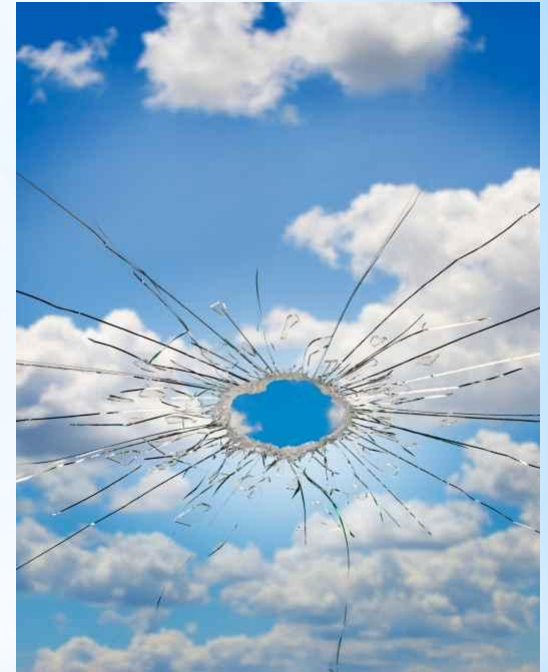


EP Tender [®]



Breaking the glass ceiling
of electric vehicle range !

Presentation to Liam Breslin DG Research & Innovation



- * A range extender (typically ICE, or fuel cell)
 - * Mounted on a small trailer (150 kg, 1 m long)
 - * Attached to an electric vehicle (typically class A or B)
 - * Capable of easy manoeuvring in reverse mode
 - * 24/7 self service rental on motorways and city periphery for long distance trips
 - * Range > 600 km (and more with refueling)
- * With EP Tender the EV can be the main car of most, not just the second car of a happy few**



*** EP Tender**

- * Drive electric
- * A car suitable for urban and interurban use
- * Go as far as you wish
- * Without compromising on cost, living space and comfort

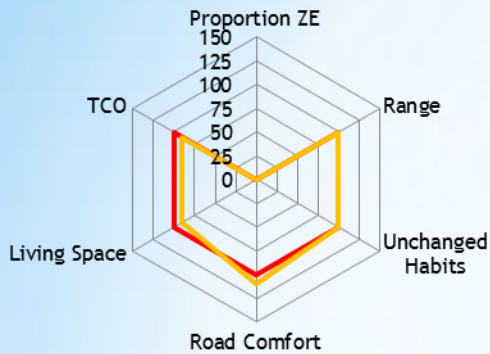
*Customer Value Proposition

- * BCG: 1.5 m EV and 1.5 m REEV sold per annum in 2020
- * Nissan and Renault target: 150 k EV per annum, Bolloré: 40k batteries per annum
- * 300k EV per annum in 2015 would be a decent start
- * France & Germany, Europe, California, China, rest of the world
- * EP Tender could reach 1 to 10% of EV sales ?

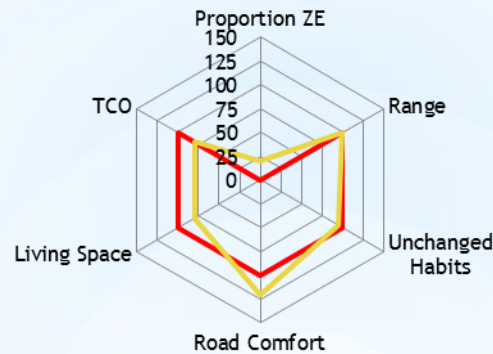
* Potential market

- * REEV (better suited to larger cars)
- * PHEV (expensive and bulky)
- * Quick drop (any future ?)
- * Quick charge (potential structurally limited)
- * Public transport (urban and long distance)
- * Multimodal transport (long term)
- * ...and ICE (is there to last quite a while)

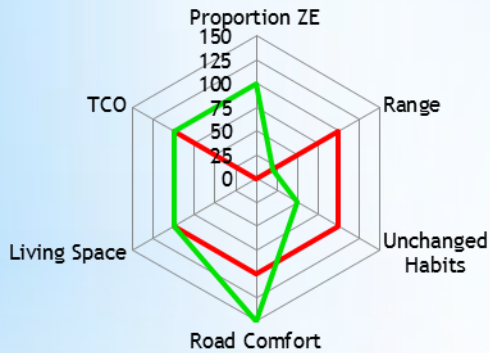
* **Competitors**



— ICE — HEV

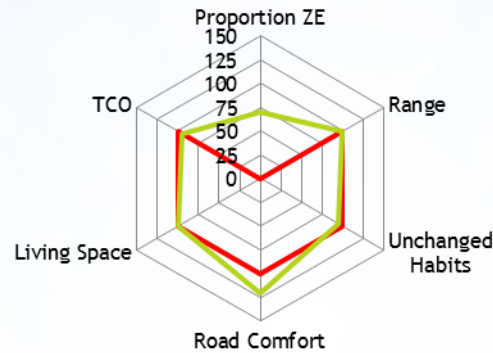


— ICE — PHEV



— ICE — BEV

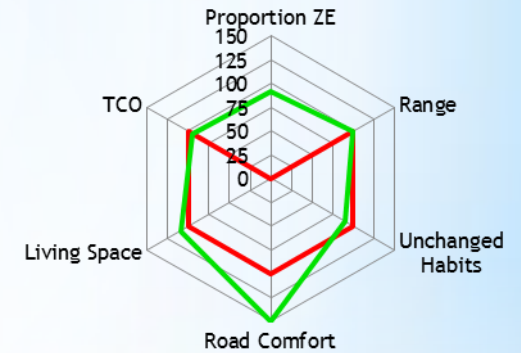
Available now



— ICE — REEV

Available medium term

- ZE= Zero Emissions
- ICE= Internal Combustion Engine
- HEV= Hybrid Electric Vehicle
- PHEV= Plug-in HEV
- BEV= Battery EV
- REEV=BEV (½ battery) + Range Extender on board
- TCO= Total Cost of Ownership
- Base 100 = ICE, except Zero Emissions
- TCO BEV=ICE



— ICE — BEV + EP Tender

Available short term

*Comparison

* Strenghts

- * Satisfies the occasional need of longer range
- * Reduced TCO compared to on board Range Extender
- * Can be available short term

* Opportunities

- * Much wider EV market
- * Bridge EV- REEV
- * Additional business for car distribution networks (renting)
- * Answer to sales force objections on range issue

* Weaknesses

- * Hitch should be mounted before factory gate
- * Blurrs the pure EV image (?)

* Threats

- * Manage rear crash security
- * Regulations / homologation
- * Standardisation of hitch & communication protocol EV - Tender
- * Evaluate consumer acceptance

* SWOT EP Tender

- * Customer acceptance
- * No EV's on the roads yet !! (but good ones are being build now)
- * Get EV makers on board
- * Mesh the territory (for example 350 rental spots required to cover France)

* Market barriers

Once concept is proven:

- * Sell licences of the patent(s) to EV makers, who manufacture and market EP Tenders in their existing sales channels + possibly rent them: easy and profitable, broader distribution/promotion, global approach
- * [Build the tenders and market them through car dealers and other distributors ?]
- * Establish Tender'Lib rental network (per country/region): requires at least a financial partner or most likely an industrial partner (Total, Vinci, EDF, ENI, Deutsche Bahn, Autogrill, ENI)

 **Business model**

Customer value

* $\pm 60\%$ of the price of an ICE vehicle in car sharing?

Cost

* $\pm 25\%$ of the cost of an ICE in car sharing?

→ A viable business model can be build

* Pricing EP Tender in rental/sharing mode

- * Build prototype 0 (proof of concept) and in parallel get FP7 Green Cars Initiative financing
- * Prove market potential through analysis of user tests
- * Industrialise prototype
- * Get going: manufacture EP Tenders and build Tender'Lib rental network
 - * Choose initial markets/region
 - * Progressive expansion alongside success

***Solve the chicken & egg equation**

EV manufacturers

- * Selling/renting by car dealers, under their brand/EP Tender concept
- * Initial marketing at the occasion of selling the EV: EP Tender hitch option including free one year subscription and some free usage.

Tender'lib

- * Pay per use renting network
- * Partner/franchise in each country / region
- * Use extensively PR in medias, EV associations, Social media buzz, rental spots visibility

Social media and press are key to create sense of « smart tech »

* Distribution /
commercial issue

- * Stronger EV usage growth
- * Very light infrastructure
- * Low cost of implementation
- * Reduced footprint of the rental spots ⁽¹⁾
- * **European industrial innovation**(and a worldwide market)

* **Public authorities
benefits**

(1) EP Tender is very compact, quick stops

- * Investment required is relatively small (far less than charging infrastructure)
- * It could be build within a short timeframe
- * If the idea works it could be a strong catalyst and very significantly boost sales and public adoption of EV's
- * Building a european Tender'Lib network and a common hitch standard among car makers would require pan european cooperation among OEM's and other industrial partners
- * FP7 could help making this happening
- * EP Tender is somehow a « pari de Pascal »: small loss, but huge upside !



* Conclusion

« Estimons ces deux cas : si vous gagnez, vous gagnez tout; si vous perdez, vous ne perdez rien. Gagez donc qu'il est, sans hésiter. »

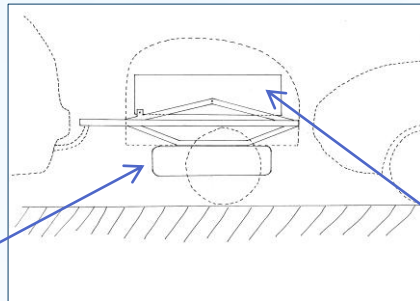
*Appendix

- * Patent filed with INPI on 09.03.2012, number 12 52169, with support from an intellectual property advisor
- * Title of the patent: « Remorque routière à train de roulage secondaire orientable » (road trailer with orientable secondary wheels)
- * Proof of concept: <http://youtu.be/DKj6CBwqCsA>
(in this video the secondary wheels are not retracting automatically yet)
- * Parking manoeuver:
<http://www.youtube.com/watch?v=euD7d9duRq8&feature=g-uplt>

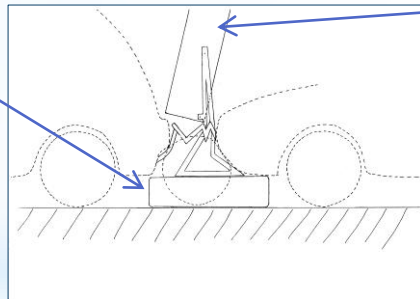
* Patent 1: reverse drive

- * Patent filed with INPI on 23.05.2012, number 12 54682 with support from an intellectual property advisor
- * Title of the patent: « Dispositif de mise en sécurité d'un objet sur un mobile en cas de choc » (moving an object to a safe place in case of a crash)

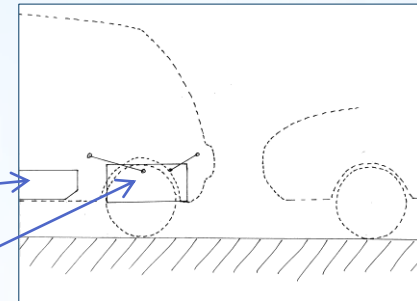
EP Tender



Gasoline tank

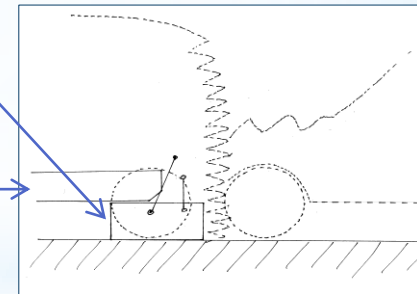


REEV



Battery

Range extender



Battery

* Patent 2: Security in case of a rear crash

* Assumptions: (very indicative orders of magnitude!)

- * EP Tender and dock development: 1500 k€
- * Unit cost per EP Tender: ± 4 k€
- * Unit cost per dock: ± 1 k€
- * Initially 350 spots to cover the territory (150 on main cities periphery and 200 on motorways)
- * 3 Tenders and 6 docks per spot
- * Internet developpements : 1500 k€
- * Initial marketing to EV owners and fleet managers: 1500 k €
- * Others: 1000 k€

* Total= 12 m €

* Example of initial investment for a region like France

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