WEATHER

Weather Extremes: Assessment of Impacts on Transport Systems and Hazards for European Regions

**Funding:** European (7th RTD Framework Programme)

**Duration:** Nov 2009 - Apr 2012

**Status:** Complete with results

**Total project cost:** €1,993,678

**EU contribution:** €1,462,318

Call for proposal: FP7-TPT-2008-RTD-1

CORDIS RCN : 99129

**Background & policy context:**

Part of the subprogramme TPT-2008.0.0.1 Assessing disruptive effects of extreme weather events on operation and performance of EU transport system. The WEATHER project dealt with weather extremes. It consisted of an assessment of impacts on transport systems and hazards for European regions.

**Objectives:**

The WEATHER project aimed at adding to the current state of knowledge on the impacts of extreme weather events on economy and society in total and on European transport systems in particular.

**Methodology:**

The project started from the broad picture of climate scenarios and broke them down to specific regions. Economic growth models were applied to study the impacts on economy and society and the inter-relations between transport and other sectors. The vulnerability of transport was assessed mode by mode, including infrastructures, operations and intermodal issues. Best practices in emergency management were identified by studying the numerous damage cases worldwide and options for adapting to more frequent and / or more extreme weather events were assessed.

A particular focal point of the project was to quantify expected damage, emergency and adaptation costs and the benefits of improved emergency management and adaptation. Moreover, the project set out to identify policy options to implement the recommended measures and demonstrate the competitive potential and the innovation power of a European lead market for adaptation and emergency management technologies and policies.

The toolbox of the project consists of literature review, targeted interviews, workshops, cost accounting models and case studies. The project had a duration of 27 months. The team consisted of eight leading transportation research institutes all having well founded experience in the core research fields of the WEATHER project.

**Related Projects:**

- EWENT - Extreme weather impacts on European networks of transport
- ECCONET - Effects of climate change on the inland waterway networks
- GHG-TransPoRD - Reducing greenhouse-gas emissions of transport beyond 2020: linking R&D

**Parent Programmes:**

FP7-TRANSPORT - Transport (Including Aeronautics) - Horizontal activities for implementation of the transport programme (TPT)

**Institute type:** Public institution
Institute name: The European Commission
Funding type: Public (EU)

Lead Organisation:

Fraunhofer Gesellschaft Zur Foerderung Der Angewandten Forschung E.v.

Address:
HANSASTRASSE 27C
80686 MUNCHEN
Germany

Organisation Website: http://www.fraunhofer.de
EU Contribution: €497,378

Partner Organisations:

Istituto Di Studi Per L'integrazione Dei Sistemi (I.s.i.s) - Societa'cooperativa

Address:
LARGO DEI LOMBARDI 4
00186 ROMA
Italy

Organisation Website: http://www.isinnova.org
EU Contribution: €124,572

Societe De Mathematiques Appliquees Et De Sciences Humaines

Address:
22 RUE DE CHERBOURG
75015 PARIS
France

EU Contribution: €147,015

Ethniko Kentro Erevnas Kai Technologikis Anaptyxis

Address:
Charilaou Thermi Road
57001 Thermi Thessaloniki
Greece

Organisation Website: http://www.certh.gr
EU Contribution: €266,500

Herry Consult GmbH

Address:
Argentinierstraße
AN/A1040 Vienna
Austria

Organisation Website: http://www.herry.at
EU Contribution: €68,004
The project provided key findings and solutions in three thematic blocks:

**Damage Accounting**
The WEATHER project worked on the issue of transport exposure to weather extremes for 30 months, touching different issues from impact assessment over emergency management and adaptation options to governance and policy questions. Across Europe, the main findings were that impacts on the transport sector are moderate on average, but show particularly critical hot spots. These are mainly floods in mountain areas and impacts on railways. Efficient adaptation and crises management can significantly reduce costs, but requires skilled personnel and well elaborated communication and response plans across institutional, company and governmental levels. These findings are confirmed by the project case studies and a series of reports from our international panel.

**Adaptation Policies**
- Strategic Level Tools: Offer tools to decision makers to determine priorities among multiple contingency alternatives by evaluating consequences from propagating risks across the 'networks of networks' (NoN).
- Better Preparedness: Identification of best practices and tools for emergency preparedness and response and minimising disruption to services of the transport networks operators.
- Easier Communication: Introduction of a harmonised holistic approach for preventive measures and risk assessment
- Means for Policy: Provide the means to develop an integrated transportation security policy.

**Specific Cases**
In total six case studies were selected for reviewing local issues of climate adaptation in Europe: 'Flood of 2002 in Eastern Germany', 'Summer heat 2007 in Southern Europe', 'Flooding of the rail link Vienna – Prague in 2006', 'Windstorm Xynthia in 2010', 'Heavy snow on mountainous roads in Italy in 2004' and 'Rhine shipping during the 2003 summer heat'. Local specificities, lessons learned and long-term adaptation strategies were discussed. The case studies provide recommendations of better emergency management, adaptation measures and policy implementation on a local level. In summary, the case
studies highlight that efficient communications structures, coordination of the involved authorities, strict maintenance of protection systems, intime information on upcoming disasters, and the development of contingency plans for people and logistics nods as well as timely, direct responses are fundamental for a successful emergency management.

**Policy implications**

It was concluded that the key actors in promoting adaptation activities in transport planning and general protection are the European Union and national governments. That conclusion is in line with the assumption that the public interest and thus the interest of the policy makers in improving the resilience of transport infrastructures and services against climate extremes is significantly higher than the knowledge 'powerful' actors have of the issue. Therefore, fostering climate change adaptation in transport planning and general protection should mainly rely on regulatory policy instruments in order to maintain a sustainable change in behaviour. Regarding infrastructure investments and technology it can be expected that the private sector is more reluctant to get involved (and invest) in policies/measures with long-term planning (because of additional costs). Thus, the basic strategy to promote climate change adaptation in terms of infrastructure and technology is to implement regulations, such as building codes and technology standards. Nevertheless, regulation of this adaptation area should be accompanied by incentives in order to avoid negative feedback and improve the efficacy.

**Strategy targets**

An efficient and integrated mobility system: Secure transport

Documents:
- Newsletter #1 (Other relevant documents)

STRIA Roadmaps: specified
- Network and traffic management systems, Other

Transport mode: Multimodal transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Digitalisation, Environmental/Emissions aspects

Geo-spatial type: Other