



Things that remain eternal:

Taking care of the world around us

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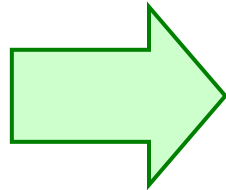
JSC "RZD" Senior Vice-President

**Global Rail Freight Conference
Session 6: "Green Logistics – railway potential"**

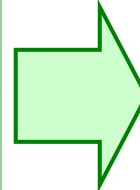
Saint-Petersburg, 7 July 2010

Implementing the Company's ecological strategy

JSC "RZD" ecological strategy for the period up to 2015 and for 2030 perspective



JSC "RZD" ecological strategy Implementation program in 2010 with prospects up to 2015



2010 activities:

Sewage treatment facilities



21 facility

Air cleaning equipment from dust and gas



48 units

Boiler installation



16 units

Ties utilization

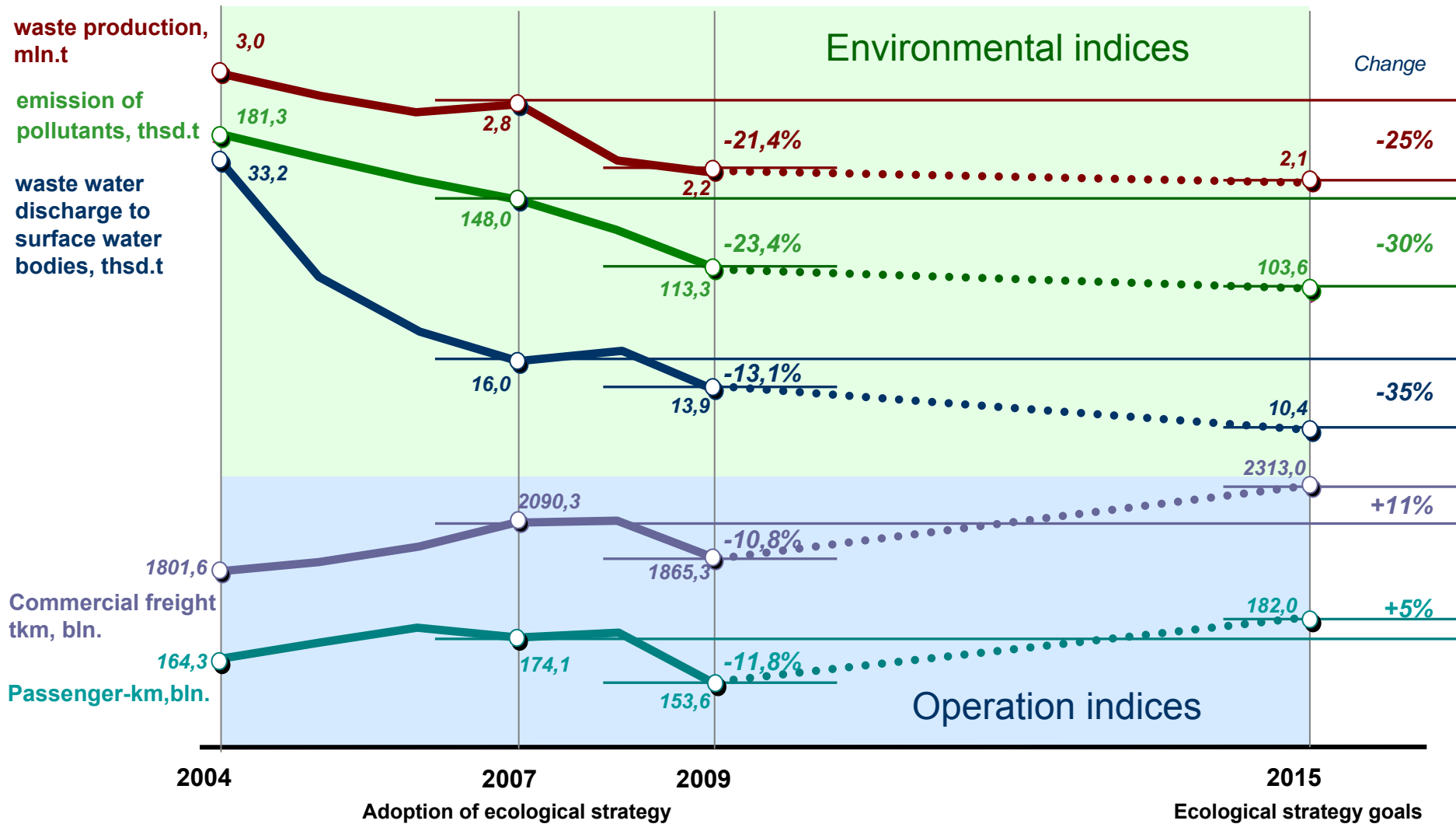


Wooden - 3,7 thsd.t
Concrete - 45 thsd.t

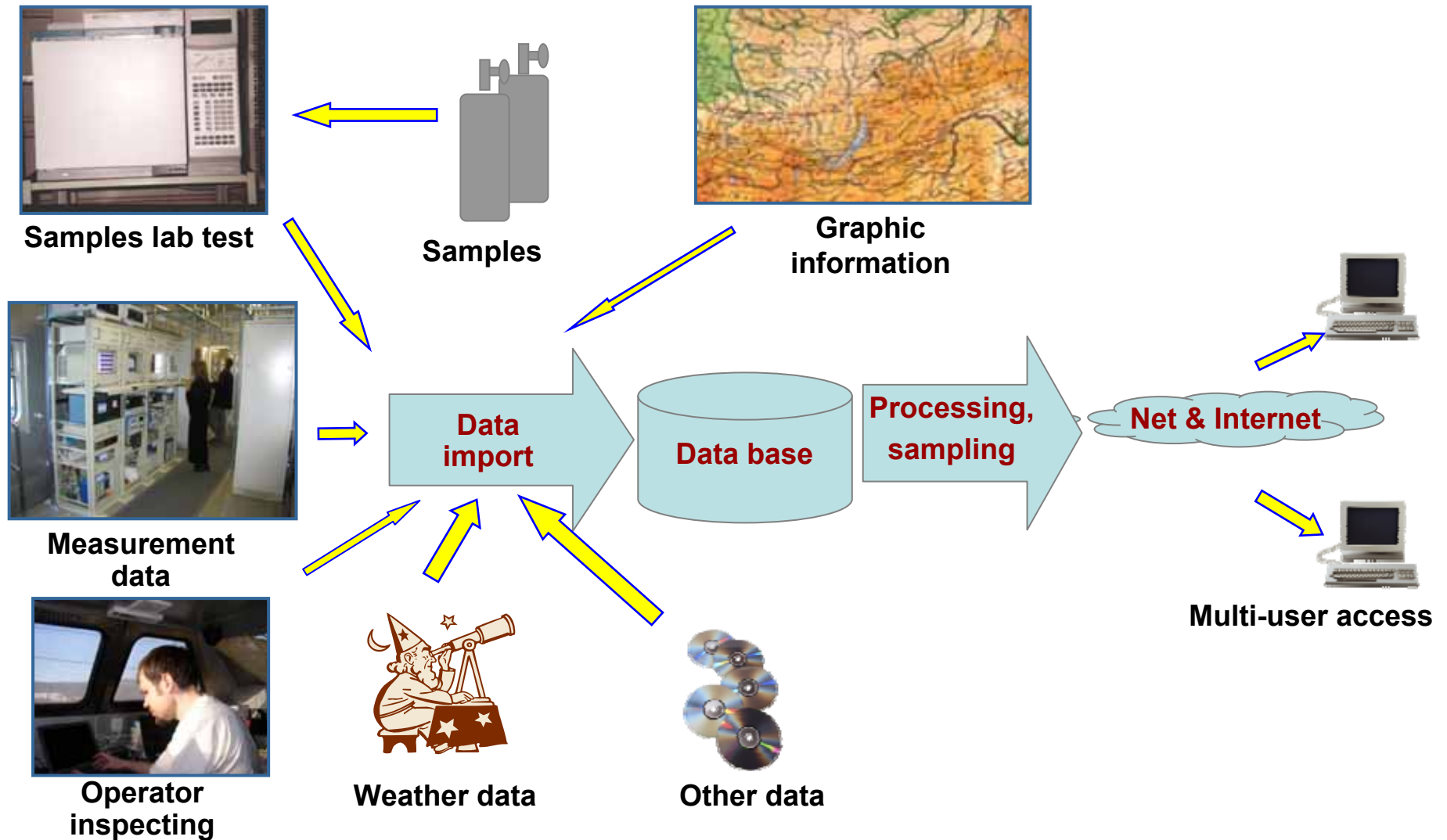
Ecological strategy target indices by 2015 and for 2030 perspective

Reduction of man-made environmental impact	2010 by 2009	2015 by 2007	2030 by 2007
Reduction of pollutant emissions into ambient air	by 5%	by 30%	by 70%
Reduction of disposal of insufficiently treated waste waters	by 3%	by 35%	by 70%
Increase of hazardous waste products treatment	by 2%	by 40%	by 70%
Liquidation of pollutions caused by last years business activities	by 8%	100%	Maintain normal condition

Improvement of JSC "RZD" environmental indices



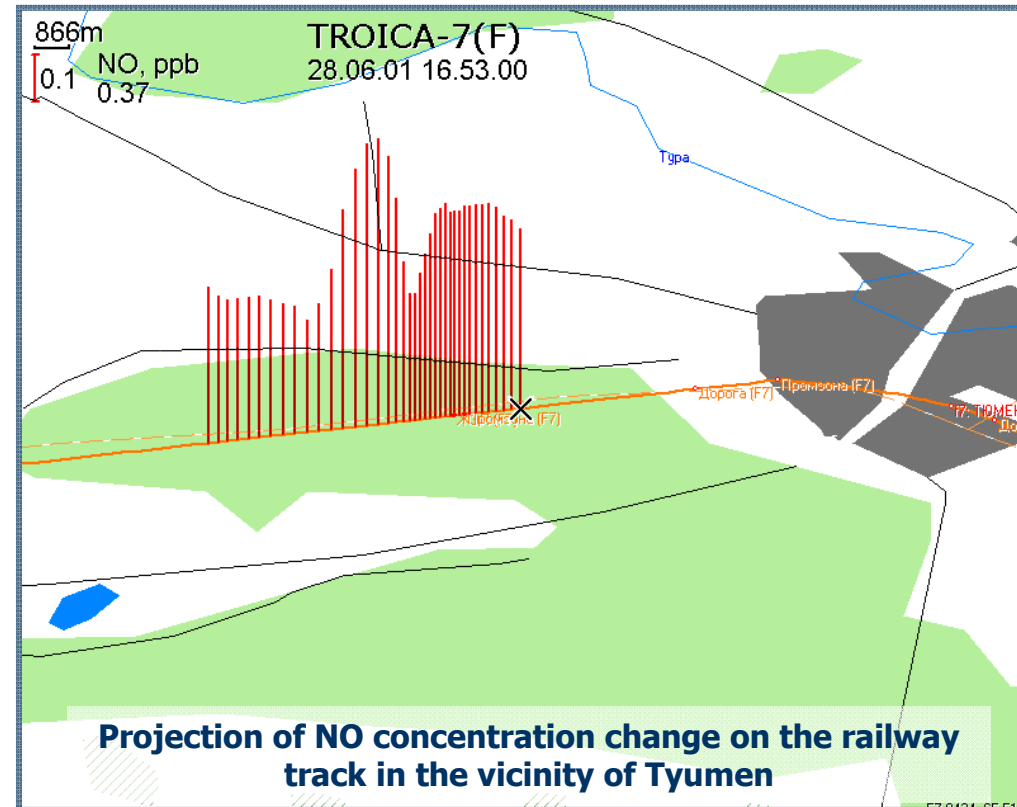
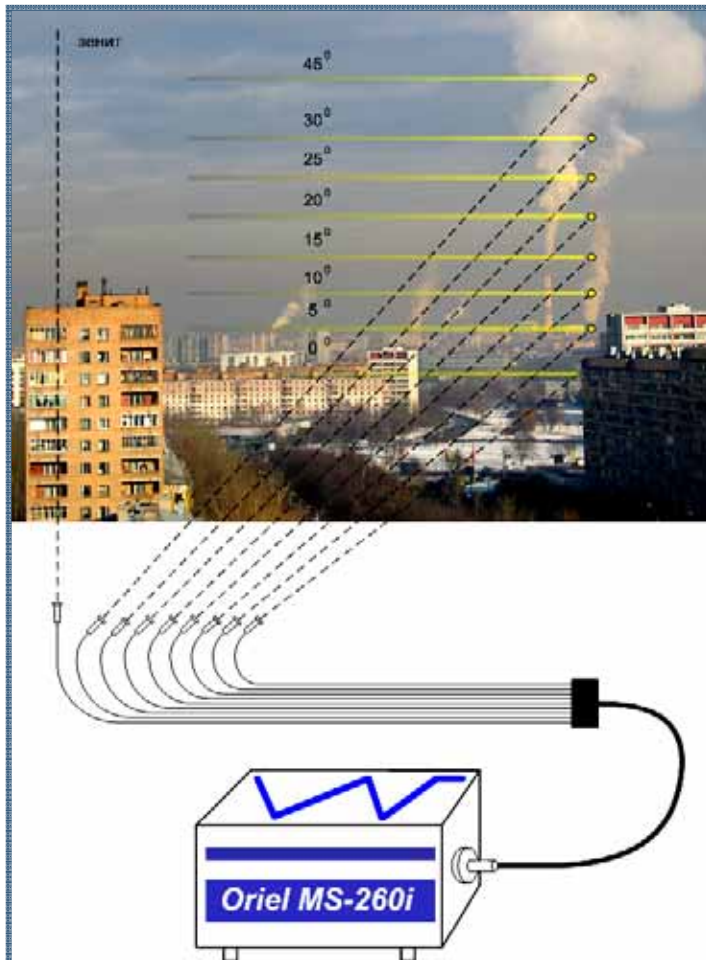
Train – lab of the XXI century



DETECTION, DIAGNOSTIC, PREDICTION AND EVALUATION OF EXTREME ENVIRONMENT AND EMERGENCY SITUATION CONSEQUENCES

Possibilities of environment monitoring with train - lab

Remote control of reactive chemical compounds emissions (NO, SO₂, O₃, stack ash)



Kits for remote testing are used for receiving 3D tomographic images of air condition and exact identification of pollutant sources.

Hazardous and special cargoes transportation monitoring system

Hazardous freight information

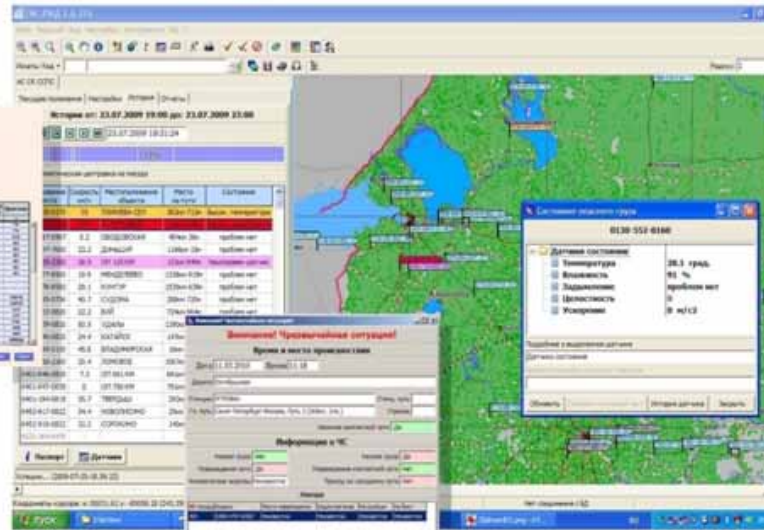


Designated computer workstations



Train sheet

№ поезда	Маршрут	Время отправления	Время прибытия	Станция назначения
1001	Москва - Владивосток	10:00	10:00	Москва
1002	Владивосток - Москва	10:00	10:00	Владивосток



Emergency situation card

Ministry of
Emergency
Situations

Internal
Affairs
Ministry

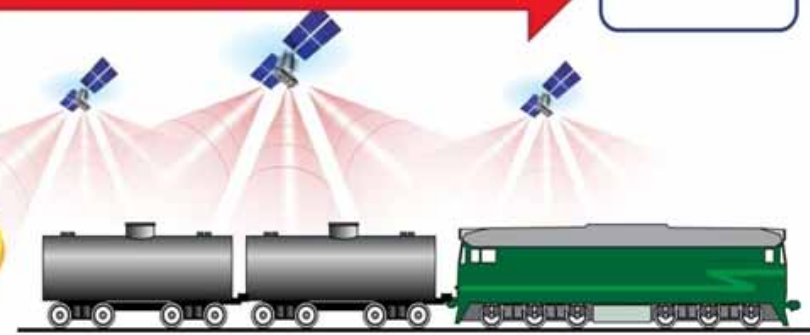
Federal
Security
System

JSC "RZD" Geographic Information System
 Time-coordinate information collecting and processing integrated center
 GLONASS/GPS
 JSC "RZD"

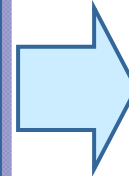
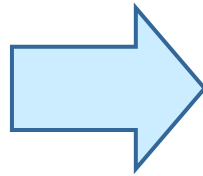


Demilitarized zone

Mobile satellite services operators

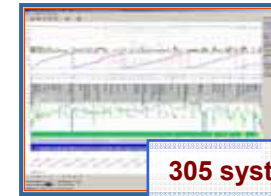


Raising the Company's energy efficiency



2010 activities

Automatic control operation



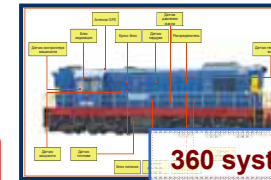
305 systems

Diesel heating system



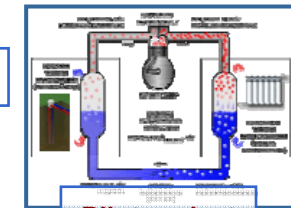
304 systems

Diesel fuel accounting system



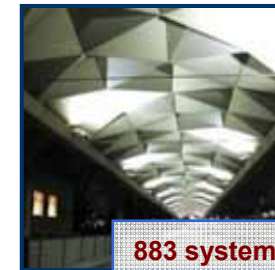
360 systems

Building energy saving system



Pilot project

L.E.D. systems



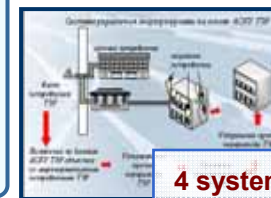
883 systems

KTU-3 System



3 boiler plants

ASKU TER System



4 systems

Energy strategy target indices by 2015

- Reduction of energy unit consumption costs for traction power:
 - electric – 3,5 – 4,0%;
 - diesel – 4,5-5,5%.
- Reduction of fuel-energy resources for non-traction needs – 13-15%.
- Note:ASKU TER System-System for integrated fuel&power resources accounting;
- KTU-3System- Catalytic centralized heating water supply modular installation

Energy saving and energy efficiency target indices in 2010

- Reduction of fuel&power unit consumption for traction power:
- electric – 0,5 kW/h/10 thsd. tkm gross (by 0,4%);
- Diesel - 0,6 kg of fuel unit/10 thsd./tkm gross (by 0,9%).
- Increase of energy pumpback return - 6%
- Reduction of main fuel&energy resources consumption in stationary power systems – 3%

Development of fuel and power resources accounting system

Automatic system for commercial accounting of power consumption (ASKUE)



22.5 thsd. metering points at 1388 traction substations
117.9 thsd. metering points at 13 ths. transformer substations

Basic functions of ASKUE

- commercial accounting of power consumption;
- energy consumption mode on-line control;
- data transmission to different control levels.

Advantages vs analogues

- low operation costs;
- no availability of wired communication links
- compactability of system;
- easy service maintenance;
- high level of data security;
- multilevel redundancy system.

Automated system for integrated fuel and power resources accounting (ASKU TER)

OBJECTIVE

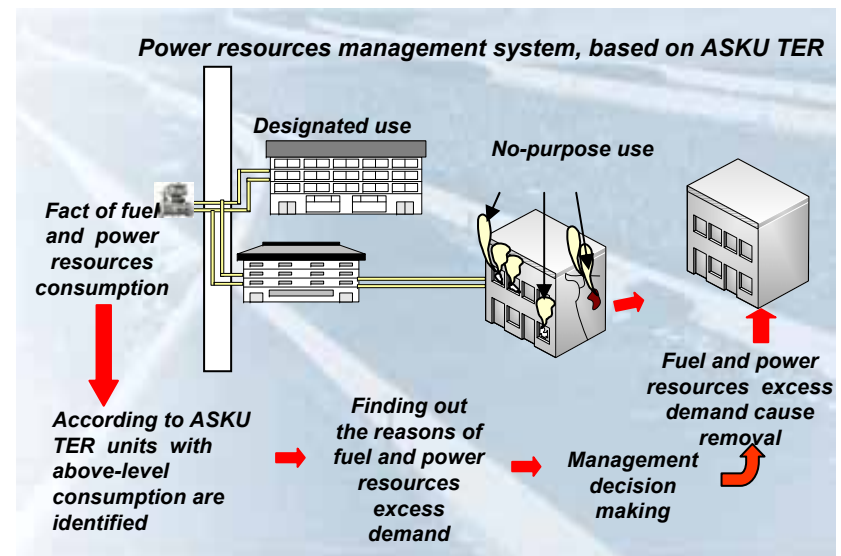
Line-up of control strategy for planning and consumption of fuel and power resources.

FUNCTIONS OF ASKU TER

- Instrumental accounting of power consumption;
- Automated data collection and processing;
- Database forming;
- Providing of remote users database access;

TARGETS, SOLVED BY ASKU TER

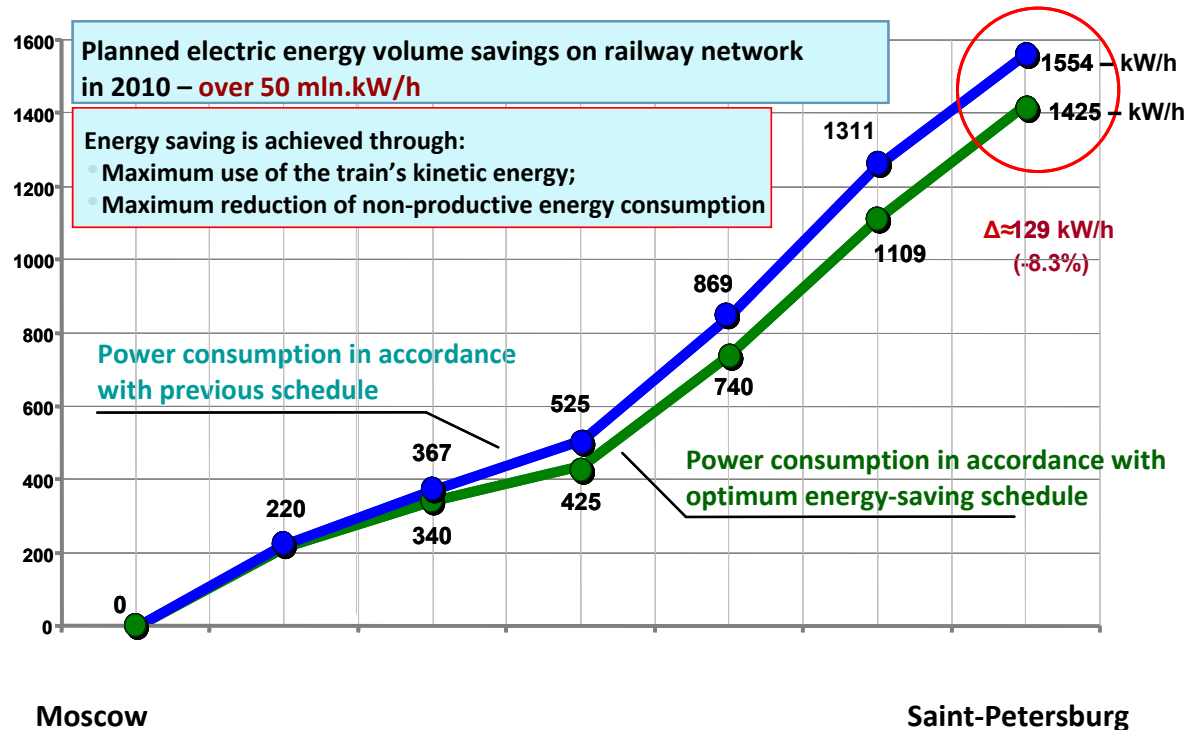
- Evaluation of power consumption pattern, consumption analysis and define directions towards fuel and power resources cost savings;
- Realization of settlement payments with energy suppliers on the basis of ASKU TER database;
- Transparent scheme of financing fuel and resources procurement .



Fuel and power resources consumption savings make up 1% per year

Main energy saving approaches in railway operations

Introduction of optimum energy-saving train movement schedules



Moscow

Saint-Petersburg



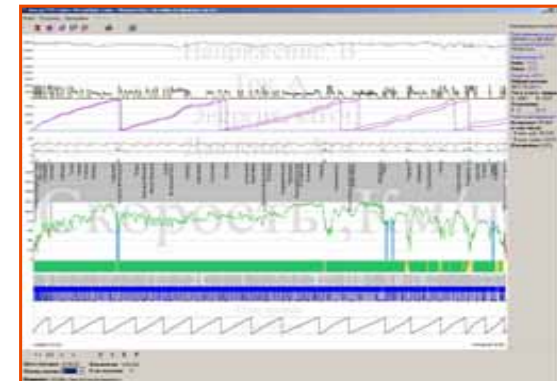
ATO systems

ATO systems started to be introduced on JSC «RZD» locomotives in 1998.

By the present time ATO systems have been installed on 3029 passenger and freight electric locomotives as well as on 1561 EMUs.

It is planned to start in 2010 installation of ATO systems also on TEP70 passenger diesel locomotives and EP2K passenger electric locomotives.

Large-scale introduction of ATO systems resulted in reduction of energy consumption by 3 - 12 per cent.



Introduction of optimum energy-saving train movement schedules has permitted to reduce indirect greenhouse gas emissions by 135,57 thsd.t CO₂ equiv.

Worlds first main-line gas-turbine locomotive GT1, working on liquefied natural gas

Power equipment capacity	– 8300 kW
Turbine type	– NK 361
Turbine resource	– >100 thsd.h
Liquefied natural gas reserve	– 17 t
Fuel endurance	– 1000 km



Emission reduction – by more than 5 times



Life cycle cost under operation conditions of Sverdlovskaya railway

Locomotive	2TE116	GT1	Change, %
Life cycle cost , bln. RUB	1.17	0.98	-19.4

Innovative technical solutions for raising rolling stock energy efficiency

Double-diesel engine unit ČME 3 shunting locomotive



Engineering company : VNIKTI

Reduction of greenhouse gas emissions, %	10
Decrease in fuel consumption, %	10
Emission reduction, %	12
Engine power, kW	2x478

Hybrid shunting locomotive

Reduction of greenhouse gas emissions, %	35
Decrease in fuel consumption, %	35
Emission reduction, %	38
Engine power, kW	441



Engineering company : VNIKTI

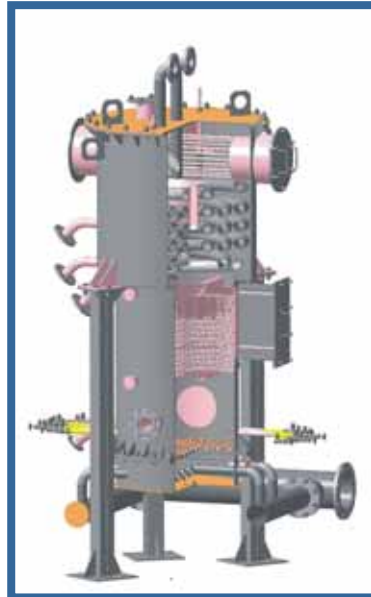
Gas-turbine locomotive ČME 3 working on compressed natural gas



Engineering company : VNIIZhT

Rated replacement of diesel fuel with natural gas %	60
Reduction of toxic exhaust gases when operated on natural gas, %	Not less than 30
Emission reduction, %	52
Engine power, kW	990

Catalytic centralized heating-water supply modular installation KTU-3 (first in Russian Federation)



ECOLOGICAL EFFICIENCY OF USING HEATING-WATER SUPPLY MODULAR INSTALLATION KTU-3 AT ARTYSHTA STATION (ZAPADNO-SIBIRSKAYA RAILWAY) DURING THE HEATING SEASON 2008 – 2009:

- Reducing coal consumption for **439 t (28%)**
- Energy saving **74400 kWh (27%)**
- Reduction of ashes and slag waste from **518 to 145 t**
- Reduction of greenhouse gas emissions equivalent to **1400 t CO₂**

Alternative energy sources application

The first in Russia power plant of railway control and communication on hydrogen fuel cells



Power plant at Malino station of Moskovskaya Railway



The power plant is intended for the usage as an automatically switching emergency power source for railway control and communication devices.



The power plant possesses some benefits: independency, high efficiency, silent running, ecological safety, compact size. Maximal capacity of the plant – 15 kW, three-phase output - 380/220 V at 50 Hz AC.

The power plant permits complete power supply of all operating devices at Malino station, which provide safety of railway operation.

Combined solar water heater



USKV-1 heater at Astrakhan-2 station of Privolzhskaya Railway

Combined solar water heater USKV-1 is used in heating and hot water supply systems

Usage of USKV-1 allows reducing of annual consumption of fuel oil by 10 t, of energy by 355 thousand kW·h, and of coal by 35 t.

Reduction of greenhouse gases emission into atmospheric air, t CO₂ e	1082
Reduction of harmful substances emission, t	131

JSC "RZD" main indicators of energy efficiency and environmental impact reduction in 2015

Unit energy consumption for train traction, kg of fuel unit / 10 thousand gross t-km

