

# MAIN ELEMENTS OF THE RAIL CARGO HUNGARIA ZRT'S ENVIRONMENTAL CONCEPT

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## Abstract

*In this research the efforts of Rail Cargo Hungaria Zrt. were studied on the reduction of main environmentally harmful factors induced by the company. The objective was to determine the key environmental indicators. The fields of examination were the greenhouse gas (GHG) emission, the use of energy, the noise level, the production of different type of wastes. Based on the results, it can be said that RCH is committed to environmental protection and has an energy conscious management*

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## 1 Introduction

The advantages of rail freight transport appear primarily from the ecological viewpoint through the reduction of greenhouse gas emissions, and the high use of transport i.e. transport of greater cargo mass, as well as the aspect of safety should lead to the renaissance of the rail system [2].

As a member of the Rail Cargo Group, Rail Cargo Hungaria Zrt. (hereinafter: RCH) attaches great importance to the protection of the environment, and has therefore drawn up an environmental sustainability plan, in which it reviews its environmental impact, as well as its goals and related measures, which are carried out in the spirit of environmental awareness. The environmental sustainability plan is a communication tool that provides comprehensive information on the measures and results taken to improve the company's environmental performance.

The environmental impact of rail transport comes from providing the technology needed to transport the volume of goods. Examining the environmental impact of rail alone does not provide a complete picture, so we will also contrast it with the environmental impact of road freight as a mode of transport with more external costs:

- Rail combines energy-efficient mobility with lower emissions. For instance, the specific energy consumption of railways is 6 times lower than that of roads due to physical effects such as lower rolling and air resistance. In addition, rail emits 9 times less carbon dioxide than road transport. In fact, European railways already offer zero-emission transport: e.g. 80% of traction is now powered by electricity (106,592 MWh in case of RCH).

European rail transport policy aims to create the Single European Railway Area with economic and climate protection implications. This is supported by the directives that regulate the legal environment, technological development and investment in railways, and operational

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financing. The development of rail transport can make a major contribution to the establishment of sustainable transport in Europe.

RCH is a highly important member of the Rail Cargo Group, the market leader group in freight transport in Central- and South-Eastern Europe. The strategy of the company to play the role of a bridge in the region, for which we, together with our parent company, are well suited due to our unique professional knowledge and innovative logistics solutions. With our excellent network of partners, we strive to optimize our customers' supply chain in a cost-effective and environmentally-friendly way, to meet their needs reliably and fully. Our customers are continuously benefiting, on all days of the year, from our solid European business network and our rail connections to key ports and terminals.

The company started its independent operation in 2006 as MÁV Cargo Árufuvarozási Zrt. (MÁV Cargo Freight Transport Ltd.). After the privatization in 2008, when Rail Cargo Austria, the freight subsidiary of ÖBB, acquired 99.9% of the shares, our company continued its activities under the new name RCH and entered a new era of development.

RCH has become synonymous with quality, reliable and safe rail freight transport. As Hungary's leading rail freight company, we offer our customers innovative rail logistics solutions in Europe and beyond, whether for individual wagons or train sets.

## 2 RCH's key environmental indicators

### Building management

One of the most significant environmental factors is the use of electricity, related to office activities (office equipment, use of air conditioning). Electricity supply is provided at all our sites, metered on the basis of meters and flat rate. Building management-related electricity consumption is: 308 MWh.

Natural gas is one of the cleanest energy carriers from an environmental protection point of view. It is energy-efficient and generates no waste during operation. The consumption of natural gas is measured by meters at the headquarters, while in the rural tenancies the fixed flat rate is the basis for billing. Building management-related natural gas consumption is: 44,921 m<sup>3</sup>.

Environmental factors related to RCH's activities include social water use and the associated discharge of municipal wastewater. At the RCH headquarters, water use is measured by water meters, while for rural tenancies the fixed flat rate is the basis for billing. Amount of water used in building management is: 2,713 m<sup>3</sup>.

### Fuel consumption

The impact of service vehicles on the environment is measured by the fuel used.

- Fuel use by motor vehicles: 232,514 litres.
- Fuel consumption by electric traction (own): 106,592 MWh.
- Fuel consumption by electric traction (purchased): 41,115 MWh.
- Fuel consumption by diesel traction (own): 105 litre.
- Fuel consumption by diesel traction (purchased): 3,937,740 litres.

In general the share of the total energy consumption of the rail sector is: 85% traction energy vs. 15% energy for buildings workshop, etc. [4].

### Noise pollution by traffic

Freight trains and lorries are equally noisy, with noise levels of 90 dB (decibels) for both vehicles. (Road transport also leads to other external effects such as vibration, congestion and traffic accidents [3]). In the case of freight wagons, this is mainly due to rolling noise between the wheel and the rail, caused by worn running surfaces of the wagon in contact with rough rail surfaces. However, this problem will soon be solved thanks to the so-called new whisper brakes. These new braking systems are made of rubber and copper composites, which are more flexible materials than the metallic grey cast iron brakes used so far. While the wheel treads on grey cast iron brake blocks get rougher with each brake application, they stay smoother with so-called whisper brakes and therefore make less noise. Trains fitted with these whisper brakes generate up

to ten decibels less noise, cutting train noise emissions by around half compared to trains fitted with conventional grey cast iron brakes.

In Austria, more than 40% of the wagons used by the Rail Cargo Group are now running with the new brakes, with the share of silent wagons increasing from 43% at the beginning of 2018 to around 55% at the end of 2018. We have launched a project to reduce noise emissions from wagons. In 2020, 1186 freight wagons had their metal brake blocks replaced with plastic brake blocks.

#### **Material use and management**

Office environments are typical, but some jobs require the use and management of chemicals. RCH keeps detailed records of the materials used:

- paper: 15,120 kg,
- toner: 298 pcs,
- accumulator, battery: 18,582 pcs.

#### **Waste Management**

The waste generated by RCH's operations comes partly from office work and partly from our other activities related to rail transport. Municipal solid waste is basically landfilled, hazardous waste is disposed of and separately collected waste is recycled. RCH manages its waste in accordance with the law.

Quantities of waste managed by RCH:

- non-hazardous waste: 2,072,298 kg,
- hazardous waste: 110,414 kg.

#### **Emission**

The direct calculation of CO<sub>2</sub> emissions from building management and motor vehicles is based on the methodology of the "Guide to enforcing sustainable development calculated by material for Regional Development Programs (2010) 2009-10". The total CO<sub>2</sub> emissions of RCH and the CO<sub>2</sub> savings compared to road were determined on the basis of the "Determination of the Rail Cargo Hungaria freight transport emission savings factor."

Total CO<sub>2</sub> emissions from RCH: 81,679 t:

- CO<sub>2</sub> emissions from locomotive fuel use: 64,919 t,
- CO<sub>2</sub> emissions from the use of service vehicles: 610 t,
- CO<sub>2</sub> emissions from building management: 180 t,
- CO<sub>2</sub> savings by rail: 247,592 t,
- NO<sub>2</sub> emissions: no data currently available.

### **3 Environmental sustainability objectives and measures**

RCH has set environmental sustainability objectives to influence its impact on the environment. The company meets the transport needs of the national economy in an environmentally friendly and sustainable way and promotes sustainable transport by consciously reducing the company's environmental footprint.

RCH's measures aim to reduce its environmental footprint and to operate in an environmentally conscious way, in line with the principles of sustainability.

In order to manage its environmental impact and continuously improve its environmental performance, RCH has implemented and operates an Environmental Management System in accordance with ISO 14001:2015 standard.

#### **Green solutions for the vehicle fleet:**

- RCH highly focuses on the rational use of energy and fuel in its operations. Operates electric locomotives to a decisive extent. RCH's own-use locomotives -

serial number 1116 - are equipped with energy recovery equipment, and our drivers are continuously trained to operate the locomotives in an energy-efficient way, thus reducing CO<sub>2</sub> emissions.

- RCH takes into account the requirements of environmental protection in the materials and technologies used in the maintenance of its vehicle fleet.
- When repairing freight wagon pairs of wheels, if the bearings need to be replaced, only bearings that reduce the use of bearing grease by about half are used.
- In the design of bogie freight wagons, we carry out modifications that do not require lubrication.
- The friction surfaces of friction parts are replaced with plastic, eliminating the need for graphite grease and reducing noise emissions.
- By converting the impact devices, the use of graphite grease is completely eliminated.
- Only solvent-free (water-based) coating systems are approved for the main inspection of freight wagons.
- Freight wagons are used with reduced noise emissions.
- There is focus on environmentally friendly solutions when washing freight wagons.

### **Transport of hazardous goods**

RCH's strategy highly focuses on the transport of hazardous and non-hazardous goods, preventing their uncontrolled release, preventing accidents, and repairing environmental damage as efficiently as possible.

RCH operates a quality assurance system, as required by UIC 471-3 (Tests to be carried out on hazardous goods consignments), to ensure that hazardous goods are transported to a high safety standard. Quality assurance is carried out by the RCH UIC (RID) hazardous goods team.

### **Determine freight transport emissions and savings factors**

Rail freight emits 76.6 g less CO<sub>2</sub> per tonne-kilometre than road freight, but rail freight is not always feasible, the JIT system is inadequate due to track constraints and unreliability to serve a strict schedule [5].

In order to be aware of its CO<sub>2</sub> emission performance, RCH has determined by WWF the CO<sub>2</sub> emissions per average km (0.0153042 kg/tonne-kilometre) and the RCH freight transport emission saving factor (0.0616958 kg/tonne-kilometre). That is, the amount of CO<sub>2</sub> (61.6958 g, 0.0616958 kg) which would not be emitted if RCH, instead of an average road hauler, transported 1 t of mass over a distance of 1 km by rail.

On this basis, RCH operates a so-called CO<sub>2</sub> calculator. The quotes sent to customers include the amount of CO<sub>2</sub> saved in rail transport. We plan to review the CO<sub>2</sub> emissions methodology.

### **Waste management**

RCH fully complies with waste management legislation and strives to minimize the amount of waste generated in its operations. Regularly reminds its customers to follow the loading rules and to ensure that a minimum of waste is generated during loading and that any waste generated is properly managed.

The company collects the solid waste generated by its activities in containers at its sites and then transports it to landfill for disposal by service providers under individual waste management contracts. The aim is to increase the proportion of waste that is recovered.

The company collects e-waste generated from IT activities separately and then transfers it to the current contracted service provider for recovery and disposal.

The ink cartridges and toners used for printers and copiers are collected by the authorized service provider under the current contract and then handed over for pre-treatment and dismantling.

The hazardous waste generated by the use of the vehicles on each site (waste oil - EWC 130205, oil filter, tank bottom sludge, oil drum - EWC 150110, accumulator, etc.) is handed over to contractors authorized to transport or dispose of hazardous waste, or taken back by the supplier, as required. We carry out the servicing and maintenance of cars, machinery, and railway vehicles in repair workshops, and the hazardous waste generated in the process is taken care of by the workshop.

RCH encourages the separate collection and proper disposal of hazardous waste from the municipal solid waste by placing a used battery container at the RCH headquarters. The collected batteries will be transported and disposed of by an authorized third party.

Since 2012, paper and plastic (e.g. PET bottles) waste have been collected separately in baskets placed in offices and designated areas. The collected paper and PET bottles will be transported by a third party for recycling. Selective waste collection reduces the amount of waste going to landfill.

### **Paper use and printing**

RCH strives to reduce paper use by introducing the following measures:

- Strives to make its operations paperless by digitizing processes.
- Awareness-raising to ensure that employees consider whether they really need to print a document before printing it.
- Using central printers.
- Using double-sided printing where possible.
- Recycling of unused single-sided sheets.
- Purchasing and using recycled (eco) paper.

### **Conducting an energy audit**

RCH is required to carry out an energy audit under the Energy Efficiency Directive 2012/27/EU and Act LVII of 2015 on Energy Efficiency.

An energy audit was carried out at the company in 2019 in accordance with the legal requirements. As a result of the energy audit, many energy-saving potentials have been identified that can increase the energy awareness of the company in the medium and long term. Opportunities to increase the efficiency of building management:

- improving the energy efficiency of computers through software configuration,
- raising the average internal temperature during the cooling period,
- reducing the average internal temperature during the heating period,
- increasing the energy efficiency of electricity supply by installing a solar photovoltaic (PV) system.

### **Energy awareness**

In order to reduce electricity consumption, RCH uses a high proportion of combined and material- and energy-efficient office equipment and computer equipment (personal computers, monitors, printers, etc.). All computers can be powered separately with a switchable power strip. Air conditioning in offices is used appropriately, taking into account energy-saving aspects.

The office staff is also involved in green logistics. The RCH headquarters is an intelligent "greenhouse", with built-in sensors controlling air conditioning and lighting.

Employees shall ensure that electronic equipment is disconnected from the power supply when not required for work or after working hours.

RCH was the first railway company in Hungary to be awarded the title of "Energy Conscious Company 2018" for its sustainability performance.

### **Motor vehicles**

To rationalize the use of service vehicles, thereby reducing their fuel consumption and emissions, they have been equipped with GPS systems. In developing its motor vehicle fleet, the company strives to purchase vehicles with low CO<sub>2</sub> emissions. The company ensures that motor vehicles are maintained in good technical condition through continuous maintenance. Unfortunately the shortest transport time on average generates 40-50% more CO<sub>2</sub> emission compared to the greenest version [1].

## **4 Conclusions**

The impact of RCH on the environment is continuously monitored through internal and independent external audits, applying the PDCA principle. In line with the requirements of the ISO 14001:2015 Environmental Management System, an integral part of monitoring is the review of environmental factors and key indicators, the assessment of environmental risks arising from its activities, and the setting of objectives and measures based on the effectiveness expressed in saving, which needs further calculations.

In addition, RCH regularly cooperates with the relevant authorities to ensure that its services are provided to the highest standards in accordance with legal, social and environmental requirements. Regular monitoring and cooperation help to control environmentally sustainable operations.

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