MOBILITY & CLIMATE CHANGE

WHAT DOES IT MEAN FOR A SUSTAINABLE MOBILITY PROVIDER
CLIMATE CHANGE MANAGEMENT

21st c – EXTREAME EVENTS
CLIMATE CHANGE: AN OPPORTUNITY FOR SNCF

GOUVERNANCE

INFRASTRUCTURE RESILIENCE

ROLLING STOCK “CLIMATE COMPLIANCE”

MOBILITY INVESTIGATIONS
CLIMATE CHANGE: AN OPPORTUNITY FOR SNCF
THE « CLIMAT D RAIL » PROJECT

First Studies

Oct 2011
Identification of CC impacts, Vulnerability and adaptation schedule

Jan 2012
Adaptation alternatives vs. impacts

March 2012
Scenarios towards the future (social, economic, environment, mobility, …)

June 2012
Guidelines for each division and global governance

Operative

Oct 2014 - BRUSSELS
SNCF - SUSTAINABLE DEPARTMENT
OCTOBER 2014 - BRUSSELS
INVESTMENT vs ORGANISATION

TIMETABLE FOR DECISIONS « WITHOUT REGRETS »

<table>
<thead>
<tr>
<th>INFRASTRUCTURE</th>
<th>MARKETING SYSTEMS</th>
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<tbody>
<tr>
<td>Creation and production of an infrastructure work</td>
<td>Management software</td>
</tr>
<tr>
<td>Electrification</td>
<td>Ticketing</td>
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<tr>
<td>Production and setting-up of tracks</td>
<td>Pricing</td>
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<tr>
<td>Revegetation along the tracks and slopes</td>
<td>Communication campaign</td>
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<table>
<thead>
<tr>
<th>TRAIN STATION</th>
<th>ROLLING STOCK</th>
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<tbody>
<tr>
<td>Creation and operation of the new station</td>
<td>Investment for new rolling stock (full set of coaches)</td>
</tr>
<tr>
<td>Creation of platforms</td>
<td>New traction unit</td>
</tr>
<tr>
<td>Design of a train station</td>
<td>Comfort elements</td>
</tr>
<tr>
<td>Reorganisation of public areas</td>
<td>Fitting of toilets</td>
</tr>
<tr>
<td>Air conditioning/heating systems</td>
<td>Repairing of existing rolling stock</td>
</tr>
<tr>
<td>Setting up of common services (toilets, water access)</td>
<td>Air conditioning/heating systems</td>
</tr>
<tr>
<td>Setting-up of a waiting room</td>
<td>Purchasing of driver assistance and consumption optimisation systems</td>
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<tr>
<td>New organisation of reception centre</td>
<td>Leasing operation</td>
</tr>
<tr>
<td>Setting-up of Passenger information systems</td>
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</table>
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
- Train: 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
## ENGINEERING: AVAILABLE SOLUTIONS

### EXAMPLE: HEATWAVES TECHNICAL ANSWER

<table>
<thead>
<tr>
<th>RISK</th>
<th>IMPACTS ON SNCF</th>
<th>POSSIBLE ADAPTATION MEASURES</th>
</tr>
</thead>
</table>
| Overheating of the temperature in the passenger car                  | Discomfort or even uneasiness of personnel and passengers | > Having longer preparation of trains  
> Higher specification of the air conditioning  
> Improvement of ventilation (modelled on the VMC turbofan)  
> For vehicles travelling at moderate speed (eg. Trams), installing ventilation without air conditioning (eg. Tram in La Réunion) |
| Alteration or premature waring of on-board electronic systems or signalling systems along the tracks | Loss of reliability                           | > More frequent maintenance  
> Tougher specifications |
| Engine overheat                                                      | Loss of power of traction units             | > Slow down of traffic |
| Vegetation drought                                                   | Fires along the tracks                      | > Choice of less flammable plant species  
> Preventive coordination with Civil security |
| Migration of certain insects to the North, due to global warming    | Presence of animals along the tracks, searching for pasture | > Fences along the tracks  
> « Cow-catcher » at the front of the locomotives |
|                                                                      | Infestation of insects in the passenger cars (ventilation systems, sleeper trains,...) | }
HEAVY RAINS
LINE LOURDES – PAU (PYRENEES ATLANTIQUES) : CIRCULATION DISRUPTION
2013 JUNE 18TH & 19TH
AROUND COARRAZE-NAY STATION
2013 JULY 8th TO 21st:
RECONSTRUCTION OF EMBANKMENTS WITH BACKING 2 LINES OF PICKETS
2013 JULY 22\textsuperscript{nd} TO JULY 27\textsuperscript{th}: (RE)INSTALLATION OF THE "NEW" TRACK
JULY 28th TO AUGUST 4th: REPARATION OF CATANERIES INST.
2013 AUGUST 5th AND 6th: TEST TRAINS CIRCULATION
35 DAYS TO DELETE ALL FLOOD IMPACTS

- A very good **Cooperation** between Infrastructure Manager (RFF) and Infrastructure Maintenance Manager (SNCF)

- Constitution of **Taskforce** to tackle the problem after a damage diagnostic
  - SNCF - Infra Engineering Department (PSIG de l’Infrapôle Aquitaine)
  - Direction for Railways Circulation (DCF)
  - RFF
  - Works Companies (gravel, steel,…)

- **New transportation plan** defined (modal shift) and a **High Stations team involvement** to help customers in their trip

- **A New background:**
  - High-level management: Works have been achieved in hard conditions, since the Gave de Pau speed remained very high during several days
  - River supervision management
SNOW CONDITIONS
UNUSUAL SNOWY EPISODE AND HOME BACK WEEKEND
2009
EUROSTAR TRAINS PERTURBATION
SNCF WINTER PLAN
ROADMAP

Modernization and preparation
- Special winter preparation of 234 locomotives
- 69 Snow-plows located in strategic places.

Reduction of the speed:
- For TGV: 220/230 kph and may be down to 160/170 kph (instead of 300 or 320 kph)
- For IC trains and Regional Trains (TER): 120 kph (instead of 160 and sometimes of 200 kph)

Switchpoint heaters:
- 100 heaters modernized in 2011
- 360 will be settled in 2011 and 2012

Investments 2011: 90 M€
- Rolling stock: 40 M€
- Infrastructures: 28 M€ and additional funds
- Information network and travellers assistance: 22 M€

ADAPTATION STRATEGIES SHOULD BENEFIT THE MANAGEMENT OF TODAY’S EXTREME WEATHER
SNCF: ADAPTATION PLAN

TO KNOW

- Risk and Opportunities Cartography

TO CHOOSE

- Climate resilience 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 TOOLS FOR SNCF ?

<table>
<thead>
<tr>
<th>POSSIBLE INITIATIVES</th>
<th>ASSOCIATED CLIMATE SERVICE</th>
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<tr>
<td>Territorial analysis of climate vulnerabilities. Climate modelling at the local level</td>
<td>Mapping of the territorialized risks and modellings of the investments</td>
</tr>
<tr>
<td>Adapt the references of construction, operation and maintenance of infrastructure subject to climate change</td>
<td>Expertise for the « robustness» of the Eurocode norms</td>
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<tr>
<td>Improve the knowledge of resistance of materials to new demands</td>
<td>Pedagogy of the stakeholders (customers, shippers, elected officials, local authorities) on climate change</td>
</tr>
<tr>
<td>Prepare and sensitise the population, users and officials about the effect of climate change</td>
<td></td>
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<tr>
<td>Eco-design elements of the transport system (rolling stock, stations, information systems, energy supply) to be more robust</td>
<td>New criteria in specifications compared to the recurring risks and the cost of the “without regrets” decisions</td>
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<td>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</td>
<td>Studies of the evolutions of tourist places natural resources compared to their access and to the medium-term climatic risks (10 - 20 years)</td>
</tr>
<tr>
<td>New crisis management devices and mobility governance in case of exceptional events</td>
<td>Establishment of a risk ladder for public authorities and operators based on Mobility recommendations (or suspension of the mobility)</td>
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THANKS FOR YOUR ATTENTION!

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ISSUES FOR DISCUSSION

- How can cross-sector climate risks and vulnerabilities be best included in the climate risk assessment to be carried out in your sectors / cities / countries? How can this help improve climate resilience in all sectors?

- How can you ensure that your risk assessment processes identify important climate risks coming from OUTSIDE your primary project boundaries – e.g. climate risks affecting its access to power, IT or transport services?

- How can your processes avoid that one project or sector is made more resilient to the detriment of another project or sector?

- How can your processes ensure that no-regret solutions and governance/operational changes are considered and, where appropriate, prioritised?
For info or further questions on this presentation, or on the activities of the JASPERS Networking Platform please contact:

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