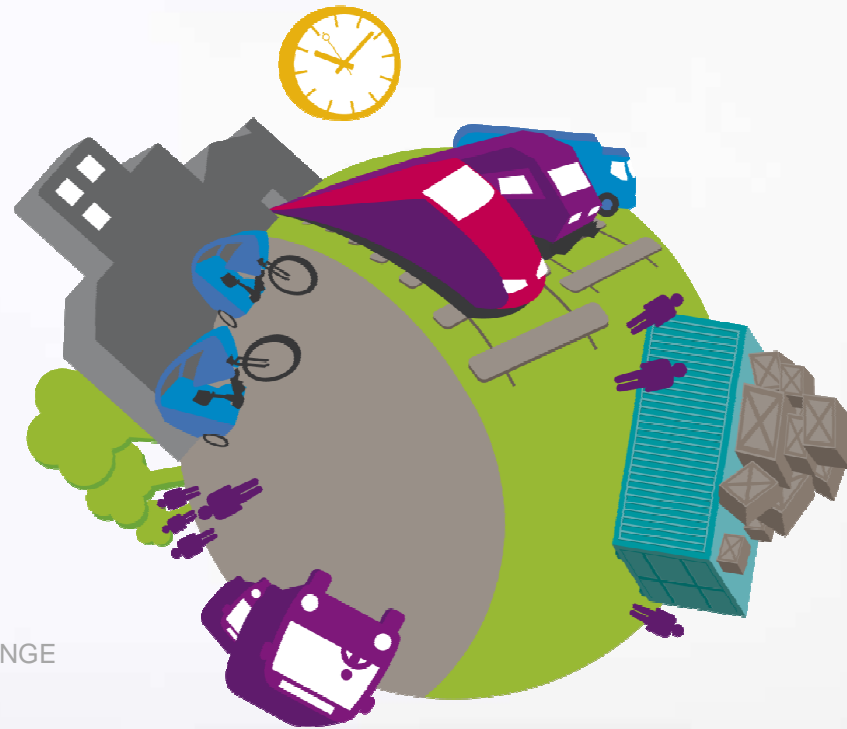


# MOBILITY & CLIMATE CHANGE

WHAT DOES IT MEAN FOR A  
SUSTAINABLE MOBILITY PROVIDER



ADAPTATION OF TRANSPORT NETWORKS FOR CLIMATE CHANGE  
SNCF - SUSTAINABLE DEPARTMENT  
27 JUN 2012



# FRANCE & CLIMATE CHANGE



40%

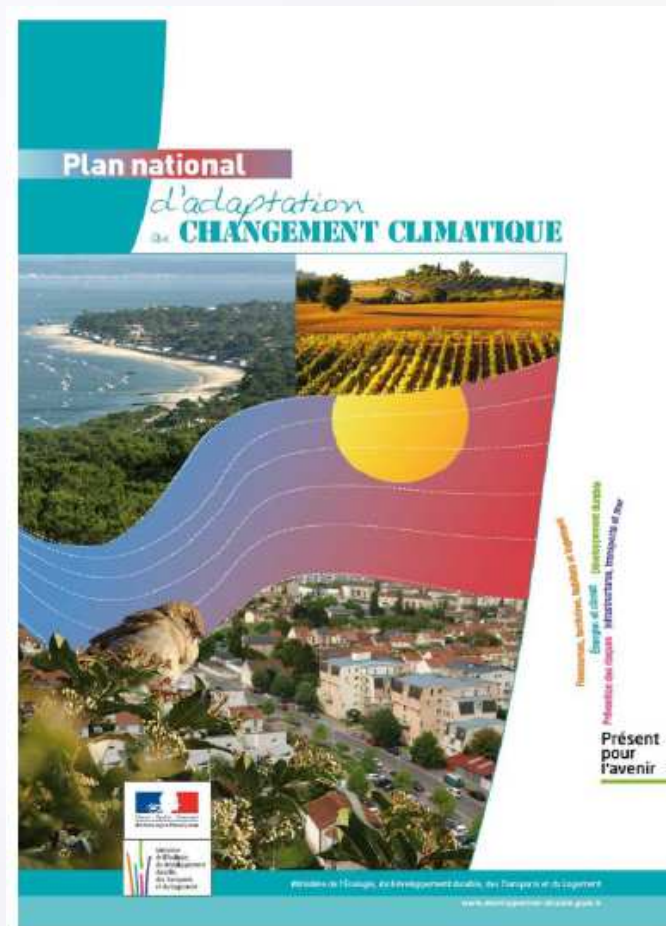
OF FRENCH PEOPLE THINKS CLIMATE  
CHANGE IS THE MOST PREOCCUPANT  
ENVIRONMENTAL RISK

Survey IFOP for WWF – March 2012

# FRENCH FRAMEWORK FOR ADAPTATION

TO PREPARE TOMORROW

PNACC (July 2011)



# ECOMOBILITY & CLIMATE CHANGE

## GUIDELINES FOR TRANSPORTS



➤ **Action #1:** To 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:** To study the impact of climate change on **transport demand** and the consequences for **reshaping transport offer**



➤ **Action #3:** To define a harmonised **methodology to diagnose the vulnerability** of infrastructures and land, sea and airport transport systems



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

The possible technical requirements and norms update will require to mobilize SNCF as WORKS OWNER for the rolling stock, railways INFRASTRUCTURE delegated MANAGER and as OPERATOR for the urban transportation

3

# SNCF ADAPTATION PLAN

A LONG-TERM PROCESS



# SNCF GROUP AT THE END OF 2011: 5 DIVISIONS / €32,6 BILLION IN REVENUE

## SNCF INFRA



Rail network management, operation, maintenance on behalf of RFF and engineering of primarily rail infrastructures

Activity in France, + engineering in Europe, Asia, the Middle East, Africa, the Americas

**€5.3 billion**

## SNCF PROXIMITÉS



Public urban, outer urban and regional transport for daily commuters

*Regional Express train (TER), Transilien in Paris area and Intercités in France, Keolis in France, Europe, the United States, Canada and Australia*

**€12.3 billion**

## SNCF VOYAGES



High speed passenger rail transport

*Europe (France, Spain, the United Kingdom, Belgium, the Netherlands, Germany, Austria, Switzerland and Italy)*

**€7.3 billion**

## SNCF GEODIS



Freight transport and logistics

*Global multi-modal in 120 countries / 5 continents*

**€9.4 billion**

## GARES & CONNEXIONS

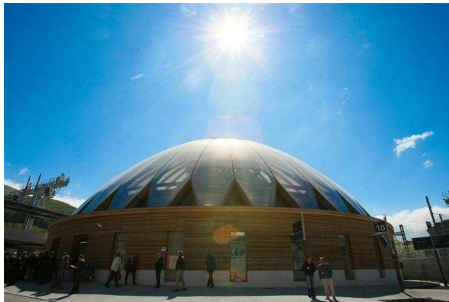


Station management and development, independent from carrier activity

*3,000 French stations, AREP subsidiary operates internationally*

**€1.2 billion**

# CLIMATE CHANGE STAKES FOR SNCF ?



## ➤ Investments (2 Billion / yr)

- Train: 35 - 40 years
- Station: 60 years
- High Speed Line (RFF): 100 years

## ➤ Risks

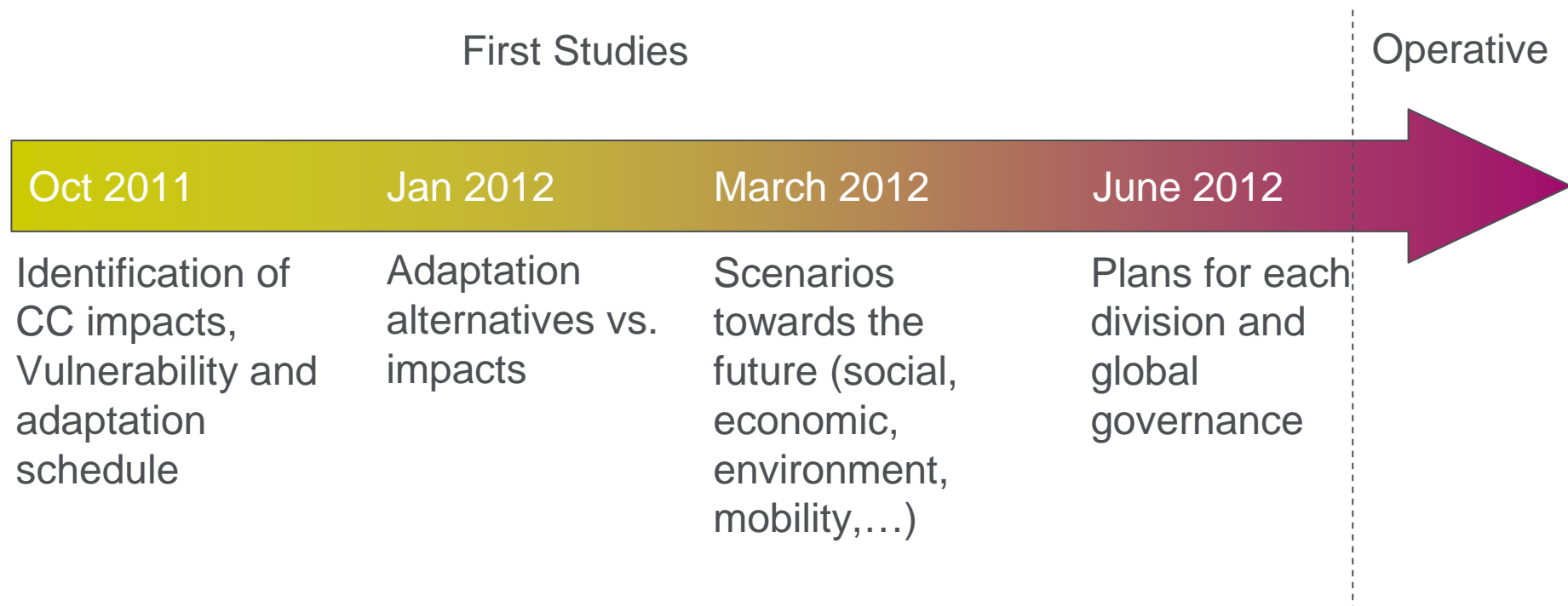
- Eco-design for trains and stations
- Production tools resilience
- Crisis management

## ➤ Opportunities

- New tourism demand : short & middle distance
- Low GHG emissions & low energy consumption

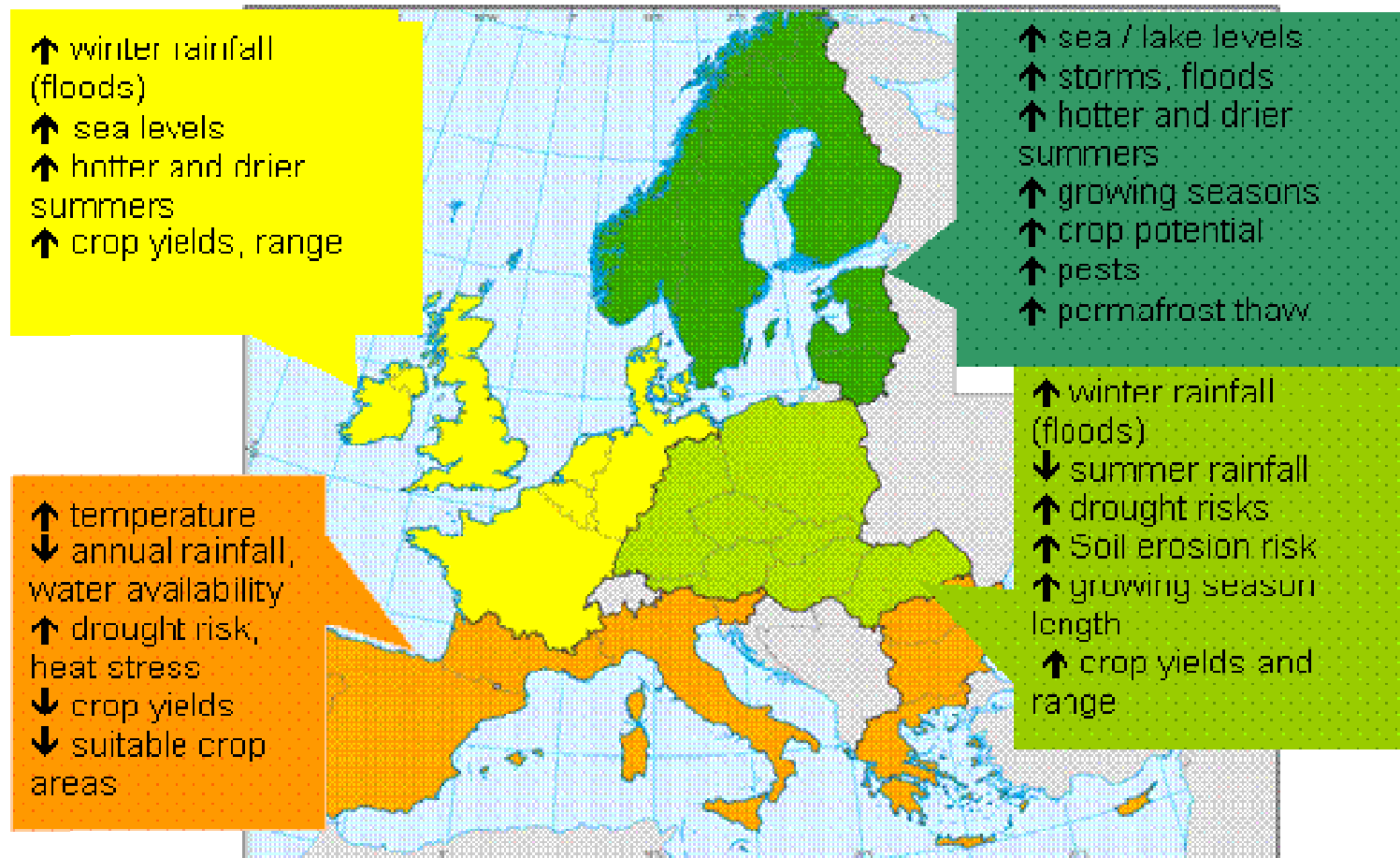
# CLIMATE CHANGE: AN OPPORTUNITY FOR SNCF

THE « CLIMAT D RAIL » PROJECT

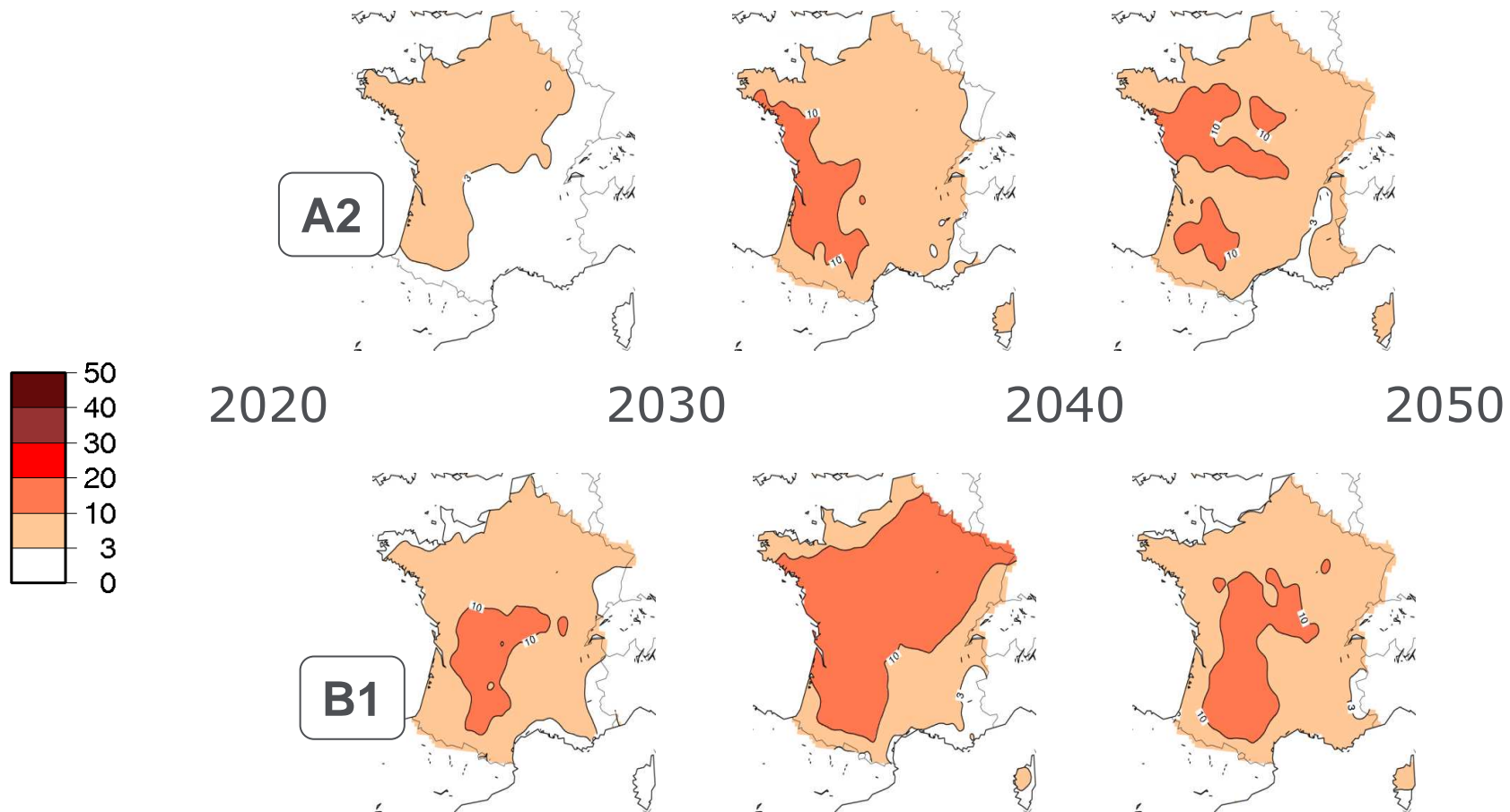




# WEATHER : MODIFICATIONS FOR EUROPE



# 2050 : WARMER SUMMERS & HEATWAVES!



# RAILWAYS SYSTEM RESILIENCE: COMPONENTS FOR AN INTEGRATED MOBILITY OPERATOR...



# INVESTMENT vs ORGANISATION

## TIMETABLE FOR DECISIONS « WITHOUT REGRETS »

■ Rolling stock    
 ■ Infrastructure    
 ■ Station    
 ■ Journey condition

INFRASTRUCTURE	Years	MARKETING SYSTEMS	Years
Creation and production of an infrastructure work	150	Management software	15
Electrification	80	Ticketing	10
Production and setting-up of tracks	50	Pricing	5
Revegetation along the tracks and slopes	15	Communication campaign	0,5

TRAIN STATION	Years	ROLLING STOCK	Years
Creation and operation of the new station	100	Investment for new rolling stock (full set of coaches)	40
Creation of platforms	50	New traction unit	20
Design of a train station	30	Comfort elements	20
Reorganisation of public areas	20	Fitting of toilets	20
Air conditioning/heating systems	15	Repairing of existing rolling stock	15
Setting up of common services (toilets, water access)	15	Air conditioning/heating systems	15
Setting-up of a waiting room	10	Purchasing of driver assistance and consumption optimisation systems	10
New organisation of reception centre	5	Leasing operation	10
Setting-up of Passenger information systems	2		

Heatwaves

Rails: overheating & torsion

Catenaries: overheating & distortion

Tracks & Trains: electric and electronic equipments disruption

Station & Trains: global comfort (temperature, humidity)

Track: High temperatures for workers

Track: Fire

Rain

Tracks, Stations, Tunnels: Flood (drainage systems)

Bridge: increase of stream flow, fretting wear

Landslides

Tracks: Erosion, excavation

Tracks: signals equipments disruption

Impracticable roads: modal transfer to the train

Snow

Switchpoint : Accumulation of snow and disruption

Trains : doors and harness equipment disruption

Tracks & Trains: electric and electronic equipments disruption

Impracticable roads: modal transfer to the train

Coldest days

Track: High temperatures for workers

Embrittlement of rails

Stations: Black ice, slippery platforms

Trains : doors and harness equipment disruption

Trains : broken windows

Blocked switchpoint

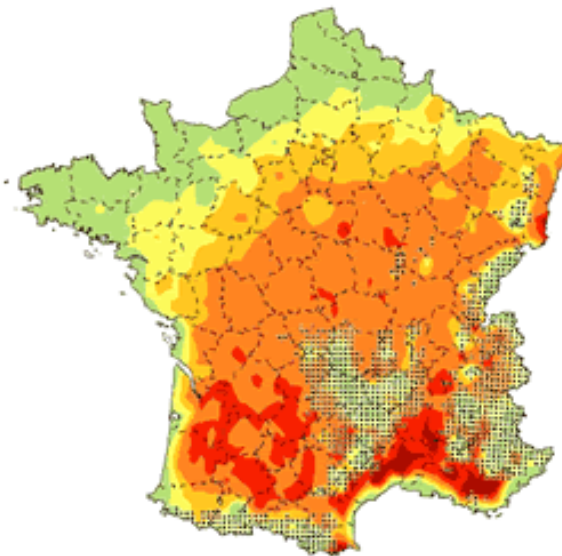
Difficulties of starting up of the driving machines

Ice-cold rails > Loss of efficiency of the braking

Icing of catenaries



# HEATWAVES: LONGER & HOTTER



©Météo France

Stations d'altitude < 500 m



SNCF - SUSTAINABLE DEPARTMENT  
JUNE 2012 - ALEXANDROUPOLIS - GREECE



# ENGINEERING: AVAILABLE SOLUTIONS

■ Rolling stock      ■ Infrastructure  
■ Station              ■ Journey condition

## EXAMPLE: HEATWAVES TECHNICAL ANSWER

RISK	IMPACTS ON SNCF	POSSIBLE ADAPTATION MEASURES
Overheating of the temperature in the passenger car	Discomfort or even uneasiness of personnel and passengers	<ul style="list-style-type: none"> <li>&gt; Having longer preparation of trains</li> <li>&gt; Higher specification of the air conditioning</li> <li>&gt; Improvement of ventilation (modelled on the VMC turbofan)</li> <li>&gt; For vehicles travelling at moderate speed (eg. Trams), installing ventilation without air conditioning (eg. Tram in La Réunion)</li> </ul>
Alteration or premature wearing of on-board electronic systems or signalling systems along the tracks	Loss of reliability	<ul style="list-style-type: none"> <li>&gt; More frequent maintenance</li> <li>&gt; Tougher specifications</li> </ul>
Engine overheat	Loss of power of traction units	<ul style="list-style-type: none"> <li>&gt; Slow down of traffic</li> </ul>
Vegetation drought	Fires along the tracks	<ul style="list-style-type: none"> <li>&gt; Choice of less flammable plant species</li> <li>&gt; Preventive coordination with Civil security</li> </ul>
	Presence of animals along the tracks, seaching for pasture	<ul style="list-style-type: none"> <li>&gt; Fences along the tracks</li> <li>&gt; « Cow-catcher » at the front of the locomotives</li> </ul>
14 Migration of certain insects to the North, due to global warming	Infestation of insects in the passenger cars (ventilation systems, sleeper trains,...)	

# STATIONS BUSINESS CASE



NEW FRAME FOR VENTILATION  
(Source DB 2004)



PHOTOVOLTAIC PANELS ON THE  
PARKING OF THE ALBACETE STATION  
(Source ADIF 2010)



SOLAR PANELS ON THE ROOF OF  
STILLWELL AVENUE STATION  
(Source NYCT 2004)





# INFRASTRUCTURE BUSINESS CASE



SNOWPROTECT™ (Source Sealeze)



# ROLLING STOCK BUSINESS CASE



PROTECTION OF THE HARNESS EQUIPMENT & LOCAL HEATING DEVICE  
(Source DB)



INFORMATION & COMFORT EQUIPMENTS (Source Alstom)

# SNCF: ADAPTATION PLAN

## **TO KNOW**

- *Risk and Opportunities Cartography*

## **TO CHOOSE**

- *Climate proofing of investments and design, inspection and maintenance standards review*
- *Updating of prevention plan and crisis management*
- *Development of alternative mobility solutions*

## **TO DECIDE**

- *Climate governance with stakeholders and awareness of regional authorities representatives*
- *Development of climate communications towards customers*
- *To carry out climate crisis exercises*

# WHAT CLIMATE SERVICE FOR SNCF ?

POSSIBLE INITIATIVES	ASSOCIATED CLIMATE SERVICE
Territorial analysis of climate vulnerabilities. Climate modelling at the local level	Mapping of the territorialized risks and modellings of the investments
Adapt the references of construction, operation and maintenance of infrastructure subject to climate change	Expertise for the « robustness» of the Eurocode norms
Improve the knowledge of resistance of materials to new demands	
Prepare and sensitise the population, users and officials about the effect of climate change	Pedagogy of the stakeholders (customers, shippers, elected officials, local authorities) on climate change
Eco-design elements of the transport system (rolling stock, stations, information systems, energy supply) to be more robust	New criteria in specifications compared to the recurring risks and the cost of the “without regrets” decisions
Vulnerability of mountain resorts, adaptation of tourist activities in coastal areas, prospective study on the transformation of tourism on climate change, sectorization of summer holidays, warning devices during extreme weather events	Studies of the evolutions of tourist places natural resources compared to their access and to the medium-term climatic risks (10 - 20 years)
New crisis management devices and mobility governance in case of exceptional events	Establishment of a risk ladder for public authorities and operators based on Mobility recommendations (or suspension of the mobility)

# HOW TO MANAGE ENERGY COSTS, LOW GHG EMISSIONS AND SUSTAINABLE MOBILITY?

- International Tourism (PNUE) :  
CO2 emission 5 % (~ 1,3 Billion CO2Teq)
  - 40 % plane flight
  - 32 % road transportation
  - 21 % for accommodation
- 5% of French tourists are responsible for around 50 % CO2 emission For Transportation (3 millions of French tourists >> 15 millions CO2Teq)



To anticipate for this decrease of tourist demand:

- New tourist destinations
- New tourism flow
- Development of Responsible tourism behavior
- Use of low carbon emission mobility
- Change the ratio distance / stay of journey

# THANK YOU FOR YOUR ATTENTION !

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