

ELIBAMA

European Li-Ion Battery Advanced MAnufacturing

Jerome PEYRARD

Project coordinator - RENAULT SAS



European Green Cars Initiative



Z.E. ZERO EMISSION VEHICLES



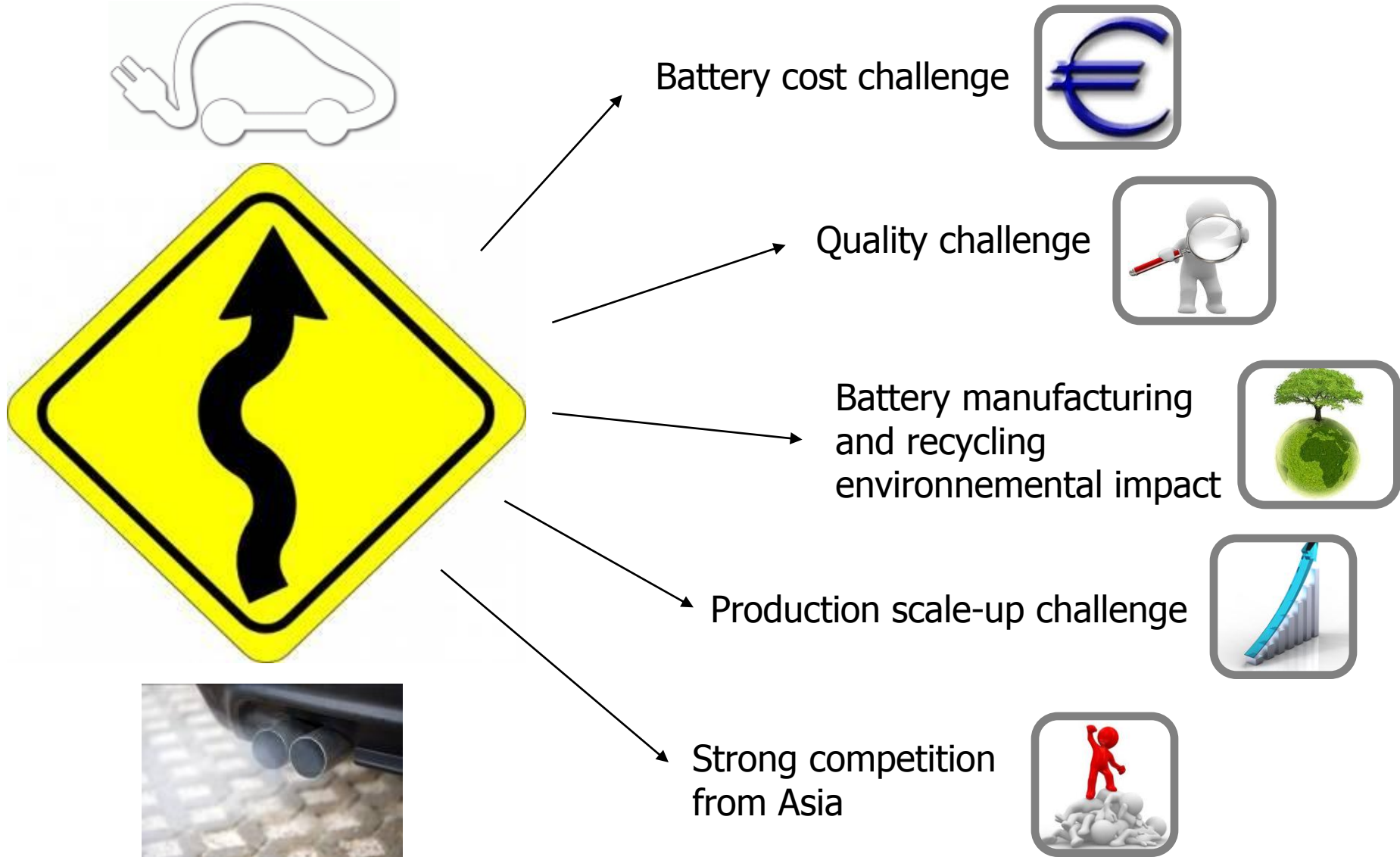
J. PEYRARD – RENAULT SAS

Joint EC / European Green Cars
Initiative Workshop 2013
10 April 2013

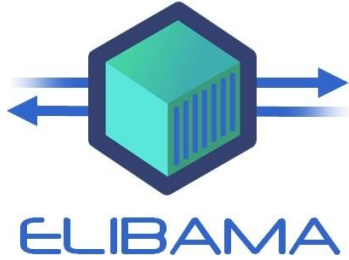
PROPRIETE RENAULT



Project's Context



Project's Objectives



European Lithium-Ion Battery Advanced Manufacturing



Enhance and accelerate the
Creation of a strong European automotive battery industry



Guarantee drastic cost reductions
across the value chain of the battery production.



Improve downstream and end of line
Quality



Significantly improve environment-friendliness
across the value chain of the battery production.



Project's strengths

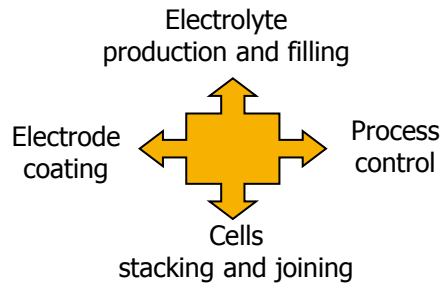


Budget : 15,4 M€ - Grant : 9,0 M€ Start : Nov 2011 - Duration: 3 years

Coordinator : Renault 

	DAIMLER		
	IN-CORE <small>Cooperation</small>		
			
			

A powerful consortium

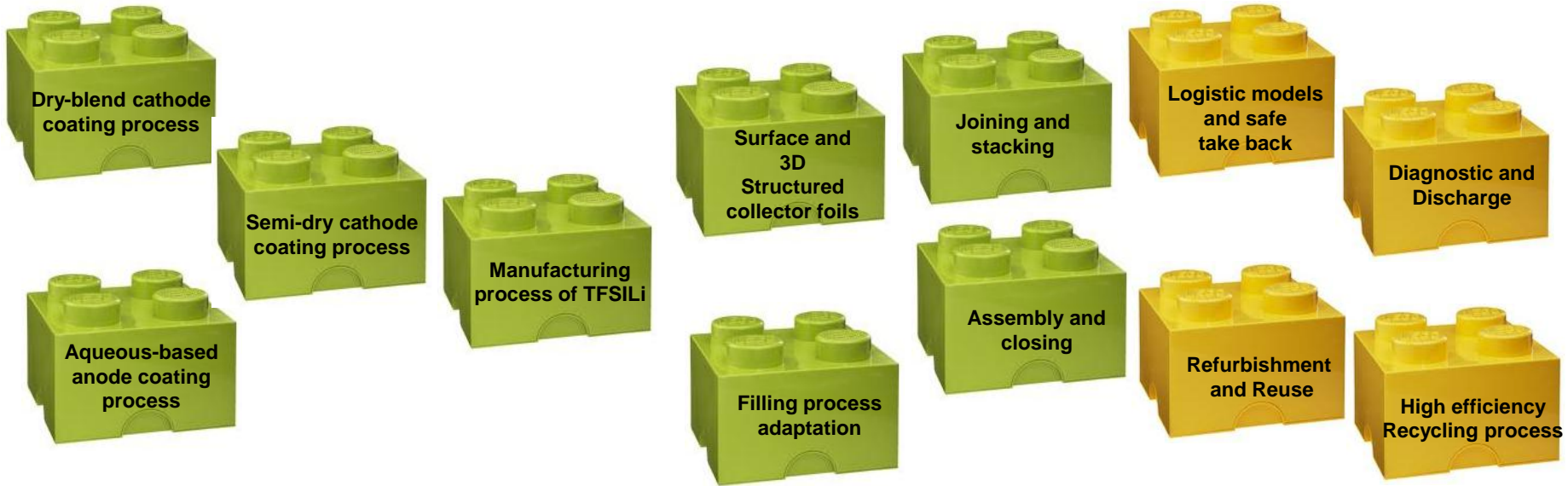


Covering a wide spectrum of batteries manufacturing steps



3 M€ dedicated to demonstration

Technical approach



Technical results : overall progress

Nov. 2011 – April 2013



MANAGEMENT

Structuration of the consortium / Consortium agreement signed
Performance indicators
Website ...

1st amendment presentation

PUDF Draft

1st assessment of the technical results (Cost, MCA)



BASE LINE

Manufacturing process base line definition
State Of the Art
1st patents database



TECHNICAL ACTIVITIES

Ex. : 1st solvent free coating trials
1st structured foils manufacturing
1st cells Non Destructive Tests
Start of the recycling process dvpt
...

Lab-scale process improvements

Pilot stage preparation

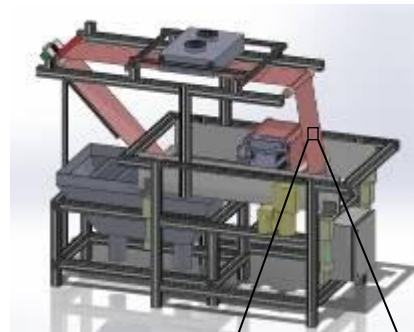
April 2012 : 1st intermediate M6 reporting
7 deliverables and 2 milestones issued on time

Oct 2012 : 2d intermediate M12 reporting
6 deliverables and 2 milestones issued on time

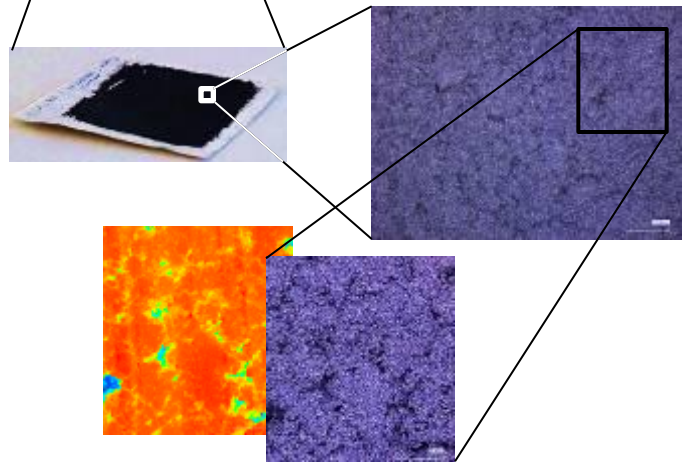
Dry blend cathode coating

Target

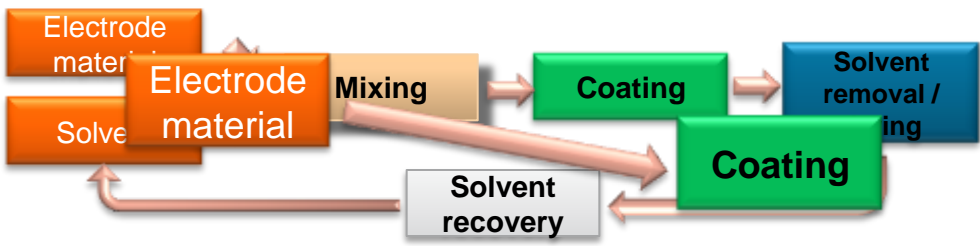
- **Eliminate** the use of **toxic solvents** in the production process (NMP!) and additionally **reduce binder content**
- **Eliminate energy use** and **cost** for drying and solvent recovery processes
- **Simplify production process** for electrode foils
- Significantly **reduce line footprint**, implement fast roll-to-roll process



Lab coater at Fraunhofer IPA, Stuttgart, will be developed together with Daimler into a Demonstrator for different applications



First foil samples from lab trials



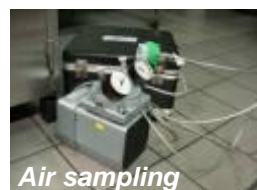
Improved coating process

Clean Manufacturing Process Control Audit Global Guideline

Audit performed on SAFT manufacturing plant (Bordeaux)

Target

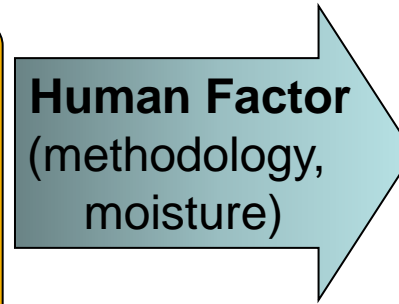
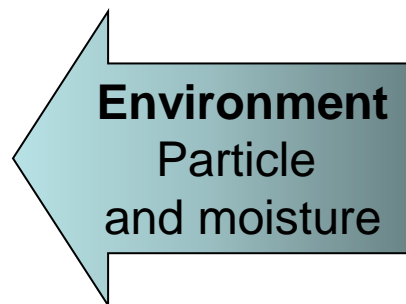
- **Improve** the electrodes and cells **quality** by implementing a clean manufacturing process control
- **Methodology** : Determination of contaminants (nature & sources) - Jan. to Oct. 2012
Implementation of solutions - Nov 2012 to Oct 2014



Air sampling

UPE membrane analysis

Energy Dispersive X-Ray Spectroscopy



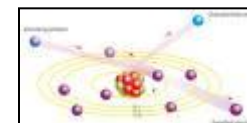
Product moisture after each step



Humidity device

Analytical analysis (ICP-MS, titration)

X-Ray Fluorescence Spectroscopy

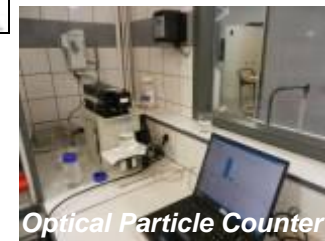
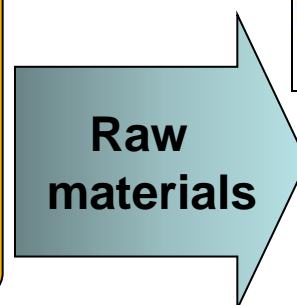
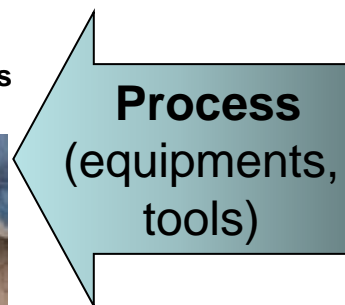


Solvent & Electrolyte Particle counting



Sampling

Capture of particles



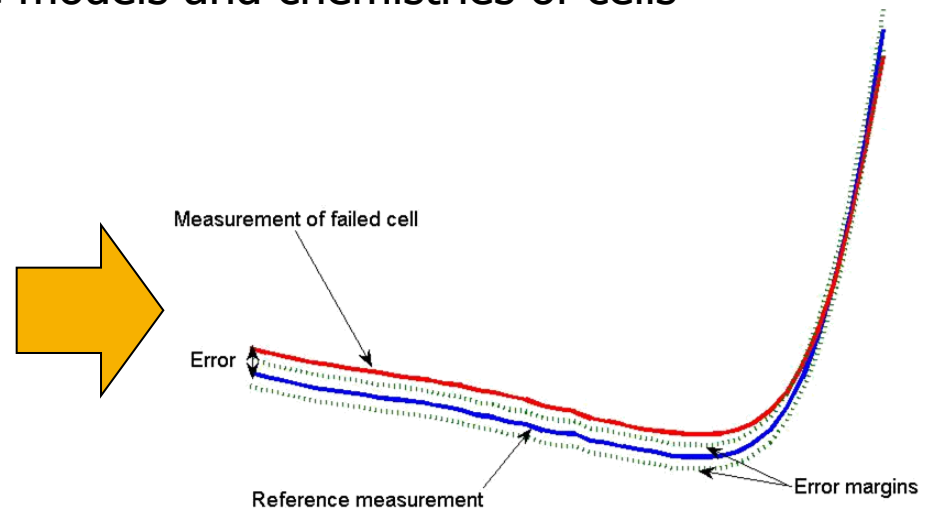
Optical Particle Counter

Non-destructive testing of Li-ion cells for production quality control

Target

Reduce quality control testing time with an accurate, fast non-destructive testing technique

- Perform active measurement of cells live on the production line
- Reduce testing time from up to 2 weeks to less than 5 minutes
- Technique adaptable to multiple models and chemistries of cells



Electrochemical Impedance Spectroscopy measurements

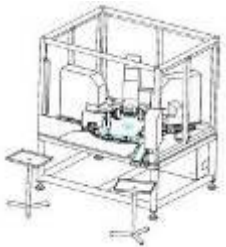
Next steps and Outlooks

2013

- ❑ Finalize the development and validation of the new processes at lab-scale.



- ❑ Prepare the pilot scale phase :



- ❑ Equipments specifications and purchase;
- ❑ Layout.

- ❑ Monitor the projects indicators : quality, cost, environmental impact (LCA results)



2014

- ❑ Produce and test 20 to 40 Ah cells to demonstrate the feasibility and the performance of new processes at pilot scale.



- ❑ Final assessment of the cost, quality and environmental savings.



- ❑ Dissemination

- ❑ Stakeholders conferences
- ❑ training courses.



- ❑ "Plan of Use and Dissemination of Foreground" of the project



Thank you for your attention ...



Q & A



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PROPRIETE RENAULT



















Project general information / Main Partners

Project full title: European Lithium-Ion Battery
Advanced Manufacturing

Coordinator: Jérôme PEYRARD (Renault SAS)

Project partners:

Coordinator : Renault							
	DAIMLER						
							

Starting Date: 1st November, 2011

Ending Date: 31th October, 2014

Budget Total/Funding: 15.4 MEUR / 9.0 MEUR.

Type of project: Collaborative Projects (CP)
Large scale Integrating Projects (IP)