



POLITÉCNICA

"Ingeniamos el futuro"

CAMPUS
DE EXCELENCIA
INTERNACIONAL

Universidad Politécnica de Madrid
ETS de Ingenieros de Caminos,
Canales y Puertos



Adaptation of Transport to climate change in Europe: Main findings of the EEA report 8/2014

Ángel APARICIO

Technical University Madrid

European Topic Centre on Climate Change Adaptation

European Environment Agency (ETC/CCA)



Adaptation of Transport to climate change in Europe: Main findings of the EEA report 8/2014

1. The context: ETC/CCA
2. Adaptation in the current transport governance framework
3. Mapping current transport adaptation actions
4. Lessons learnt
5. Key challenge ahead: Adaptation, mitigation, and the transition paradigm
6. Elements for a research agenda

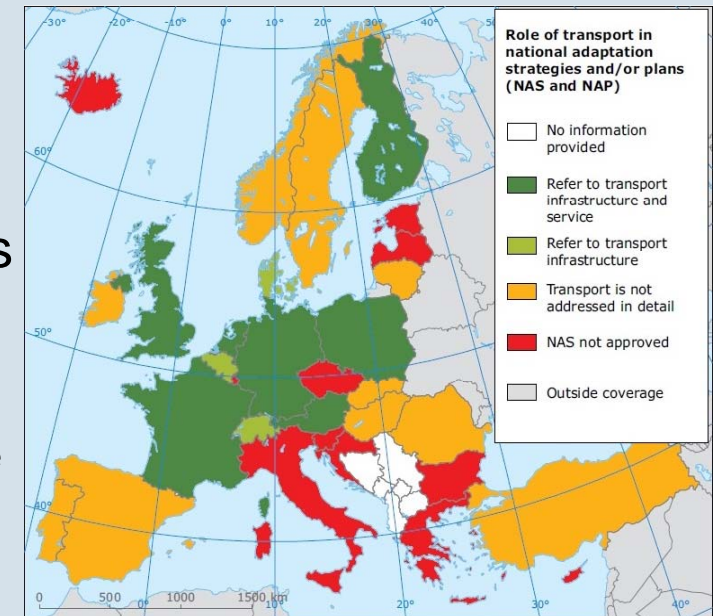
1. The context: ETC/CCA

- **ETC/CCA**
 - European Topic Centre on Climate Change impacts, vulnerability and Adaptation (ETC/CCA)
 - A consortium of European research centres, selected through a public call of the European Environment Agency (EEA)
 - Annual implementation programmes approved by EEA
 - Transport adaptation included in the work programmes 2013 and 2014
- **Partners involved in transport adaptation tasks**
 - Technical University of Madrid (Spain)
 - Meteorological Office (United Kingdom)
 - Umweltbundesamt (Austria)
 - SYKA (Finnish Environmental Institute)

2. Adaptation in the current transport governance framework

Increasing visibility of transport in National Adaptation Strategies (NAS):

- **Stakeholders have reacted positively to the inclusion of transport in NAS:**
 - Quick reaction from infrastructure managers for revision of design and maintenance practice
 - Difficulties to integrate adaptation within the planning process
- **First actions and achievements:**
 - Revision and upgrading of current standards and technical guidelines
 - Identification and action on vulnerable spots



Sources: ETC/CCA, 2013; EC and EEA, 2014; EEA, 2014b.

2. Adaptation gaps in the current transport governance framework

The institutional framework for adaptation in transport	Key perceived barriers to adaptation action	European action welcomed on
<p>“Top-down”, modal approach Infrastructure managers leading Mobilizing in-house knowledge Limited involvement of service providers, users, civil protection authorities...</p>	<p>Many barriers identified, but focus on:</p> <ul style="list-style-type: none"> - Lack of awareness - Lack of resources 	<p>Cooperation among stakeholders Funding Transport research</p>
<p><i>A lost opportunity to strengthen collaborative planning and governance practices?</i></p>	<p><i>Does adaptation deserves more attention in the transport policy agenda?</i></p>	<p><i>Is current EU involvement appropriate?</i></p>

3. Mapping current adaptation actions

- **Based on a screening process: 38 experiences reviewed**
 - All transport modes included
- **Focus on infrastructure:**
 - at both, maintenance and design stages
- **Main focus identified:**
 - keeping current functionality/ performance also in future
- **No quantitative assessment of adaptation options**
 - Traditional assessment tools (CBA) not appropriate to deal with uncertainty?
 - Alternative approach: are additional costs reasonable compared to current practice?

3. Mapping current adaptation actions

Research and studies

Knowledge
expansion

Coping with
uncertainty

Vulnerability assessment:

Checking critical
infrastructure
and increasing
resilience

Applying new
assessment tools

Maintenance and design

Revising
existing
guidelines,
standards...

Contingency plans

Weather inform.

Weighting options:
- Quick-recovery
- Users' inform.
- Climate-proofing

CBA assessment?

Long-term

Planning

Scenario building

3. Mapping current adaptation actions

Research and studies

- **EU FP7 projects**
 - EWENT, WEATHER, ECCONET
 - MOWE-IT
 - TOPDAD, BASE, ENHANCE...
- **National research projects**
 - UK: TRACCA (rail)
 - DE: KLIWAS (waterborne transport)



3. Mapping current adaptation actions

Vulnerability assessment

- **Pilots based on risk assessment concepts**
 - Vulnerability = Prob(Occurrence) x Impact
 - France: Nice airport
 - Denmark: Copenhagen airport
 - Scotland: Scottish road network
- **Developing new assessment tools**
 - Norway: xGEO (roads)
 - Denmark, Sweden...: Blue spot concept (roads)
 - Austrian: ÖBB database on rail disruption events



3. Mapping current adaptation actions

Revision of maintenance and design guidelines

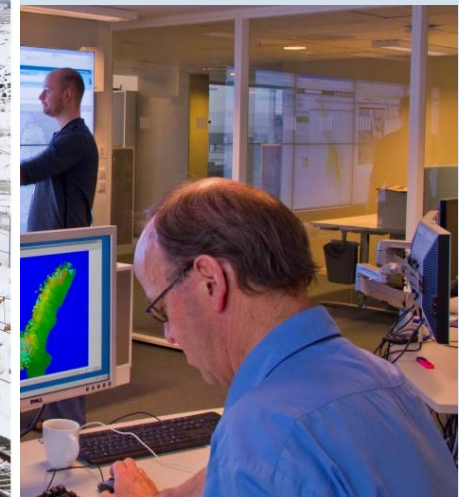
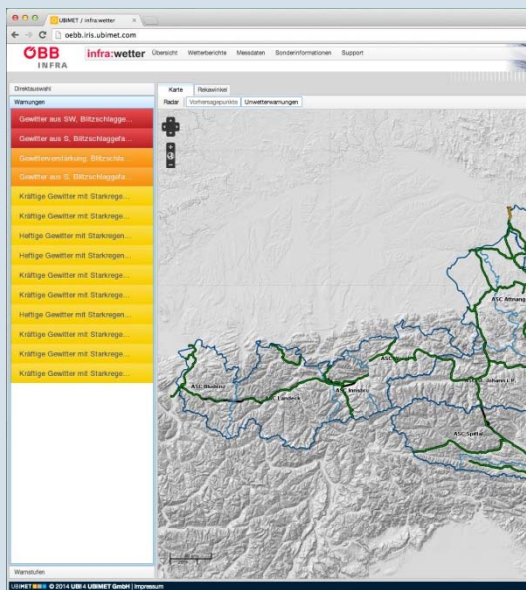
- **Identification of priorities vs. comprehensive revision**
 - UK: Railway drainage standards
 - European Commission mandate on revision of standards (2014)
 - FR: Comprehensive revision of transport infrastructure standards
 - DK: Copenhagen metro



3. Mapping current adaptation actions

Contingency plans and revision of operational practices

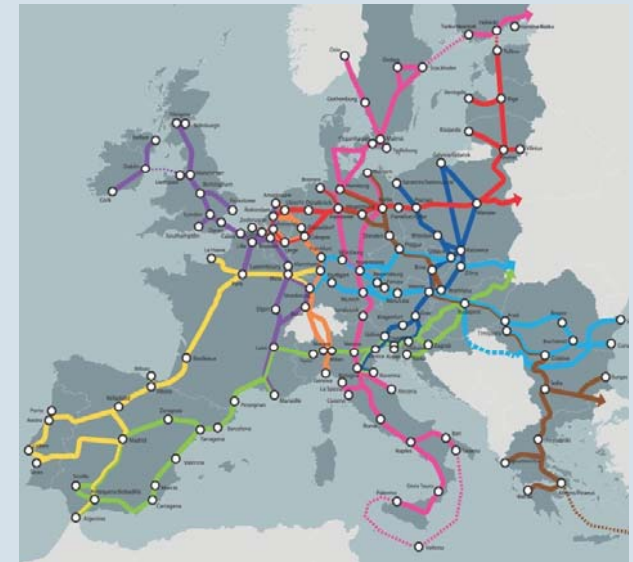
- Tailored weather information
- Quick recovery vs. major infrastructure investments



3. Mapping current adaptation actions

Long-term analysis and scenario building

- **Limited consideration of adaptation within long-term planning**
 - TEN-T: adaptation should be included within “working plans” for 9 TEN-T priority corridors
 - FR: On-going study on long-term changes in urban mobility patterns
 - DHL: Exploring resilience of future logistics chains



4. Lessons learnt (1/2)

- **Keen interest in adaptation within the transport community**
 - But limited mainly to infrastructure issues
- **Looking for pragmatic, low-regret actions**
 - Based on in-house knowledge and expertise
 - Vulnerability studies have been made by many infrastructure managers
 - Contingency plans focusing on low-regret measures, as options are difficult to compare and assess properly
- **The knowledge base has significantly expanded in the last 5 years**
 - Based on better tailored climate forecasting and estimates
 - Impact assessment generally based on general equilibrium models
 - Transitions towards low-carbon mobility not considered

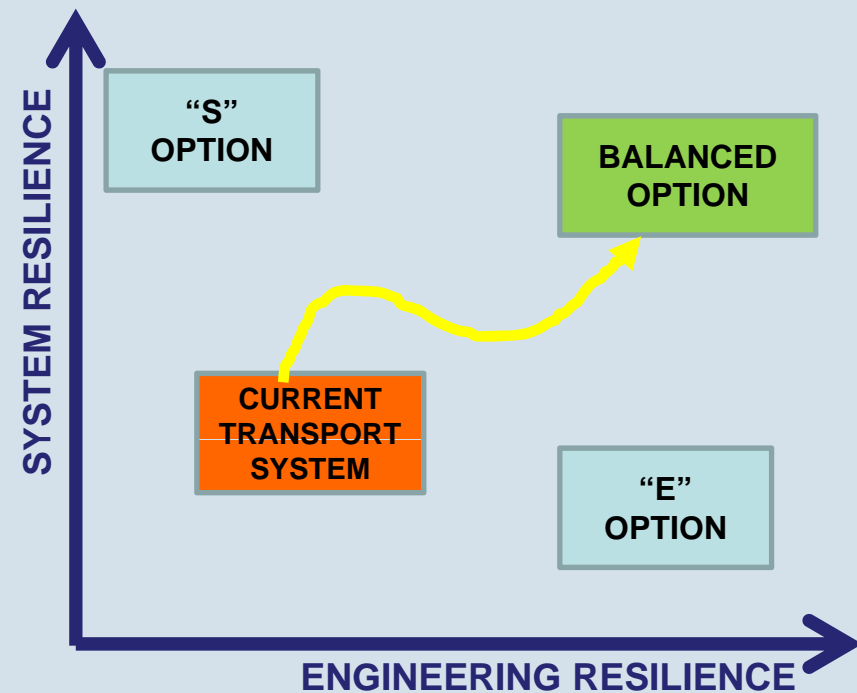
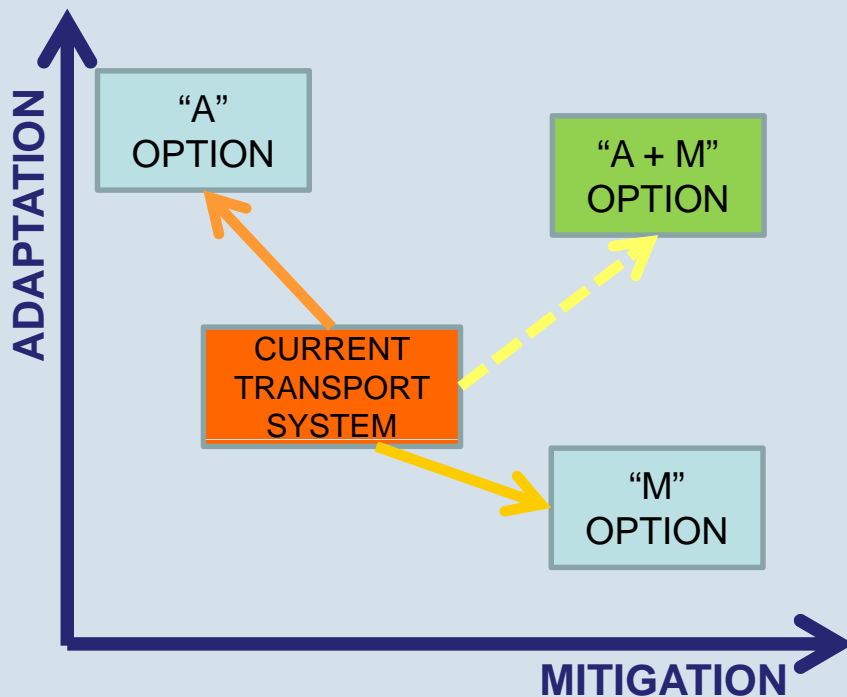
4. Lessons learnt (2/2)

- **Adaptation is not integrated within transport planning practice**
 - No specific consideration of adaptation challenges within on-going national transport planning processes
 - Vulnerability assessment lacking in TEN-T (and in most of TEN-T priority corridors)
- **Conflicting expectations and strategies: engineering resilience, demand management, recovery options...**
 - Assessments based on current conditions (socio-economic framework, transport system operations...)
 - Transport impacts considered: those due to infrastructure disruption
 - No radical changes expected in the operating conditions of transport systems

5. Key challenge ahead: Adaptation, mitigation, and the transition paradigm

Integrating the transition challenge

Assessing adaptation options



6. Elements for a research agenda

MOVING FORWARD TOWARDS COLLABORATIVE PLANNING

Adaptation as an opportunity to collaborative governance
...and to stakeholder involvement

ADAPTATION WITHIN LONG-TERM PLANNING

Joint approach to mitigation and adaptation
Build upon current practice: TEN-T and national transport plans

DEVELOPING STRONGER ASSESSMENT TOOLS:

Including compatibility with low-carbon transitions
Including demand management and flexibility

IMPROVING THE KNOWLEDGE BASE:

Further development of transport-tailored climate forecasts

FURTHER INFORMATION

- **ETC/CCA TECHNICAL PAPER 03/2013**
 - <http://cca.eionet.europa.eu/reports>
- **CLIMATE ADAPT PLATFORM**
 - <http://climate-adapt.eea.europa.eu/>
- **EEA REPORT 8/2014**
 - Adaptation of transport to climate change in Europe: Challenges and options across transport modes and stakeholders
 - <http://www.eea.europa.eu/publications/adaptation-of-transport-to-climate>

