EP Tender

Smart mobile powerbank for mass market EV adoption

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Soutenu par
MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE
Liberté
Égalité
Fraternité
GREENTECH INNOVATION
LEONARD
together @VINCI
SOLARIMPULSE EFFICIENT SOLUTION JULY 2018
HORIZON 2020
SEAL OF EXCELLENCE

The public’s request

1900

faster horses, running longer and feeding in 5 minutes

=

2021

Competitively priced EVs
500 km effective range on motorways
5 minutes charging time
Low environmental footprint

=

EP Tender

Mission & Business

Enable mass market EV adoption
Optimise the use of natural resources
Reduce CO2 impact and cost

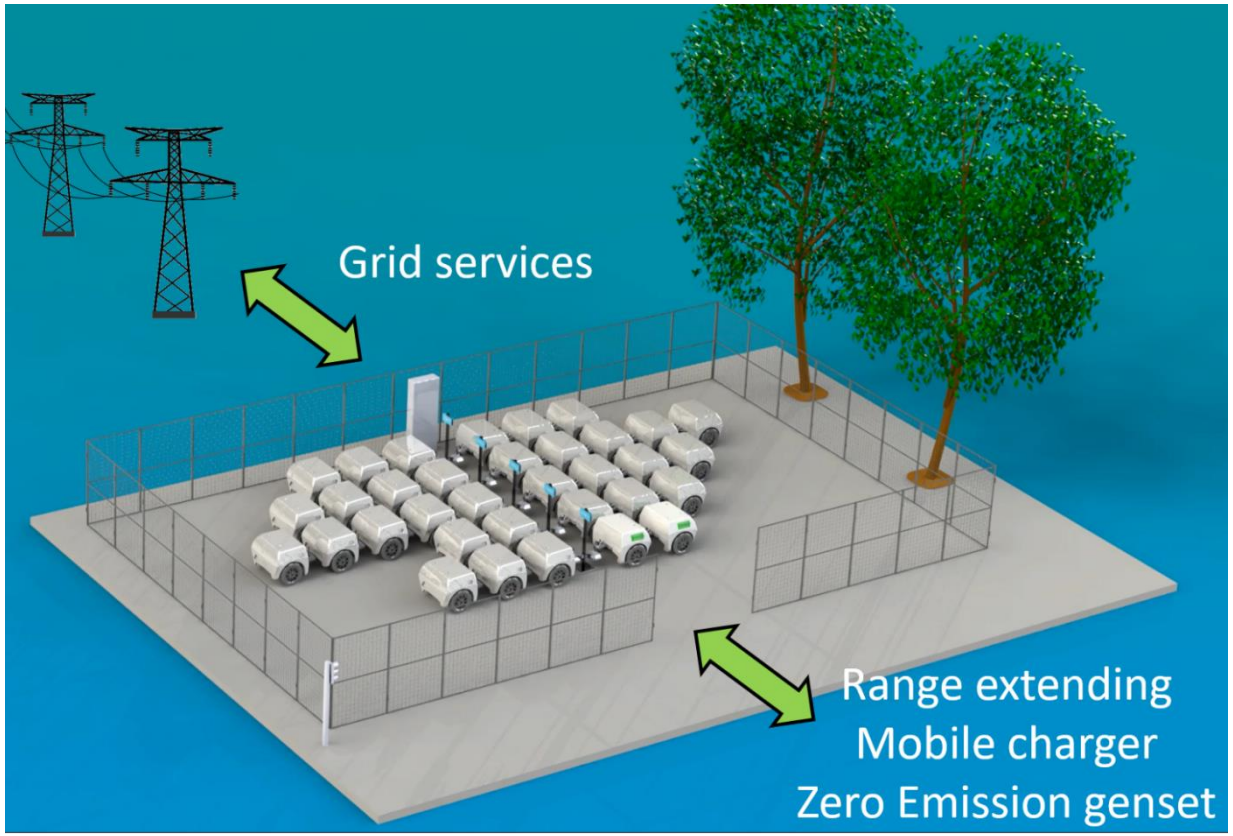
➔ Accelerate the advent of sustainable mobility

Batteries as a Service

- Range extending
- Grid services
- ZE Generator
- Mobile charging
- Home storage

EP Tender

EP Tender: Batteries as a Service



A 60 kWh powerbank on-demand

- No payload impact
- Pay per use
- Seamless to use and drive (see links to video)
  - Self pairing with the car
  - Self steering when backing (Patented)
  - Equivalent to 1,8MW net charging power
- Utilisation rate > 90%

EP Tender

Safety

- Satisfy USVFM301R (US crash test from the rear) and ECE R100.02

- Pass the Moose test at same speed
  (sway amortiser)

- Same braking distance
  (active braking when mechanical brakes activated on the car)

- Perfectly neutral dynamic behaviour

The EV problem

Long distance trips

- Not realistic
- Somewhat possible
- Yes

VW e-Up!

Range & charging speed with onboard battery

VW Id3 45

Hyundai Kona 64

VW Id3 77

Tesla Model 3

Citroën AMI

15 to 25k€ : 42%

25 to 35k€ : 27%

New car market price structure

<15k€ : 13%

>35k€ : 18%

➔Sticky ICE mass market + Gentrification of new cars

EP Tender

EP Tender is the solution

Long distance trips

- Yes
- Somewhat possible
- Not realistic

Used Zoe & Leaf

Range & charging speed with EP Tender

Range & charging speed with onboard battery

15 to 25k€ : 42%

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New car market price structure

<15k€ : 13%

>35k€ : 18%

VW ID3 45

Hyundai Kona 64

VW ID3 77

Tesla Model 3

➔EVs become inclusive and suitable for all budgets !

EP Tender

Comparing solutions

VW ID3 45 (city)

45kWh battery
175km effective motorway range
33 890 €
45 kW net avg charging power
(3,75 km/min)
5 passengers

Price	Range

VW ID3 45 + EP Tender

45 / 105 kWh battery
475km effective motorway range
34 490 €
1 800 kW net avg charging power
(150 km/min)
5 passengers

Price	Range

VW ID3 77 (Max)

77kWh battery
335km effective motorway range
48 990 €
110 kW net avg charging power
(9,17 km/min)
4 passengers (instead of 5)

Price	Range

EP Tender

Customer value

Clients are addict to ICE features:

- Emotion
- 500 km motorway range
- Charging 500 km in 5 minutes
- Traveling with peace of mind
- Affordable
- Versatile

EV + EP Tender delivers:

- Emotion
- 500 km motorway range on demand
- Charging 300 km in 2 minutes on demand
- Traveling with peace of mind
- Affordable
- Versatile
- Green for all

EP Tender

Trajectories induced by EVs, vs opportunities offered by EP Tender

Without EP Tender	With EP Tender
Gentrification of new cars: shrinking new car market	Affordable and convenient ABC segments and light utility EVs
Lower volume x lower margin (gentrification x premium segment getting overcrowded)	Maintaining volumes with healthy margins
Large balance sheet investment into battery factories	More EVs produced per Gigafactory built
Heavy (loss making) investments into motorway charging infrastructure	Promising EP Tender business model
Push sales to reach CAFE targets + risks of social unrest due to ULEZ obligations + subsidies requirements	Natural demand for attractive, affordable and convenient EVs
Battery marginal cost $\gg$ marginal utility	Battery marginal cost (on demand rental) $\leqslant$ marginal utility
0,5% utilisation rate of large batteries stranded into cars (10% utility of a car used 5% of time)	90% utilisation rate of shared batteries (shared range extension, mobile charging, ZE generator, grid services)
EV adoption in wealthier countries' upperclass	Widespread global EV adoption

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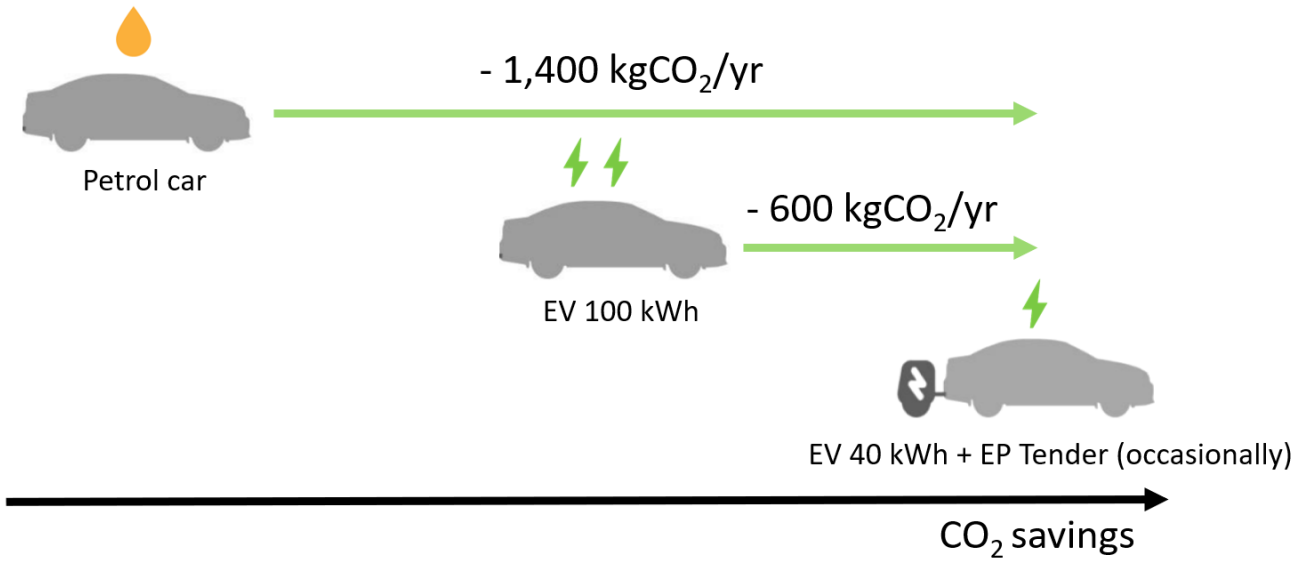
Channels and sales/distribution model

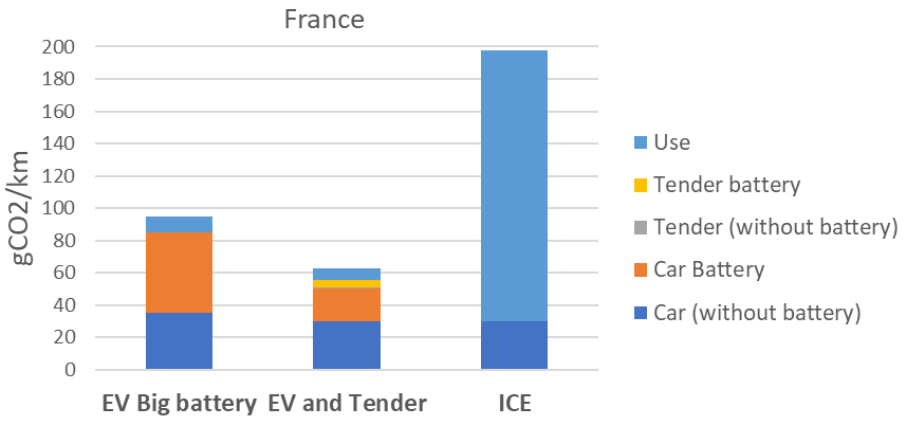
EP Tender

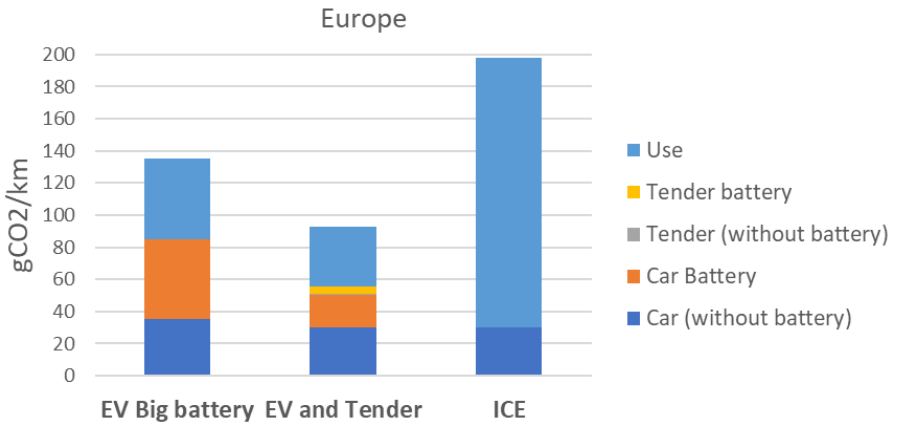
Equipment of the vehicle

Range Extending service

CO_2 savings







CO_2 savings of 20-50 million tons per year in Europe
(15% market share adoption)

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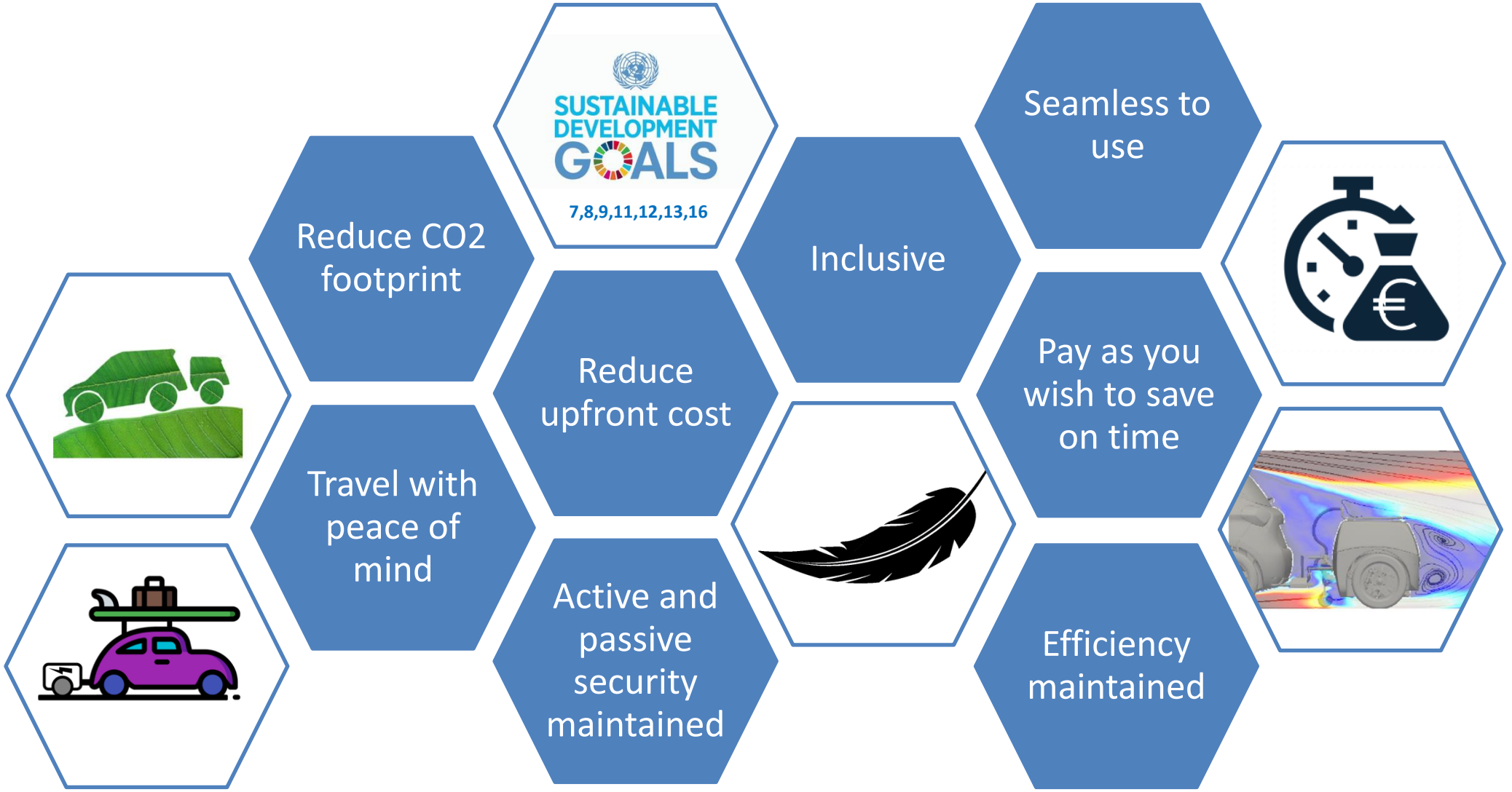
Value proposition



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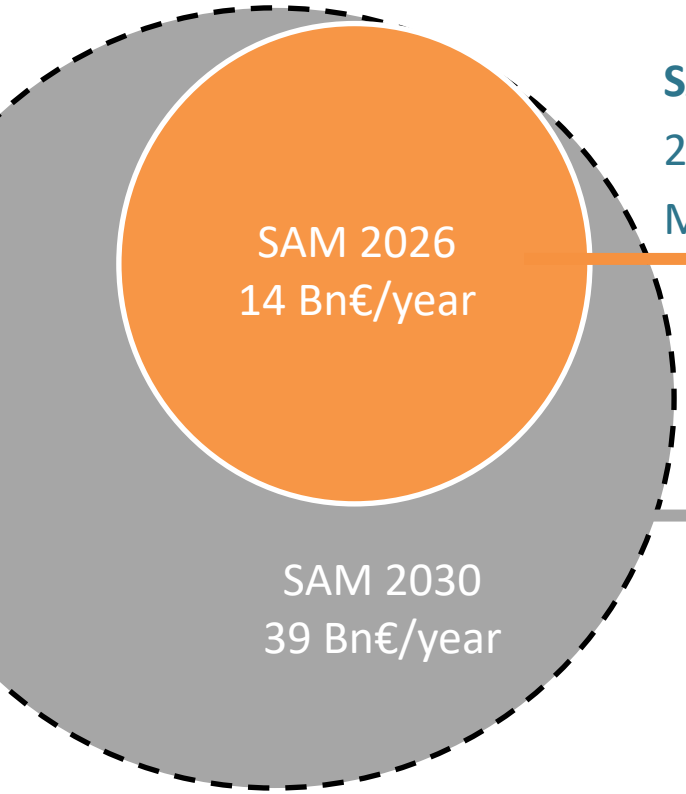
Market Opportunity and Risks



SAM 2026: 14 Bn€/y

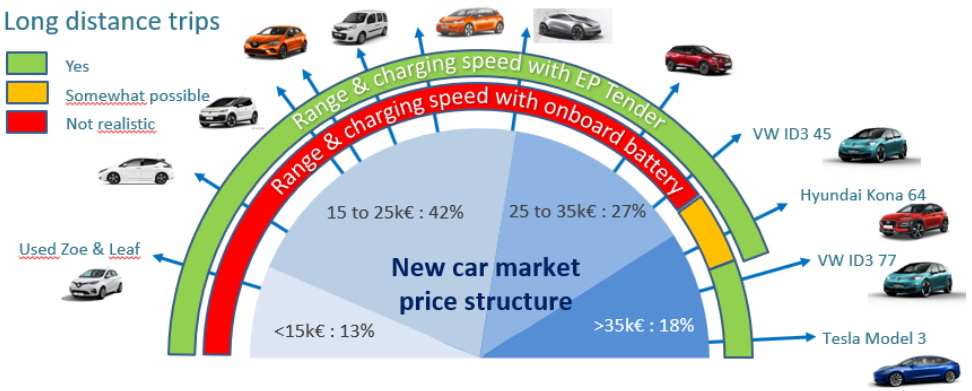
25 M adressable cars

Market share central scenario: 0.5%

SAM 2030: 39 Bn€/y

71 M addressable cars

Market share central scenario: 2.5%



Limited EVs available for towing

Clear trend with new platforms homologated for towing

Capital intensive business

VCs and corporate VCs with environmental mandate

Derisking by EIC Accelerator

Deceptive user experience:

Seamless user experience and safety

Field test / dissemination / pioneers / OEM support

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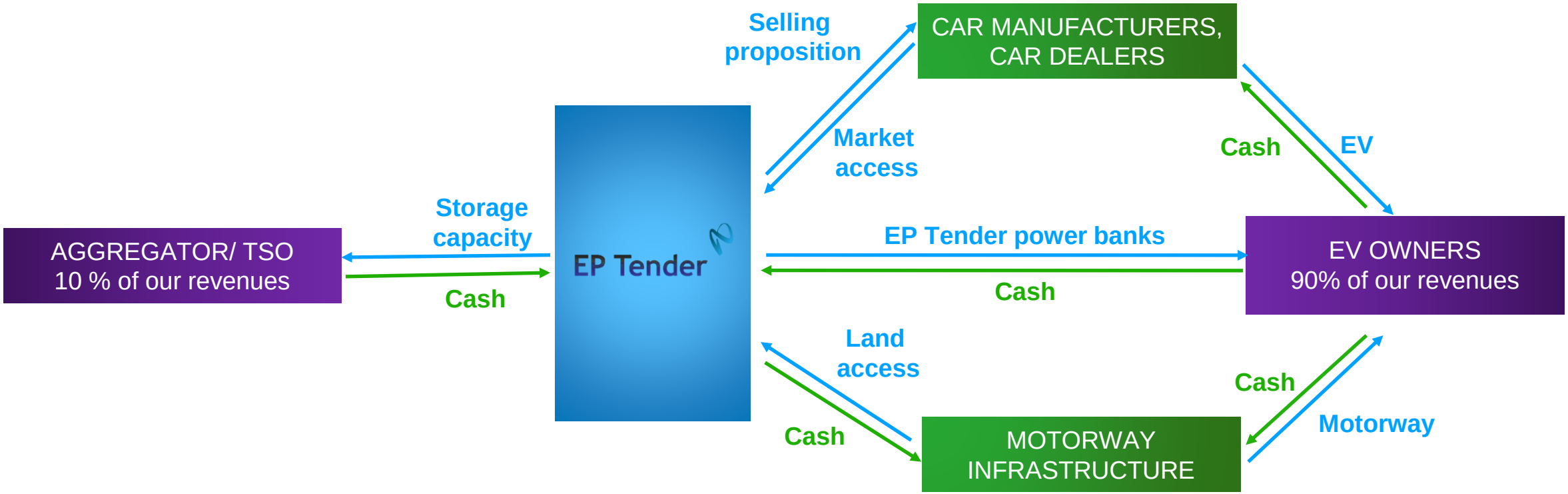
Business Model



Roadmap

Consortium EP Tender – Stellantis – Vinci Autoroutes

2021 - 2022

- Engineering
- Manufacturing
- Homologation

2022 - 2023

- Pilot users and field tests
- Dissemination
- EU type-approval
- EV series homologation

2023 - 2024

- Commercialisation in France
- 20 rental points
- 124 Tenders
- 1 400 clients

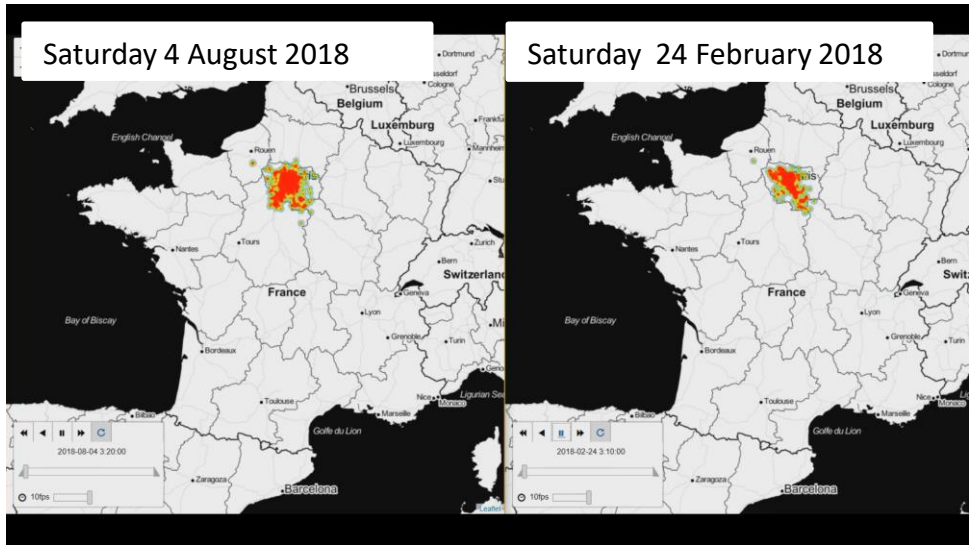
2024 -2025

- Expansion in Europe
- Find local partners
- 170 rental points
- 1 400 Tenders
- 17 600 clients

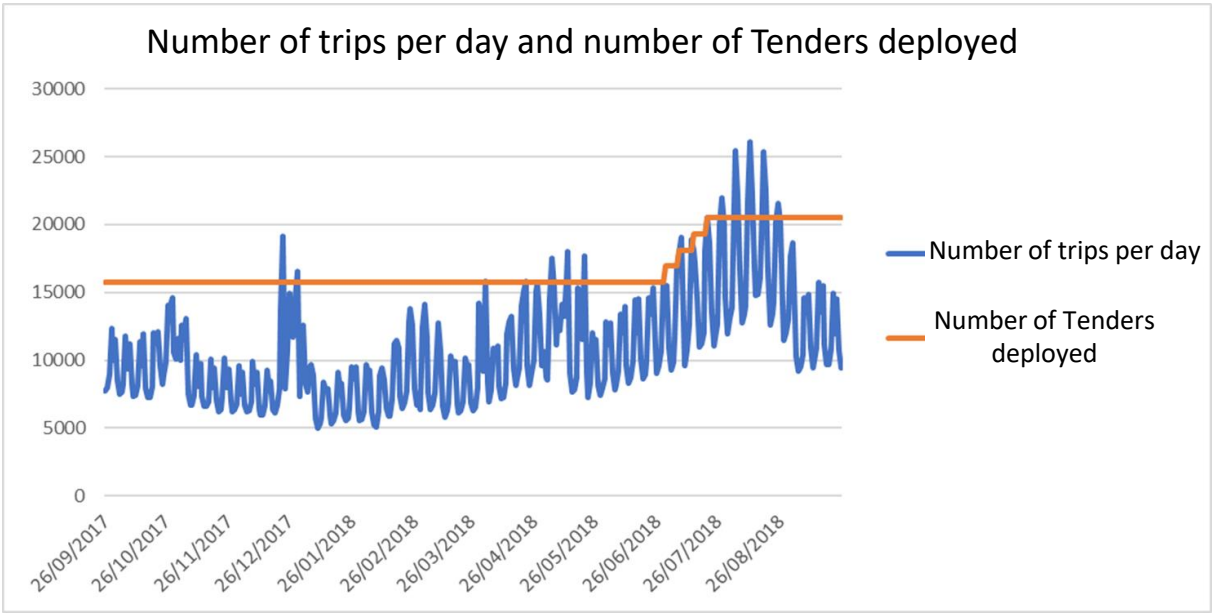
Detailed microsimulation of the rental network (digital twin)

Microsimulation with database issued from mappy
Data : origin-destination trips of 329 000 users
Number of occasional car trips over 200 km: 4,15 M
Periode: 1st September 2017 to 30 September 2018.
Geography: 3708 cells in France and 10 neighboring countries

Sample of trips (video link below) from Ile-de-France in summer and winter holidays



https://www.youtube.com/watch?v=DDi3_ZokuJU&ab_channel=Jean-BaptisteSegard



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Results of the microsimulation

	Results
Average length of trip	470 km
Average kWh bought during the trip	66 kWh
Number of rentals per Tender	175 rentals/annum
Number of swaps per Tender	93 swaps/annum
Number of cycles per Tender	193 cycles/annum
Number of relocalisations per Tender	6 reloc/annum
Number of one way trips	73 one way /annum
Turnover on mobility per Tender	11 000 €

Ramp-up analysis

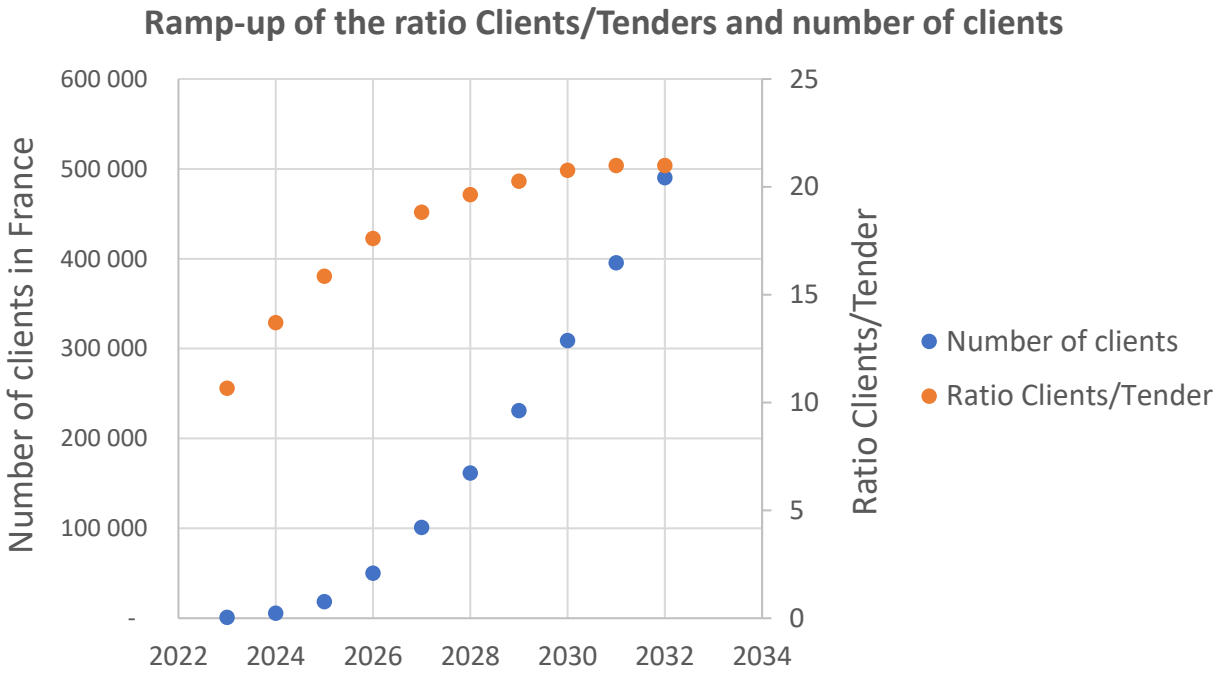
Stations 1 to 30

Stations 31 to 60

Stations 61 to 100

Critical mass: 400-500 Tenders for EBITDA >0

French market	2024	2025	2026	2027
Number of Tenders	124	507	1 348	2 920
Number of clients	1 400	7 200	21 800	51 600
EBITDA	-2.0 M€	+0,76 M€	+4,6 M€	+12,0 M€



EP Tender

Client Value

	Flex	Active
Membership fee/month	3 €	20 €
1 day rental	15 €	10 €
Price per kWh	0.75 €	0.50 €
Swap fee	5 €	5 €
One-way fee	10 €	10 €

The Tenders are booked for picking up and dropping at the rental points

Examples for a 600 km trip:

e-208
+ Ionity fast charging

Trip duration: 8h40
Cost: 77€

e-208
+ EP Tender (Flex)

Trip duration: 6h15
Cost: 93€

e-208
+ EP Tender (Active)

Trip duration: 6h15
Cost: 65€

EP Tender

Consent to price analysis

Analysis conducted by Vedecom in 2019 among 952 people: Preference for EP Tender versus fast charging, according to the length of the journey, the tariff option chosen and the status of the person

% preferring EP Tender vs fast charging	Short distance 400 km	Long distance 750 km
Active tariff	38% 63% 50%	56% 72% 54%
Flex tariff	25% 33% 41%	62% 73% 56%

PVE: EV owners
NPI: Undecided non owners
NPR: Reluctant non owners

This analysis has been made assuming fast charging priced at 0,50 €/kWh

EP Tender

Financing requirements

Funding to date:

- 1.5 M€ founder
- 1.4 M€ grants

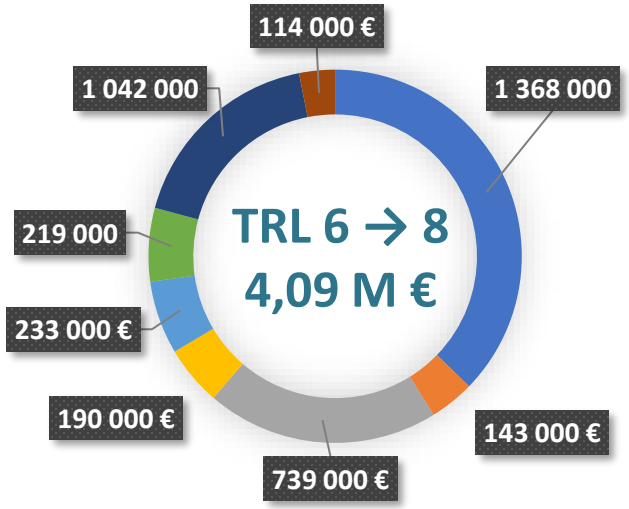
Milestones :

- Development and homologation of 52 kWh pre-series Tenders
- Field tests with 41 EVs and 14 Tenders.
- Preparing for industrialization and commercialization

Marketed from 2024 with:

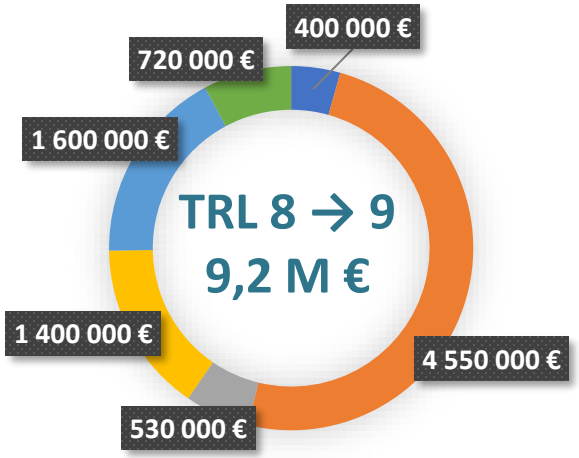
- 124 Tenders
- 21 Stations
- 1400 Clients

Field tests
2021-2022



- Hardware and software development of new platform
- Modelling and data analysis
- Manufacturing for field tests
- Homologation, certification, safety
- Implementation and operation of the field test
- Vinci
- Stellantis
- Coordination

Commercial
2023-2024



- Industrialisation
- Tenders manufacturing
- Homologation and certification
- Infrastructure deployment
- Operations, sales and general administration
- Intellectual property and R&D

EP Tender

Central scenario assumptions

Our target market is the ABC and LCV EV segments. Strictly urban and premium EVs have a sufficient battery and are not our target.
However, premium autonomous EVs will probably prefer 2' pit stops instead of an omnibus ride!

We will start marketing in 2023 with Europe. North America, China, India and Latin America will be phased in from 2025.

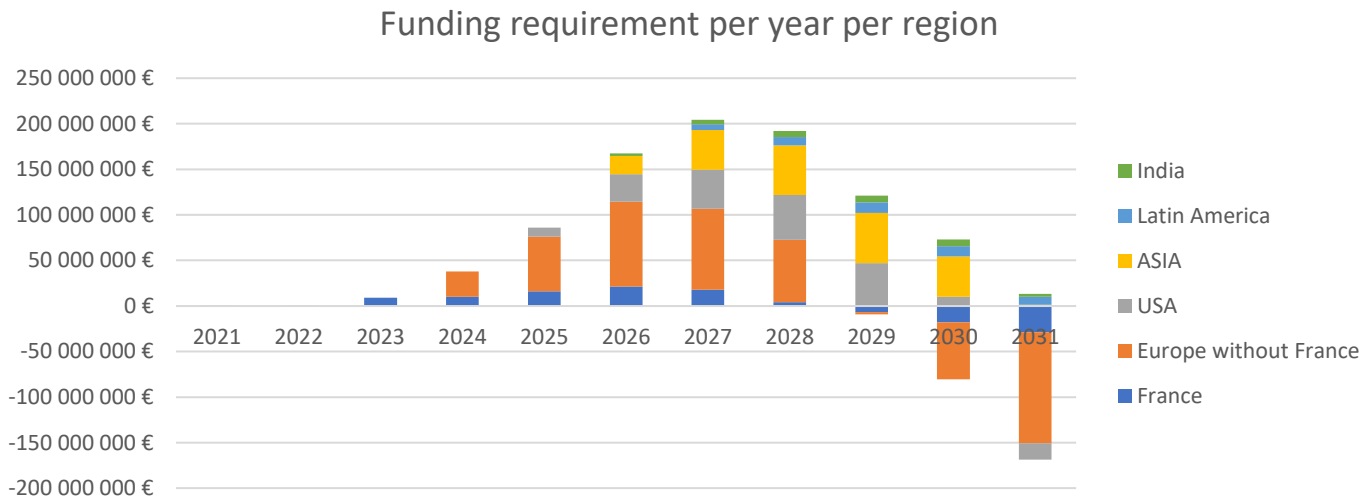
We are also targeting the nascent market for zero emission generators, which is expected to grow rapidly due to tighter emission and noise regulations, as well as network services, home storage and mobile charging.

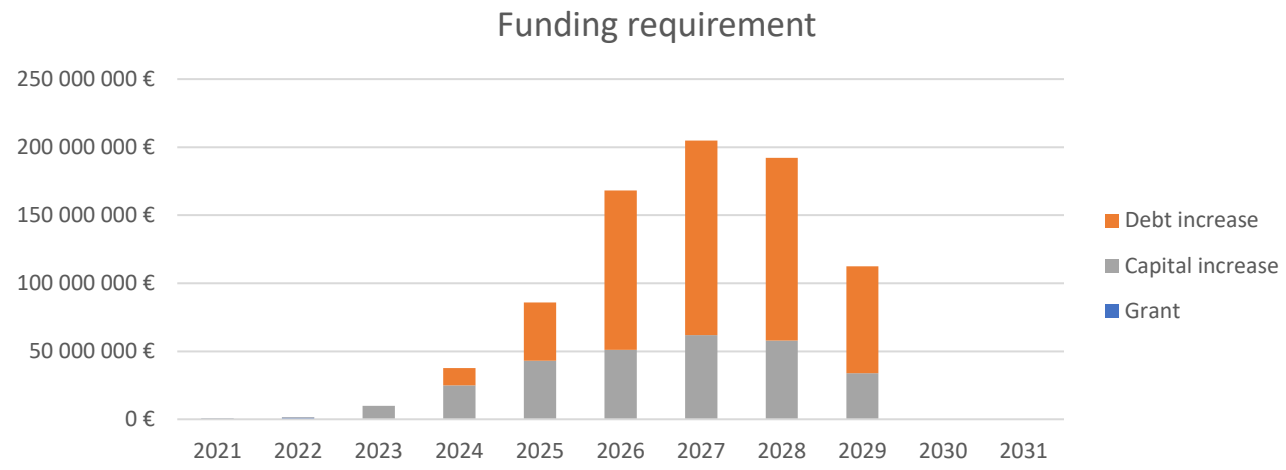
	2025			2030		
	EV market share	EV Sales	EP Tender share of EVs	EV market share	EV Sales	EP Tender share of EVs
Europe	25,0 %	3 900 000	1,5 %	50 %	7 800 000	5,0 %
North America	7,0 %	1 300 000	0,25 %	25 %	4 700 000	3,3 %
Asia	14,0 %	4 600 000	0 %	31 %	10 300 000	1,7 %
India	1,4 %	80 000	0 %	6 %	500 000	5,0 %
Latin America	2,5 %	140 000	0 %	13 %	800 000	3,9 %

EP Tender

Financing plan of the roadmap

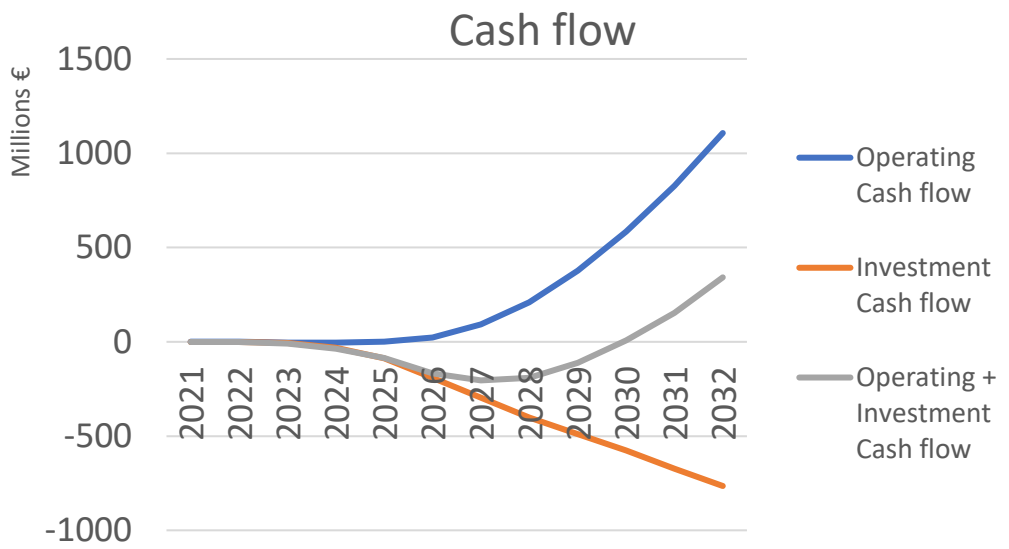
Financing requirement per region and cash flow:





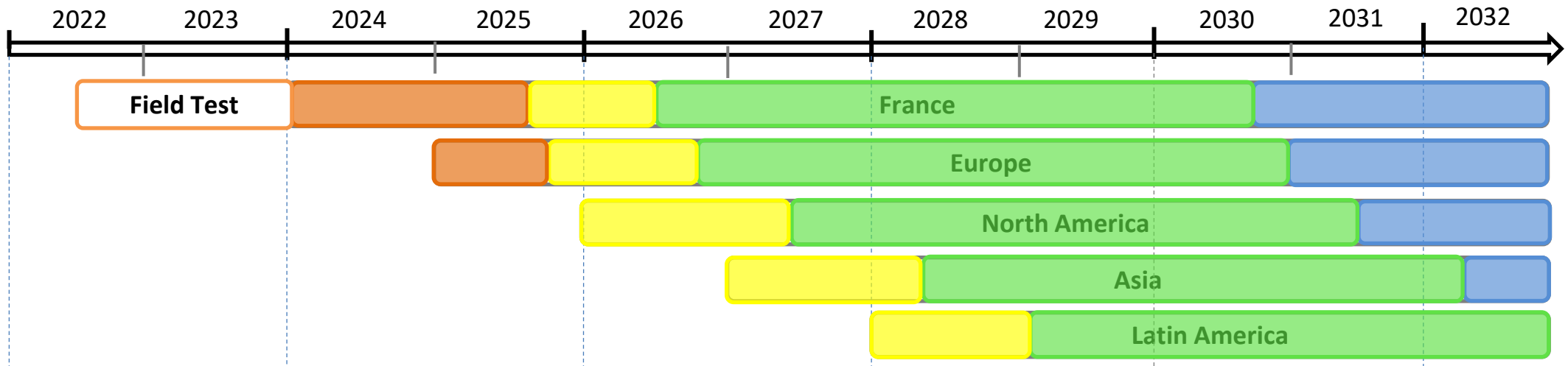
Funding required before cash flow positive	
France	80 M€
Europe without France	338 M€
USA	190 M€
Asia	219 M€
South America	47 M€
India	32 M€

Total Funding: 814 M€
Total Equity: 284 M€



EP Tender

Financial projection



Funding Need (M€)	1,15	1,7	10	40,75	95,7	182	211	182	82	0
Equity Need (M€)	0,5	0,5	10	27	48	55	64	55	25	0
Number of users	10	41	1,646	21,017	97,053	299,601	655,816	1,2M	1,8 M	2,6 M
Number of Tenders	3	14	141	1,597	6 ,407	18,344	37,989	65,638	99,024	137,117
Revenues (M€)	**0,12**	**0,20**	**0,83**	**9,5**	**44,9**	**144**	**333**	**623**	**1 005**	**1 462**
EBIT (M€)			**-2,63**	**-1,71**	**5,2**	**30,3**	**87**	**186**	**330**	**517**

Total Funding: 805 M€

Total Equity: 285 M€

High Risk

Moderate Risk

Growth

Net operating income < 0

Net operating income > 0

Net income > 0

Cash flow > 0

EP Tender

P&L

Profit and Loss		2024		2025	2026	2027	2028	2029	2030	2032
Revenues (M€)		0,76	9,40	44,5	142	329	617	995	1447	1956
COGS (M€)		1,38	4,58	18,7	53	113	200	305	423	548
Gross margin (M€)		-0,62	4,82	25,7	89	216	418	691	1024	1409
% of revenues		**-82,2%**	**51,3%**	**57,9%**	**62,5%**	**65,6%**	**67,7%**	**69,4%**	**70,8%**	**72,0%**
Operating Expenses (M€)		1,46	3,21	7,02	20,34	44,87	80,99	126,18	178,85	237,48
% of operating expenses	Sales	43,9%	41,0%	50,7%	50,5%	46,2%	43,4%	40,8%	39,0%	37,3%
	G&A	40,5%	22,8%	17,8%	19,9%	21,4%	22,5%	23,6%	24,4%	24,9%
	operations	15,6%	36,1%	31,4%	29,7%	32,4%	34,1%	35,6%	36,7%	37,8%
EBITDA (M€)		-2,09	1,61	18,7	69	171	337	564	846	1171
% of revenues		**-275%**	**17%**	**42%**	**48%**	**52%**	**55%**	**57%**	**58%**	**60%**
Amortization (M€)		0,54	3,32	13,52	38,32	84,37	150,46	233,84	327,99	427,43
% of Amortization	R&D	42,5%	10,3%	5,5%	5,4%	6,4%	7,7%	9,4%	11,5%	13,9%
	Tenders	54,2%	83,6%	87,5%	87,2%	85,8%	84,4%	82,5%	80,2%	77,8%
	Stations	3,3%	6,1%	7,0%	7,4%	7,7%	7,9%	8,1%	8,2%	8,4%
EBIT (M€)		-2,63	-1,71	5,2	30	87	187	331	518	744
% of revenues		**-346%**	**-18%**	**12%**	**21%**	**26%**	**30%**	**33%**	**36%**	**38%**
Net income (M€)		-2,56	-1,61	4,7	21	58	127	231	371	548
% of revenues		**-337%**	**-17%**	**11%**	**15%**	**18%**	**21%**	**23%**	**26%**	**28%**

EP Tender

Business plan sensitivity analysis

		Number of clients				
		-75%	-50%	Central scenario	+50%	+100%
Tender Manufacturing cost	+25%	7%	12%	18%	21%	22%
		654 M€	904 M€	1 268 M€	1 560 M€	1 877 M€
		218 M€	302 M€	430 M€	537 M€	641 M€
		16%	28%	40%	47%	52%
	Central scenario	14%	19%	24%	26%	28%
		416 M€	580 M€	814 M€	1 023 M€	1 199 M€
		144 M€	201 M€	284 M€	358 M€	422 M€
		27%	38%	50%	57%	62%
	-25%	22%	26%	30%	32%	33%
		243 M€	343 M€	479 M€	597 M€	702 M€
		89 M€	124 M€	176 M€	219 M€	259 M€
		36%	47%	59%	67%	72%

Legend
Net Margin in 2030
Total funding need
Total equity need
IRR

EP Tender

Alternate solutions

- Hybrid cars: these vehicles are optimised petrol cars, but can't satisfy the long term objective of decarbonization.
- Plug-in Hybrid: PHEVs are a remarkable engineering achievement, but with up to three motors, a battery, a fuel tank, a complex transmission and two cooling systems, their cost is 10 to 15k€ higher than a gasoline version. As their battery range improves from 30km to 150 km, the engine gets seldom used and quasi redundant. Therefore, BMW has abandoned the Rex (petrol range extender) on the BMW i3. It remains a good solution for frequent long distances trips of premium vehicles, where the cost can be absorbed and the benefits in terms of convenience is key compared to pure EV.
- Large batteries: Makes the car overly expensive for the mass market, with a much larger environmental footprint than necessary for 98% of usage. It results into poor use of natural resources and higher CO2 emissions for manufacturing the battery and the vehicle. But a large battery comes with benefits: more power and faster charging. This solution is very well suited for premium cars where the cost is not an issue, and performance is key.
- Fast charging: On a given battery technology, the charging power is proportional to its capacity. Fast charging requires more expensive cars. The competitive advantage of EP Tender: a very affordable EV charges 12 times faster than a Model 3 LR (!) by adding a Tender or swapping it. Fast charging is a requirement on motorways, but alternate solutions must be tried alongside.
- Graphene supercapacitors: Charge your car in 15 seconds! But the energy density is a fraction of a LiOn battery: 60 Wh / kg versus 270 Wh/kg in the best current battery cells. It would make sense to have a hybrid configuration with high power density in the car and high energy density into the Tender. Supercapacitors and EP Tender are complementary.
- Battery swap: Battery swap is a tempting solution, but it is car dependant, and it requires a very costly widespread infrastructure. Better Place has made the most serious attempt in the early 2010, followed by Tesla, NIO and Ample (with a refined approach). EP Tender has the benefit of working with any EV (including light utility vehicles), adding capacity without impacting the payload and requiring very low-cost infrastructure. Overall the cost is lower, and the client value higher: we take the best of battery swap and do not suffer its weaknesses.
- H2 fuel cells: after much controversy, there is now a consensus on focussing fuel cells on heavy transport, trains and boats. Mercedes has abandoned H2 for passenger vehicles after 30 years of efforts, due to excessive cost as compared to batteries, even in premium vehicles. Once the H2 infrastructure has developed, we may envisage a fuel cell version of EP Tender, hybridizing a pure EV on demand. We will use the winning technology (battery or H2), while retaining the same pay per use benefits, and the same platform and EV interface for full compatibility over time and territories.
- Dynamic inductive & conductive charging: like EP Tender, they have the huge benefit of saving on the on board battery size and charging time, as the charging is continuous while driving. Some pilots are being made to evaluate the infrastructure cost, the vehicle cost, the electromagnetic pollution, the safety, and the normalisation. If successful, the transition to having all motorways and most vehicles equipped will take decades. Having the EP Tender platform equipped with the receiving hardware (inductive windings or current collector) would facilitate this transition as all our clients could choose between the best of add-on battery, fuel cell, or on road charging device depending on technology progress and territory.

EP Tender is a highly innovative solution, which complements very well all other solutions, rather than competing with them. It makes EVs accessible to all categories of the public, in an economically sustainable way, with the same convenience as petrol cars, and reduces drastically the environmental footprint of cars and light utility vehicles. EP Tender fertilises the market.

EP Tender

Team

Jean-Baptiste Segard, CEO,
EPFL, INSEAD AMP

Hugo Basset, Data scientist,
Ecole Polytechnique, UC Berkeley

Vincent Baudier, Mechanical engineer,
Arts et Métiers, Georgia Tech

Théo Laurent, Mechanical designer,
IUT Mantes en Yvelines

Ahmed Gharsellaoui, Embedded Software,
ENET

Ophélie Cavillat, Embedded software,
Polytechnique Montréal, Grenoble-INP

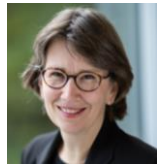
Zied Abidi, Electronics engineering,
ENSIT

Starting in 2021 : Head of sales and marketing

Advisory board

Bertrand Largy: former Renault's Expert Leader Powertrain & Batteries

Martin Roemheld: Head of e-mobility Services at VW Group, Board member of Ionity



Philippe Chain: Chief Client Officer Verkor, formerly at Tesla, Audi, Renault

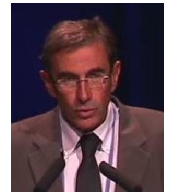
Gilles Van Eegher: former PSA's head of Europe homologations

Pascal Serres: Mobility consultant (Moby-D), former deputy CEO at ALD S.A.

Geneviève Houriet-Segard: EDHEC Open Leadership for Diversity and Inclusion

Philippe Doublet: former Renault's Secretary General R&D

Eric Morgain: Member of NextMove Business Accelerator Expert Committee



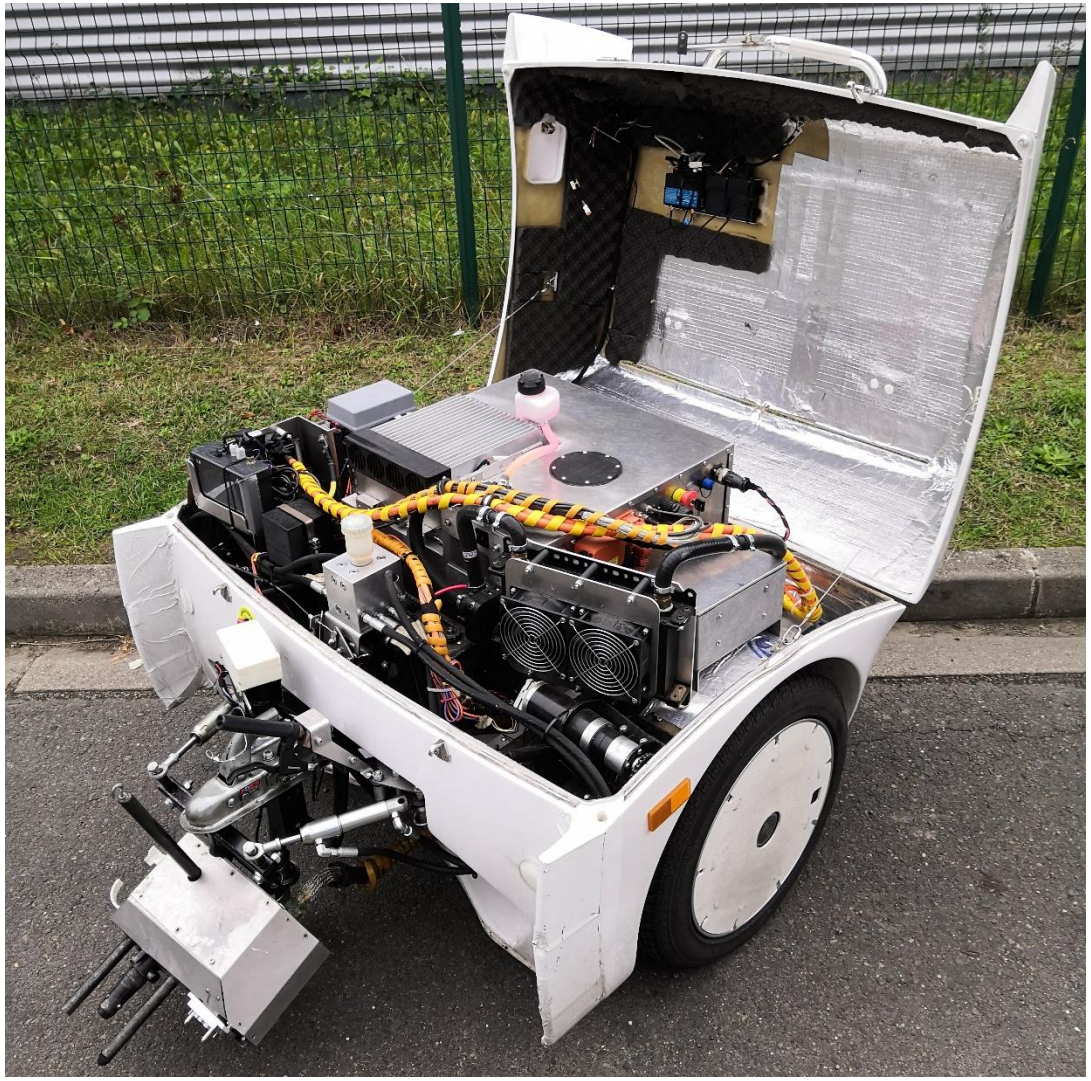
EP Tender

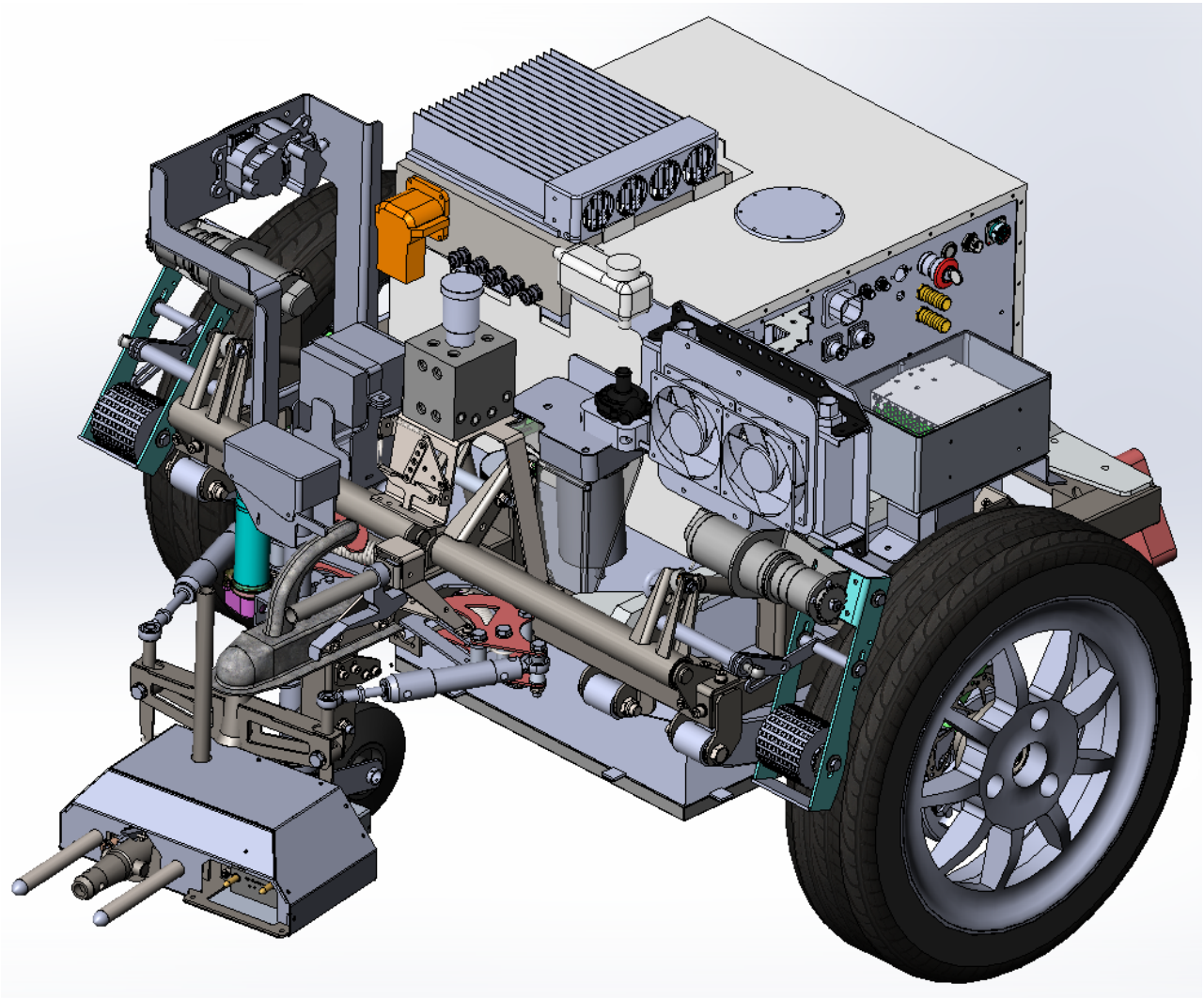
Achievements

- First 38 kWh demonstrator 2018
- Proof of Concept (PoC) Renault 2019:
  - Paris-Bordeaux with a 2013 Zoe in 6h30 (with Swap of Tender in Poitiers)
  - Aerodynamic analysis (enhanced SCx by 4-5% with Tender attached)
- 2020 Records :
  - 1000 km with a 2013 Zoe in 9h41’ (with Swap)
  - 500 km with a Renault Master ZE in 6h42’
- PoC Vinci Autoroutes 2021
  - Experimenting a motorway patroller during 3 months
- PoC Stellantis 2021:
  - PoC Fiat 500-e
  - PoC e-208
- Development of the first Tender CE (Construction Equipment) for a construction company, as a mobile charger for an electric mini digger

EP Tender

Battery Tender





Call to action

- EV opportunity:
  - French recovery plan for the automotive industry
  - Gentrification of new cars seen as a threat by stakeholders (due to large batteries and environmental regulations)
  - Strategic alignment of EP Tender, Stellantis and Vinci Autoroutes
    - Inclusive EV
    - Client value in useful features (instead of battery hypertrophy)
    - Reaching CAFE CO_2 targets with profitable vehicles and natural sales
    - Decarbonized highway
  - Technical Validation by OEMs through PoCs
  - EP Tender may become part the manufacturer's roadmap at the end of the project.
  - The project is considerably de-risked and has significant potential.

- Batteries as a Service opportunity
  - Mobile charger (EVs and construction equipment)
  - Zero emission generator (events, construction sites, filming)
  - Grid services
  - Vehicle to home, Tender to home/building

➢ EP Tender is looking for seed investment to fund the collaborative field tests alongside Stellantis and Vinci Autoroutes

EP Tender

Final message

Batteries as a Service:

- Doing more (range, renewables, inclusion)
- With less (cost, carbon impact, raw materials, travel time)

Traveling with peace of mind with an affordable EV

Contact

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