-fold
- The economic potential amounts to 215-230 mtoe
- The market potential totals 188-200 mtoe with 2010 energy prices
- In many instances, additional energy efficiency comes at no or low incremental capital and (or) maintenance cost
- Associated potential CO2 emission reduction is 793.3 mln. t CO2 eq. per annum
- Full implementation of the energy efficiency potential may allow for 8-10 years of Russia's economic development without additional primary energy consumption
- First signs of decoupling were already visible:
  - in 2000-2008, GDP grew by 66%, electricity demand was up by 18%, gas demand by 16%, while heat demand was 8% below the 2000 level

Cost of saved final energy (a) and primary energy (b) curves for energy efficiency improvements in Russia's manufacturing



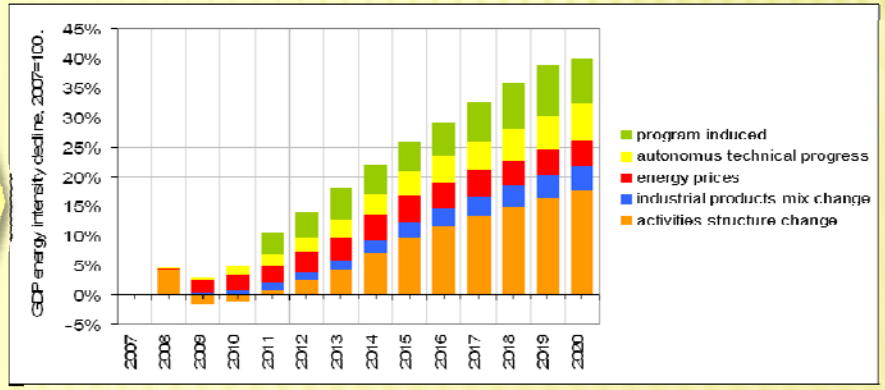


FEDERAL PROGRAM "ON ENERGY CONSERVATION AND IMPROVING ENERGY EFFICIENCY UNTIL 2020" WAS ADOPTED TO SCALE UP THE CONTRIBUTION OF THE TECHNOLOGICAL FACTOR TO THE REDUCTION OF GDP EI

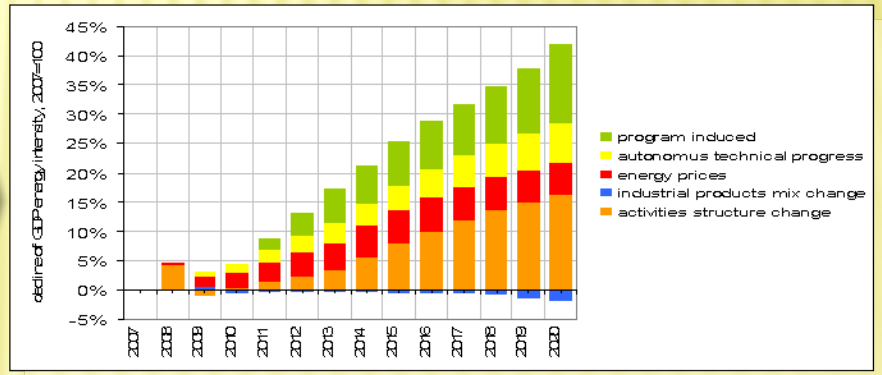
Program measures:

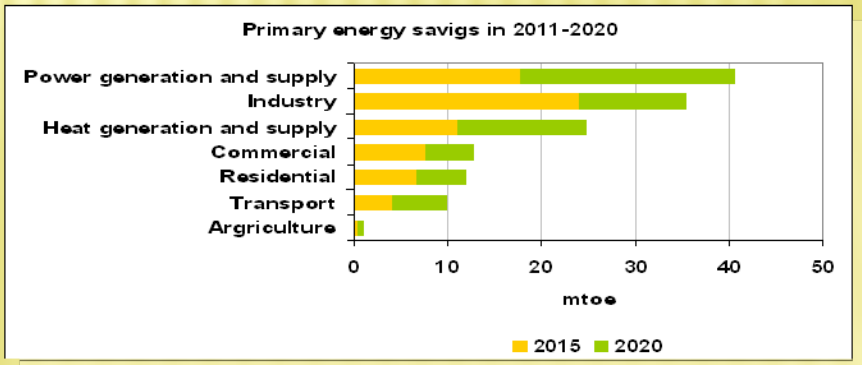
- Incorporate all 25 measures recommended by the IEA and more
- Provide 13,5% GDP energy intensity reduction
- cumulative energy savings
  - 233 mtoe in 2011-2015, and
  - 1124 mtoe in 2011-2020
- 9255 billion rubles overall energy costs cumulative savings in 2011-2020 is twice the 2010 energy costs
- 530 billion rubles reduction of public expenditures for public buildings
- 260 billion rubles reduction of public expenditures for household subsidies
- 837 billion rubles of additional profit tax
- 2700 billion rubles of additional export revenues
- 2436 mln. t CO2 eq. cumulative GHG emission reduction
- Require in 2011-2020 9835 billion rubles program costs, including:
  - 70 billion rubles of federal allocations
  - 100 billion rubles of federal allocations for loan guarantees
  - 625 billion rubles of allocations by Russia's regions

"Innovative" scenario



"Inertia" scenario





ENERGY EFFICIENCY POLICIES AND MEASURES LAUNCHED

- Federal support for regional EE programs development and implementation (in 2010, about all regions and most municipalities developed such programs)
- Federal guarantees for the implementation of EE programs by large enterprises
- Request for energy and water utilities to develop EE programs
- Providing incentives for the implementation of typical EE projects by investment tax credits and reducing interest rates
- Energy and water metering
- EE building codes and standards, EE building retrofits
- Energy efficiency labeling
- Energy management standards
- Energy audits and energy passports
- Energy pricing schemes to let public utilities keep monetary savings
- Energy efficient equipment procurement
- Energy performance contracting
- Tasks for public sector to reduce energy consumption
- Federal informational system on EE, energy balances, analytical tools and improving energy statistics
- Informational support and propaganda
- Training and improving EE qualifications
- R&D in EE

PROBLEMS ASSOCIATED WITH ENERGY EFFICIENCY POLICIES AND MEASURES IMPLEMENTATION

- Lack of institutional capacity to develop and implement correct and timely decisions
- Lack of EE knowledge and qualifications at all management levels
- Lack of data and information to support decision-making
- Lack of incentives and motivation, or conflict of motivations, which prevents from timely implementation of measures (installation of meters, for example)
- Imperfect institutional market structure, which lacks clearly defined beneficiary of energy costs reductions and complicated investment decision-making process (apartment buildings)
- Insufficient attention to EE policies in the industrial and transport sectors
- Lack of access to long-term financial resources at acceptable interest rates
- Lack of marketed bank products to finance EE projects and lack of bankable projects
- Insufficient competition and high level of corruption
- Low energy prices (in some locations) and soft budget limitations
- Unwillingness to adopt many innovative EE promotion mechanisms well-proven abroad
- Action against EE on the part of some groups (energy suppliers, vendors of obsolete equipment (like incandescent lamps), etc.)
- Lack of Russia-based production of EE equipment in some sectors

- There are several Russian and international projects in place or ready to start to overcome some of listed barriers and to promote EE measures