THE FOREVER OPEN ROAD

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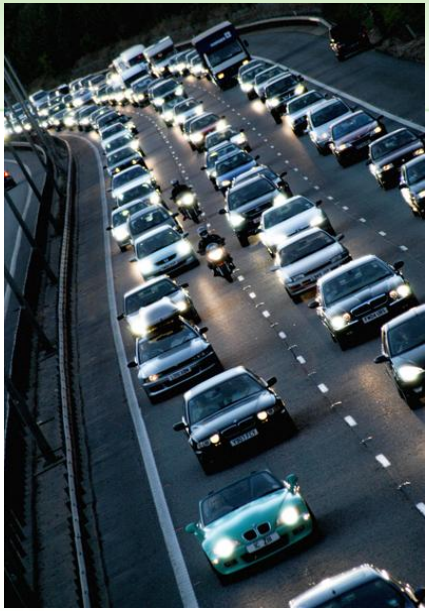
Development of the Forever Open Road

1. Background
2. Concept
3. The Research & Development Plan
4. Deliverables
5. The Future

Background

Global Challenges



Concept

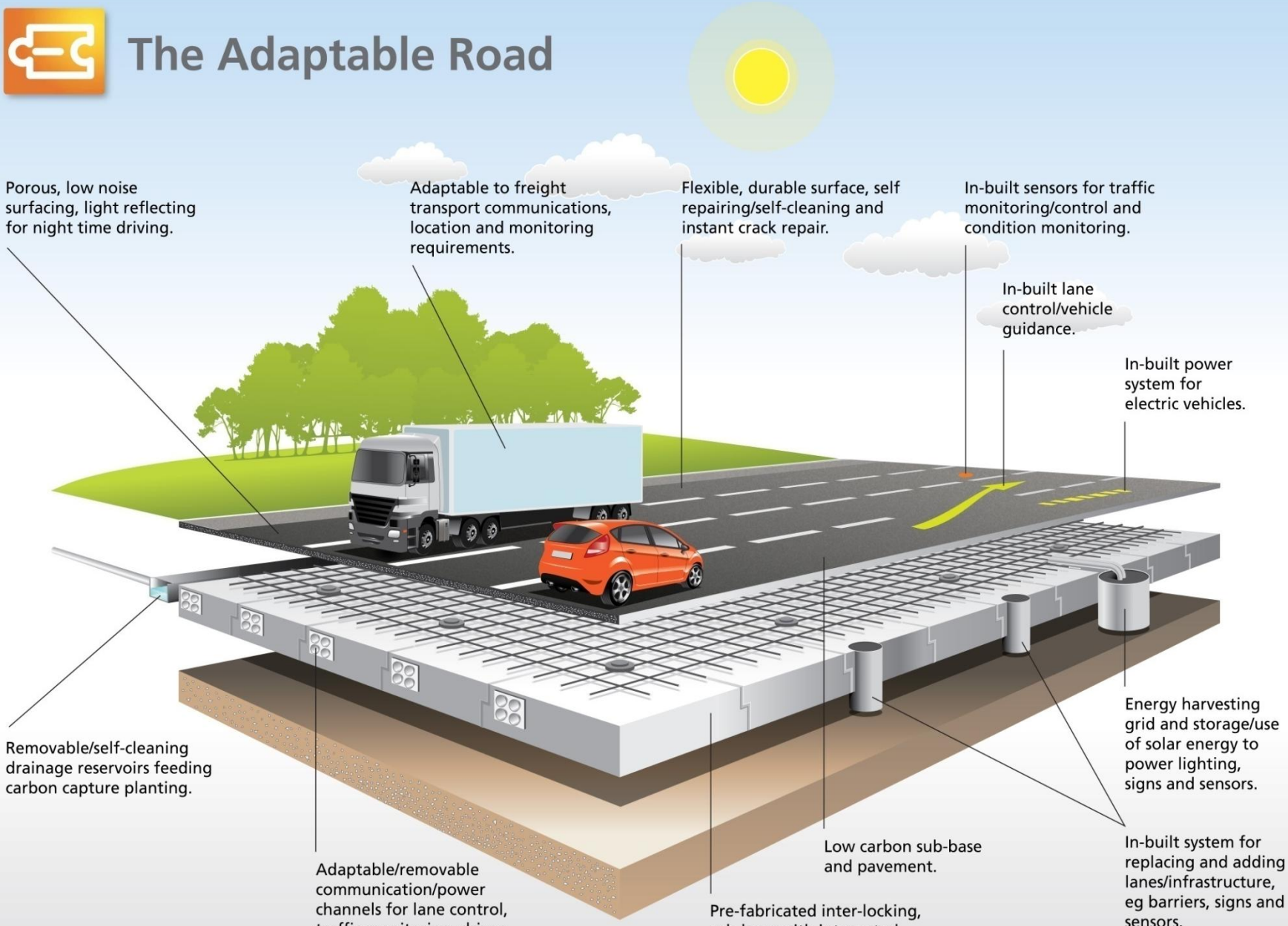
Concept – a Project with a WOW! Factor!

- The Fifth Generation Road
  - The track
  - The paved road
  - The smooth road
  - Motorways
  - **What's next?**
- A BIG Leap forward for 'the road'!
  - Solves existing and future problems
  - Achievable through existing and new technology
- Must be a workable concept
  - Long-term pan-European solution
  - Many costs savings and benefits

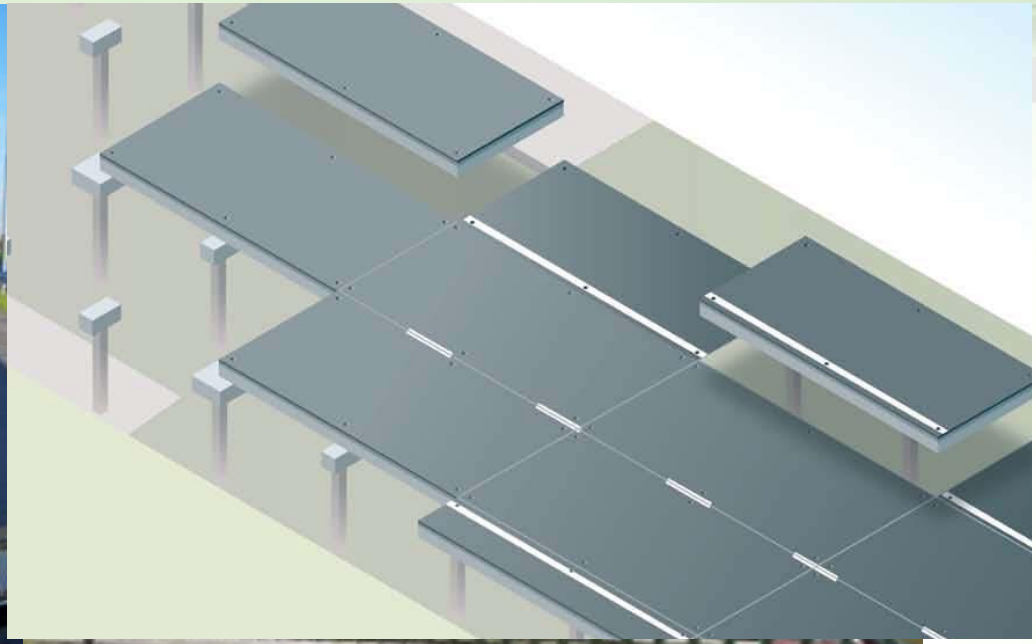
The Forever Open Road

- Takes all our existing ideas and makes one solution that will support all our on-going future needs
- Will produce a new generation of road comprising:
  - the Adaptable Road 
  - the Automated Road 
  - the Resilient Road 
- Integrates innovation in infrastructure, vehicle technology and intelligent transport systems

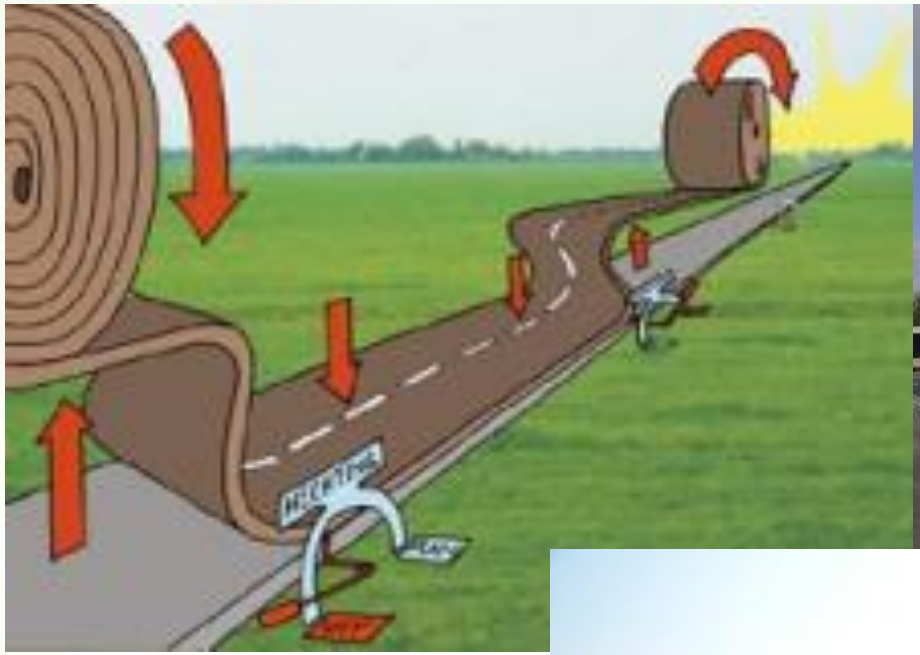
The Adaptable Road



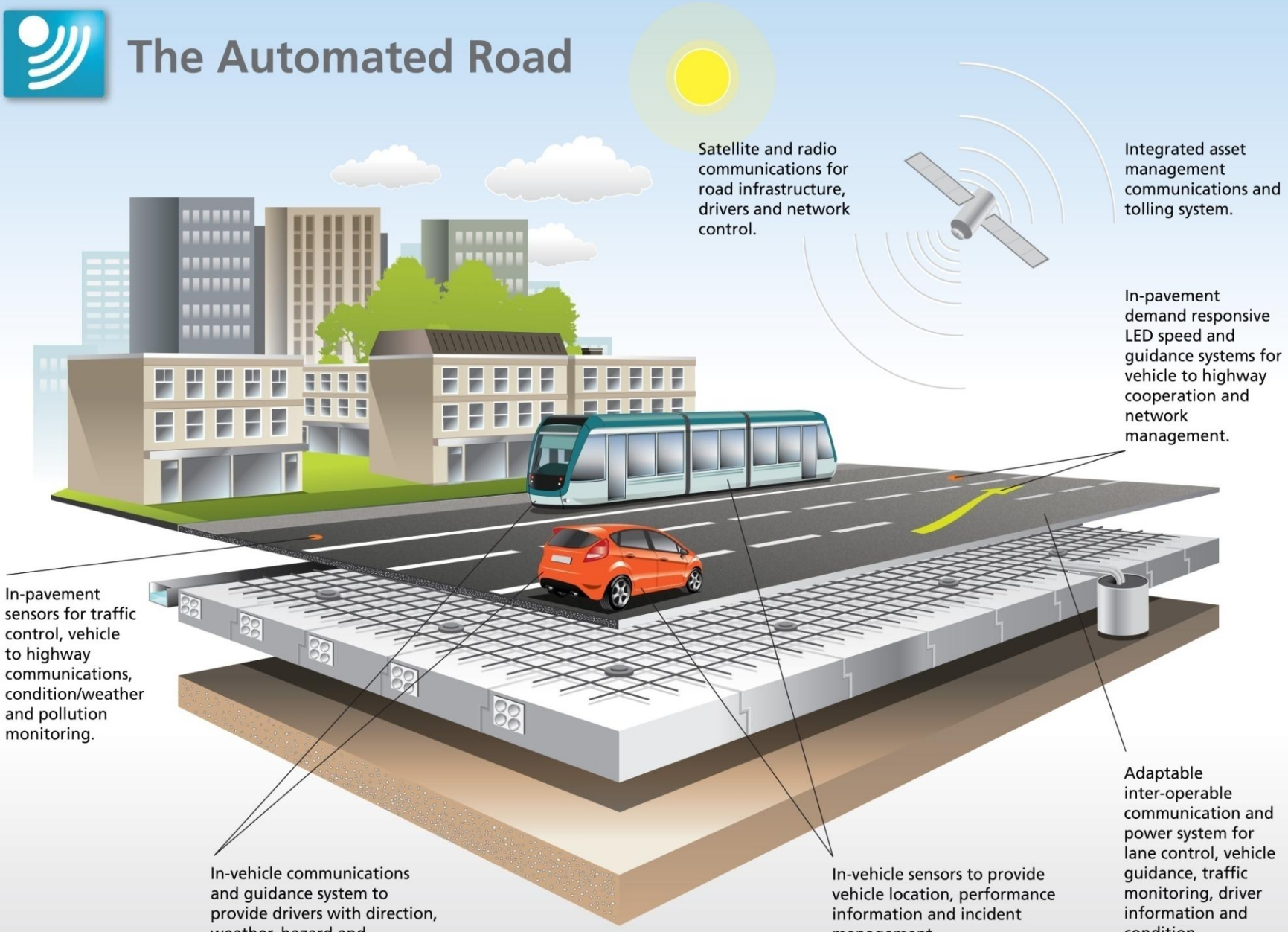
ModieSlab Prefabricated Road



Road on a Roll, Netherlands



The Automated Road



New Communications Systems?

Autonomous Driving

Report: Google quietly logs over 140k on autonomous cars in U.S. city traffic

by **Jonathon Ramsey** (**RSS feed**) on Oct 10th 2010 at 7:01PM

All Media

NCEPTS

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technology
comfort to
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- Brand Values
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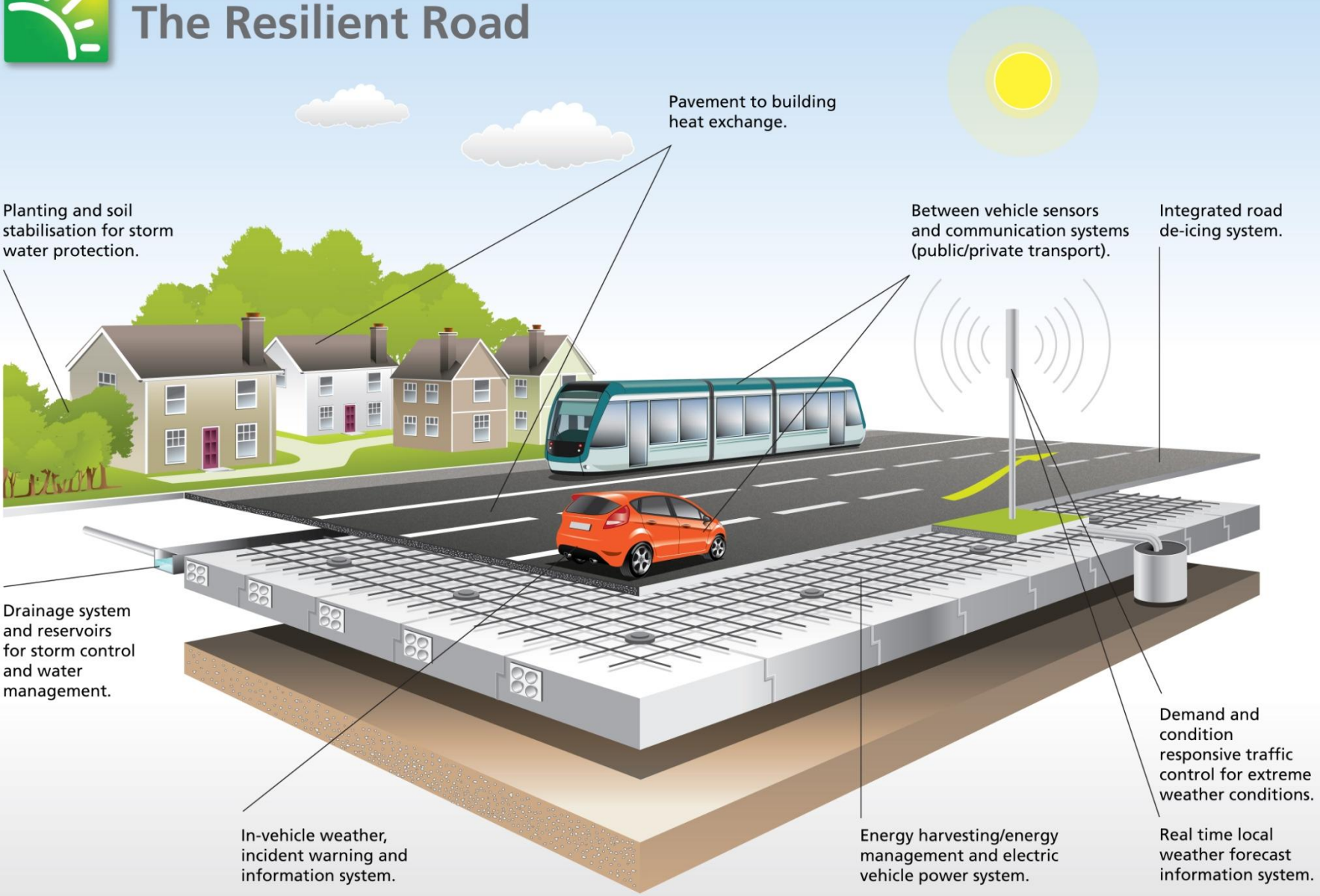
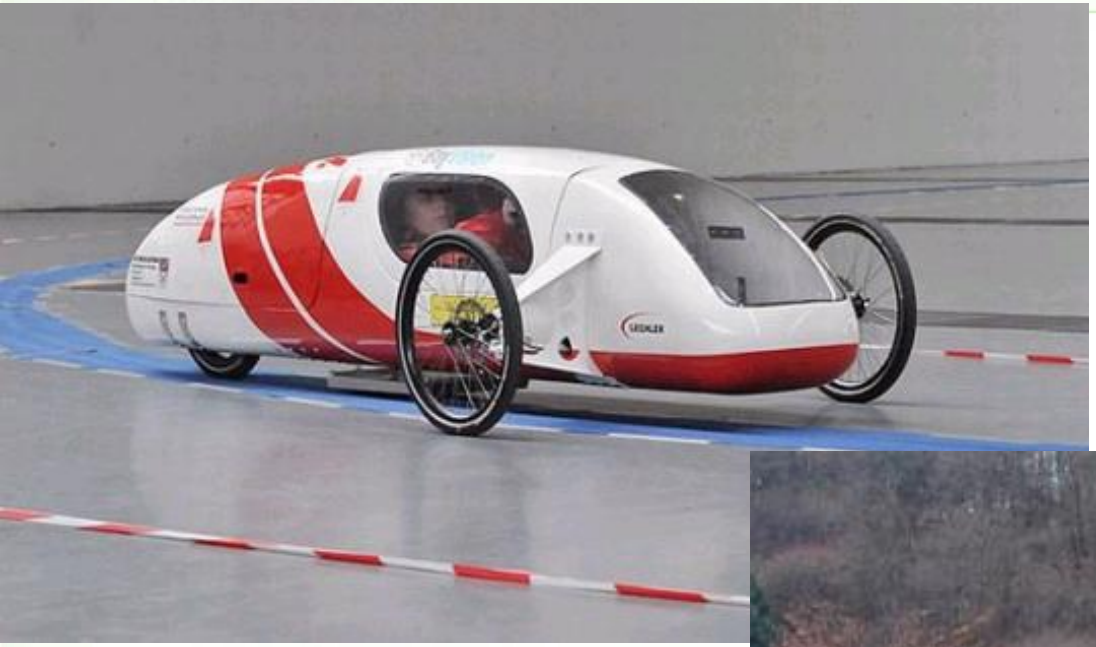
The Resilient Road



Inductive Charging

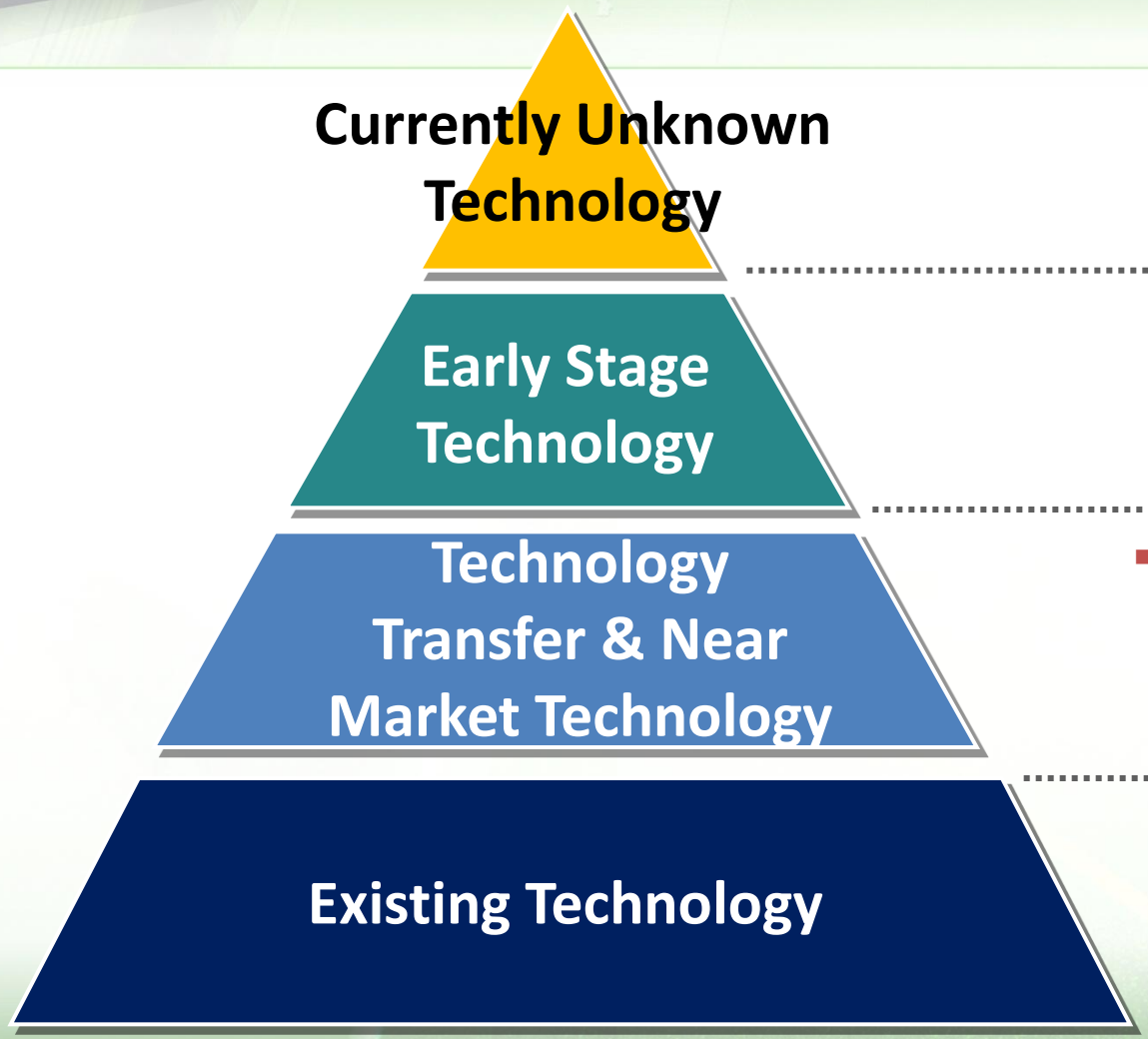


Solar Roadways

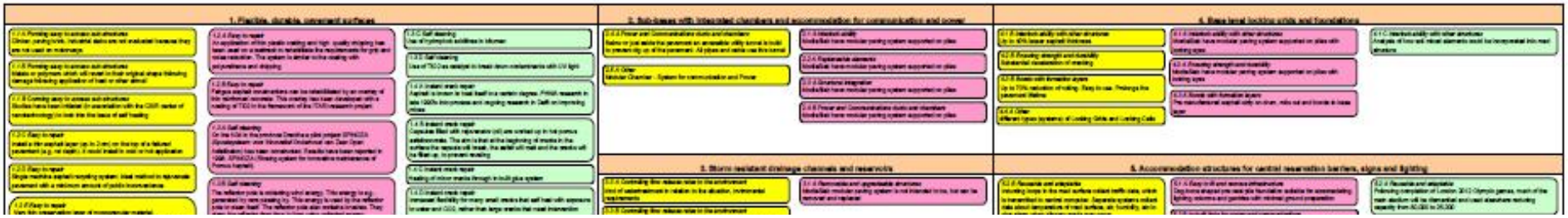
Solar Road – www.solarroadways.com

Research and Development Plan

Technology Identification



- As yet undefined or beyond horizon technology
- E.G. emission hoods for urban areas, wireless power and automated vehicle control
- E.G. bridge pre-fabrication and development of near market technologies, e.g. collision avoidance systems
- Integration of current best practice in relevant fields, e.g. ITS, wireless communication and resevoir pavements



1. Flexible, durable, pavement surfaces

1.1 A Forming easy to access sub-structures
Clinker, paving brick, industrial slabs are not evaluated because they are not used on motorways

1.1 B Forming easy to access sub-structures
Metals or polymers which will revert to their original shape following damage following application of heat or other stimuli

1.1 B Corming easy to access sub-structures
Studies have been initiated (in association with the CSIR center of nanotechnology) to look into the issue of self healing

1.2 C Easy to repair
Install a thin asphalt layer (up to 2 cm) on the top of a failured pavemtent (e.g. rut depth). It could install in cold or hot application

1.2 D Easy to repair
Single machine asphalt recycling system; ideal method to rejuvenate pavement with a minimum amount of public inconvenience

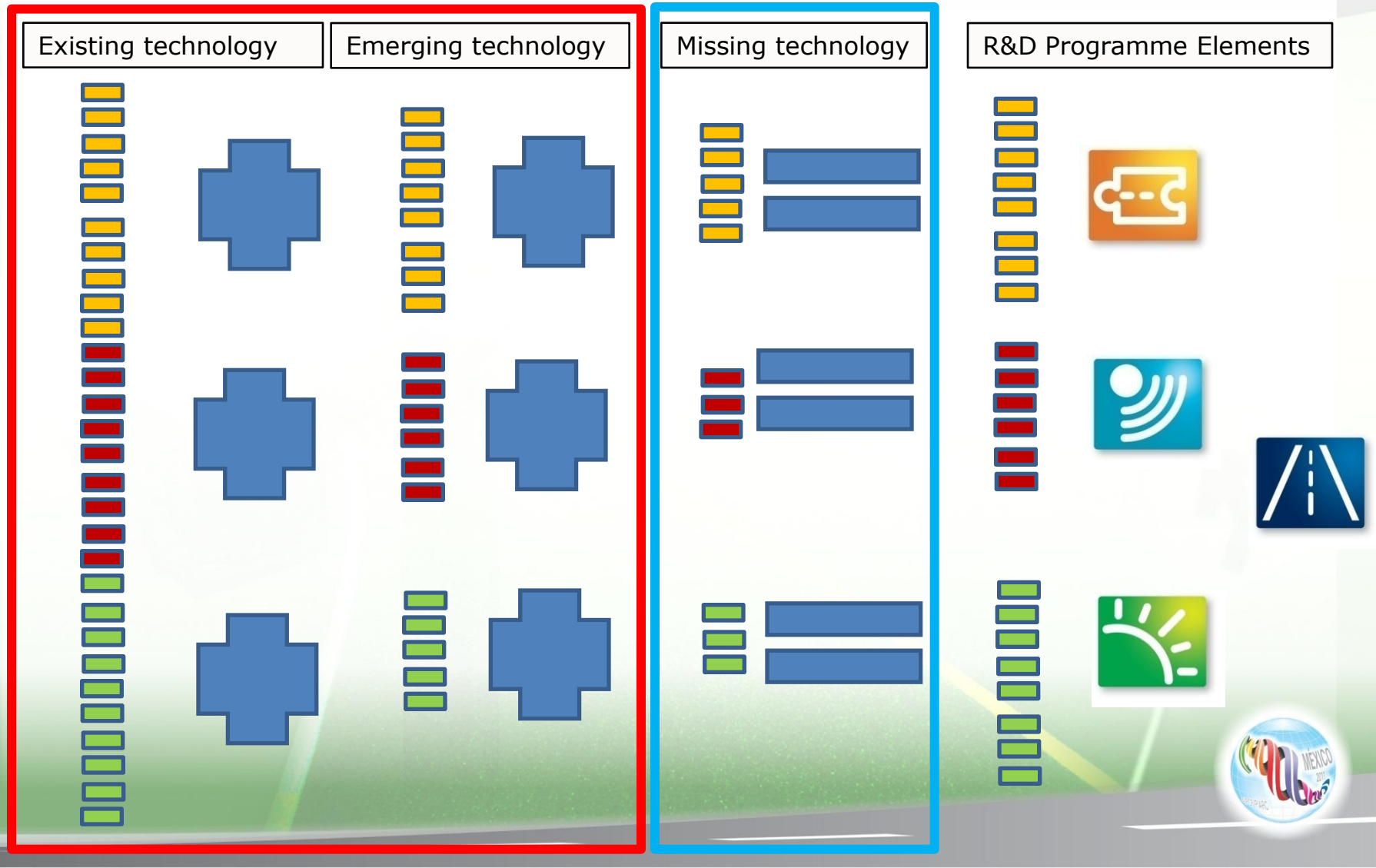
1.2 A Easy to repair
An application of thin plastic coating and high quality chipping hae been used on a testtrack to rehabilitate the requirements for grip and noise reduction. The system is similar to the coating with polyurethane and chipping

1.2 B Easy to repair
Fatigue asphalt constructions can be rehabilitated by an overlay of thin reinforced concrete. This overlay has been developed with a coating of Ti02 in the framework of the ITARI-research project

1.3 A Self cleaning
On the N34 in the province Drenthe a pilot project SPINOZA (Spoelsysteem voor INnovatief Onderhoud van Zeer Open Asfaltbeton) has been constructed. Results have been reported in 1998. SPINOZA (Rinsing system for Innovative maintenance of Porous Asphalt)

1.3 B Self cleaning

Building the R&D Programme



Deliverables

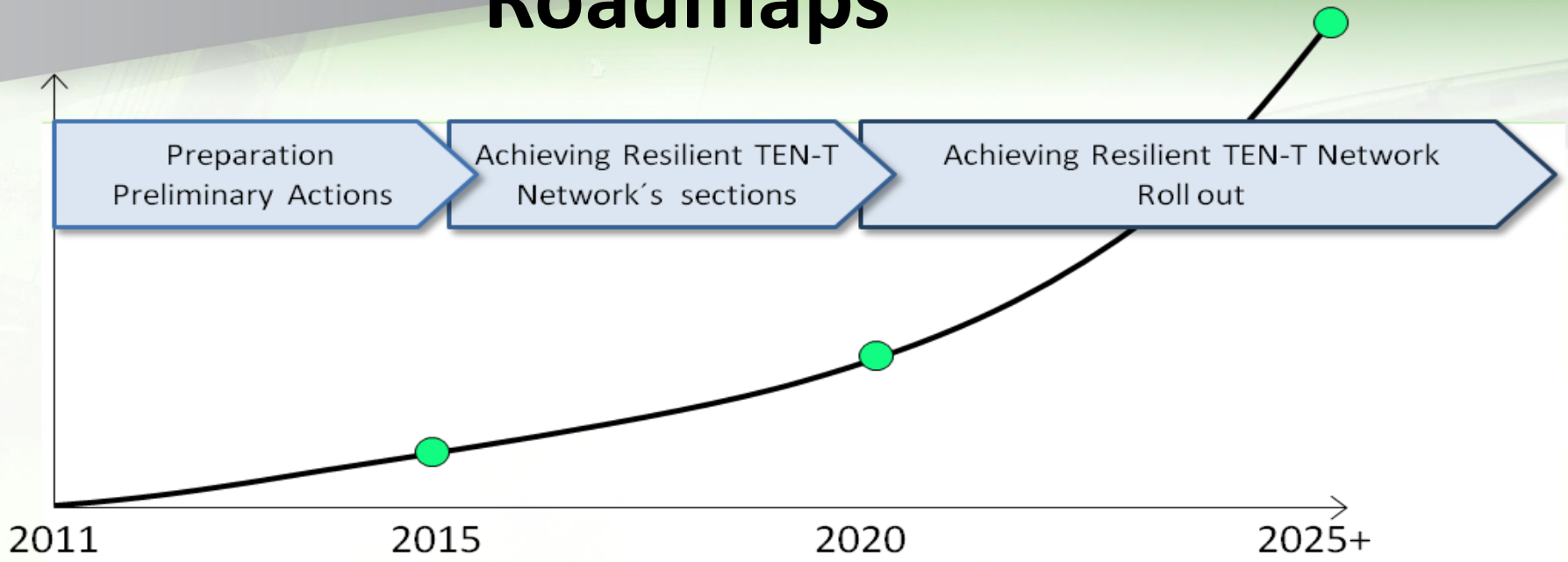
What

- R&D plan identified a number of research priorities inc:
  - Low noise
  - Self cleaning / repairing
  - ITS / sensor / communication technologies in general
- Technology Trials, starting from 2010, including:
  - Functional Structural Modules for Innovative Road Construction
  - Floor heating on bridge decks
  - Noise reduction through integrated resonators
- Technology Capture
  - FEHRL Research Coordinators
  - Other non FEHRL organisations , subject to minimum requirements

Roadmaps

- Three roadmaps developed
- Further define research priorities and timescale

Roadmaps



Milestone 1

- **Corridor**
  3 European corridors selected, agreed and assessed on risks
- **Methodologies**
  - Risk Assessment TEN-T network developed
  - Adaption Measures identified
  - Adaption Strategies drafted
- **Technology**
  Key Single Technologies proven in practice

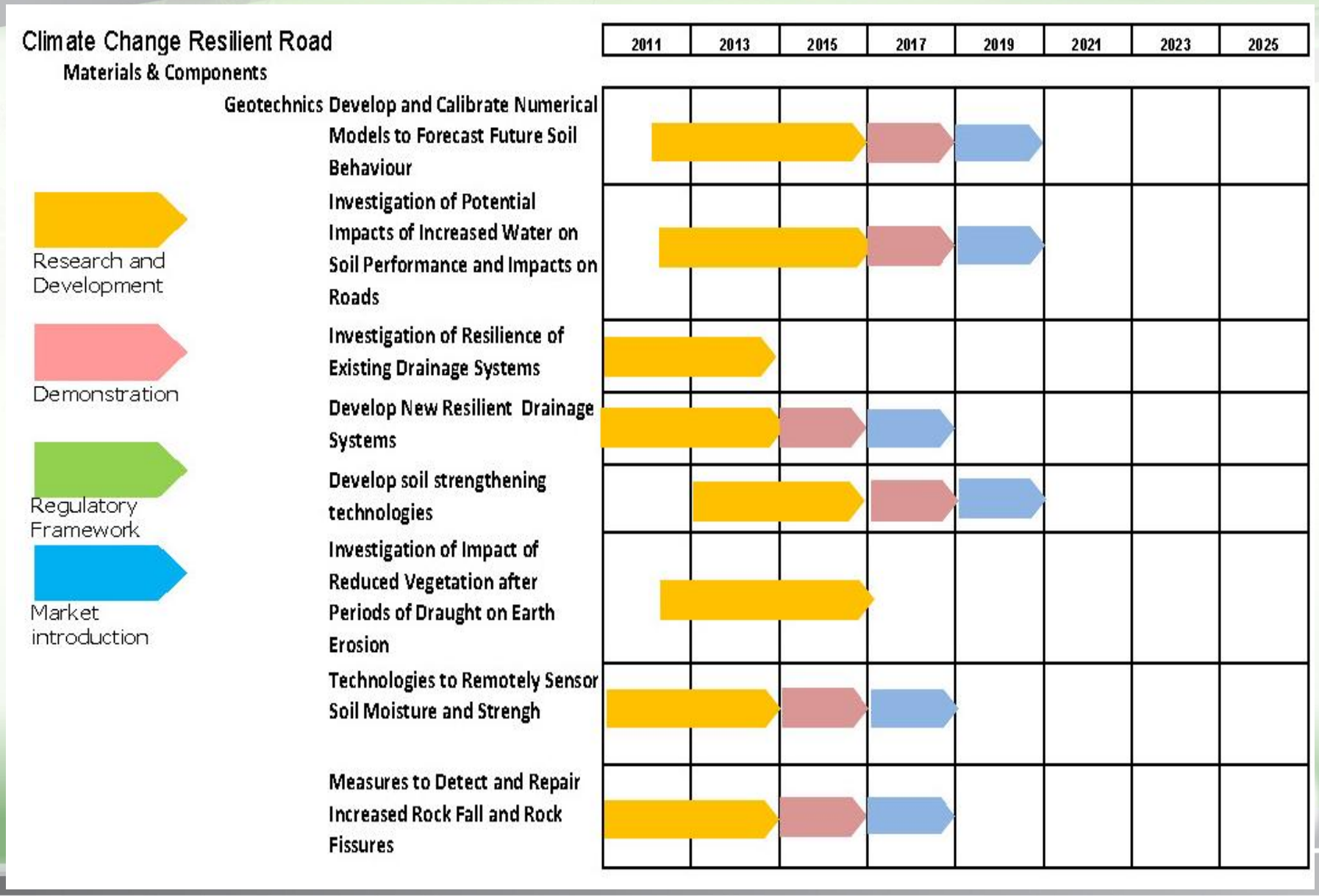
Milestone 2

- **Corridor and Sub-System**
  - Implementation climate resilient technologies
  - Application of risk based methodologies
  - Modification of Adaption Strategies
- **Technology**
  - Corridor and Sub-System proven to be available under all weather conditions
  - 50% reduction of down time

Milestone 3

- Roll out plans agreed:
  - On regional/national scale
  - On EU scale (TEN-T)
- Regulatory/legislative framework set on a European scale

Roadmaps

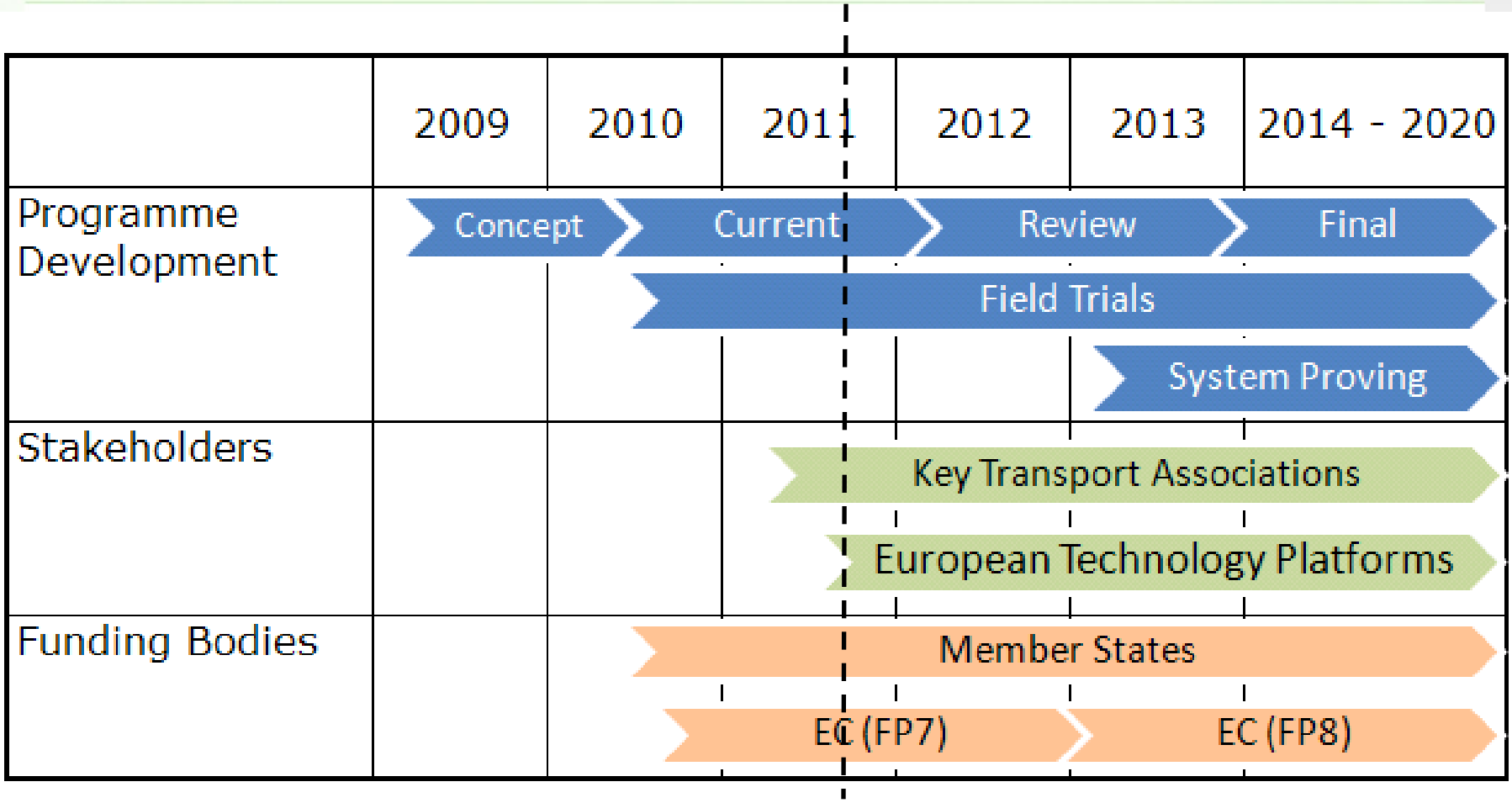

Climate Change Resilient Road
Materials & Components
2011
2013
2015
2017
2019
2021
2023
2025
Geotechnics Develop and Calibrate Numerical Models to Forecast Future Soil Behaviour
Investigation of Potential Impacts of Increased Water on Soil Performance and Impacts on Roads
Investigation of Resilience of Existing Drainage Systems
Develop New Resilient Drainage Systems
Develop soil strengthening technologies
Investigation of Impact of Reduced Vegetation after Periods of Draught on Earth Erosion
Technologies to Remotely Sensor Soil Moisture and Strengh
Measures to Detect and Repair Increased Rock Fall and Rock Fissures
Research and Development
Demonstration
Regulatory Framework
Market introduction

Deliverables

- A Vision for the Future – to provide the strategy for developing and improving our road network
- Demonstration Projects - to showcase integrated technologies in real road conditions
- Knowledge Transfer - to ensure dissemination of new ideas and prevent unnecessary duplication
- Common European Standards - that will enable the Forever Open Road principles to be deployed across Europe

The Future

Future Programme



Opportunities to get involved

- Undertake Technology Trials
- Coordinate research activities with Forever Open Road programme
- Cooperate on Work Packages
- Membership of Technical Advisory Boards, Specific Scientific Boards…….

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