

**French Institute  
of Science and Technology  
for Transport, Development  
and Networks**



**How does the Forever Open Road respond  
to the challenges of climate change faced  
by the European transport system?**

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FOREX member - FEHRL



# Challenges are huge

- The challenges are numerous
  - Safety and security
  - Reliability
  - Efficiency
  - Quality of life
  - Cost and financing
  - **Decarbonization**
- Infrastructure investment is recognized by the EU as a major answer to these challenges
  - Horizon 2020: Smart, Green and Integrated Transport
    - Infrastructures are considered for the 1st time as a service
  - EU's Juncker Infrastructure Investment Plan: 300 M€



# ...BUT OPPORTUNITIES ARISE | 1



# Materials and Structures

- Progress in materials science allows considering a new generation of pavements with novel properties

- Modular
- Prefabricated
- Long-life
- Self-cleaning
- Silent
- Recycled
- Depolluting
- Biosourced
- Thermochromic

- **Challenges**

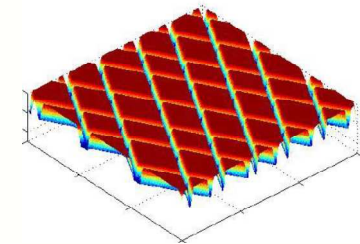
- Reduce negative externalities
- Consume less materials and less resources



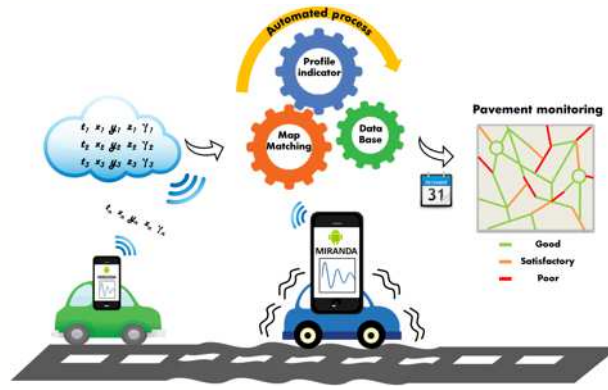
## ANR CLEAN

RD117 St Philbert (CG 44)  
75 m of EHFG + 75m of EHFR,  
2x2 lanes at 110 km/h

**ODSURF**  
Modelling and building the  
Optimal Dense low noise  
Surface



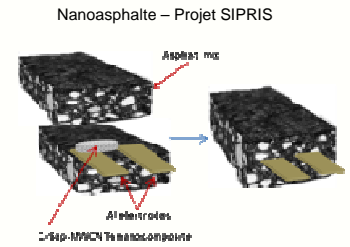
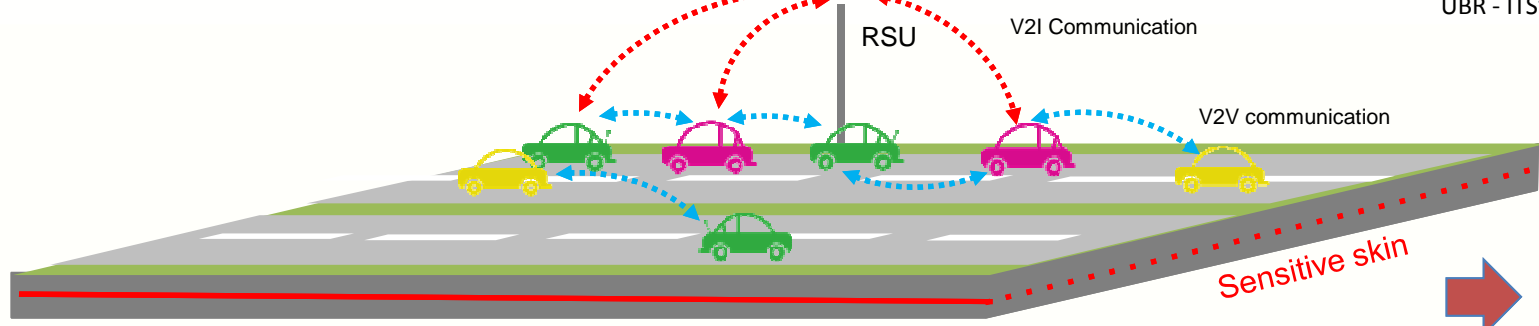
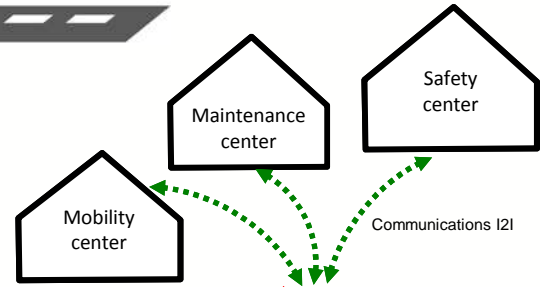
IFSTTAR imagines the post-oil  
launching of the **ALGOROUTE**  
project on bio-bitumen



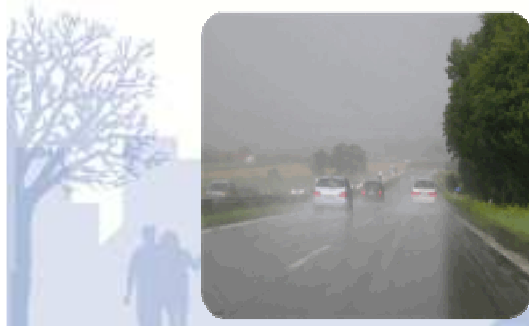
# ICT



UBR - ITS'09, Stockholm

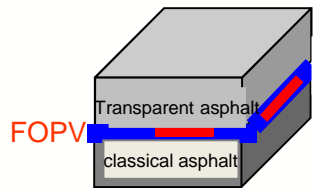


Pégase - A10 Vinci Autoroutes

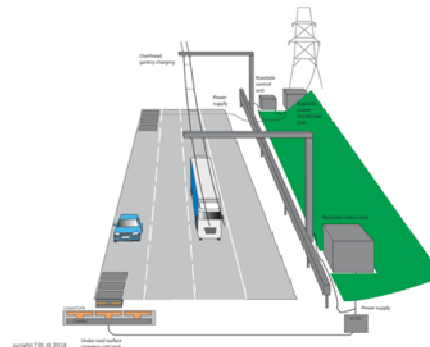


# Energy

- Energy harvesting
- Road electrification



OPV Road



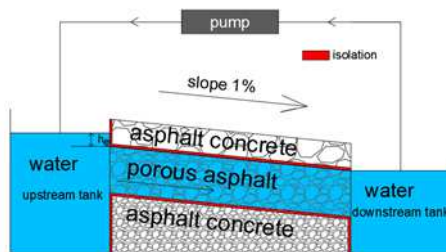
EU Project FABRIC  
Vedecom (+Ifsttar) © TRL



eHighway Siemens



APS Alstom



Self-tempered road



Primove - Bombardier



# THE FOREVER OPEN ROAD | 2



# An international alliance

- An alliance prompted by TRL (UK) and by RWS (Netherlands)
- An alliance around national programs
  - Die Strasse im 21. Jahrhundert led by BAST (Germany)
  - Ferry Free E39 led by NPRA (Norway)
  - Exploratory Advanced Research led by FHWA (USA)
  - Route 5<sup>e</sup> Génération led by IFSTTAR (France)



[www.ifsttar.fr](http://www.ifsttar.fr)



# Brought into the European and international research agendas

- ERTRAC SRA 2010
  - Infrastructure for green vehicles
  - Climate change resilient transport
  - Long distance freight transport
- FP7
- HORIZON 2020 *Smart, green and integrated transport*
- CEDR transnational research programme
- EN+ INFRAVATION

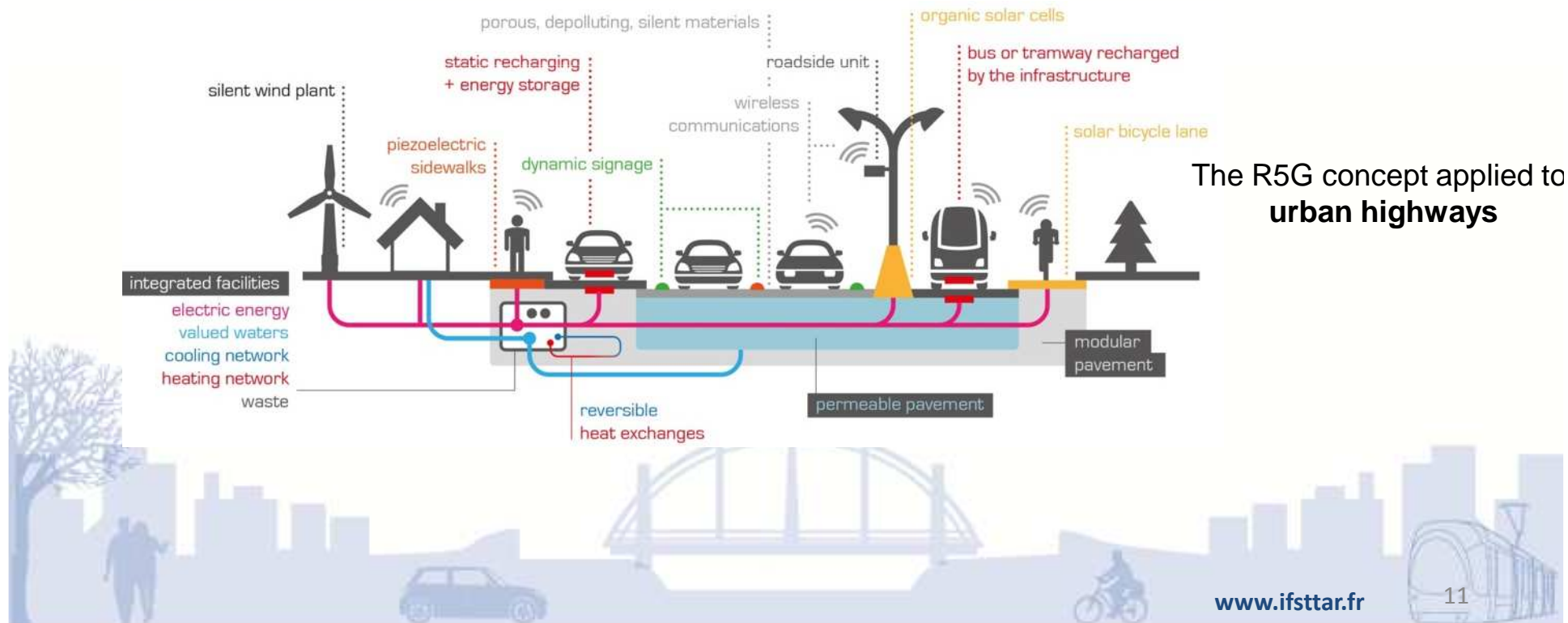


# LA ROUTE 5<sup>e</sup> GÉNÉRATION | 3

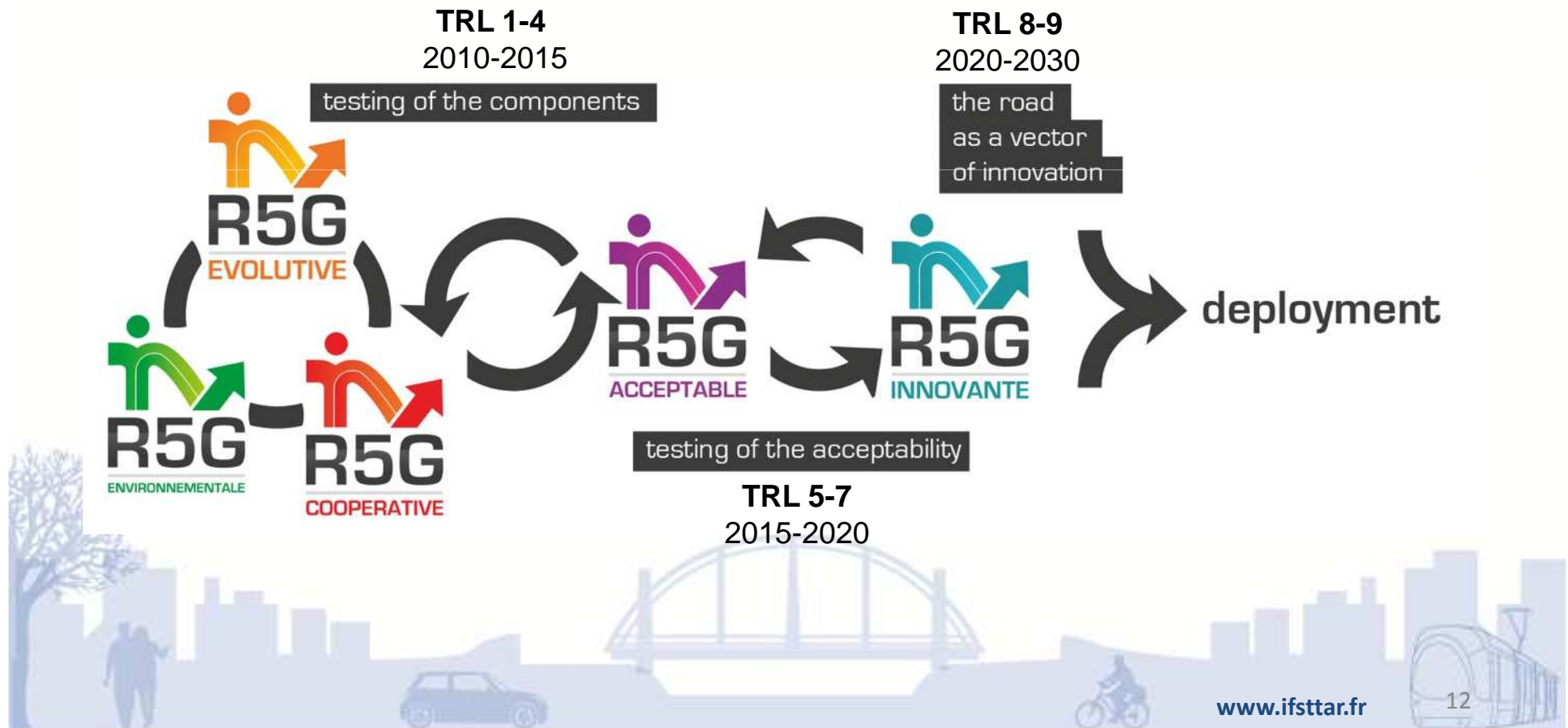


# R5G Concept

- R5G aims at integrating the different components of the Forever Open Road following a system approach to build full scale demonstrators of the next generation of roads



# A Progressive Approach



# Brought into the national research agenda

- Scientific strategy of IFSTTAR
- SNR France Europe 2020, in particular through the “Ancre” alliance
- Direct partnerships with industrials
- Competitiveness clusters
  - MOV’EO
  - ADVANCITY
  - LUTB
  - ITRANS
- Instruments of PIA
  - ITE VEDECOM and EFFICACITY
  - IRT Railenium and SystemX
  - Equipex SENSE-CITY
  - ADEME MOV’EO TREVE

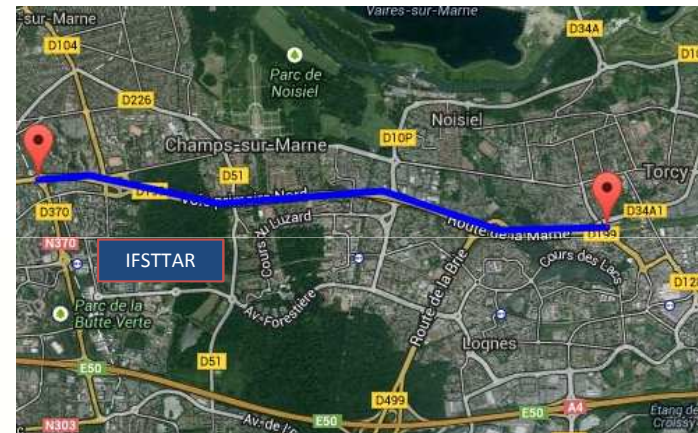


# AN EXAMPLE: | 4 THE A199 REGENERATION



# Urban Highways – A199 Regeneration

- Challenge related to the territory
  - The A199 is a 5 km French motorway opened in 1974 but never finished
  - It is under-utilized but impacts negatively the neighbors
  - It has been classified as a local road in 2006 and could become an urban arteria until 2030



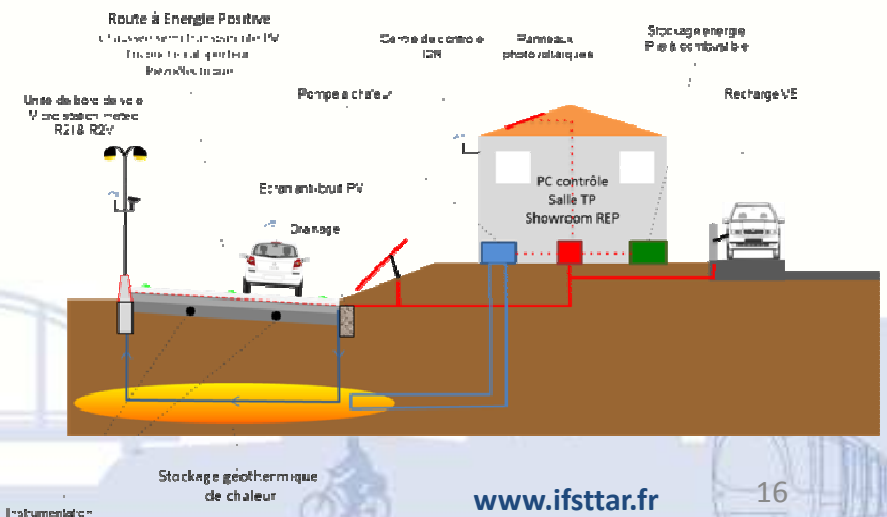
- Project objectives:
  - To develop a demonstrator of the fifth generation road by innovating the services offered by road networks and improve the acceptability of these networks by neighboring people.



UNIVERSITÉ  
— PARIS-EST

# Urban Highways – A199 Regeneration

- Current inconvenient related to this road could be turned into advantage for innovation
- We envisage a set of demonstrators, which is between the open road and the test track.
- The different demonstrators will be complementary and will benefit from IFSTTAR experimental facilities:
  - APT in Nantes
  - Sense-City in Marne la Vallée
  - Dynamic inductive charging in Versailles
  - Transpolis in Lyon
- A partnership was signed in November 2014 between CG77, EPAMARNE and IFSTTAR.





# TRANSITION – | 5 INNOVATION SUPPORT



# Upselling and innovation are the keywords

- Upselling of road industry is the key
  - The road industry must be able to demonstrate its capacity to adapt to increasing environmental constraints:
    - Energy efficiency
    - Biodiversity
    - Water quality
    - Land field consumption
    - ...
  - At the same time, public authorities must support the transition periods, like for rail, automotive and building industries
    - RAILENIUM
    - VEDECOM
    - EFFICACITY
    - What's up for road industry?
- With this aim, 2015 is a key period:
  - In the framework of PIA2, a call for project “Route du Futur” has been published by ADEME the 23<sup>rd</sup> of June 2015
  - R5G will also be presented during the CFCC2015 International Scientific Conference “Our Common Future under Climate Change”
  - France is organizing the COP21 and must exhibit its knowledge



# Conclusion

- › The road embeds all the global challenges. In particular, it must contribute to the limitation of anthropization, when building new roads becomes necessary.
- › Current progress in materials, ICT and energy sciences allows redesigning the future of roads.
- › Future roads have the potential to support a wide range of terrestrial transport modes and to be integrated from an energetic point of view.
- › Neglecting the preservation of these assets could prevent the regeneration of actual roads into 5<sup>th</sup> generation roads. This would be a **choice with regrets**.
- › Like other industrial sectors, innovation and upselling are key success factors and must be encouraged by public authorities.



# Thank you for your attention

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