49th ASECAP DAYS

Decarbonizing Road Infrastructure : Challenges, Perspectives and Actions in Tough Economy

ASECAP DAYS
BRUSSELS 2022

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INSERT TITLE OF THE PRESENTATION

Speakers contact details

Name of the Company

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DECARBONIZING THE ROAD IS AN ENVIRONMENTAL EMERGENCY

Novemver 24th 2022

Introduction - VINCI Autoroutes

- VINCI Autoroutes finances, designs, builds and operates motorways in France
- Network of **4,443 km** : corresponding to the concessions of ASF, Cofiroute, Escota, Arcour and Arcos
- In the face of the climate emergency, **VINCI Autoroutes has committed to environmental transition**, by transforming its infrastructures and services to massively develop new low-carbon mobility uses

Concessions deadlines

- Escota : 2032
- Cofiroute : 2034
- ASF : 2036
- Arcour : 2070
- Duplex A86 : 2086
- Arcos : 2070
- Tunnel du Puymorens : 2037

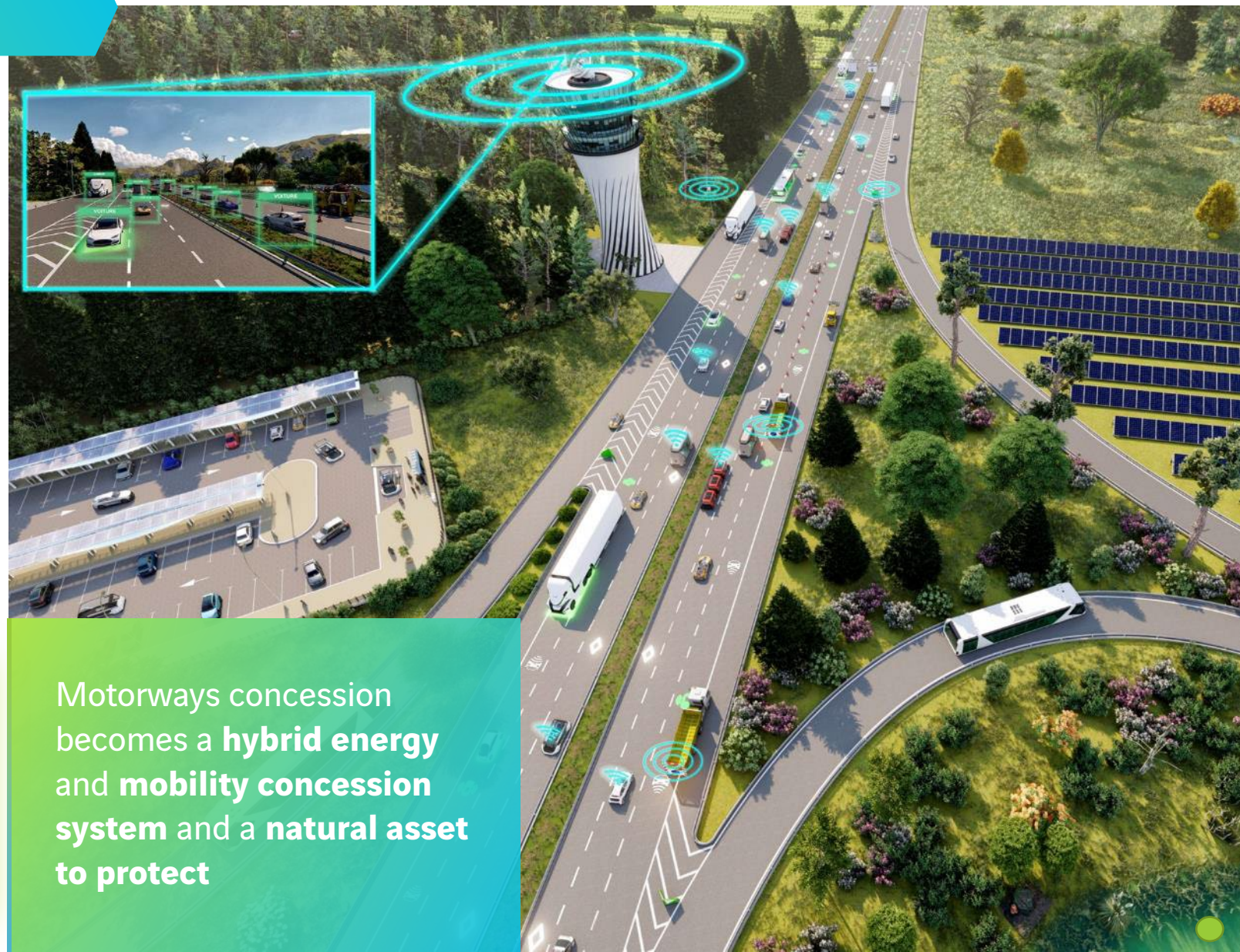
Introduction – Transport sector and highways GHG emission

- In France, the road provides **88%** of goods transport[1] and **81%** of passenger transport[2]
- The transport sector accounts for **31%** of national emissions ; Road transport accounts for **94%** of those emissions[3]
- Highways represent **1%** of the road network (12 379 km, 9 158 km under concession), they concentrate **30%** of the distances travelled,
- Concessionned highways represents **25%** of transport emissions, or **7 %** of national emissions
- Shifting from road to railway would not be enough to decarbonize transport : Even if the goals of the shift from road to rail were reached, the road would still account for nearly **75%** of the transport mode.

[1] % tons-kms in 2019. Chiffres clés de transports, CGDD
[2] % passengers-kms in 2019. Chiffres clés de transports, CGDD
[3] ASFA, 2019

5 levers of transformation

- Develop shared mobility services
- Accommodate low-carbon vehicles
- Turn the highways into renewable energy production centers
- Fluidify traffic through innovations
- Strengthen highway resilience and integration into natural environments



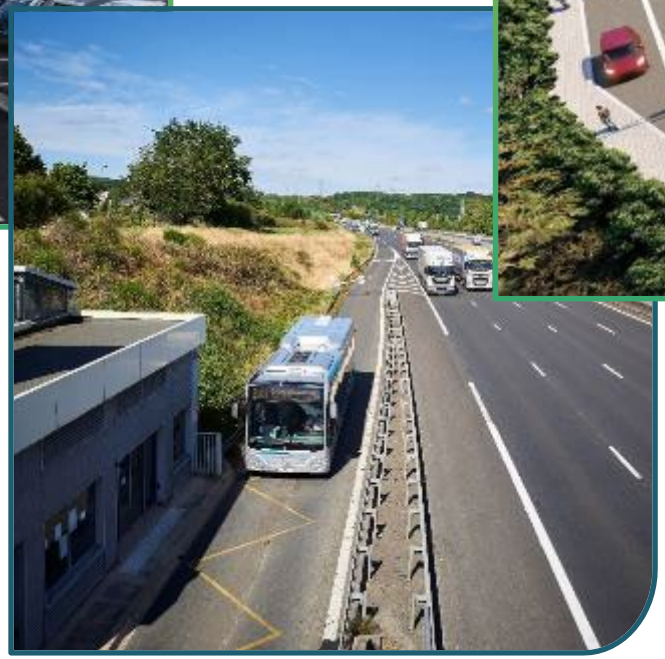
2019 ····· » **2030-2035**

15,9Mt
CO_2eq

Over -30%

Motorways concession becomes a **hybrid energy** and **mobility concession system** and a **natural asset to protect**

1- develop shared mobility services



2- Accommodate decarbonized vehicles (light vehicles)

1 CHARGING NEED ESTIMATION

2023

~ 6 charging points / site

Overloading risk on few summer hours

x10

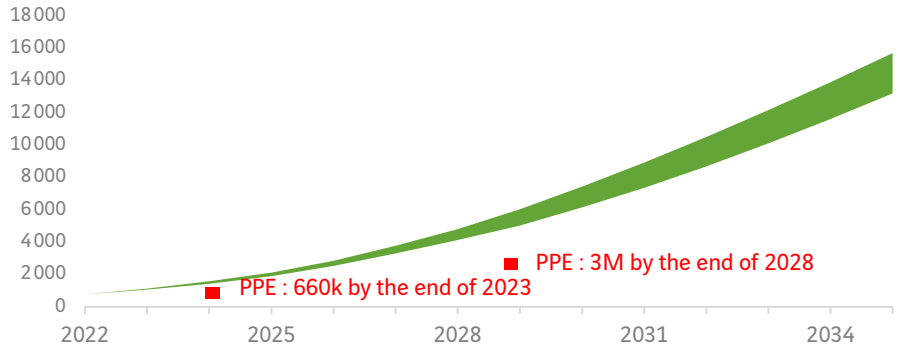
***By* 2035**
(VA / Renault)

~ 60 charging point / site

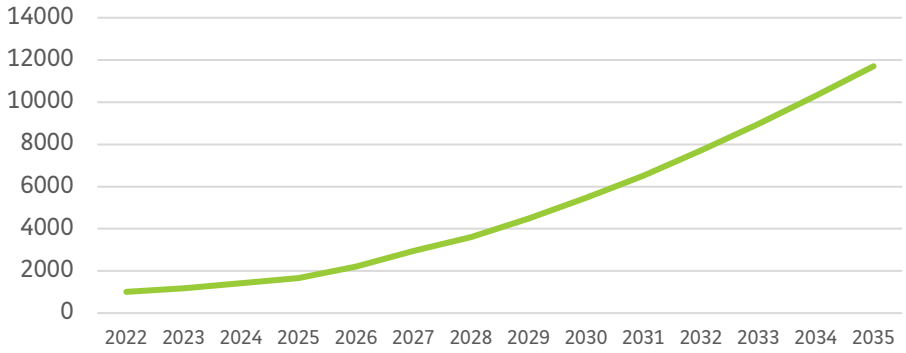
8 MW

2 BUSINESS MODEL CPO / PEAK LOADS & ANTICIPATION

Change in battery electric vehicle (BEV) fleet



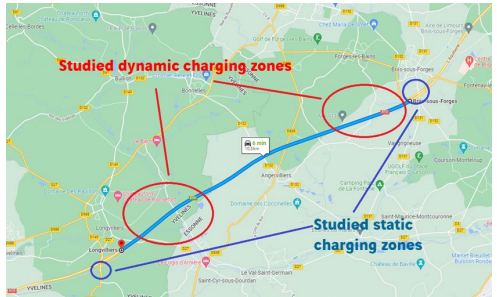
Evolution of the number of charging points required on services areas



2- Accommodate decarbonized vehicles (trucks)

ERS PROTOTYPE ON A10

Call for Tender : Develop inductive dynamic charging for trucks, coaches and light-duty vehicles on highways



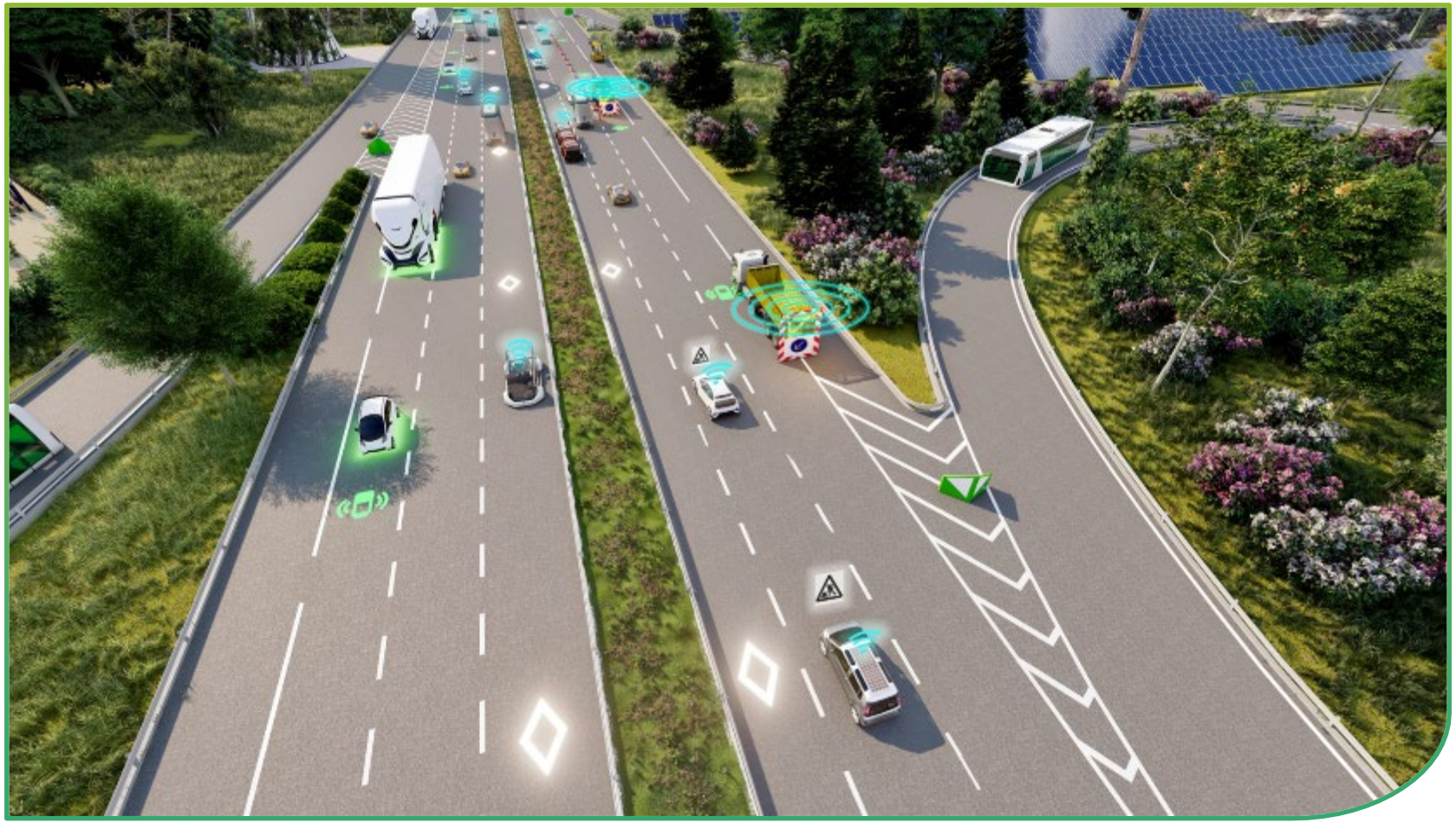
3- Turn the highways into renewable energy production centers

Estimated production potential:

- 800 MW on unused surfaces (500MW DPAC, 300 private)
- 200 MW on carpark canopies

= **1 000 MW**

3- Fluidify traffic through innovation



5- Strengthen highway resilience and integration into natural environments

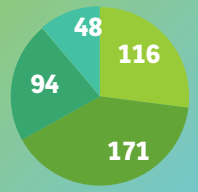
- Highways are essential to **public service continuity** and goods transport
- Some sections are **vulnerable to extreme rain and fire**. In addition to urbanization and outdated protection standards
- Road and highway infrastructures must strengthen their resilience, assure their sustainability and public service continuity.

- To lessen the impact of highways on biodiversity and ecological continuity a **restoration plan of natural habitat** is needed :
  - Bridges and tunnels for animals to reduce the division of their habitat by highways
  - Restore eligible sites to their natural state

What costs for what benefits ?

Construction sites

2030
-50%
(per operation)
vs 2019



- Earthwork
- Civil engineering
- Roadway
- Other

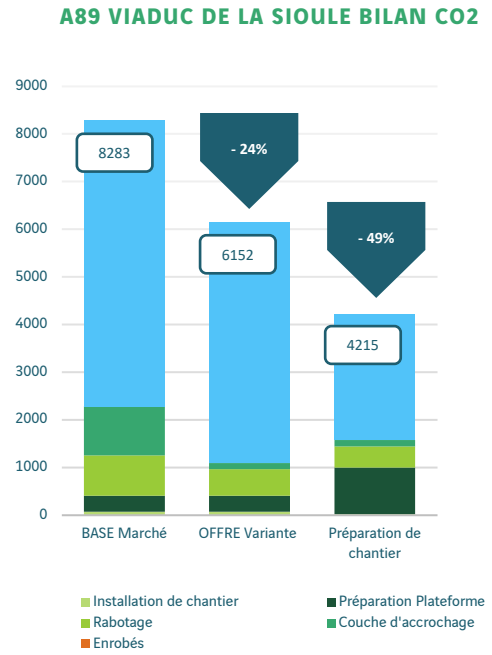
ULTRA LOW-CARBON CONCRETE EXPERIMENT (A10)

A89 : 40% CO_2 REDUCTION

1. **Recycling of asphalt aggregates from 50% to 70% (developed by Eurovia and Ermont)**

2. **Energy supply**
   - biobased fuel (DERTAL G)

3. **Km optimisation**
   - creation of a platform in the immediate vicinity of the site



What costs for what benefits ?

Comparison of global costs of battery trucks with ERS trucks :

Major interest of ERS is to **reduce the battery size** in comparison with an electric truck with static charging : divided by 3,5 (*2021 MTE report on ERS*)

- The total cost of ERS infrastructure on all French main roads would be much higher than charging points infrastructure for trucks on service and rest areas

- But including the additional cost of batteries, ERS appears much more economical

➡ **Strong interest for developing ERS instead of battery trucks with static charging**

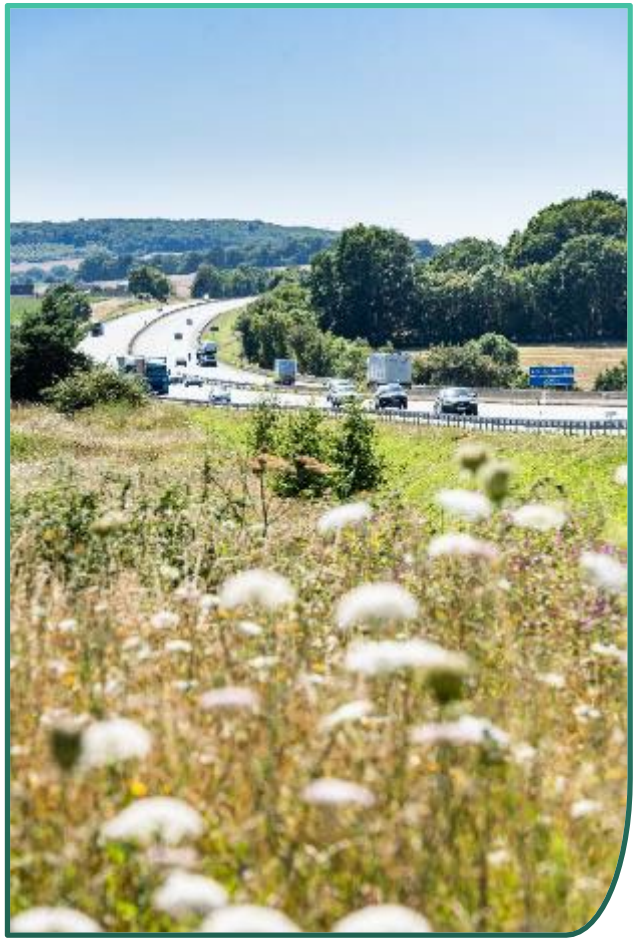
➡ **Condition : public authorities must support ERS at European level**

ERS : more CAPEX in infrastructure, but much less CAPEX in battery truck

Battery trucks with static charging : less CAPEX in infrastructure, but much more CAPEX in battery truck

What costs for what benefits ?

Altermind	Amount (M€) for 1000km	Positive externalities
1. Develop shared mobility services	110 to 120	2% of VINCI Autoroutes GHG emissions
2. Accommodate decarbonized vehicles (light vehicles)	200 to 250	40% of electric vehicles : 22% of GHG emissions
3. Accommodate decarbonized vehicles (trucks)	2800 to 2900	3% H2 trucks + 3% electric trucks : 2% of GHG emissions 10% of ERS trucks : 4% of GHG emissions ERS divide batteries size and price
4. Turn the highways into green energy production centers	200	Development of renewable energies without conflict of land use
5. Use innovations to smooth traffic	980 to 1030	Free flow : 0,8% of GHG emissions Reducing congestion will also reduce GHG emissions
6. Highway resilience	550 to 750	Avoids environmental damage
7. Highway integration into natural environments	760 to 810	Reduces pollution Enhances CO2 carbon sinks



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