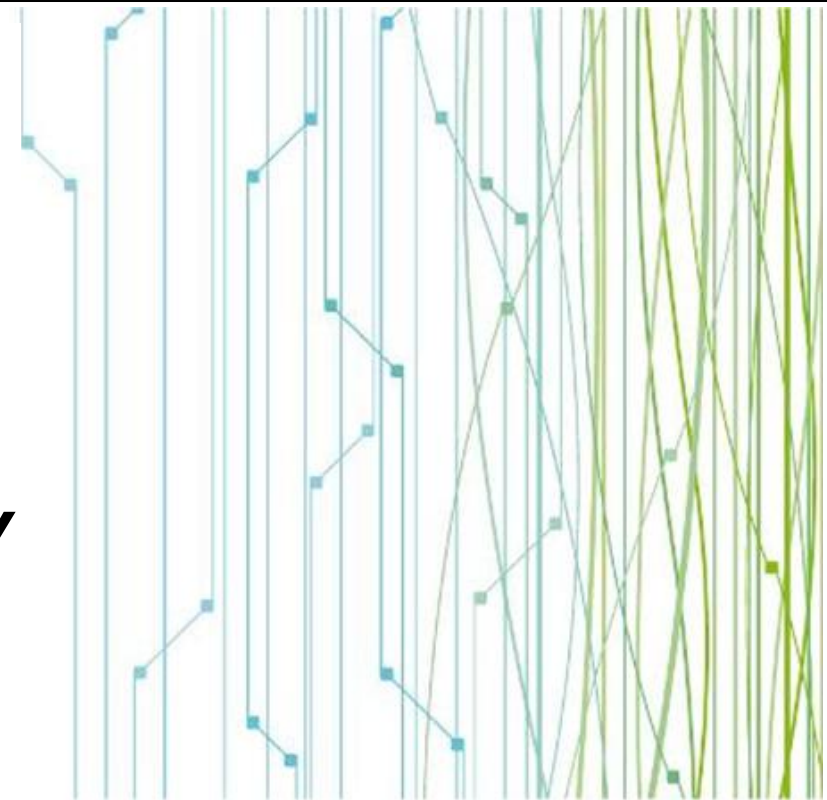


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PATH TOWARD EV BATTERY PRODUCTION

Christophe GARNIER

*Advanced Battery Lab Director
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ZERO EMISSION STRATEGY



become leader, together with Nissan, in zero emission mobility by offering affordable electric vehicles



FLUENCE



TWIZY



KANGOO



ZOE



LEAF



Zero Emission



TODAY

ZOE

RENAULT
Z.E.



ELECTRIC EXCELLENCE
FOR ALL

ZOE : A MASS MARKET ELECTRIC CAR WITH OUTSTANDING ASSETS



1. Best-in-class RANGE

- NEDC = 210 km
- Range optimiZEr : 100 – 150km
In suburban use



2. Attractive PRICING

- From 13.700 € incl. VAT (in France with Bonus 7000 euros) + battery fee 79€/m



3. R Link system with EV specific applications

4. First EV with FAST CHARGING 3 to 43 kW

- 80 % charge in 30 minutes and full charge in 1h
- Innovative AC charging technology : cheaper charging stations allowing also 22kW



TOMORROW: to go forward to remain leader



BATTERY: a key component

Battery for EV: not a single technology, still an open field, with different Li-Ion chemistries



BlueCar (Bolloré) : LMP



Honda Fit: LTO Anode



Renault ZOE: LMO/Gr

Battery: a lot of components and technical fields to master

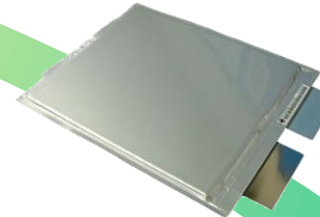
Powder



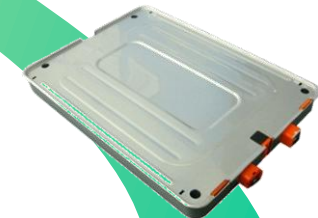
Electrodes



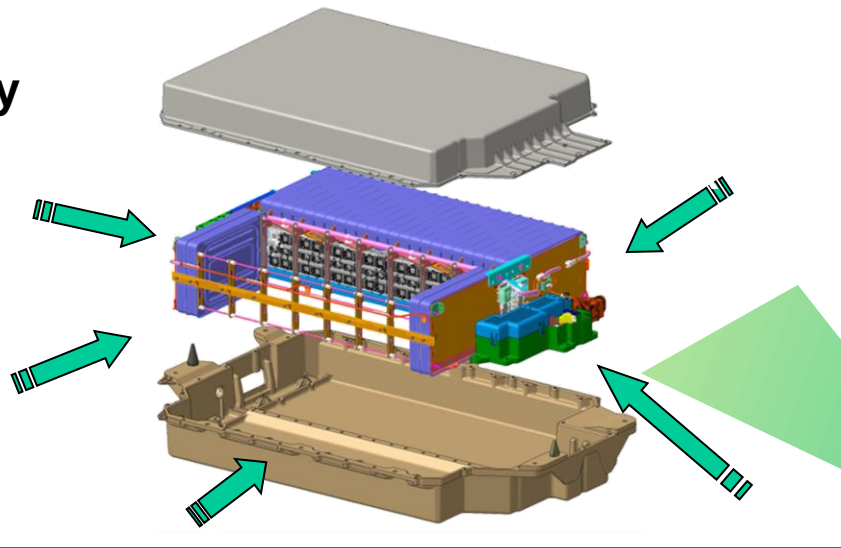
Cell



Module



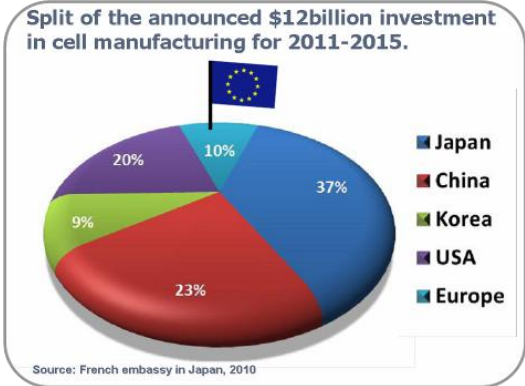
Battery



Mastering the route from R&D to production through partnership

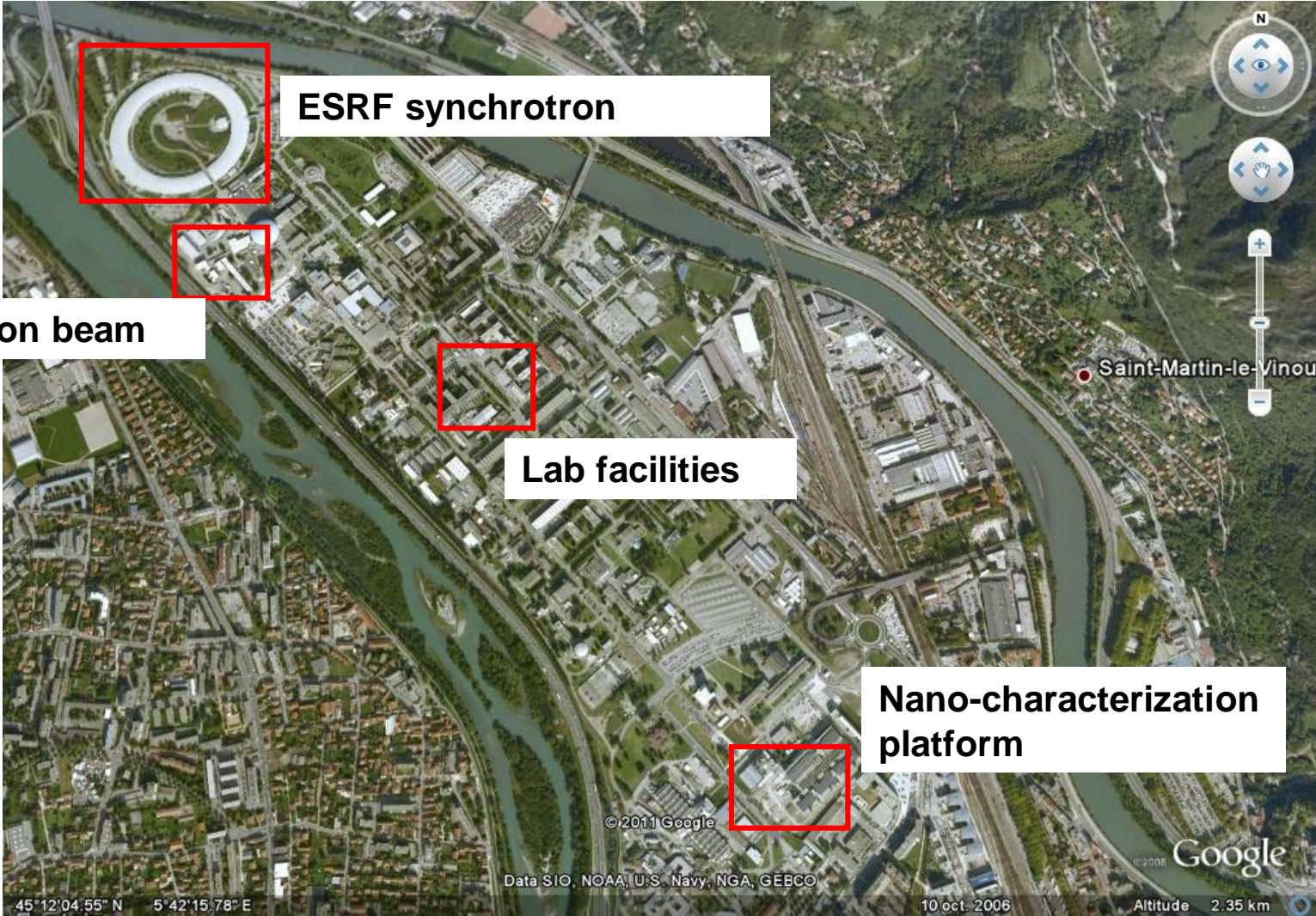
Characteristics:

- A long road
- Requires a lot of investment and funding in both human and material resources
- A lot of existing capacities in Asia



Increase of European added-value will conduct to the building of a strong local industry.

Example of partnership: Renault/CEA Lab in Grenoble - Immersion within a scientific campus



Quick overview of available abilities for batteries

More than 400 square meters of dry rooms

More than one hundred highly skilled researchers and engineers

A whole set of technologies at a single place:

- Active material upscale
- From coin cells to large scale prototyping for electrode, cells and batteries
- Testing
- Materials characterization

Benefit from all CEA-Tech experience and skills

Summary

Battery is a key component in a strong EV strategy

Not a single answer for battery technologies, and a lot of room still exists for innovation and improvement

To lead the race, 3 key points must be mastered:

- R&D to anticipate new products
- Production for cost reduction and quality insurance
- Network of partner/suppliers to consolidate the global framework

A fast and profitable strategy could be partnership to build a sustainable business in Europe

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THANK YOU ! – Q&A

