LOW CARBON ROAD OPERATION
– ELECTRIC ROAD SYSTEM (ERS)

Bernard Jacob
Scientific Division, IFSTTAR
Technical Committee B4, PIARC
Challenges or the ERS

- To ensure a **continuous energy supply** on the **equipped road network**
- **Reliability** and **efficiency** of the system
- **Resilience** to the weather, traffic and **infrastructure** conditions
- **Safety** of other divers/users
- Affordable transformation of **vehicles**, electricity/fuel in parallel
- **Infrastructure electrification**: technical issues and **business model**
- **System operation**
- IRU recommends **40-45%** of long haul road transport **on ERS by 2050**
ERS Technologies

- Catenary solution
- Ground conductive solution
- Ground inductive solution
Catenary (overhead) supply

To be presented by P. Akerman
Ground-level feeding: from rail to road

- Segmented ground feeding system
- APS in operation since 2003 in Bordeaux
  - In 10 cities (in operation or under construction)
  - More than 30 000 000 km run in APS
  - Total: 334 tramways and 141 km of track
  - APS provides same performances than OCS
  - Intrinsic safety and compatible with mixed traffic (crossroads)
Ground-level feeding

- APS for road: proof of concept (Slide-In project, SE)
- Demonstrator (350 m) built on Volvo test track
- Proof of concept validated
- Improved solution answering road needs under development

<table>
<thead>
<tr>
<th>Current collection test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>125kWatts 180Amps 690VDC transfer</td>
<td>✓</td>
</tr>
<tr>
<td>Truck speed more than 80km/h</td>
<td>✓</td>
</tr>
<tr>
<td>20km of continuous power transfer</td>
<td>✓</td>
</tr>
<tr>
<td>Rainy conditions</td>
<td>✓</td>
</tr>
<tr>
<td>Short circuits tests</td>
<td>✓</td>
</tr>
<tr>
<td>Track adherence tests</td>
<td>✓</td>
</tr>
</tbody>
</table>
Conditions and barriers

• At least 20-30 km transport distance
• About 60% of the distance needs to be on electric road
• The average daily number of electric transports should be 3 times the length of the mean transport distance in km
• At least 20% (preferable 50%) of the annual distance driven by each electric truck should be on the electric road
• Preferably several operators running on the same electric road
• Elements of shuttle like operation
• High/long-term investments + cost share → Business model!
• Some safety issues to be mitigated + standardization
Benefit of Electric Road System (ERS)

- reduces energy use
- reduces CO2 emissions
- utilizes existing infrastructure
- creates new field of knowledge and industrial branch
- is a field for cooperating between the political, administrative and industrial entities
### Évaluation économique de l’autoroute électrique sur 20 ans

#### Deux cas de figure

**Rentabilité intrinsèque**

- Section de 210 km
- Trafic de ~ 14 000 PL / jour

<table>
<thead>
<tr>
<th>Coûts</th>
<th>Recettes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infra. 320 Mt€</td>
<td>Gains SPV* 320 Mt€</td>
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</tbody>
</table>

**Cas avec soutien public**

- 3 200 km d’autoroutes, 1/3 du réseau
- Trafic moyen de ~ 8 100 PL / jour

<table>
<thead>
<tr>
<th>Coûts</th>
<th>Recettes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infra. 5 Md€</td>
<td>Gains Transporteurs 1 Md€</td>
</tr>
<tr>
<td>Gains SPV* 2 Md€</td>
<td></td>
</tr>
</tbody>
</table>

### Contributions

- **5 MtCO₂ évitées**
- **850 Millions d’€ d’économies sur la balance commerciale**

- **30 MtCO₂ évitées**
- **5 Md€ d’économies sur la balance commerciale**

*SPV : Special-Purpose Vehicle, ou société de projet. Il s’agit de la société dédiée qui construira et exploitera les infrastructures de distribution d’électricité le long de l’autoroute.*
ERS Technologies and Projects

Project Victoria
E-Way Corridor

29/06/2018
Decarbonizing Road Freight - Bernard Jacob
Projects

Ray Corridor:
- Paris-Le Havre (A13)
- Feasibility study
- Multi-technology
- Techno-economical
- ADEME: “Road of the future”
- OIE, IFSTTAR, SANEF, SPIE, AFNOR, Accenture…
Thank you very much for your attention!

bernard.jacob@ifsttar.fr