- TEM19 gas locomotive with a gas-piston power plant – 1 unit.

In 2015, the Company modernised 684 locomotive sections and commissioned 704 units (including locomotives with an extended service life) for a total of RUB 6.3 bln.

A total of 230 rolling stock railcars were purchased in the reporting year for a total of RUB 20.8 bln, including:

- 64 railcars of the ED electric train series manufactured by Demikhovsky Machine Building Plant;
- 6 railcars of the RA-2 rail bus series manufactured by Metrovagonmash;
- 4 Sapsan electric trains (40 railcars) and 1 Desiro electric train (5 railcars) manufactured by Siemens AG;
- 23 Lastochka (Desiro RUS) electric trains (115 railcars) manufactured by Ural Locomotives.

A total of 513 rolling stock railcars were modernised, including locomotive traction railcars and 8 Sapsan trains for a total of RUB 720.8 mln.

The electric trains are equipped with modern air conditioning systems, hermetically sealed inter-railcar walkways, automatic sliding doors, LED lighting, soft cushioned seating and headrests, a video surveillance system, forced ventilation of railcar vestibules, an on-board train diagnostics and technical monitoring system as well as security and fire alarm systems.

Other projects

Projects to introduce resource-saving technologies and develop the social sphere, among other things, were implemented as part of the 'Other projects' section.

17 innovative locomotives

purchased in 2015

Investment Programme results

The measures implemented as part of the Russian Railways investment budget in 2015 resulted in improvements to the following indicators:

- the work performed to rebuild (modernise) railway tracks in 2015 increased the domain of passenger train traffic with speeds of 120-140 km/h by 1,176 km, or 4.6%, with respect to 2014 and the domain of freight trains with speeds of more than 80 km/h by 580.6 km (+1.0%);
- the total length of main tracks on concrete sleepers stood at 97,794.517 km at the end of 2015, an increase of 1,756.4 km for the year (+1.8%), while the total length pf seamless tracks stood at 90,695.168 km, an increase of 1,701.778 km (+1.87%);
- when performing work to renovate and modernise railway automation and telemechanic equipment in 2015 on certain railway sections, the comprehensive approach prevailed with the simultaneous modernisation of electric interlocking devices, the automatic blocking system and remote monitoring and their integration into comprehensive transportation management systems. Modernisation of technical railway automation and telemechanic equipment that has doubled its service life made it possible to improve the safety and reliability of the devices; equipping technical diagnostic and monitoring centres with diagnostic and remote monitoring systems on railways ensured the maximum detection of pre-failure conditions in technical railway automation and telemechanic equipment. As a result of these measures, the number of first- and second-category failures (the KASANT system) decreased at the Company from 6,920 in 2014 to 6,363 in 2015, or 8.1%;
- work to renovate railcar fixed assets in 2015 resulted in an 11% decrease in the number of hardware failures compared with the 2014 level and also expanded the length of dedicated sections for non-stop train traffic by 16 km versus 2014;
- work to renovate electrification and power supply fixed assets in 2015 reduced the number of hardware failures 9.4% compared with the 2014 level, 111.5 km of contact network tracks for 160-km/h rapid-transit trains were rebuilt, 21.6 km of contact network were renovated on 200-250-km/h tracks to establish rapid-transit and high-speed transportation and restrictions were lifted on trains weighing 6,300 tonnes on 3 inter-station zones with total length of 71 km.

Overall in 2015, Russian Railways commissioned:

- 163.5 km of new and secondary tracks,
- 45.8 km of electrification,
- 157.7 km of station track;

and rebuilt:

- 129 electric interlocking switch units,
- 50.8 km of the automatic blocking system,
- 280.5 km of centralised traffic control,
- 640.4 km of long-distance cable communication lines,
- 288.1 km of the contact network,
- 2,814 km of railway tracks.

Modernisation and innovative development projects

The Company spent a total of RUB 1.3 bln on scientific and technological development in 2015, an 18% increase versus the amount spent in 2014.

New technologies

In accordance with Order of the Russian Government dated August 2014, the Company has established the Comprehensive Innovative Development Programme of the Russian Railways Group until 2020 under which a wide range of innovations is planned: technological, product, process, organisational and marketing innovations. The Programme consists of a new format of measures and projects that aim to introduce breakthrough innovative technologies and technical equipment based on the requirements of the Company's customer-focused business processes.

As part of the Programme's development, the Scientific and Technical Development Strategy until 2020 and Beyond until 2025 (the 'White Book'), which is an integral component of the Programme, was updated taking into account engineering, technological and economic challenges. The Strategy underwent a comprehensive discussion by the scientific community and was approved by Russian Academy of Sciences President Vladimir Fortov.

One breakthrough project that incorporates a number of innovative solutions by Russian and foreign developers was the Ust-Luga Transport Hub. The station was the first in Russia to introduce an automated control system for a driver-less hump locomotives. The promising set of automated control systems set up for the transport hub allows for using the building-block approach to configure the hardware of a marshalling yard, maximise automation and drastically reduce the use of manual labour, and cut costs on all components of the station's production process. Utilising such approaches should become the basis for the design and modernisation of marshalling yards throughout the entire railway network of the Russian Federation for the period until 2025.

Import substitution

The Company has approved and is implementing an Import Substitution Programme for the products it purchases.

The share of purchases of import-containing materials and equipment decreased 4% in 2015.

Challenging issues with respect to import substitution are being resolved in informatisation. The main problem is the lack of Russian-made products on the market of digital IT products and operating systems. Together with developers and manufacturers, the Company is implementing an import substitution plan for software. Traffic control and safety systems are transitioning to open source software using domestic components.

Components were tested using Milandr controllers and will be used in 2016 to manufacture prototypes for locomotive safety systems and automatic blocking systems.