



# ADAPTATION OF TRANSPORT INFRASTRUCTURES AND NETWORKS TO CLIMATE CHANGE

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# FRENCH CLIMATE CHANGE ADAPTATION PLAN - CONTEXT



| 2006                         | 2009   | 2010   | 2011                                    | 2015   | 2016          |
|------------------------------|--|--|---|--------|---------------|
| National Adaptation Strategy | Report – Impacts and costs of climate change | PNACC preparation: National and local consultation | French National Adaptation Plan - PNACC | COP 21 | The new PNACC |

PNACC research and studies

Reports on Climate Projections in France

# PNACC – TRANSPORT INFRASTRUCTURES AND SYSTEMS



**Action 1 – Review and adapt technical standards for construction, maintenance and operation of transport networks – infrastructures and equipment – in continental France and French overseas territories**

**Action 2 – Study the impact of climate change on transport demand and the consequences for reshaping transport provision**

**Action 3 – Define a harmonized methodology to identify the vulnerability of infrastructures and land, sea and airport systems**

**Action 4 – Establish a statement of vulnerability for land, sea and air transport networks in continental France and in French overseas territories and prepare appropriate and phased response strategies to local and global climate change issues**



# THE WORKING GROUP



## *Sponsor*

French Ministry for Environment,  
Energy and the Sea

## *Project manager*

Cerema

## *The Technical Working Group*

Cerema, SNCF, STAC, STRMTG, VNF

## *Infrastructures taken into account*

Airport infrastructures

Cable transport infrastructures

Earthworks

Highway infrastructures

Highway constructions

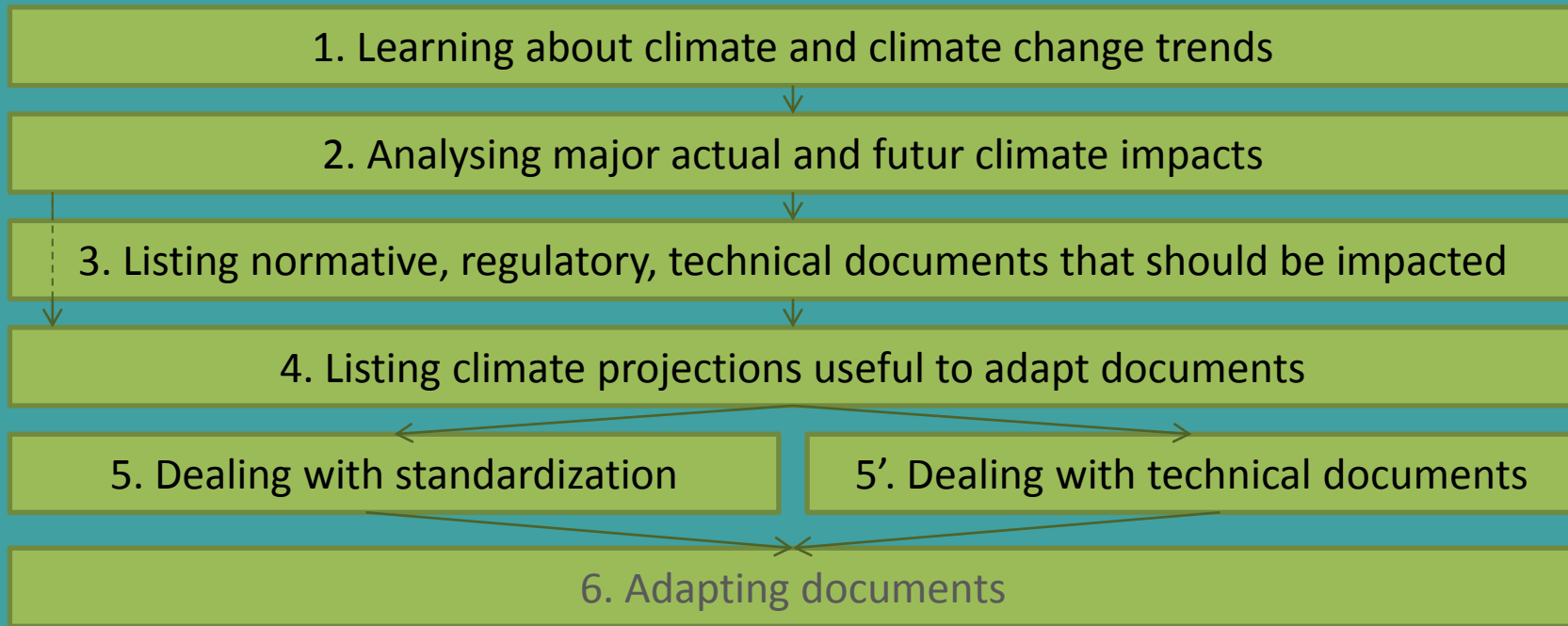
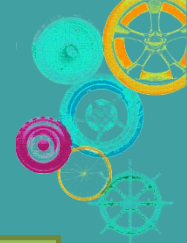
Maritime, port and river infrastructures

Rail and guided transport infrastructures

Urban roads



# A1 – ADAPTATION OF DOCUMENTS



# A1 – ADAPTATION OF DOCUMENTS

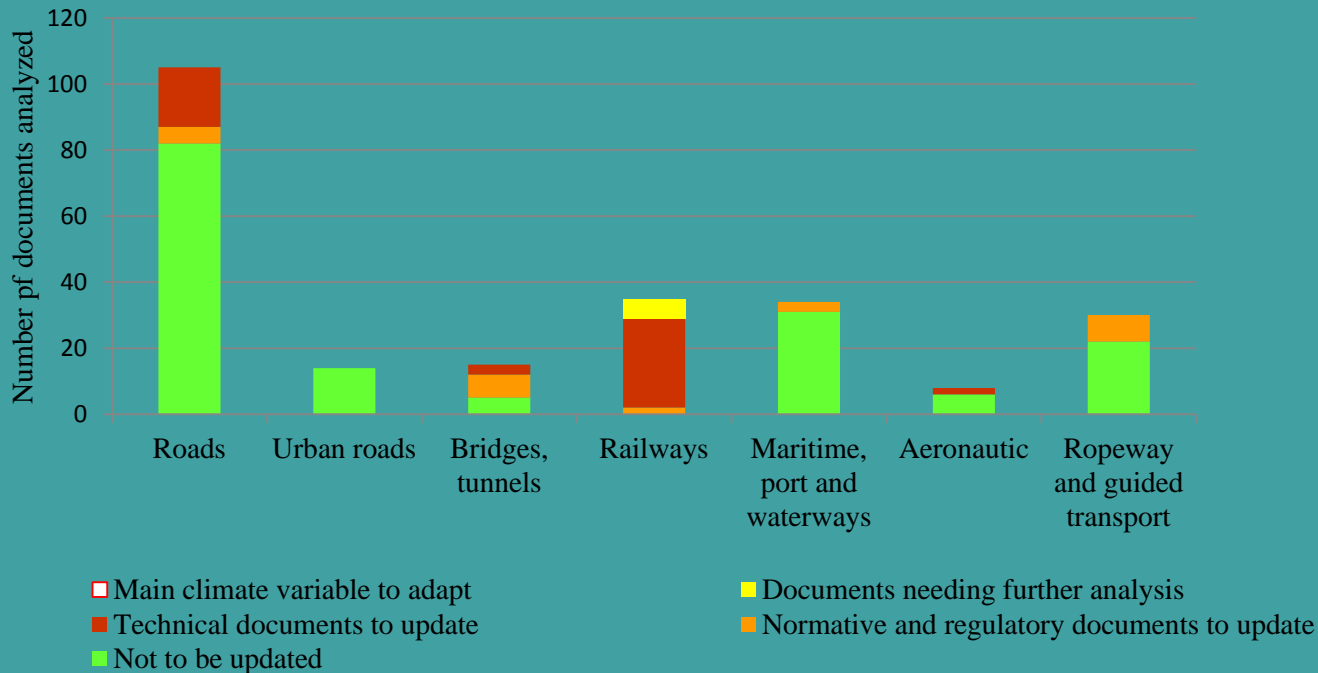


Climate zone, drainage, freeze, freeze-thaw cycle, groundwater, lightening, rainfall, snow, temperature, wind, etc.

Impacts are due to climate variables changes or correlated consequences

Impacts are expected on design, maintenance and operation

Adaptation needs precisions on existing climate variables or new indicators



# A2 – CLIMATE CHANGE AND MOBILITY



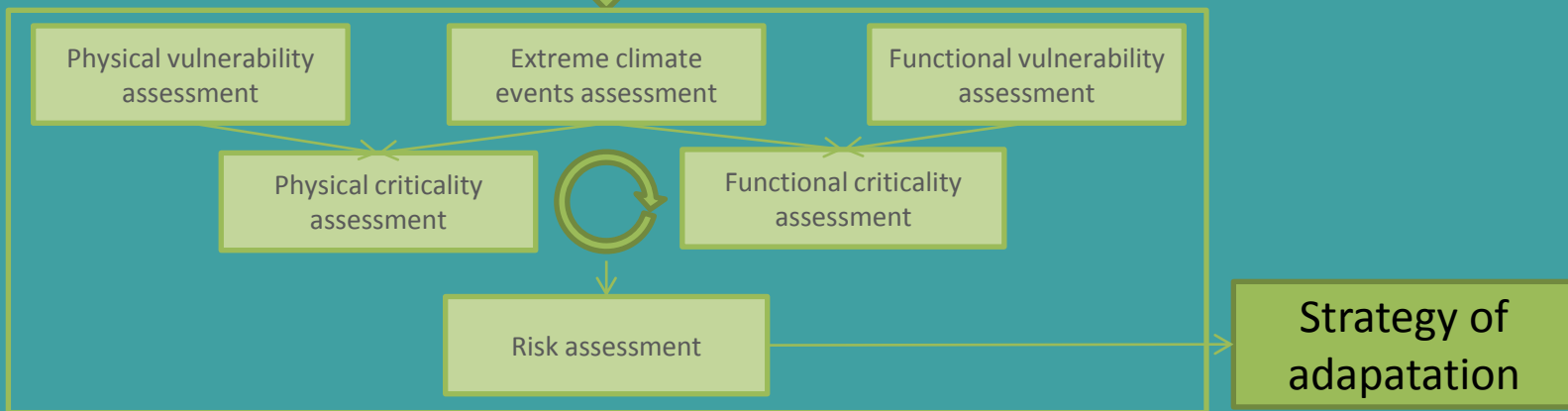
- Aim of the study: listing and analysing major issues to adapt mobility
- Methods : analysis of an international bibliography, including french local adaptation strategies; analysis of such issues in towns with similar climates
- Results:
  - Examples of climate change impacts on mobility
  - Analysis of how some french local adaptation strategies take into account mobility adaptation
  - Methodological elements to adapt mobility
  - Listing and analysis of adaptation measures



# A3 – RISK ANALYSIS

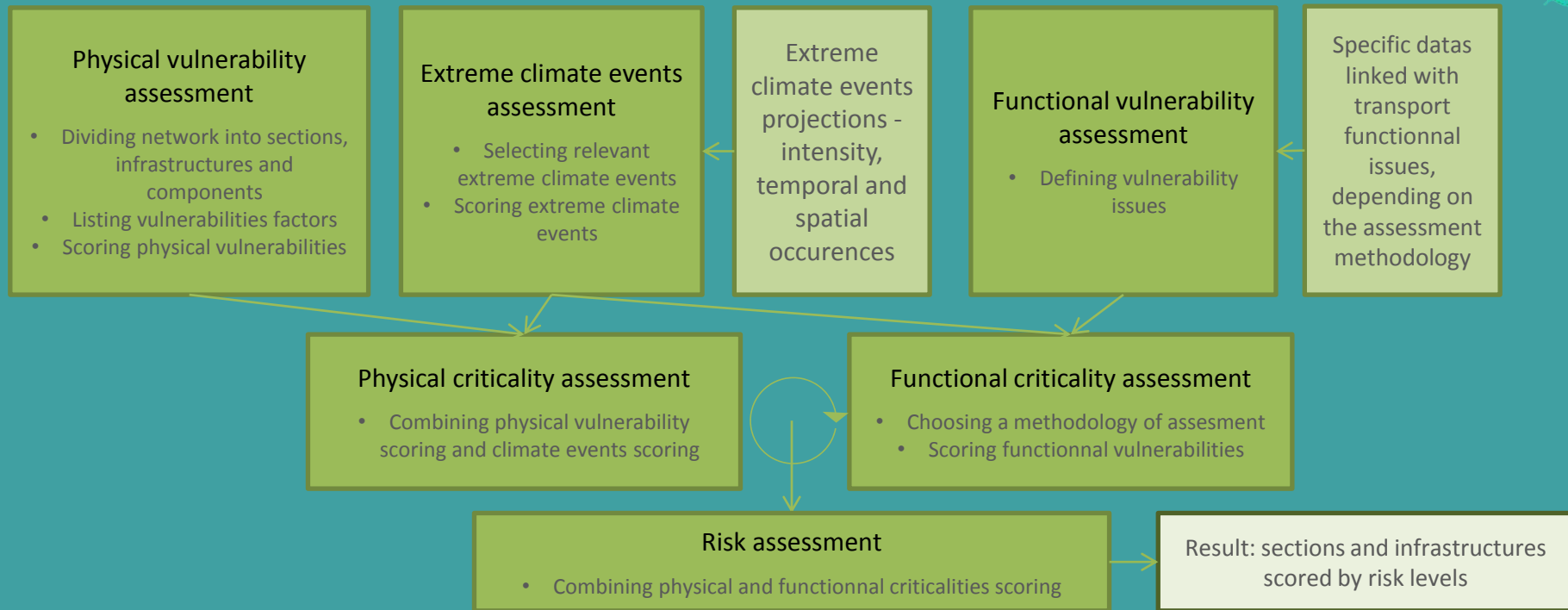


Defining scope, study of area and purpose of the analysis

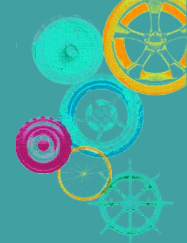




# A3 – RISK ANALYSIS



# CONCLUSIONS



**Toward a new PNACC 2016-2020 with a continuity of actions**

**Action 1:**

- **Over 1000 documents analyzed, 241 listed, 30 % with a need of further studies or with a need of adaptation**
- **Today : involvement in standardization, small technical working groups**

**Action 2: issues on mobility adaptation need to be shared with planners**

**Action 3:**

- **An applicable methodology... still under development , tested with pilot studies applied on various study areas and transport types**
- **Next steps: automation of the methodology, adaptation solution strategies**





# Thank you for your attention

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## Reports are available on:

<http://www.infra-transport-materiaux.cerema.fr/national-climate-change-adaptation-plan-a5978.html>



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