

PoISCA Meeting

# ENERGY CONSUMPTION REDUCTION IN URBAN RAIL SYSTEMS

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# Transport Research Centre

a public research institution

Centrum dopravního výzkumu, v.v.i.



Brno / Czech Republic

[www.cdv.cz/en/](http://www.cdv.cz/en/)



# History

- ❖ the successor of the former Federal Transport Research Institute
- ❖ continues in over 50 years tradition of Czech transport research
- ❖ founded in the year 1993
- ❖ Public Research Institute since 1. 1. 2007

# Mission

„our knowledge is your resource“

- ❖ to be the European's leading research organisation fully covering all transport sectors in the Czech Republic and fully integrated in the European Research Area

# Activities

- ❖ research and development activity with national effect for all branches of transport
- ❖ conceptual, methodological, information service for MT with supplementary activities
- ❖ international cooperation
- ❖ application of knowledge from research and advisory service for subjects in the sector of transport

# Areas of expertise

- ❖ Development of traffic
- ❖ Transport infrastructure and environment
- ❖ Safety and transport engineering

Departments of:

- Conception of development of the transport sector
- Road, integrated and combined transport
- Traffic information science and GIS
- Traffic telematics
- Non - motorized transport
- Civil aviation
- Problem-solving in transport

# Areas of expertise

- ❖ Development of traffic
- ❖ Transport infrastructure and environment
- ❖ Safety and transport engineering

Departments of: - System management, technologies and diagnostics

- Research, assessment and risk management
- Materials department
- Geotechnics department
- Environmental aspects of transport
- Model transport and emissions
- Sustainable transport
- Alternative fuels and drives



# Areas of expertise

- ❖ Development of traffic
- ❖ Transport infrastructure and environment
- ❖ Safety and transport engineering

Departments of:

- ❖ Traffic engineering department
- ❖ Department of traffic statistics and road accident analysis
- ❖ Department of humanities in transport

# Projects

## Selected projects aimed at energy savings in transport

- **Integration of the Measurement of Energy Usage into Road Design (IERD)**
- **Energy Conservation in Road Pavement Design, Maintenance and Utilisation (ECRPD)**
- **Hybrid vehicles – study of the technology application in the Regiotram NISA system**
- **TRAILBLAZER project**
- **other relevant activities**

## Integration of the Measurement of Energy Usage into Road Design (IERD)

The specific objectives of the IERD project were:

- To reduce the energy used in the construction of roads and also the energy used by the vehicles using the roads. It will also reduce emissions, as it will allow energy efficient driving which means that new energy efficient vehicles engines will be used at maximum efficiency.
- To create a piece of software that can be added to the software tools currently being used in road design in over 70 countries. This will facilitate the road design engineers to automatically evaluate the energy implications of their road designs.

## Energy Conservation in Road Pavement Design, Maintenance and Utilisation (ECRPD)

The specific objectives of the ECRPD project were:

- ❖ To identify the energy usage in existing road pavement in EU25
- ❖ To identify energy use in new low energy road pavements
- ❖ To identify the energy efficiency in road maintenance
- ❖ To preserve road pavements in a condition that maximises the energy efficiency of vehicles using the road
- ❖ To determine the energy savings that can be made in the life cycle of a road, in terms of manufacture of materials, construction, maintenance and usage by vehicles

# HYBRID VEHICLES – STUDY OF THE TECHNOLOGY APPLICATION IN THE REGIOTRAM NISA SYSTEM



# HYBRID VEHICLES – STUDY OF THE TECHNOLOGY APPLICATION IN THE REGIOTRAM NISA SYSTEM

## Basic projects:

- ❖ **RTN-0** includes organizational measures, integrative measures (progressive steps towards an integrated order, optimization of routes, tariff integration, links to other transport modes including public transport)
- ❖ **RTN-1** Hrádek nad Nisou – Liberec – Jablonecké Paseky
- ❖ **RTN-2** Jablonecké Paseky – Tanvald
- ❖ **RTN-3** Tanvald – Harrachov
- ❖ **RTN-4** Zittau – Hrádek nad Nisou
- ❖ **RTN-5** Josefův Důl – Smržovka
- ❖ **RTN-6** Železný Brod – Tanvald
- ❖ **RTN-7** Liberec – Raspenava – Frýdlant;  
Raspenava – Bílý Potok pod Smrkem

# **HYBRID VEHICLES – STUDY OF THE TECHNOLOGY APPLICATION IN THE REGIOTRAM NISA SYSTEM**

## **Goal of the study**

It is necessary to carry out design, economic assessment and comparison of possible operational variants of the Regiotram NISA transport system for different types of traction energy in relation to the planned time period of the investment needs for the acquisition of rail vehicles.

## **Content of the study**

- a) processing of traffic patterns using the already prepared background documents
- b) overview of the available information on rail vehicles, their technical parameters, the actual purchase price and operating costs
- c) rough estimate of the cost of modification of the infrastructure using already prepared documents
- d) calculation of operational costs
- e) preparation of other inputs for multi-criteria and economic analysis
- f) multi-criteria analysis
- g) economic analysis
- h) evaluation and final recommendations

# **HYBRID VEHICLES – STUDY OF THE TECHNOLOGY APPLICATION IN THE REGIOTRAM NISA SYSTEM**

## **Multi-criteria Analysis**

4 basic criteria:

- ❖ **Economic**
- ❖ **Operational**
- ❖ **Environmental**
- ❖ **Socioeconomic**

Methodology INTRAMUROS for the assessment of integrated transport systems was used.

# TRAILBLAZER project

1.

**T**Ransport and **I**nnovation **L**ogistics **B**y **L**ocal **A**uthorities  
with a **Z**est for **E**fficiency and **R**ealisation

- will achieve a reduction in energy used in urban freight transport through public sector policy interventions across Europe by showcasing good practices and promoting Delivery and Servicing Plans (DSPs)

# TRAILBLAZER project

2.

The specific objectives of TRAILBLAZER are:

1. Implement the actions contained in the DSPs produced by the four PATHFINDER cities.
2. Evidence reduced energy use as a result of DSPs.
3. Transfer knowledge and exchange experience between experienced and less experienced organisations.
4. Promote best practice in freight energy efficiency amongst local and regional authorities and the private sector in Europe.

# TRAILBLAZER project

3.

- ❖ TRAILBLAZER will evaluate both the impacts of the measures implemented during the project and the processes involved in planning and implementation.
- ❖ Specific attention will be given to the impact of DSPs and the impact of the TRAILBLAZER project on energy saving.
- ❖ Project Communication tools will include a series of DSP workshops, site visits and conferences to enable interested organisations to learn from the experience of more experienced project partners.
- ❖ The project website will enable a wide audience to access project outputs such as the DSP case studies, the State of the Art report, the DSP Toolkit and the project newsletter.

# TRAILBLAZER project

4.

The four specific objectives for TRAILBLAZER are

1. Implement the actions contained in the Delivery and Servicing Plans produced by the four PATHFINDER cities of Eskilstuna (Sweden), Växjö (Sweden), Vercelli (Italy) and Zagreb (Croatia).
2. Evidence reduced energy use by freight transport in PATHFINDER cities following production of Delivery and Servicing Plans.
3. Transfer knowledge and exchange experience between experienced and less experienced municipalities, private sector organisations, freight transport operators and project stakeholders.
4. Promote best practice in freight energy efficiency amongst local and regional authorities in Europe.

**Thank you  
for your attention**



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