European Green Cars Initiative

Joint EC / European Green Cars Initiative PPP
Expert Workshop 2013

Electric Vehicles Batteries: Moving from Research Towards Innovation

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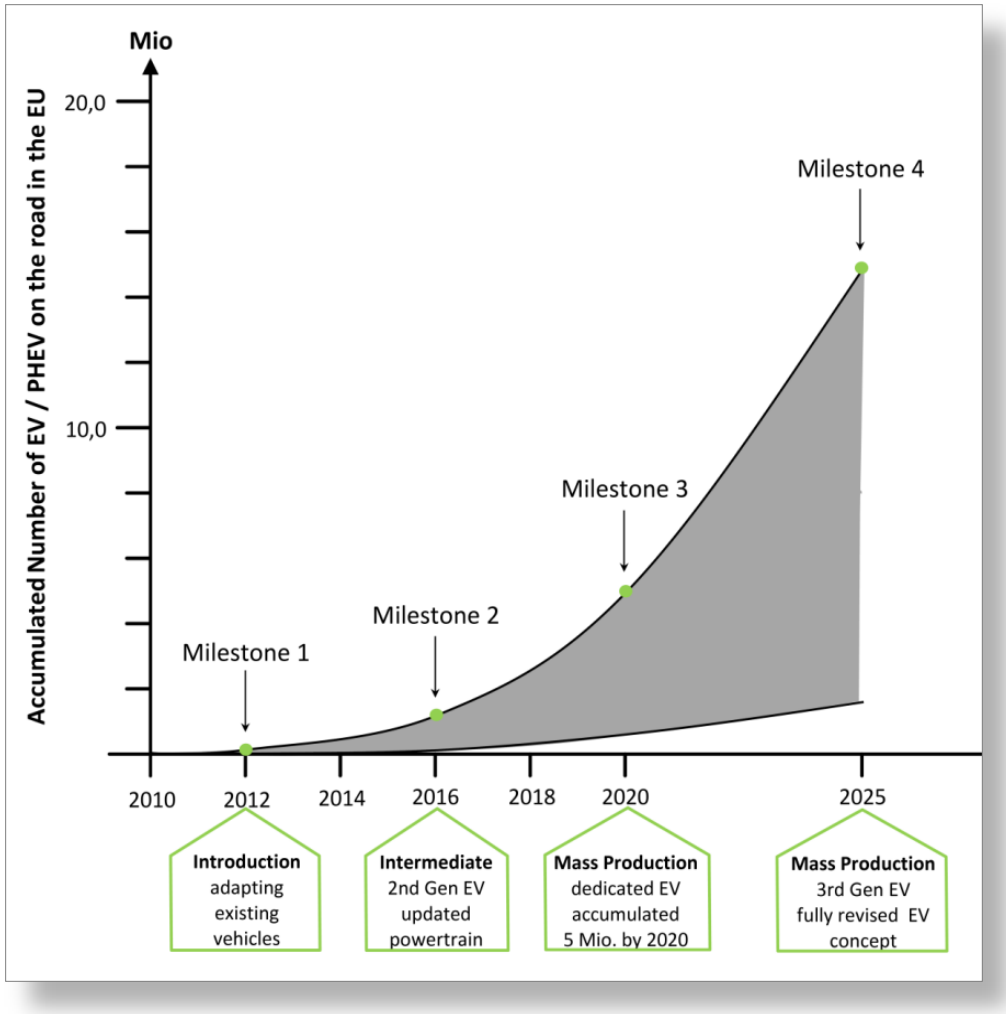
Chair EPoSS Executive Committee / Vice Chairman EGVIA

Electrification Roadmap

In FP7 started

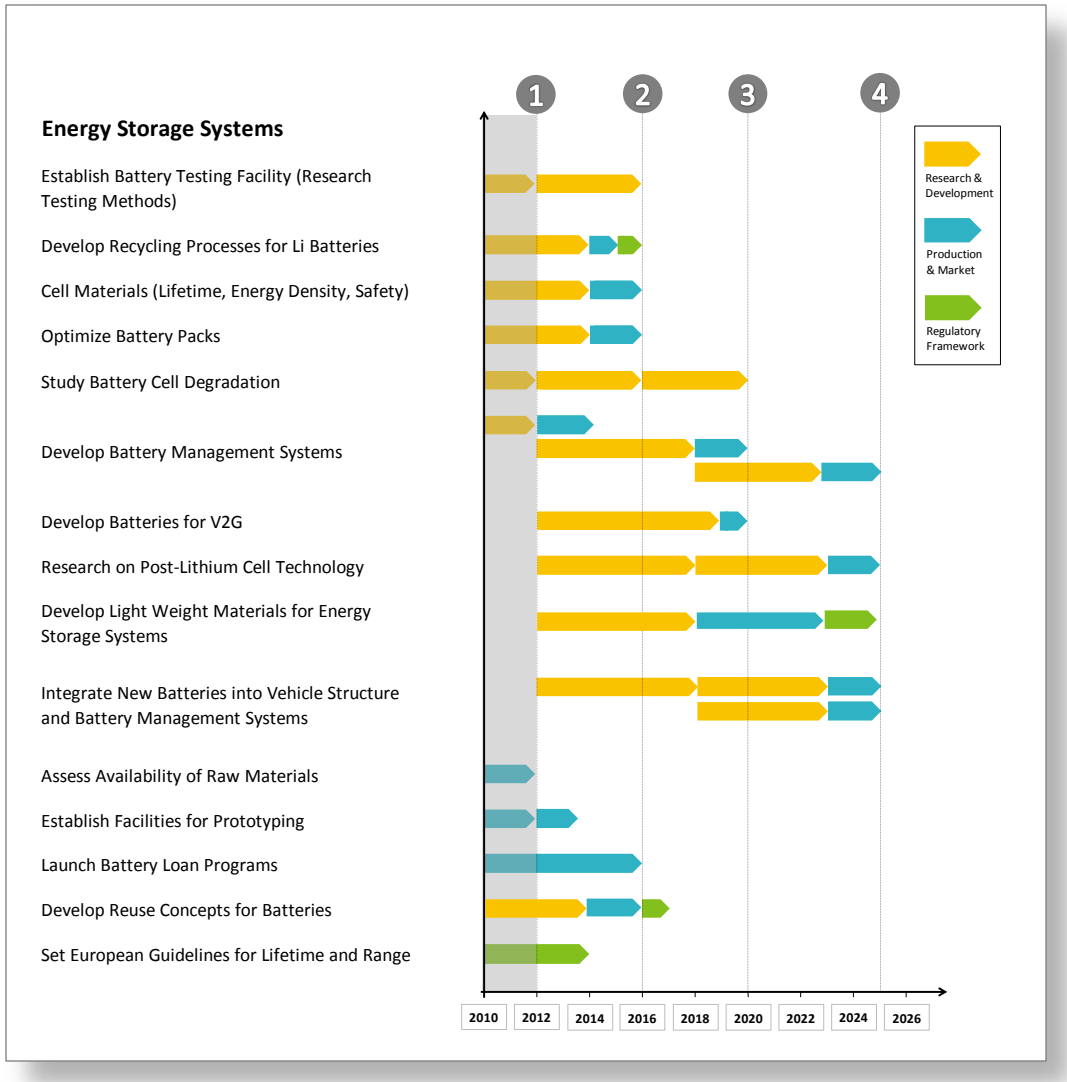
- Drafted by ERTRAC, Smart Systems and Smart Grids in 2009 (update 2012)
- Optimistic scenario requires batteries providing doubled life time and energy density at 30% of 2009 cost by 2020
- Also, a completely new vehicle E/E architecture, synergies from various technologies, and using full potential of ICT are needed



Focus Topic: Batteries

In FP7 started

- Implementation by the programs and on projects of the PPP European Green Cars Initiative (EGCI)
- Topics include:
  Materials,
  technologies and processes,
  manufacturing,
  nanotechnology,
  aging resistant batteries,
  battery management systems
- About 20 projects were launched



Workshop Today

Objective:

Provide recommendations on research and innovation support activities in the framework of the European Green Vehicles Initiative PPP of Horizon 2020.

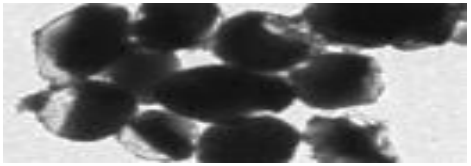
Agenda:

- report results of collaborative research projects on batteries
  funded under the European Green Cars Initiative
- review relevant attempts for the implementation of prototype manufacturing and mass production in Europe
- discuss current European activities and policies for bridging the gap between research and innovation in the domain of batteries for the electric vehicle

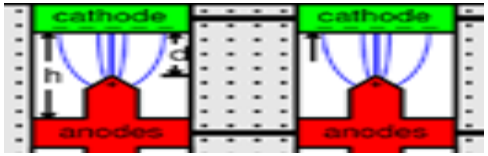
Reports:

Minutes, slides and proceedings with project papers to be published

Redox-Flow-Batteries: enabling short recharge with reduced volume (VW)



Nanostructures increase lifetime and robustness (Stanford Uni)



Digital quantum baterry:: millions of nano-capacitors could have 10x LiO E-density (Theory)

	Current Li-ion	Optimistic Li-ion*	Optimistic Li-Sulfur*	Optimistic Li-Air*
Specific Energy Density - Wh(total)/kg (cell)	250	530	550	710
Specific Energy Density - Wh(total)/kg (system)	**150**	**290**	**300**	**280**
Energy Density - Wh(total)/liter(cell)	520	1050	620	760
Energy Density - Wh(total)/liter(system)	**230**	**375**	**260**	**240**

*Assumes Li-Metal negative

Benchmark LiO, LiS, LiAir

Questions

Evaluation & Benchmark of Electrification Approaches from a System Perspective

- How much will it weigh?
- Will it fit?
- How well does it accelerate?
- Will it start quickly from -30°C?
- Will it run well at 40°C?
- Will it last 150k miles (240k km) and 10 years?
- How fast can it refill?
- Is it safe?
- How much will it cost to buy and refuel the vehicle?