



World Road Association (UK) 2018 Congress:

Cutting the Gas:
Positive steps towards low carbon transport



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Session 4:
Supply chain and infrastructure
– future mobility
Chair: Lila Tachtsi, Chair of WRA (UK)
and Atkins Fellow





EV charging within the context of cities
– what does this mean for energy
companies:
Tim Armitage, Arup Project Director for
UK Autodrive



Electric Vehicle Charging in the Urban Environment

World Roads Association – UK Congress

15th November 2018

Tim Armitage

Future of urban mobility



- Road transport is changing (quickly):
 - Convergence of key technologies
 - Changes in social attitudes



Global mega-trends

- Decreasing private ownership
- Desire for decreased emissions
- Increasingly connected vehicles
- Increasingly automated vehicles

Decreasing private ownership

- Less demand for private ownership
- Shared ownership will come to dominate
- Mobility as a service models being introduced
- Traditional automotive OEMs transitioning to mobility providers





Decreasing emissions

- Government legislation will ban sales of pure ICE cars from 2040, some pressures to do this much earlier
- Health concerns focus on NO_x, SO_x and PM₁₀
- Electric and electric hybrid currently only mainstream solution, hydrogen fuel cells may emerge as viable solution



Decreasing emissions

- Electric vehicle charging still developing
- Normal (3kW) Fast (7kW) and Rapid (50kW) well established
- CHAdeMO, CCS and Type 2 connectors
- New formats up to 350kW rolling-out



Increasingly autonomous vehicles

- Not just passenger cars
- Vans, buses and HGVs (platooning)
- Third generation 'pods'
- Small parcel delivery vehicles

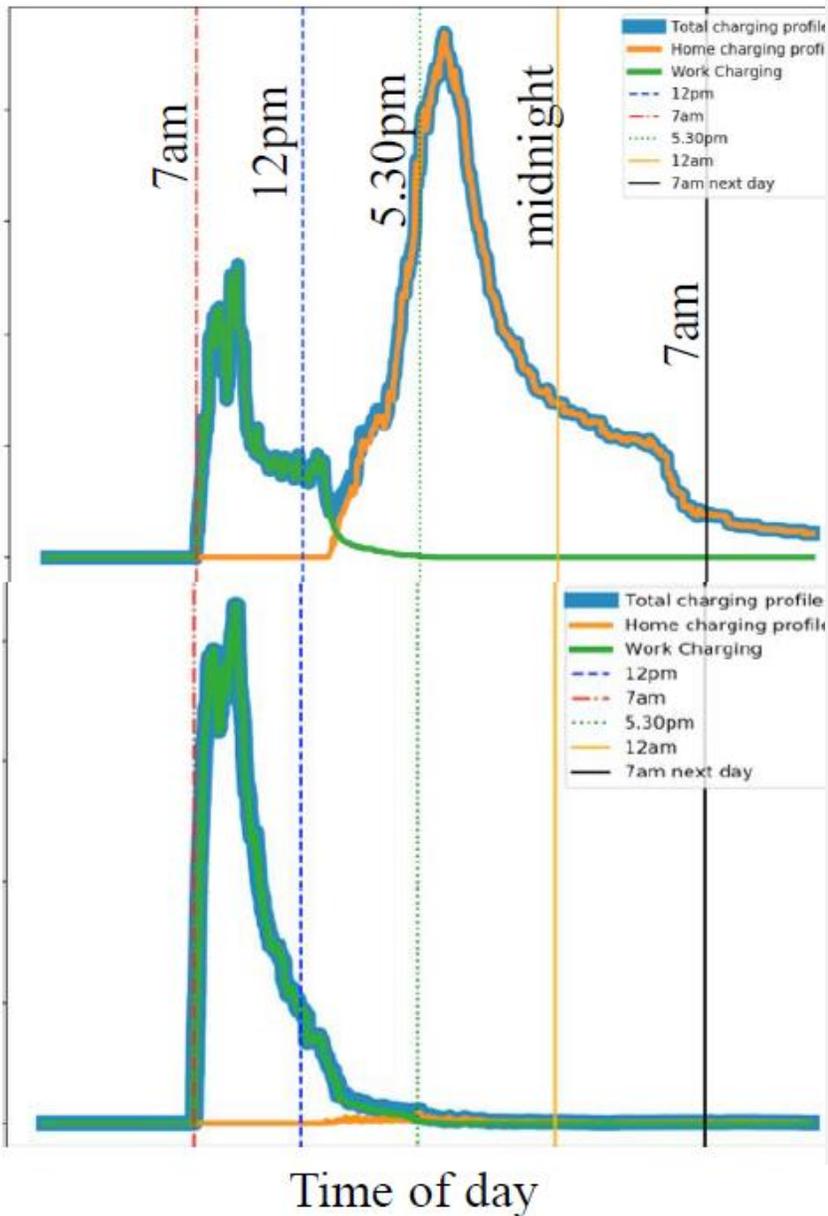


Electric vehicle market:

- Electric vehicles (pure battery and hybrid) still a small fraction of parc
- Supply of vehicles is limited
- Common belief that there is insufficient charging infrastructure, **but:**
- Existing infrastructure is under used

Future power demand:

- If we make some assumptions about vehicle origin and destinations we can estimate power demand
- Suburban charging and urban charging have different profiles



10:25



Future power demand:

- Possible to map peak demand throughout urban environment



Into an uncertain future

- Positioning of EV charging facilities to become more strategic than pragmatic
- Intelligent chargers used to control grid loading
- Kerb management becomes more important
- Interoperability will remain an issue

Thanks for listening

Tim.Armitage@arup.com



Urban Mobility- TfGM -
Nikish Bakshi, Technical Manager –
Intelligent Mobility, Atkins, member of the
SNC-Lavalin Group



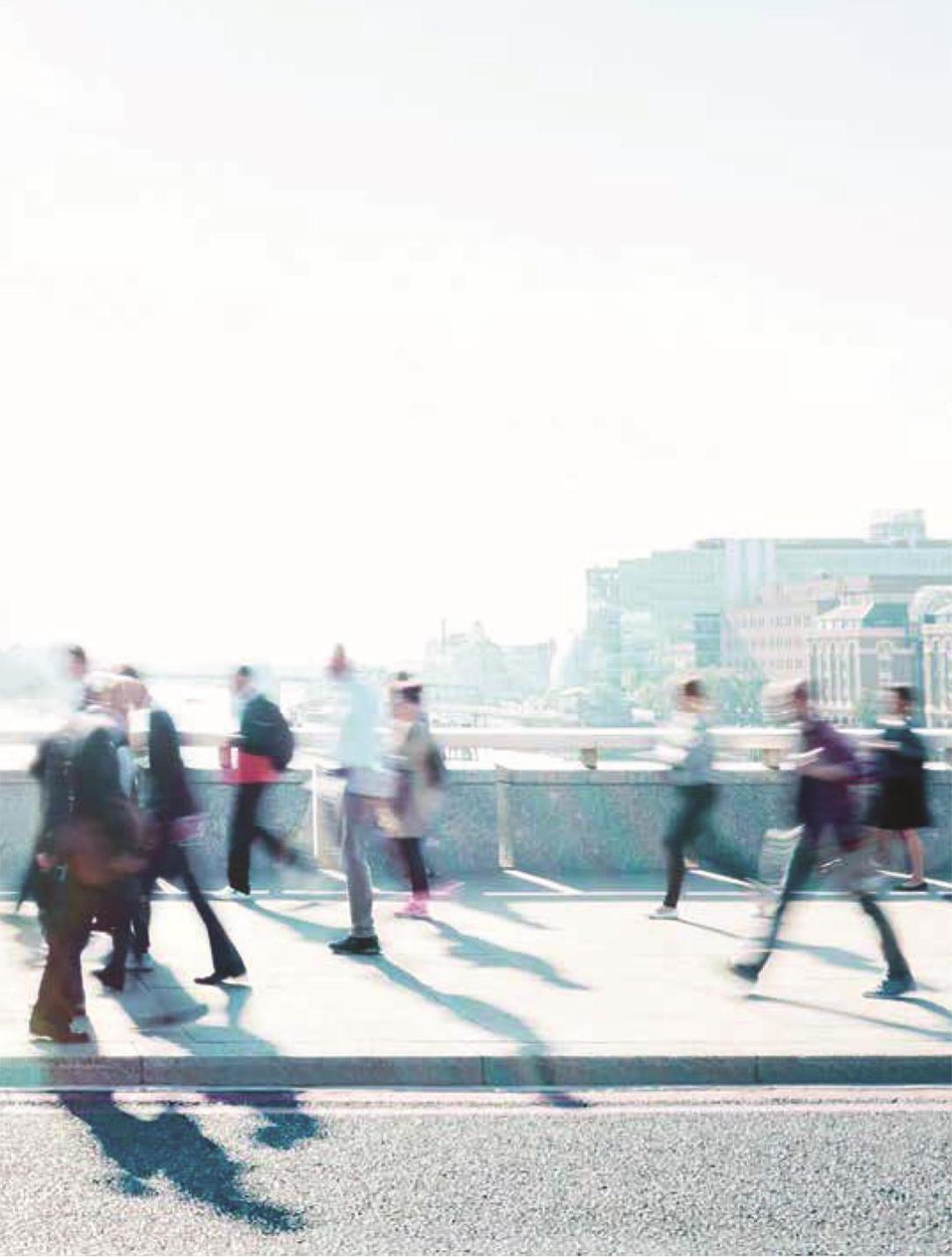


Impact of Technology on Infrastructure Management - Yogesh Patel, Group Process & Improvement Director, Eurovia



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Impact of Technology on Infrastructure Management

Yogesh Patel

Group Process & Improvement Director



Term Services Divisions

Including Ringway, Ringway Jacobs, BEAR Scotland and SWH



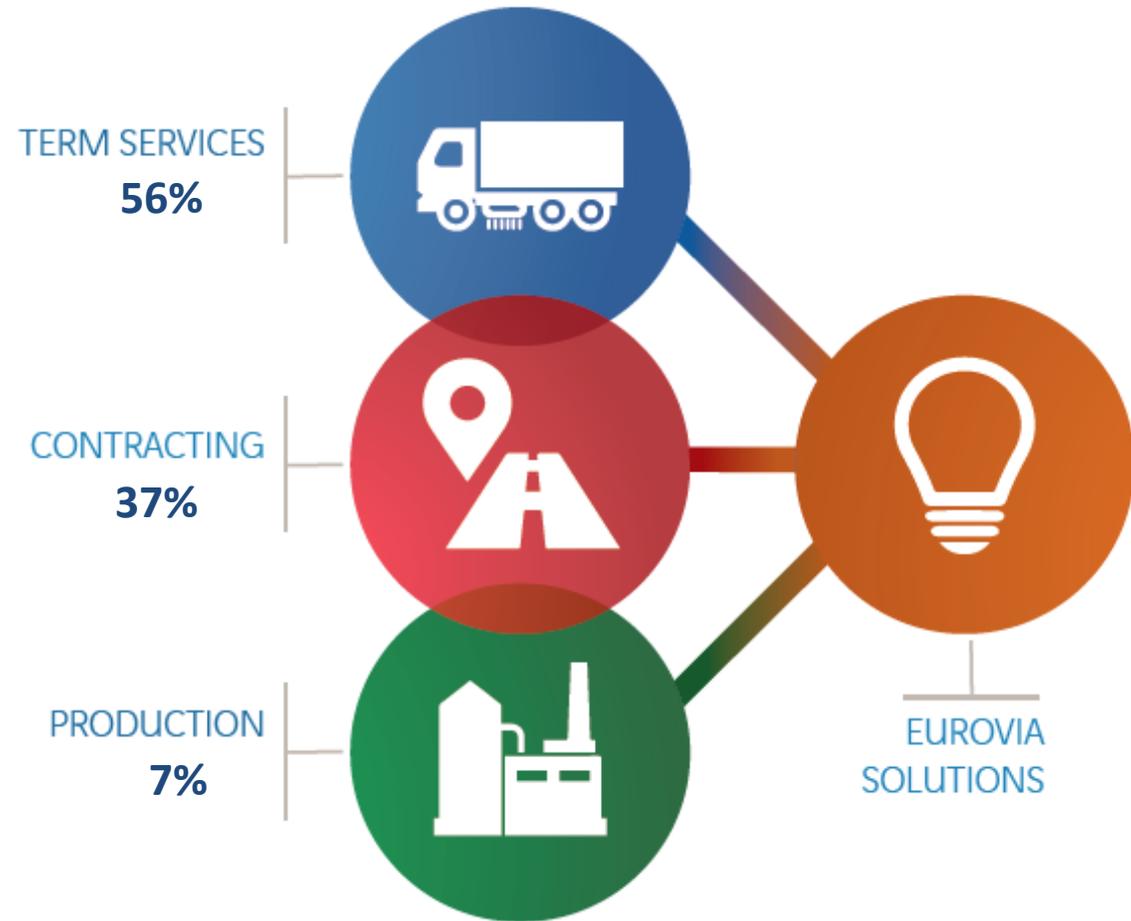
Contracting Divisions

Road & Public Realm Contracting and Surfacing



Production Divisions

Bitumen, Emulsion & Asphalt Production and Specialist Treatments





DIGITISING OUR ACTIVITIES

- Robotic Process Automation
- Connected worksites
- Real-time data analytics



TRANSFORM EXPERIENCE

- 5G Connectivity
- Stakeholder sentiment analysis
- Automated transactions



DEVELOP NEW OFFERS

- Smart infrastructure & vehicles
- Predictive whole-life asset management
- Commercialised data & intelligence



CORE THEMES

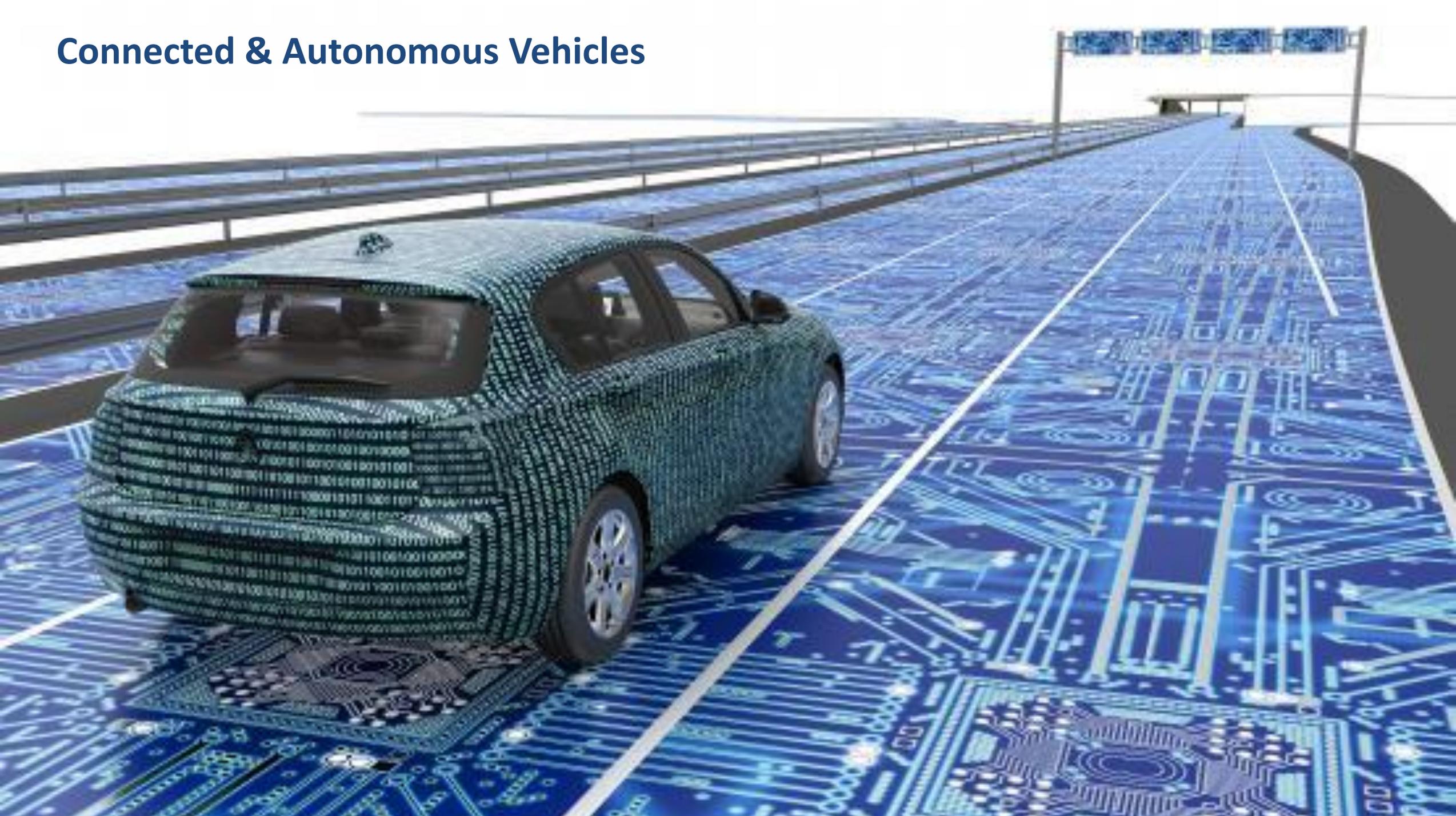
- 1) INNOVATION & EMERGING TECHNOLOGY
- 2) CONNECTED & AUTONOMOUS VEHICLES
- 3) HIGHWAYS IN THE FUTURE
- 4) BUSINESS MODELS & FUNDING

Innovation & Emerging Technologies



- Artificial Intelligence
- Machine Learning
- Big Data
- Internet of Things
- 3D Printing
- Drones
- Robotics
- 5G
- Blockchain
- ???

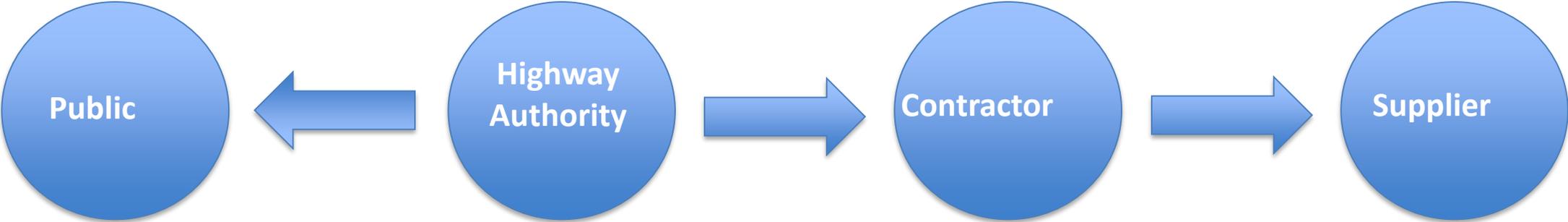
Connected & Autonomous Vehicles



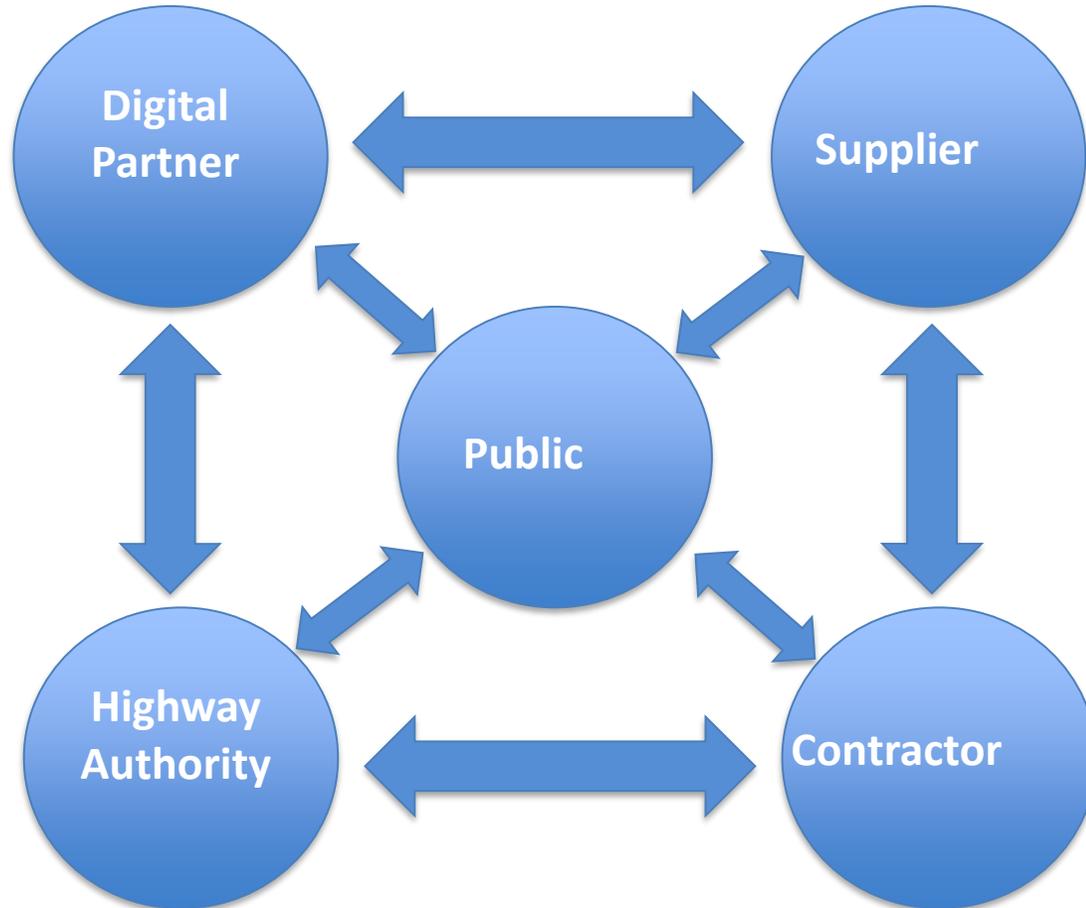



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VINCI

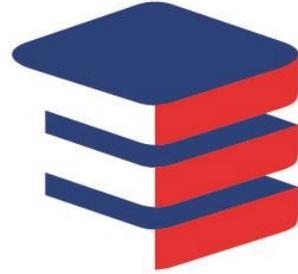
Traditional Business Model



Future Business Model



- Personalised Service
- Crowd Voting
- Crowd Funding
- Taxation Models
- Shared Ownership of Assets
- Extracting Value from Highway Assets
 - Energy
 - Connectivity & Data
 - Mobility
 - Water



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Create your **next move**



Question and Answer Session



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Concluding remarks and close - Lila Tachtsi, Chair of WRA (UK) and Atkins Fellow

