IPESOFT
REMS

A comprehensive solution to manage
efficiency and optimize energy
and fuel costs for a rail carrier

IPESOFT®

Right time \ Right place solutions

IPESOFT
REMS

01

- Do you need to have complete and online information about what is happening on the tracks?

- Are high fuel costs and energy purchases a burden for you?

- Are you lacking the relevant information needed for effective transportation management?

- Do you want to be able to assign consumed energy (electricity and diesel fuel) to each activity?

- Can you detect unaccounted fuel losses from your vehicles and their exact volumes?

- Do you want to provide the energy carriers purchases on your own?

IPESOFT REMS solution enables detailed mapping, monitoring, management and consumption and purchasing of traction energy optimization adjusted according to specific rail carrier's conditions.

The basic feature of IPESOFT REMS solution is detailed traction energy consumption on-line monitoring of electric traction and diesel consumption for a rail carrier. Energy consumption data obtained by using REMS is paired with positioning data of the train on the line, operating information about the train's progress and intermediate inputs from the driver about current operations. Based on this categorization, REMS system enables the rail carrier to create summary reports of consumption division into individual activities. Consequently, the accurate energy consumption can be predicted and monitored and consumption standards for the traction energy in transport can be implemented. This creates the conditions necessary for controlled and efficient energy purchases on the liberalized electricity market.

IPESOFT REMS is the optimized solution for the railway companies and railway transport operators.

IPESOFT REMS – it means the comprehensive approach to energy cost optimization. This system enables the building of diesel and energy control center empowered to map, monitor, evaluate and administer carrier energy management.

The capabilities are supported by two subsystems:

A) Energy Trading Centre Capabilities
- Optimizing coverage of a carrier's energy needs in relation to train transport timetables.
- Providing cooperation with partners on the liberalized electricity market.
- Providing business activities on the liberalized electricity market to buy and sell electricity.

B) Energy Control Centre Capabilities
- Energy consumption planning based on transport related to its purchase.
- Diesel consumption planning and its stocks minimization.
- Operational management of electricity consumption to minimize imbalances.
- Evaluation of electricity/diesel consumption aimed to find the optimal transport version.
- Regulation of a railway company balance section.
- Integration with other carrier's systems.

BENEFITS

The main benefit of IPESOFT REMS is a significant costs reduction related to the transportation.

IPESOFT REMS saves carrier costs on several levels:

- It measures the energy consumption, and evaluates it in real time according to the consumption standards to identify uneconomical usage.
- Based on a transportation timetable, the system efficiently plans electricity consumption in the company at 15 minute intervals.
- Depending on the transportation timetable and circulation of locomotives, the system plans diesel consumption of the carrier per locomotive and refuel point to eliminate unnecessary stocks of fuel.
- The system reduces energy consumption by introducing type standards for trains and track sections, demanding smooth and optimal rides, efficient train queuing and preventing unscheduled stops on the track – it performs "online consumption audit".
- It enables to reduce purchase costs of energy carriers by the cost-effective energy purchasing based on predicted energy demand.

- Enables development of new transportation products with different prices for transport, e.g. for long-term planned transport, for transport in a specific time frame etc.

Originality of the Solution
The IPESOFT REMS system is unique in Europe in terms of its scale, comprehensiveness and parameters.
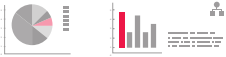
The solution comprises:
- Development of a digital railway network with energy parameters description and the gradual development of a knowledge base concerning actual specific energy consumption for each section.
- Incorporation of an original routing algorithm that continuously transforms positioning measurements to a digital sequence of logical locomotive rides.
- Building a knowledge base of typical consumption for particular locomotives, units and track sections depending on the travel direction.
- Positioning measurements, electricity and fuel consumptions and GPRS transmission combined with high quality validation and data outage management.
- The variability of the carrier consumption forecast based on either modified transport timetable and train type consumption or using the artificial neural networks (ANNs).

IPESOFT REMS is an open-system solution enabling its integration into existing rail carrier infrastructure and processes, with the ability to exploit information from other information systems and to share any data with them if needed. IPESOFT REMS interconnects IT, energetics and railway transport worlds.

The comprehensive and innovative approach to the carrier's energy efficiency attracted so much attention among professionals that IPESOFT REMS won the 2010 Slovak IT Project Award.

BASIC CAPABILITIES

Detailed Operation and Consumption Monitoring in Real Time

Detailed consumption monitoring is the basic capability of the system. It always provides the carrier with correct, accurate and up-to-date information about the location, consumption and other operating parameters of specific train units. This means that the system can create a detailed insight into the current energy consumption of a particular train, if any consumption imbalances occurred during the train's progress compared to the defined standard and their cause.

Optimized Operations

The system processes all acquired data to create a set of reports for further usage of the company management. Based on REMS information, it is possible to suggest the optimal solution for the operation and effective energy usage, analyze and monitor energy demands of specific sections, optimize train composition and queuing and better map and monitor the performance of the entire system, in order to minimize transport costs.

Mapped Consumption Management

With IPESOFT REMS, railway companies are supplied with actual consumption data of specific train sets according to their weight and size. At the same time, energy consumption for specific track sections is closely monitored. This enables a railway company to forecast and manage its energy needs more effectively and accurately.

Energy Procurement

Based on the comprehensive energy consumption data, a railway company can become an independent energy buyer and to participate actively on energy markets. It can achieve better purchase prices and use the benefits of liberalized energy market. In addition, the detailed fuel consumption plan enables a carrier to minimize fuel-related costs.

System Basis

The system is based on the accurate measurement of real-time data from all points of consumption with transfer to a single place at regular intervals that are as short as possible. The acquired data enable parallel data online processing and their storage in a single time series format.

Three-Dimensional Track Model

A three-dimensional track data model has been developed on the basis of historical data, describing in detail the carrier's entire railway line, combining its location in both space and altitude. It consists of track points, elements and segments together with height and slope parameters. Such a three-dimensional data model is able to calculate and predict future consumption of the planned transportation moves.

REMS Elektro

It is a module of REMS system focused on efficient traction and non-traction power management and consumption planning of a railway company. The module makes it possible to create the plan and management related to the liberalized energy market trading.

REMS Diesel

It is a module of REMS system dealing with effective mapping and management of diesel consumption. The module enables to compare amount of purchased diesel fuel based on accounting books with recorded consumption quantities on the filling stations and actual amounts of diesel put into locomotives. It also enables detailed diesel fuel management monitoring in locomotives and potential imbalance alerts concerning diesel fuel.

ABOUT
IPESOFT

IPESOFT is a leading provider of comprehensive IT solutions for energy, transport and industrial companies. IPESOFT solutions and applications provide powerful tools for real-time decision support for managers at all levels. Their benefits include effective and up-to-date information about the state of production or business process, enabling truly effective management.

The Company Using IPESOFT REMS:

Železničná spoločnosť Cargo Slovakia, a. s., Bratislava

Kazakhstan Temir Zholy, Astana city, Republic of Kazakhstan

IPESOFT®

IPESOFT Ltd., Bytčická 2, 010 01 Žilina, Slovak Republic
Phone: +421 41 5070 311 \ **Fax:** +421 41 5070 312 \ **E-mail:** info@ipesoft.com \ **www.ipesoft.com**