

EXAMPLES OF GOOD PRACTICES AND METHODOLOGIES ON HOW TO DEAL WITH INTERDEPENDENCIES IN RESILIENCE APPROACHES

French Case Studies

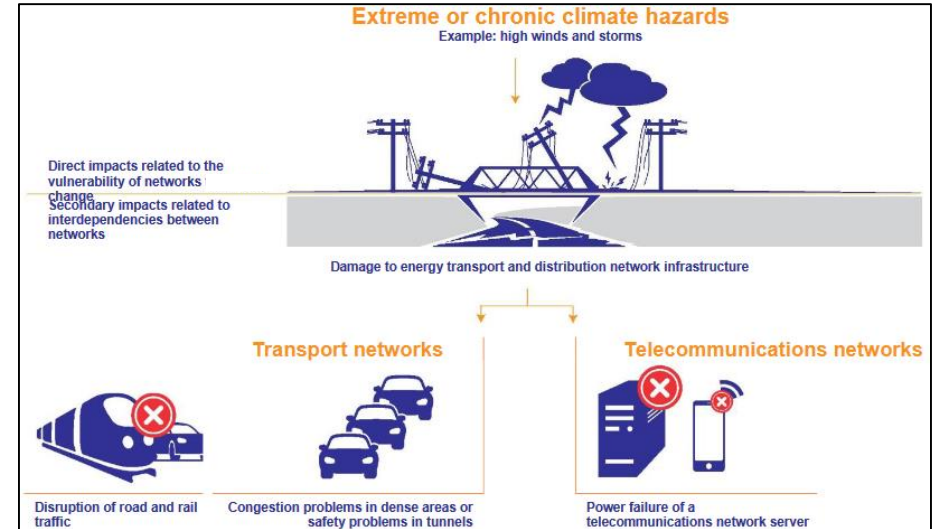
12/09/2025

Marie COLIN,
Project manager, *Cerema* (France)

IDENTIFY & MAP OUT INTERDEPENDENCIES

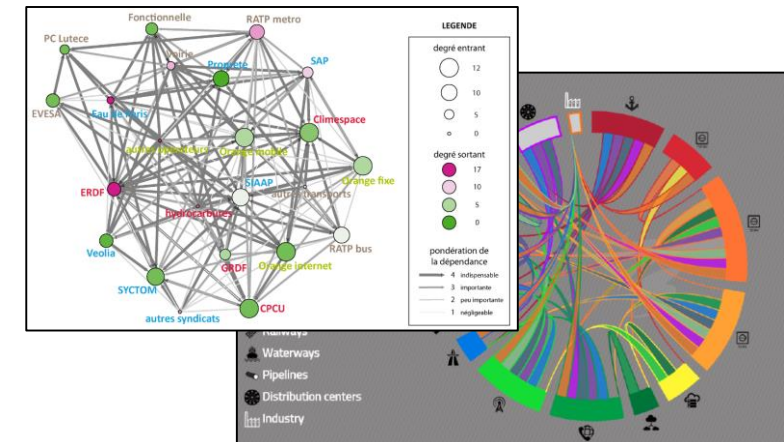
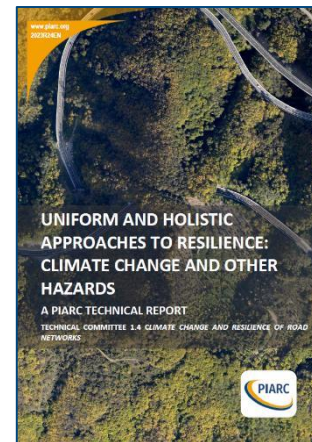
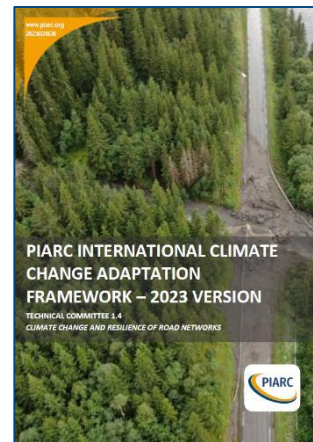
A variety of interdependencies (France Stratégie, 2022)

- **Physical:** involve physical links between assets
- **Geographic:** proximity links
- **Cybernetic:** based on transmission of information between infrastructures
- **Organizational:** structural, social, political dependencies



Identify, map out them:

- Impact chains
- Multimodal graphs
- Specific tools



Interdependances in resilience approaches

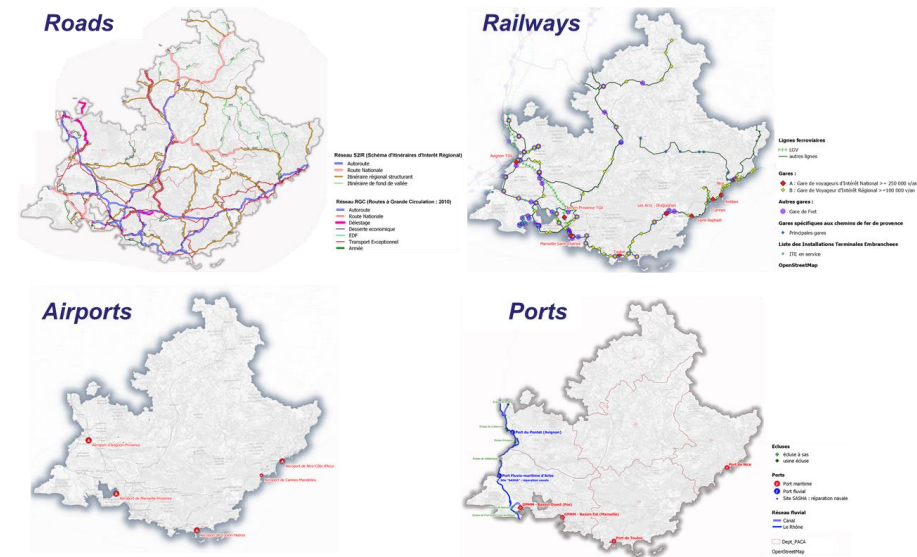
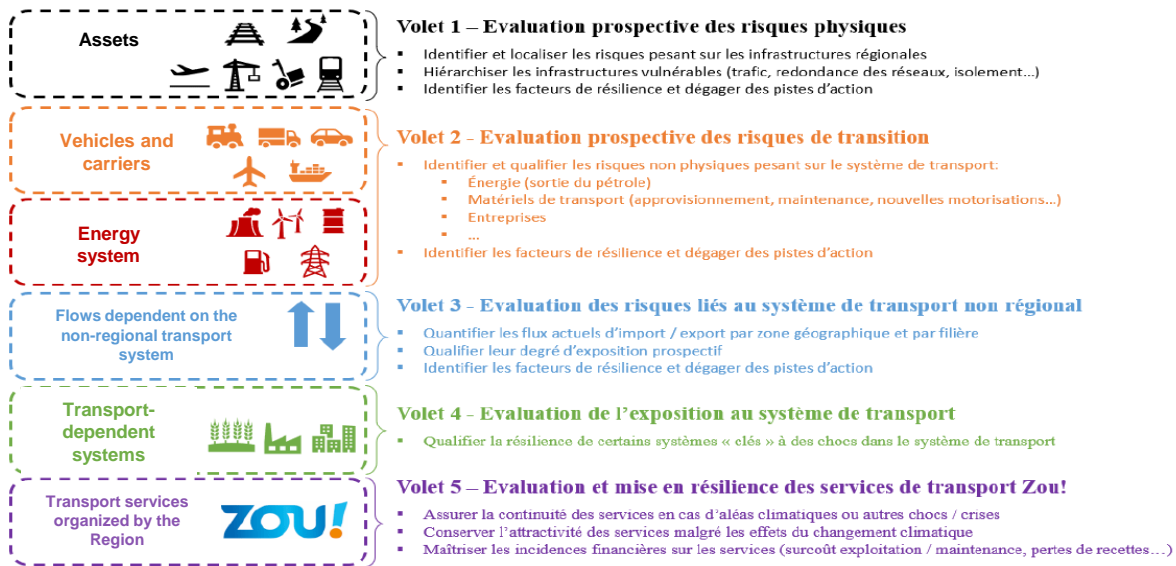
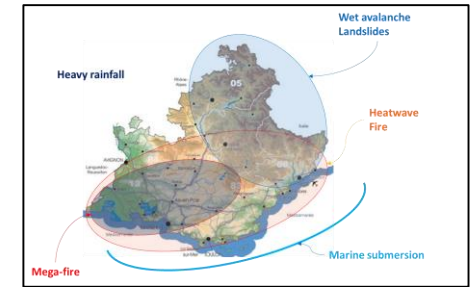
DEFINE CLEAR OBJECTIVES

PACA resilience study:

- Launched as part of the **PACA region's resilience strategy**
- Study leader: State-Region (50% of funding each)

Objective:

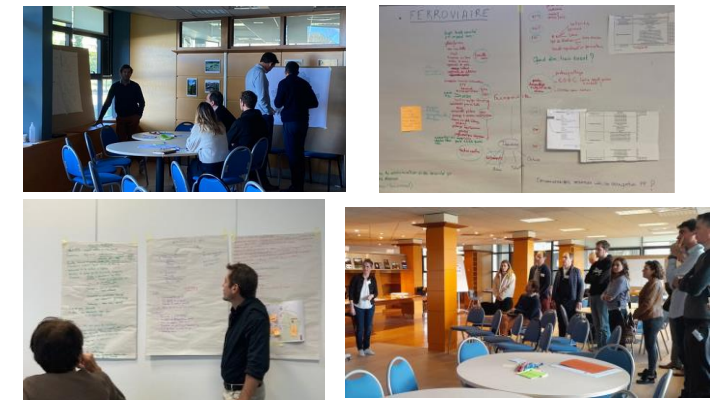
- **Adapt the regional transport system to make it resilient to crises**
- **Including interdependencies between modes**



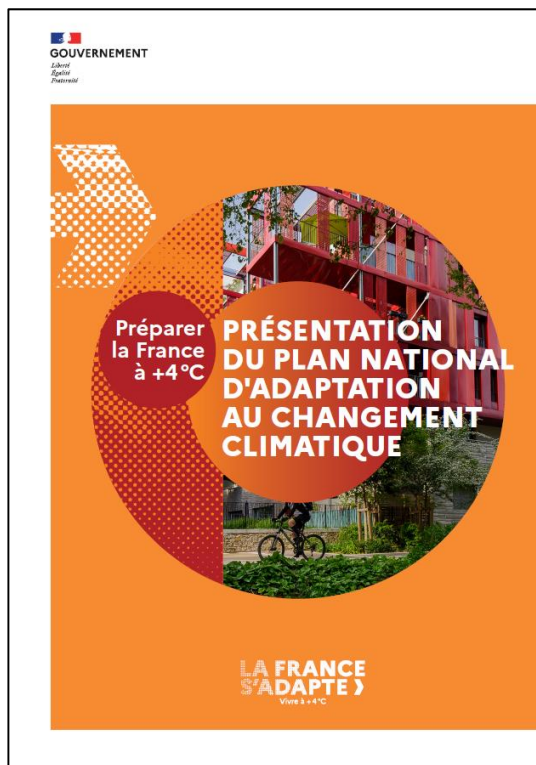
ESTABLISH APPROPRIATE GOVERNANCE & DEVELOP COMMON KNOWLEDGE

- A Charter of Commitment, proposed by the State and the Region, signed by each asset manager:

*"The purpose of the Charter of Commitment is to bring together stakeholders in the region around the theme of adapting transport systems to the challenges of climate change. The signatories to the charter **undertake to work collaboratively**, both within their own organizations and in conjunction with other similar initiatives within their scope, on the vulnerability study of transport infrastructure and activities, and to **work on the development of multi-partner action plans** to improve their sustainability and resilience to the effects of climate change. They also commit to **monitoring and evaluating progress**. [...] This charter is not intended to formalize a financial commitment on the part of the stakeholders."*
- **Common knowledge:** training on resilience, regular workshops to share knowledge on impacts, sensitivity, etc.
- Workshops to identify and **collect data** & discuss how to share it



ESTABLISH POLITICAL SUPPORT & DEVELOP TECHNICAL GUIDELINES

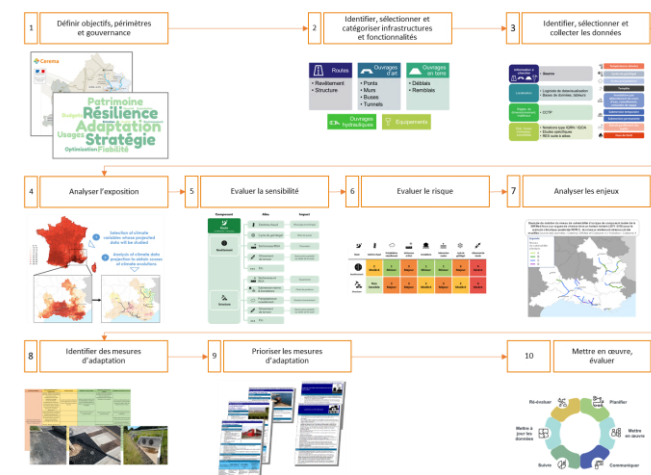
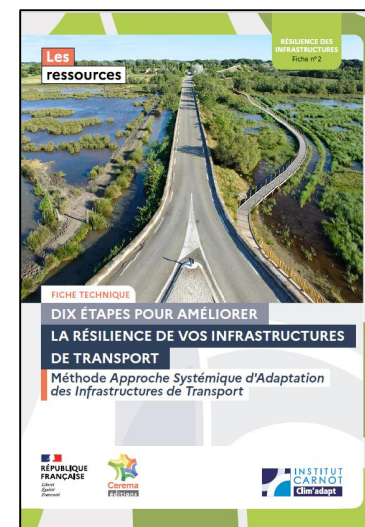


Third French National Climate Change Adaptation Plan – PNACC 3

11 – Adapting transport

- One of the priority measures
- For transport authorities: conducting resilience studies and defining adaptation strategies
- Conducting multimodal studies
- For large public transport companies: conducting vulnerability studies, which will serve as a basis for defining adaptation plans

- A framework to improve resilience of transport networks: the “ASAIT framework”
- Currently being adapted to multimodal studies



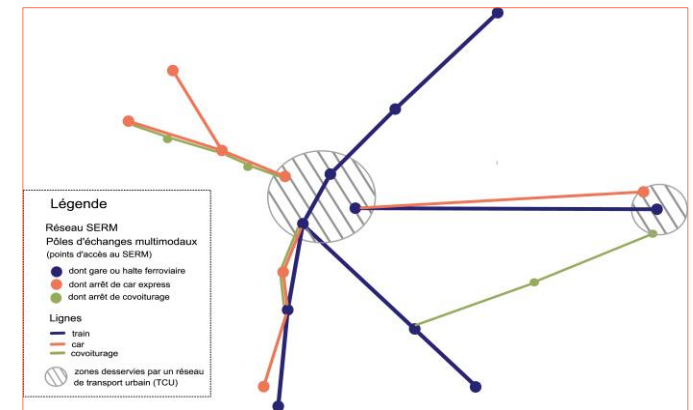
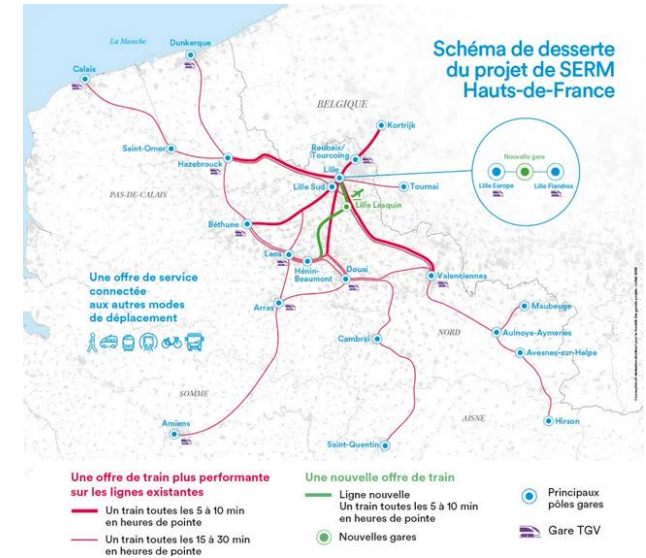
DEVELOP TECHNICAL GUIDELINES

Example of resilience framework adapted to « Regional express metropolitan services »

- REMS = Projects to **strengthen rail services** and **supplement them** with other modes of transport, **linking them together** and ensuring the **clarity** and **attractiveness** of the system
- Aim: Decarbonize. Open up.** Improve the living environment. Improve purchasing power

How to deal with resilience & interdependencies in these projects?

- Think systemic** > adapt the physical scope of risk assessment: structural services, multimodal transport hubs, all elements contributing to smooth operation
- Do not only focus on technical solutions** > Organizational measures, e.g.: coordination between operators

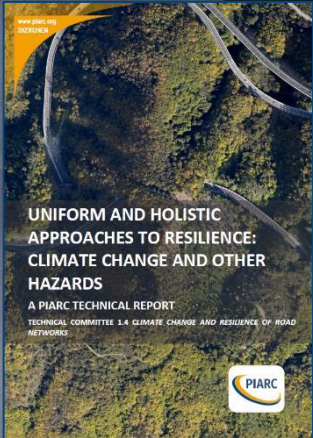
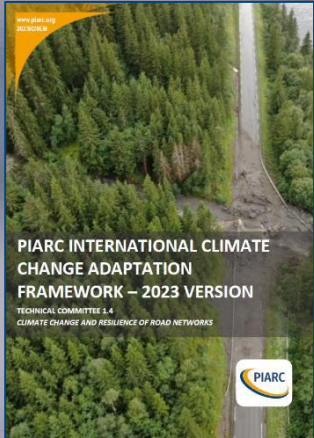
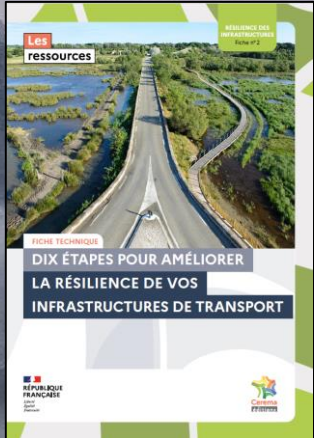
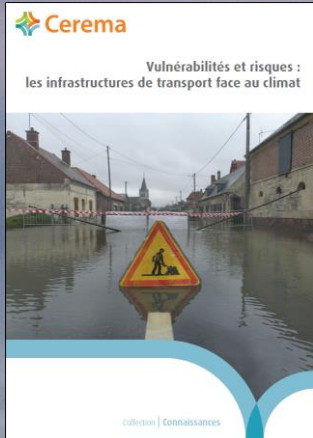


KEY TAKE AWAY

To consider interdependencies in resilience approaches:

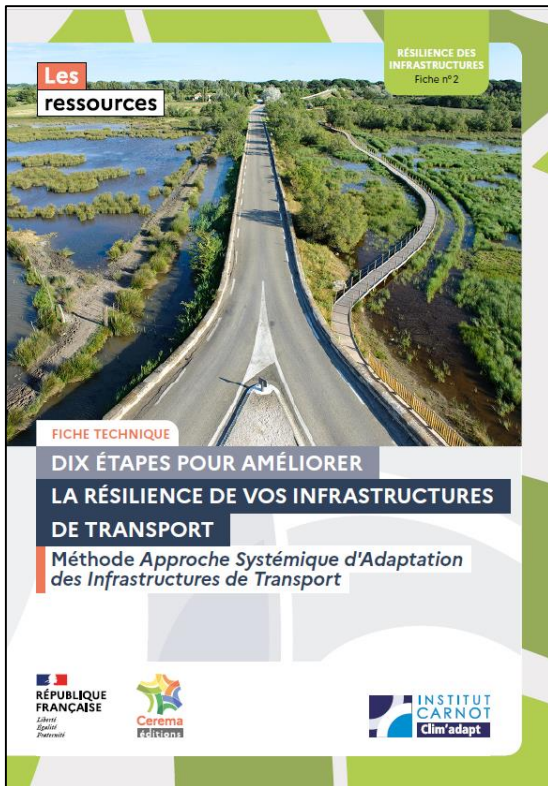
- Develop knowledge, map them out
- Define clear objectives for your resilience approach and how interdependancies will be taken into account
- Establish an appropriate governance and set the foundations for cooperation on this issue
- Develop shared knowledge on interdependencies, organise data collection and sharing (results dissemination)
- Establish political support
- Develop technical guidelines, collect examples for best practices for examples... by attending symposiums on this topic!

Thank you for your attention



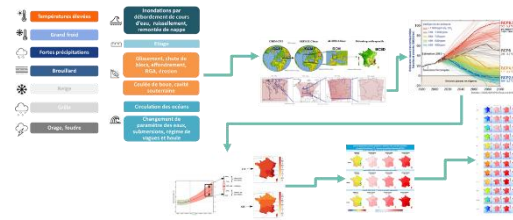
A SYSTEMIC APPROACH: ASAIT METHOD

Systemic Approach on Transport Infrastructures Adaptation - ASAIT

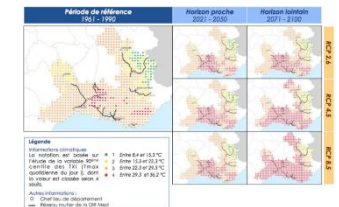


Define objectives, scopes and governance

Assess exposure to current and future hazards



Analyse sensibilités et risques évolutions



Identify adaptation solutions

Adaptation Measures (Infrastructure Related)	Adaptation Measures (Traffic Management)	Adaptation Measures (Maintenance)	Adaptation Measures (Planning)
Road adaptation measures Bridge retrofit Tunnel protection Bike roadings Retaining structures Evacuation routes Others	Transport System ETCS Early warning systems Re-routing (short-term and planned)	Prevention Service restoration Technical regulations Adaptation of current regulations to climate change Legal Financial Others	Integration of climate change in the design phase Technical regulations Adaptation of current regulations to climate change Legal Financial Others

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Define a resilience strategy



ASAIT METHODOLOGY

