
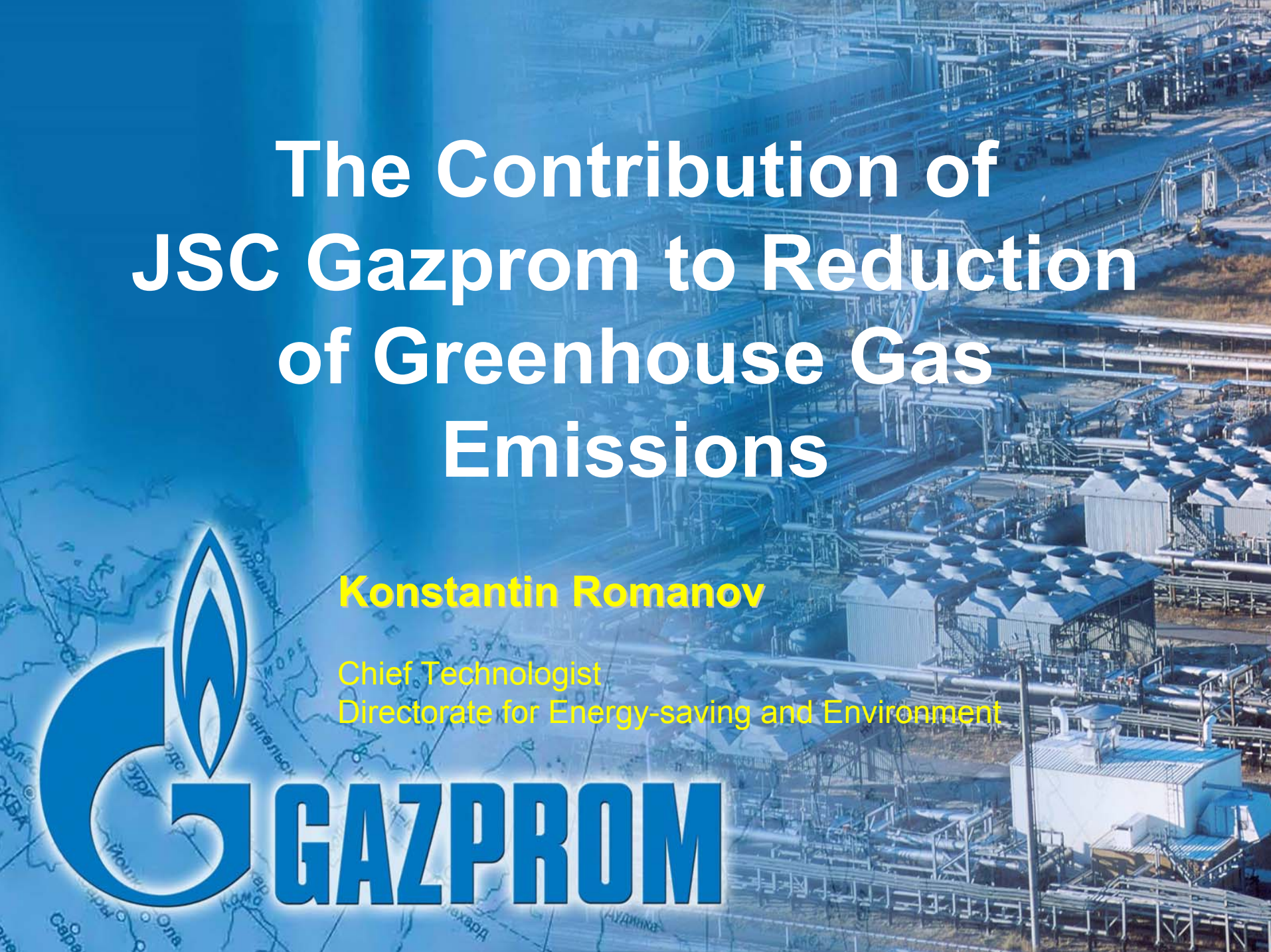


The Contribution of JSC Gazprom to Reduction of Greenhouse Gas Emissions

Konstantin Romanov
Chief Technologist
Directorate for Energy-saving and Environment




GAZPROM

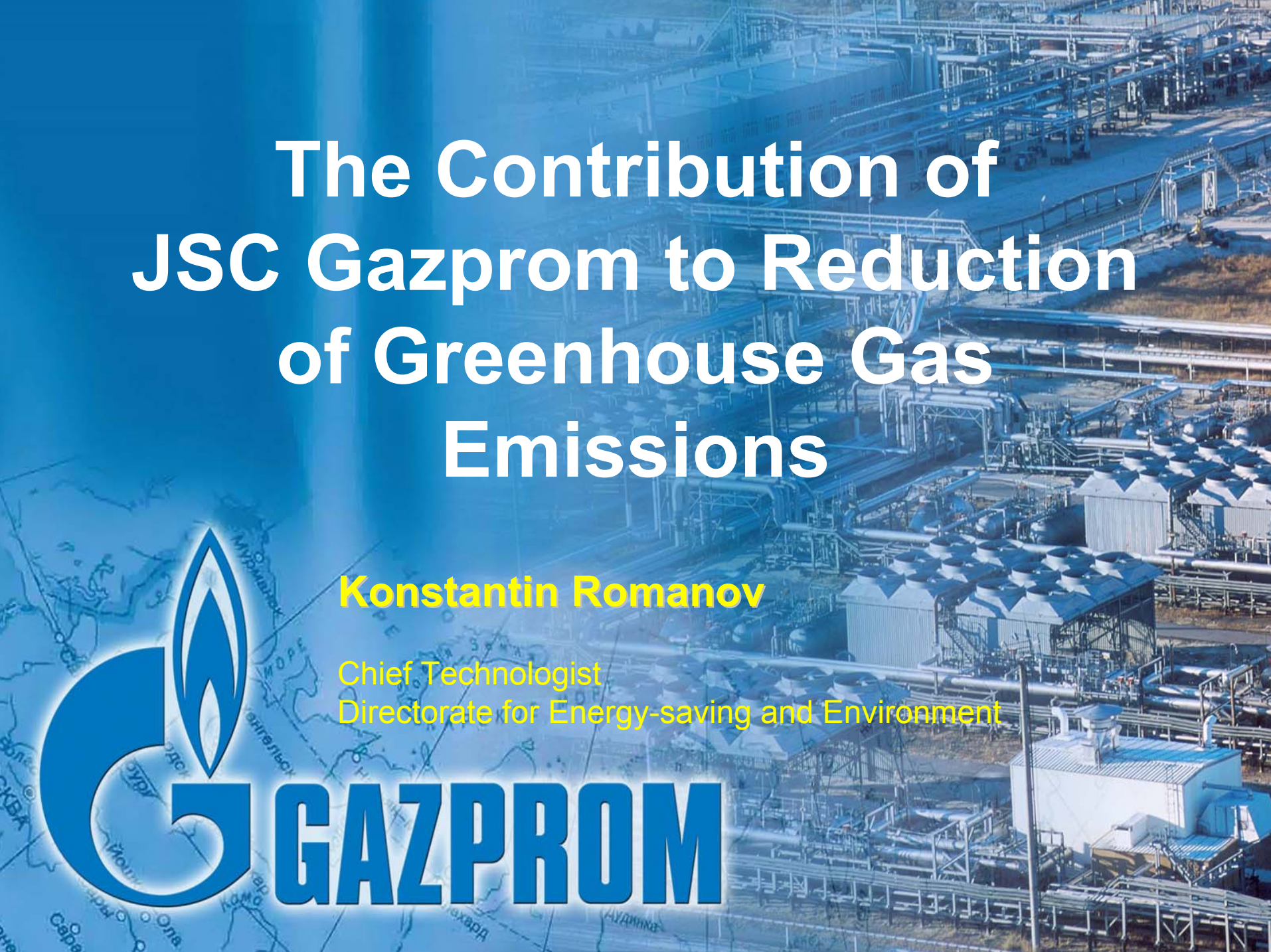


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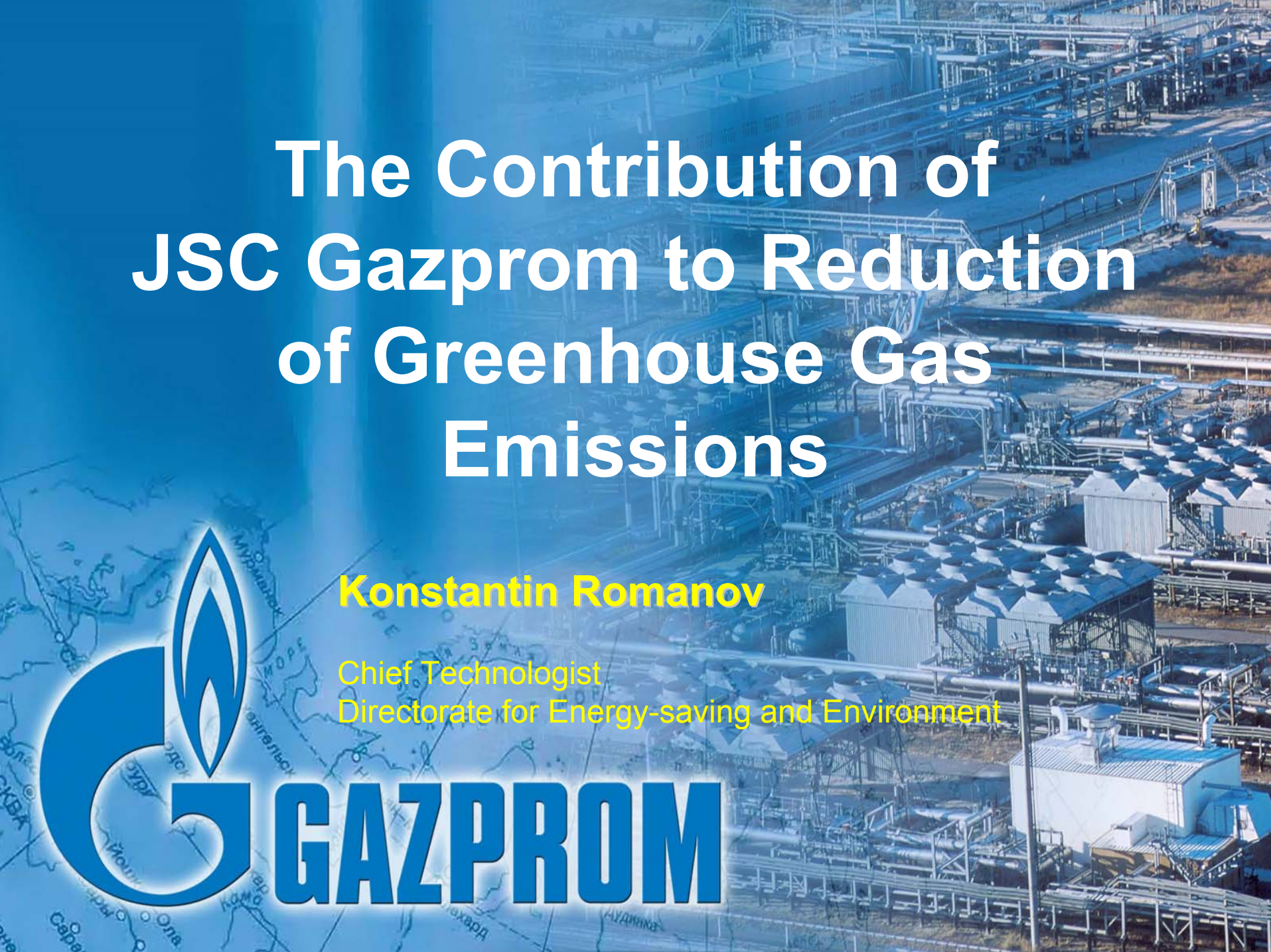


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GAZPROM



SUSTAINABLE DEVELOPMENT

is the basic principle of Gazprom

- Dynamic economic growth -
- efficient natural resource management -
 - maintaining favourable environment
for future generations



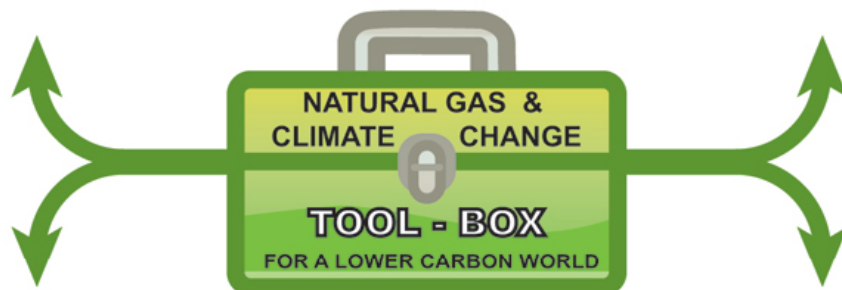
ENERGY EFFICIENCY

IN OWN OPERATIONS	FOR NATURAL GAS CUSTOMERS
<ul style="list-style-type: none"> More efficient conversion to electricity & mechanical energy Utilize reservoir pressure and heat energy Design new gas systems based on high future energy- and CO₂ cost-assumptions 	<ul style="list-style-type: none"> Help customers find and use best available technology Make natural gas available in more regions & locations Seek out new end-use types where natural gas is particularly efficient



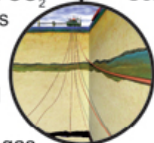
CUTTING FLARING AND VENTING EMISSIONS

IN OWN OPERATIONS	FOR NATURAL GAS CUSTOMERS
<ul style="list-style-type: none"> Limit (already low) gas industry flaring and venting to very low levels Limit methane emissions from valves, flanges, start-up/stop, maintenance etc. to very low levels Remediate old town gas systems used for natural gas where applicable 	<ul style="list-style-type: none"> Assist oil industry to reduce their flaring/venting by gathering and transporting this natural gas to market Allow various forms of bio-gas into natural gas grid



CO₂ - CAPTURE, -TRANSPORTATION AND - STORAGE (CCS)

IN OWN OPERATIONS	FOR NATURAL GAS CUSTOMERS
<ul style="list-style-type: none"> Store already captured CO₂ in geological formations (e.g. from LNG-plants) Capture & store CO₂ from high - CO₂ natural gas Use CO₂ for enhanced gas recovery Later priority: capture CO₂ from gas turbine and boiler flue gas CO₂ as cushion gas in storages 	<ul style="list-style-type: none"> Sell CO₂ to oil companies for enhanced oil recovery Sell CO₂-transport and geostorage space for customers



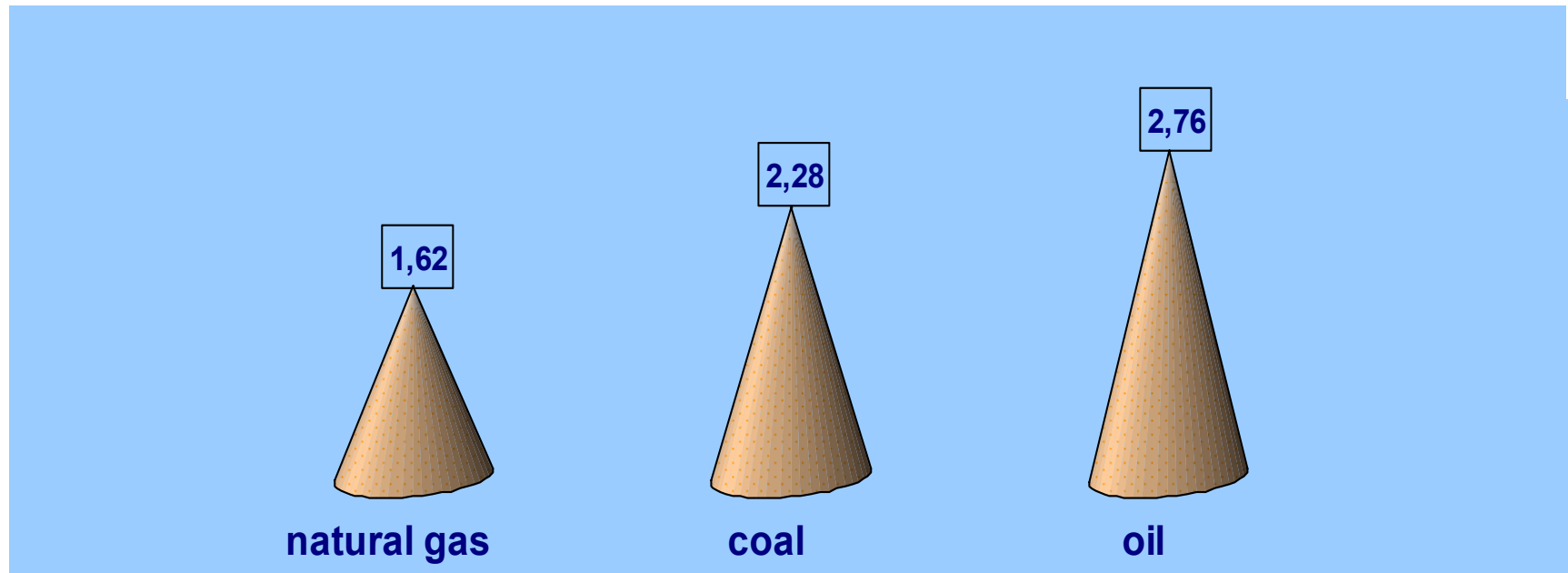
FUEL SWITCHING AND RENEWABLES

IN OWN OPERATIONS	FOR NATURAL GAS CUSTOMERS
<ul style="list-style-type: none"> Use hydropower, wind etc. as part of the electricity supply to own plants Natural gas fuel for own trucks & ships Ultimately switch to electricity, hydrogen and heat made from natural gas with CCS Natural gas to fuels and chemicals 	<ul style="list-style-type: none"> Switch from coal to natural gas in electricity generation Introduce natural gas in new types of end-use (i.e. shipping, heavy trucks) Introduce natural gas more in energy intensive industries (e.g. steel) Produce and distribute hydrogen Mix bio-gas into gas grid



CO₂ emissions from different hydrocarbon fuel

(as compared with 1 ton of standard coal equivalent)



Additional emissions

(as compared with use of 1 million m³ methane)

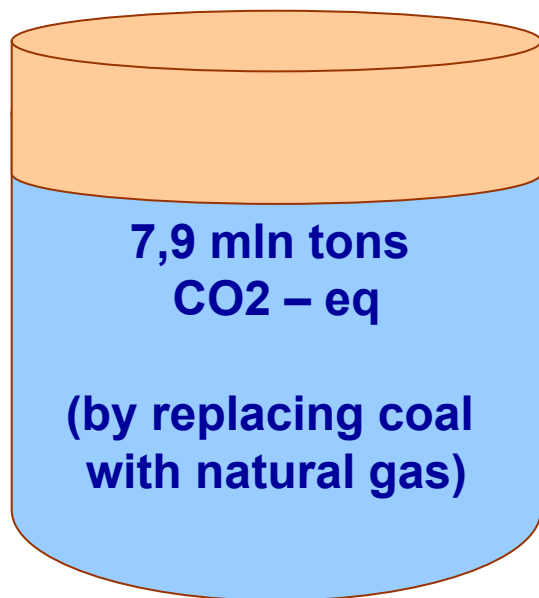
oil + 980 ton CO₂

coal + 574 ton CO₂

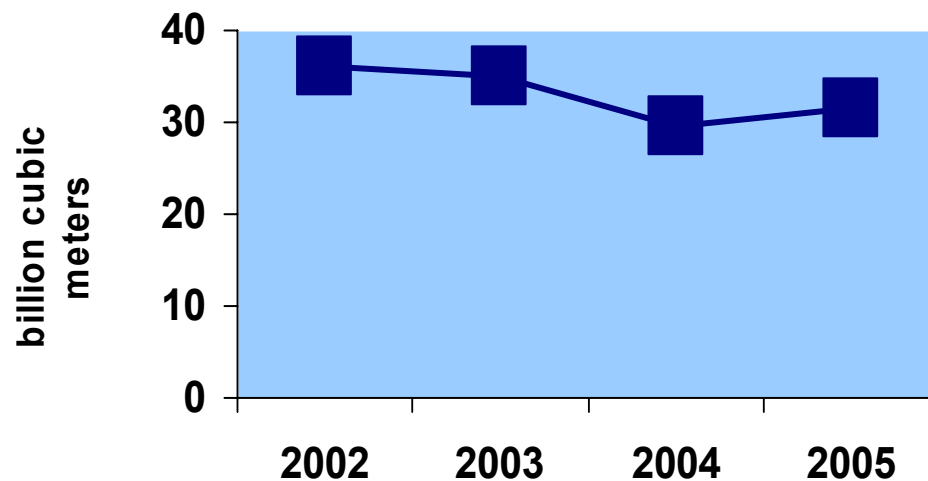
GHG gas reduction in Germany (2003 – 2004)



9,1 millions tons CO₂ – eq.

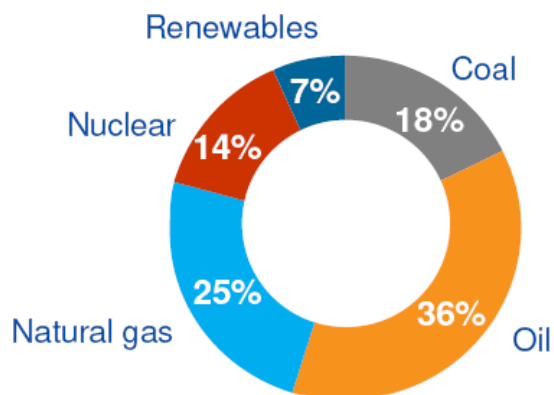


Natural gas export to Germany

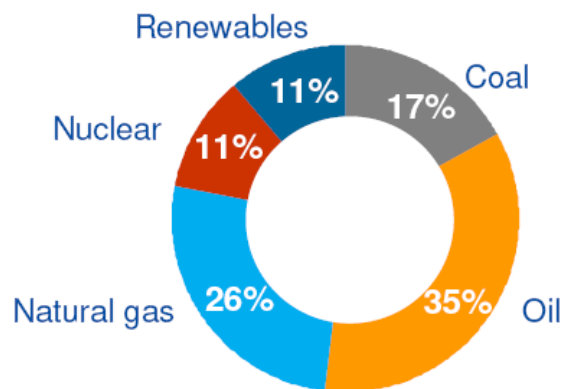


Renewables will not fill the supply gap – Importance of natural gas increases

Energy mix 2005



Energy mix 2025



Alternative energy sources

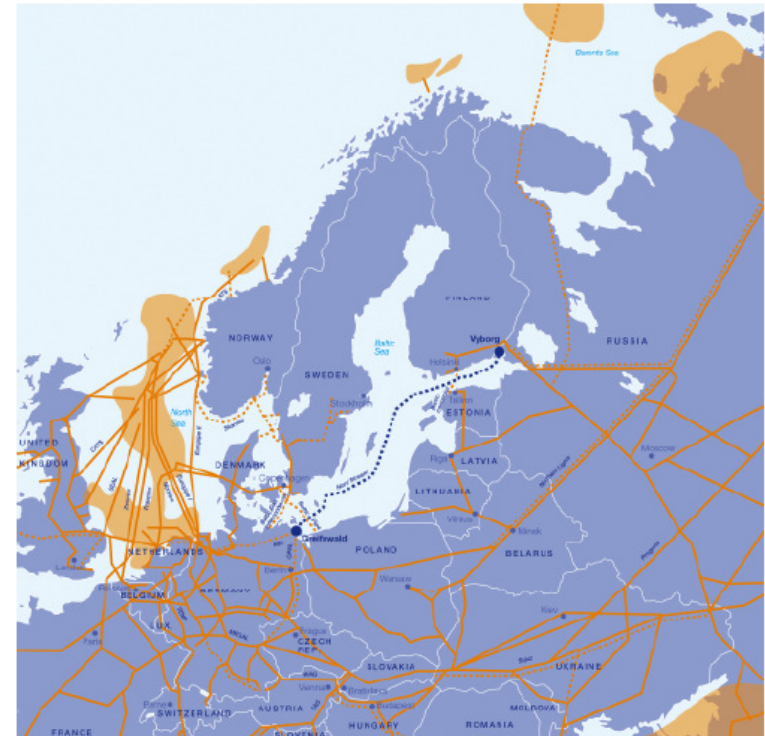
- **Gas is the most environmental friendly fossil fuel** – indispensable for achieving the EU's greenhouse gas emission targets
- **Renewable energy** cannot cover the shortfall of natural gas supply in short/medium term
- **LNG transport** means more greenhouse gas emissions

Alternative import routes

- **Diversification** of routes important for Europe's independence
- **Enlargement of current capacity** of Yamal/EUROPOL does not provide a diversification of existing routes

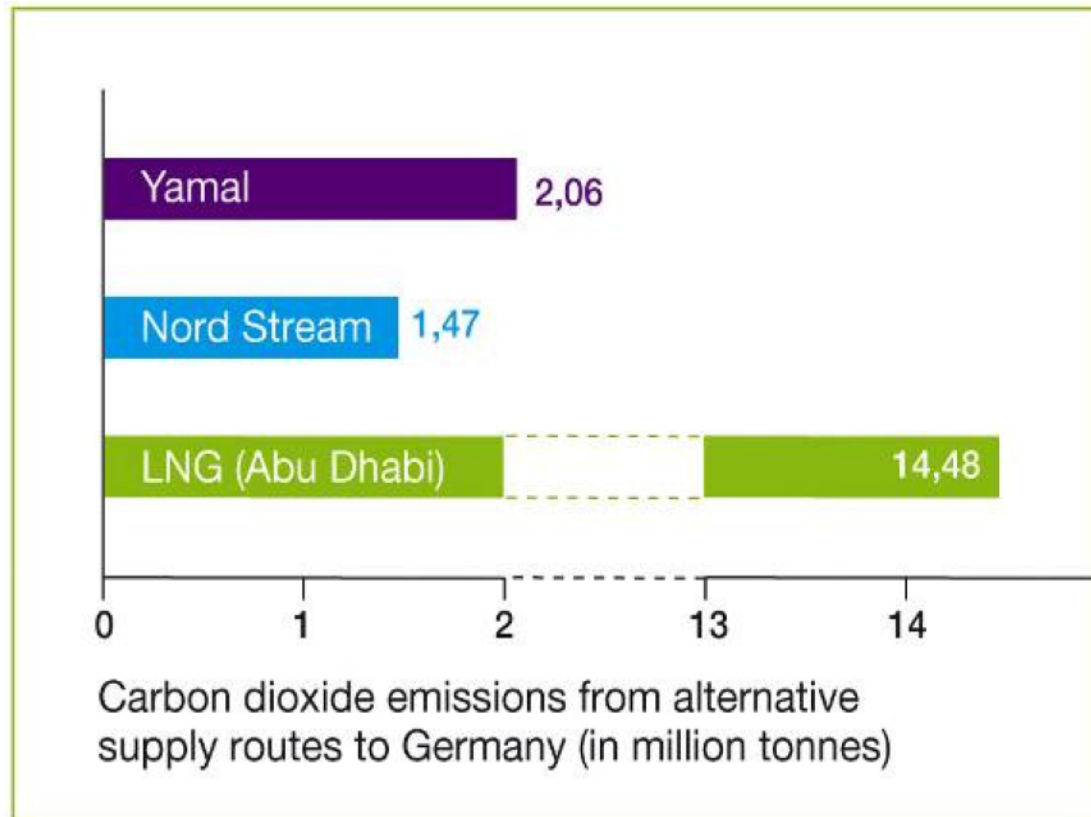
Nord Stream – Contribution to energy security

- The new gas supply route for Europe consists of two parallel 1,220 km long offshore natural gas pipelines across the Baltic Sea
- **Enhances** Europe's security of supply by delivering 25% of additional gas imports
- **Directly connects** Russia with its **largest available gas reserves** in the world to European gas networks
- **Complements** existing routes from Russia to Western Europe
- **Transports** gas directly to the countries and customers where it is most needed: the UK, the Netherlands, Belgium, France, Italy, Czech Republic and other countries



Offshore pipeline – Comparatively low CO₂ emissions

- Offshore pipeline emits **40% less CO₂** than onshore alternatives and LNG



The alternative to Nord Stream

Nord Stream

**55 billion
cubic
metres**

=

150 oil tankers via the Baltic Sea

550 LNG shipments via the Baltic Sea

55 coal-fired plants

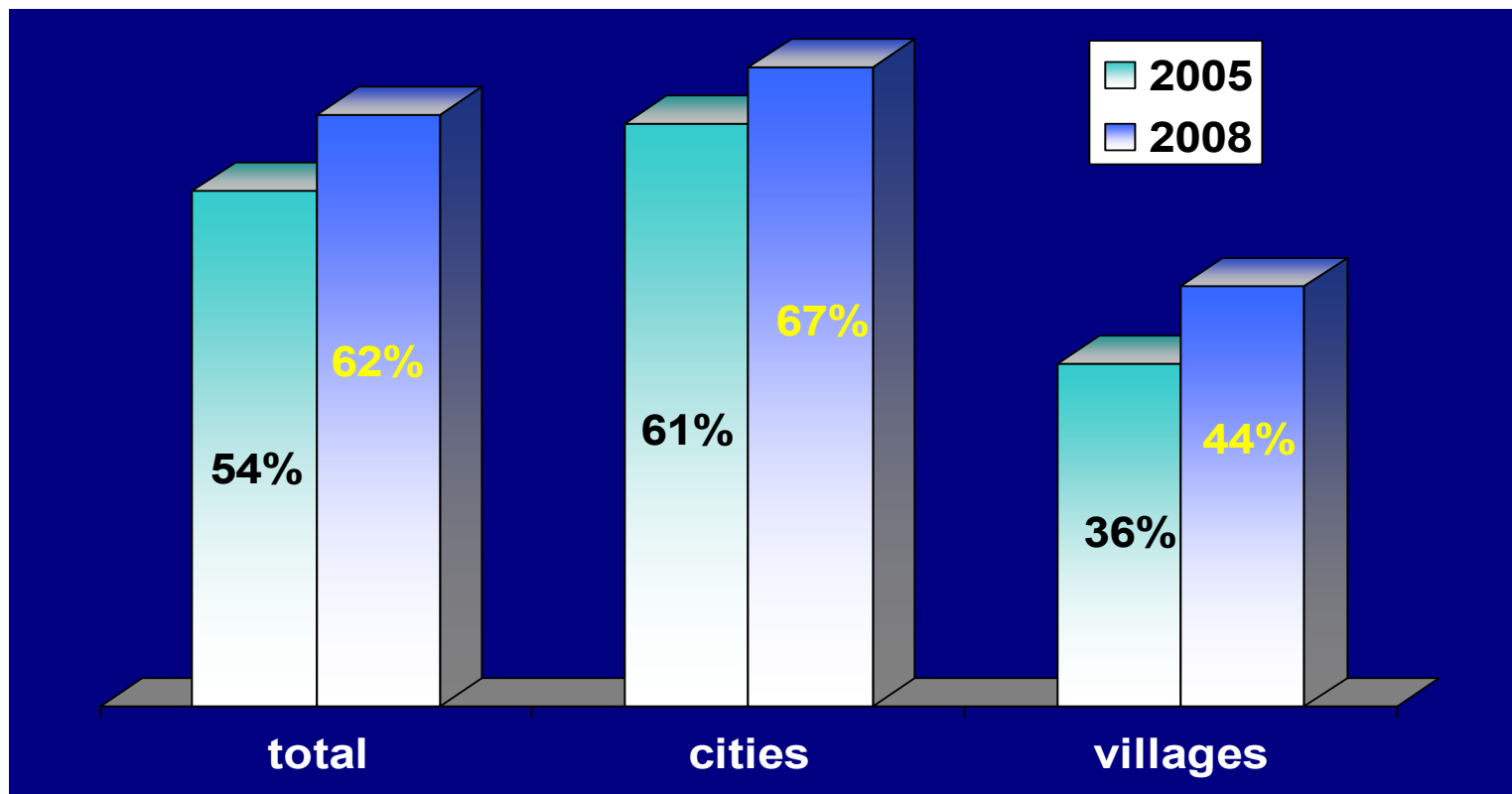
23 new nuclear power stations

19 new hydroelectric power stations

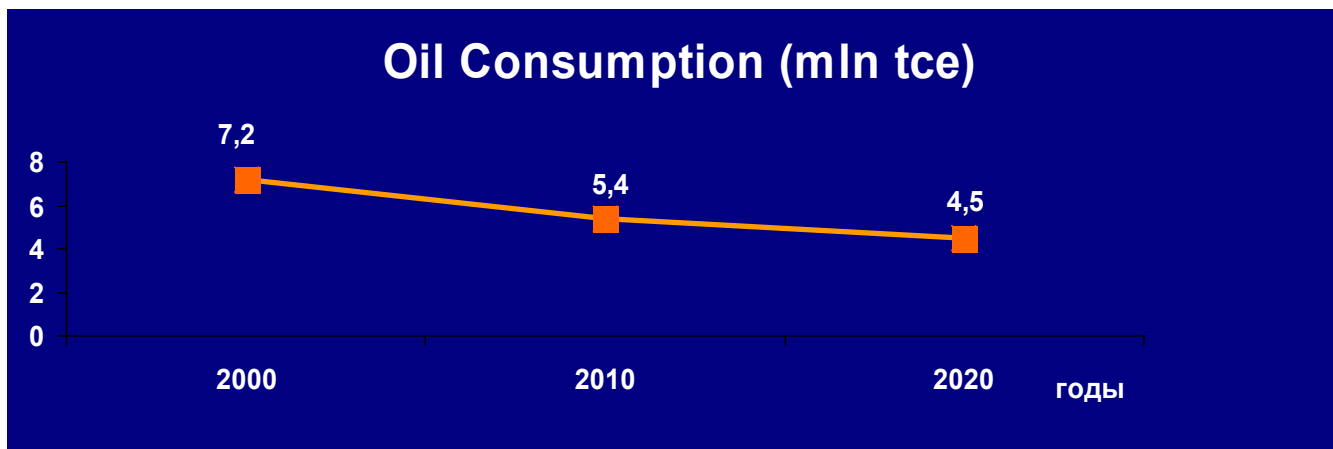
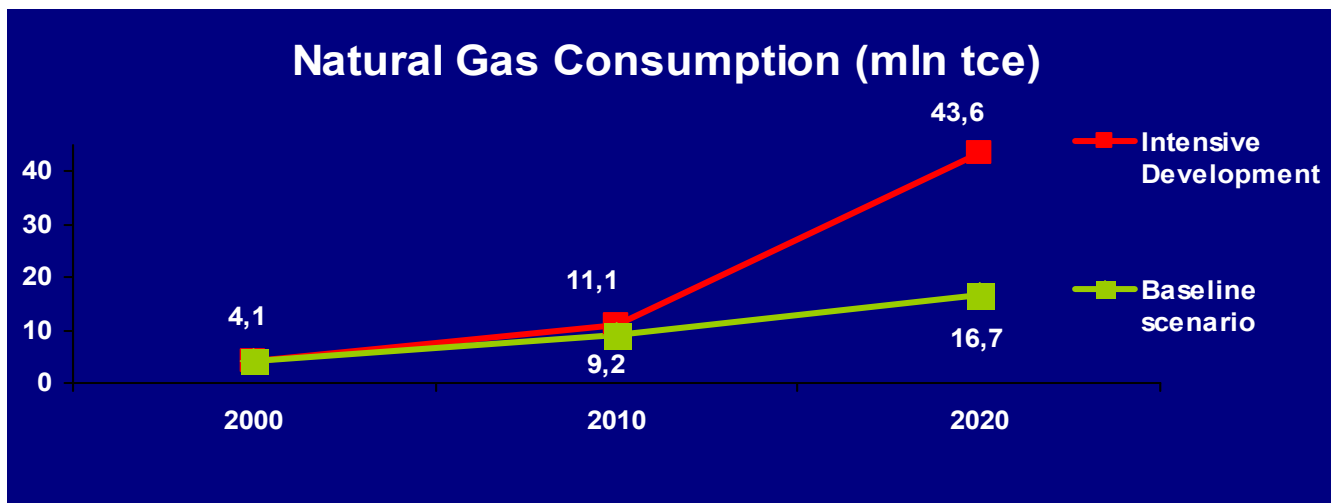
240,000 wind mills

90,000-100,000 square kilometres of corn fields
to produce **bio-ethanol**

Gasification of regions in the Russian Federation

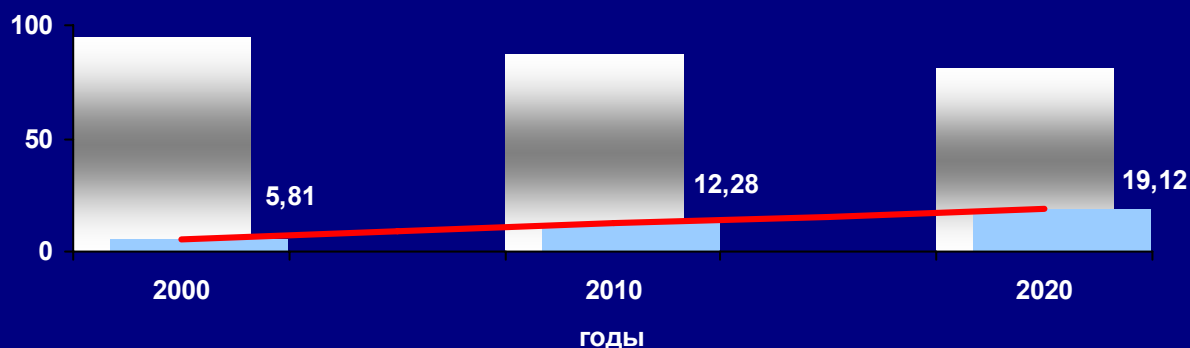


The consumption of fuel in the Eastern Siberia and the Far East

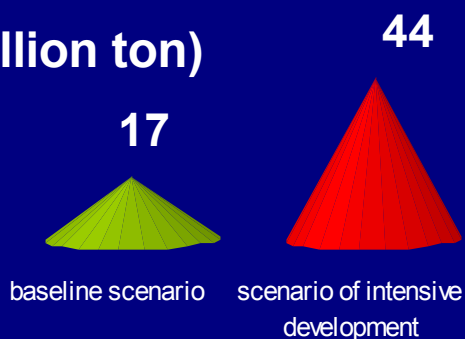


Ecological effect of the gasification of the East Siberia and the Far East

The share of natural gas in Energy Balance (%)



Annual CO₂ emissions reduction from gasification (billion ton)





New initiative of Gazprom

Euroavtogas

“We propose to our European partners to jointly develop a project for creation of a large-scale network of automobile gas fuelling stations in Europe with participation of Gazprom.”

Alexey Miller

Chairman of Gazprom's Management Committee

Gazprom annual General Shareholders Meeting – June 27 2008

Blue corridor project

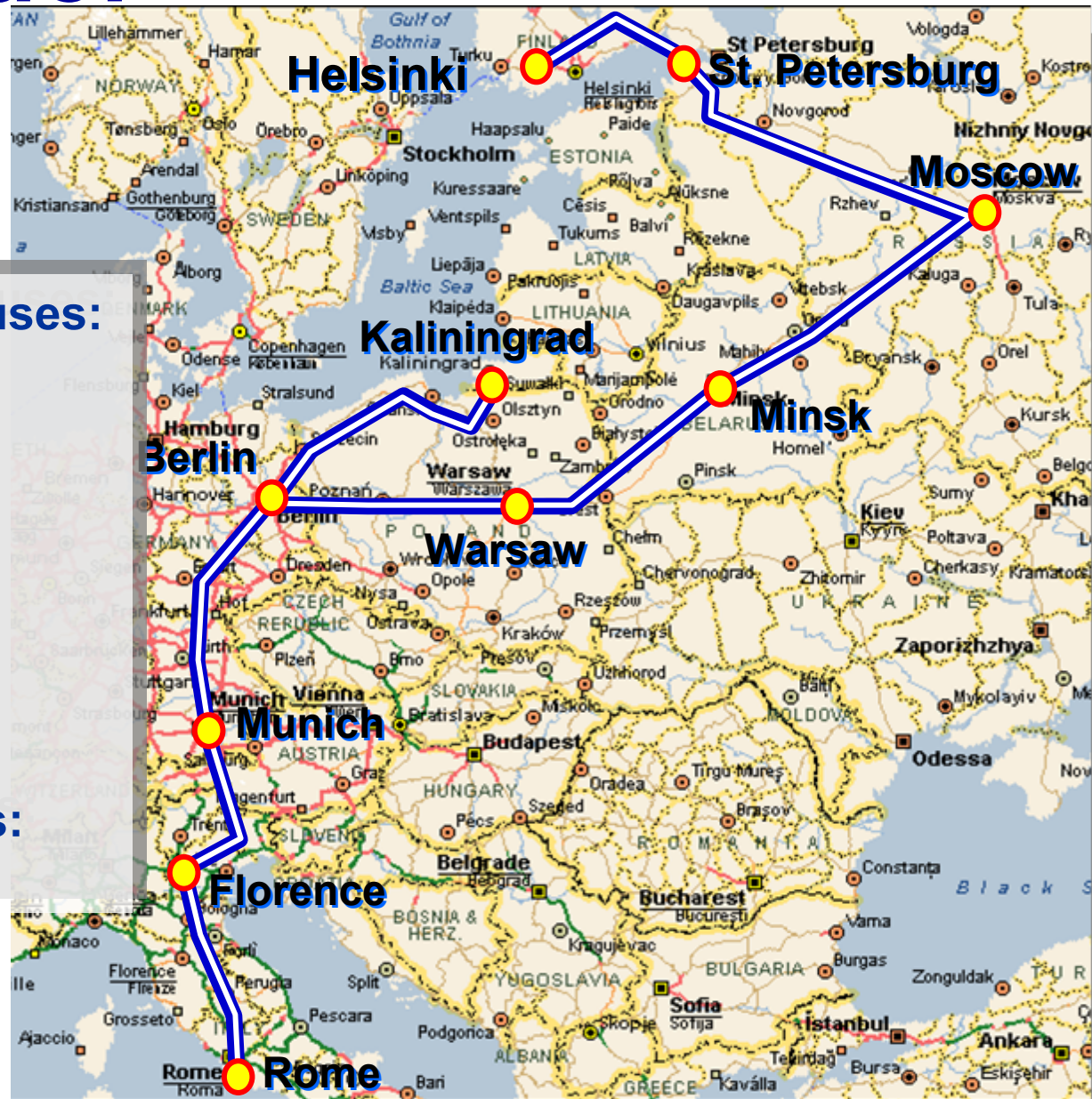


For 10 500 trucks and buses:

Save the cost of fuel:
37 million € / year

Reducing air pollution
(CO - eq):
270 000 tons / year

Reducing CO₂ emissions:
25%



The Blue Corridor Project

(natural gas as a motor fuel in the European

Developed by OAO «Gazprom» and approved at the Summit of G8 (St. Petersburg, 2006)

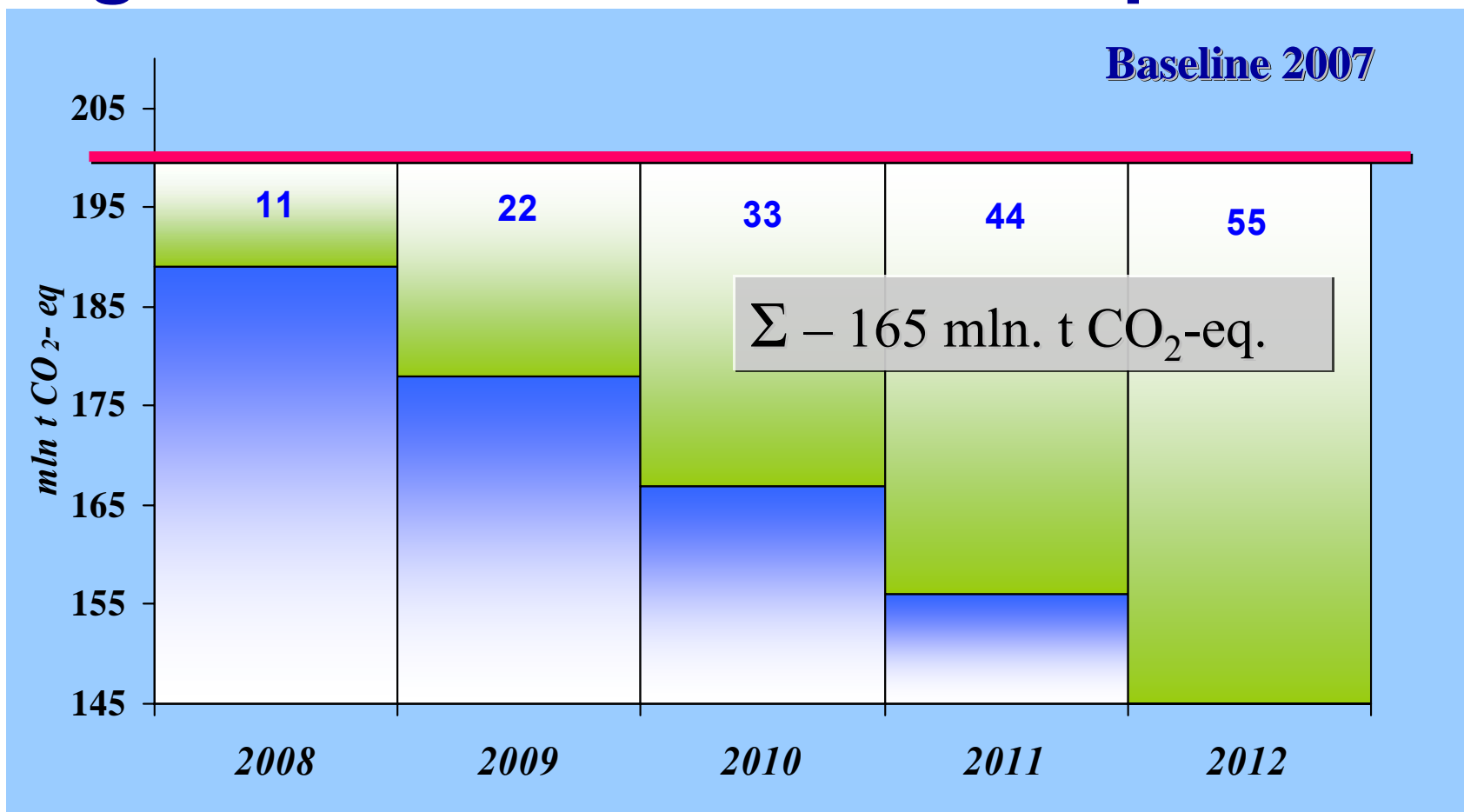
Program for developing CNG stations network and fleet of natural gas vehicles (2007 - 2015 years)

*Program will double by 2015 the number of natural gas vehicles in the Russian Federation,
create 1700 new jobs,
replace 2.5 million tons of oil motor fuel to gas
reduce total emissions 1 million tons of CO₂ - eq.*

Gasification of Sochi transport system for the XXII Olympic Winter Games and the XI Paralympic Winter Games 2014



Projected reduction of greenhouse gas emissions in JSC Gazprom



Projected environmental effect of increasing the percentage of gas in world energy balance

**The results of the increase till 2030
of the gas share in world energy balance by 3%:**

- reduction of greenhouse gases emissions > 2%
- reduction of acid gases emissions - 1,5-1,8%
- reduction of soil and water pollution - 2,1-3%

14% due to the russian gas

Thank you for your attention

