

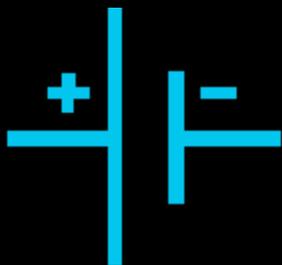


Battery Safety and Industry Developments

Alfons Westgeest
EUROBAT Executive Director

*International Conference on Hydrogen Safety,
Brussels, 10 September 2013*

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What Similarities: Hydrogen-Fuel Cells and Batteries ?

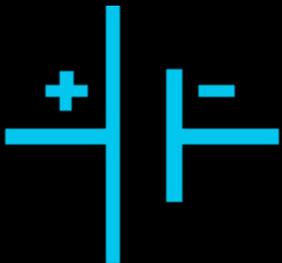
Both are breaking ground:

1. Transition to a low carbon economy – renewable energy. New combination of the mobility and storage concepts
2. Safety Regulations and Standards with practical aspects that both technologies need
3. Developments: Testing and Database
4. Public Acceptance – Media
5. International and Transatlantic Cooperation Research : Transport; Industrial policy; Clean energy; EU Strategy

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About EUROBAT

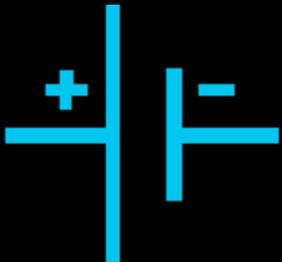
Association of European Automotive and Industrial Battery Manufacturers

- Promotes the interests of European manufacturers and supply chain of automotive and industrial batteries
- Represents the industry on European Institutions level, national and international level; including Environment, Health and Safety
- Provides expert information to decision-makers, customer, stakeholders and media
- Includes important players in a large, experienced and global market for Electro-Mobility and Energy Storage

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Membership

Battery Manufacturers

- ASSAD



- Banner



- EnerSys



- Exide



- FIAMM



- Hoppecke



- Inci Akü



- Johnson Controls



- Dow Kokam

(Battery System Integrator)



- MIDAC



- Moll



- Mutlu



- Rombat



- Saft



- Systems Sunlight



- TAB



- Yuasa



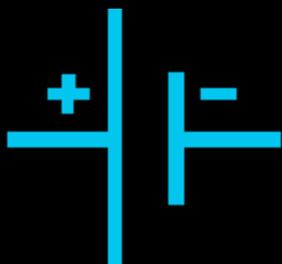
- AKOM Group



- Eternity Technologies



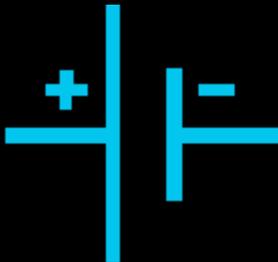
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Membership

Supply Industry

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▪ Abertax



▪ Accuma Spa



▪ Accumalux



▪ Amer-Sil



▪ Berzelius



▪ BM Maschinen GmbH



▪ Daramic



▪ DEKRA Certification



▪ Entek



▪ Evonik



▪ Frötek



▪ Glatfelter



▪ Hollingsworth & Vose Company



▪ HOFMANN Power Solutions



▪ Mecondor



▪ Mitsui Chemicals



▪ MTH Metalltechnik Halsbrücke



▪ Nissan



▪ Recylex



▪ SOVEMA



▪ TBS



Water Gremlin Aquila Company S.p.A.

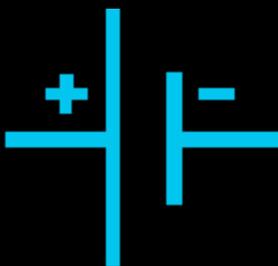
European Battery Industry' Strong Start

EUROBAT Regular Member Operations
Number of Employees per Region

Region	Number of Employees
 Central Europe	9908
 Southern Europe and Mediterranean	10157
 Eastern Europe	5372
 North-Western Europe and Scandinavia	2251

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*EUROBAT Battery
Manufacturers provide over
30,000 direct jobs to
Europe, with more to come*



1. Transition

Growing demand for energy storage

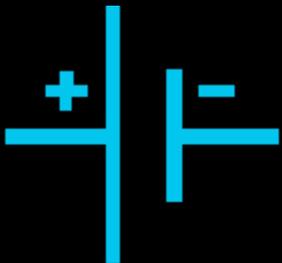
Industrial

- Electricity Grid Functionality; Self-consumption
- Renewable Energy; Photovoltaic, Wind
- Motive Power – Public Transport



Automotive

- Advanced Batteries & Start-Stop
- Micro, Mild and Full HEVs
- Plug-in Hybrid Electric Vehicles, (Hybrid)EVs

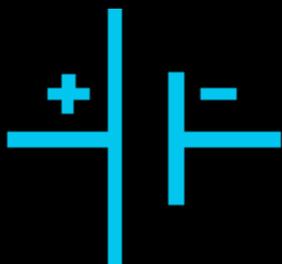


All Batteries Technologies: Sustainable & Efficient

Battery families to effectively contribute to the efficient and sustainable use. All battery technologies are engaged in Environment, Health and Safety. Each have specific attributes:

Battery Technologies	Characteristics & Use (in development):
Lead based	Proven application, low production cost Numerous motive, standby and grid applications Start-Stop micro application, up to HEV autonomy of main battery
Nickel based	Proven off-shore & harsh environments, long life For Energy storage (such as largest bank in Alaska) Propulsion of HEV applications mostly
Lithium based	High energy density, small and light Energy balance / storage or propulsion of HEV, plug-in HEV and full Evs;
Sodium based	High energy density, light Large storage options; Propulsion of PHEV and full EV, commercial vehicles;

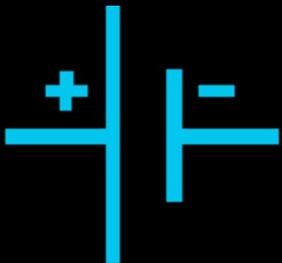
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2. Battery Safety & Regulation and Standardisation

Benefits of internationally harmonising safety and environmental testing processes:

- Interoperability of (Hybrid / Plug-in) Electric Vehicles
- Increased administrative efficiency
- Research collaboration and reduced testing overlap;
- Optimised tests through pooling of resources
- Reduction of costs
- Information sharing and public acceptance.



Regulation & Standardisation

➤ *Main Standards and Regulations*

UN - Economic Committee Europe

Regulation 100 and many others covering mandatory rules; new EV Safety Working Group to develop a Global Technical Regulation (GTR) next year. Hydrogen GTR already in place

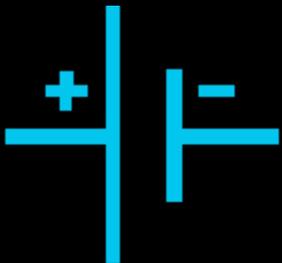
EU Standards CEN CENELEC;

Coordination in Committees and Workshops

International Electrotechnical Committee (IEC)

International Standards Organization (ISO)

Existing battery technology standards; next page



Existing Standards for Batteries used in (H)EVs

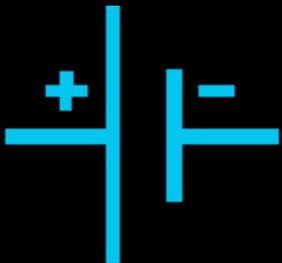
Several **IEC** and **ISO** standards already exist to give safety and test specifications for batteries used in EVs:

- **IEC 62660-1, 2**: Secondary batteries for the propulsion of electric road vehicle. Part 1: performance. Part 2: reliability;
- **IEC 61982**: Secondary batteries (except lithium) for the propulsion of electric road vehicles – performance and endurance tests;
- **IEC 62485-3**: Safety requirements for secondary batteries and battery installations. Part 3: traction batteries;
- **ISO 6469-1, 2, 3**: Electrically propelled road vehicles – safety specifications. Part 1: on-board rechargeable energy storage system (RESS). Part 2: vehicle operational safety means and protection against failures. Part 3: protection of persons against electric shock;
- **ISO 12405-1, 2**: Electrically propelled road vehicles – test specification for lithium-ion traction battery packs and systems. Part 1: high power applications. Part 2: high energy applications

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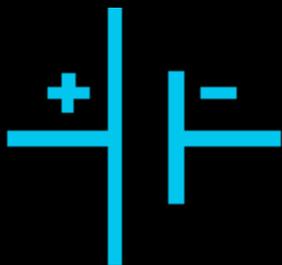
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3. New Developments

- Battery Testing: BESTEST
- Database: BaSIT

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BESTEST – Battery EV Testing



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EUROBAT and the ***European Commission Joint Research Centre Institute for Energy & Transport***

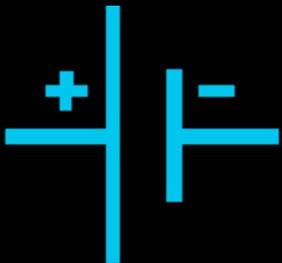
Actors: EUROBAT Members, JRC and overall industry will be working on the development of battery energy storage testing for safe electric transport (BESTEST)

Objectives: provide impartial and balanced scientific evidence to ensure that European standardisation supports legislation and policies on clean transport

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Advantages of Testing Program

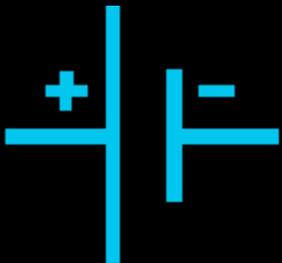
Strengthening Safety Protocols and Harmonisation: *testing specifications and procedures*

1. Streamlining pre-normative research activities on battery performance and safety testing and evaluation to best meet the priorities of European battery manufacturers and component suppliers
2. Contributing to European and international standardisation and regulation by ensuring a sound scientific and technical basis for robust legislation and policies on clean, efficient and safe electricity storage particularly for transport.

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BaSIT: Battery Safety Information Tool

EUROBAT & EC JRC IET collaborating

- Development of an online database containing descriptions of unwanted events or near-events involving batteries, battery systems and their use
- Information will include type of battery involved, situational background, likely cause, consequences of unwanted or near-event and, most importantly, the corrective actions taken and the lessons learned

EUROBAT will be collecting information from its membership to input to the BaSIT's database.



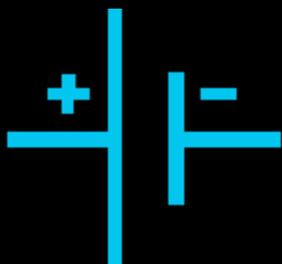
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4. Common Interest HyFC and Batteries

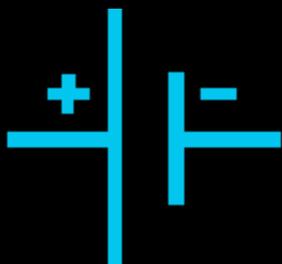
Accelerate acceptance of technologies

- **BESTEST** and **BaSIT** are examples of industry and regulators partnering for the development of future transport modes. EV and Plug-In are expected to have 5-7% of EU car sales by 2020
- **Tackling misconceptions and educating consumers** is key to ease acceptance of technologies (hydrogen, battery vehicles)
- **Improving the public awareness** and trust will benefit the market deployment and uptake of more sustainable transport modes for both eMobility and FC/Hy mobility concepts
- Hydrogen and Fuel Cell and Battery technologies are **complementary: What can we learn from each other?**
- Now to get TransAtlantic harmony?

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5. Joint Transatlantic e-Mobility Work Plan

- EU-US coordination focusing on *Batteries* and *components*, *smart grids* and *e-vehicles* to improve:
 - Testing methods
 - Standardisation
 - Interoperability

Main actors involved in the process:

- US Department of Energy & the Argonne National Laboratory
- European Commission Joint Research Centre in Petten (NL) and ISPRA (It)
- EUROBAT and Transatlantic Business Council facilitating



U.S. DEPARTMENT OF
ENERGY



Joint Research Centre

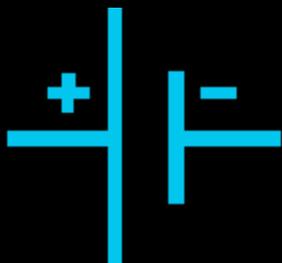


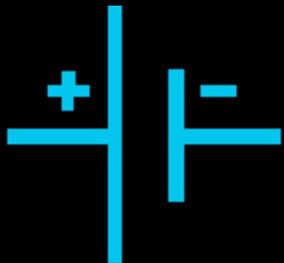
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BUSINESS COUNCIL

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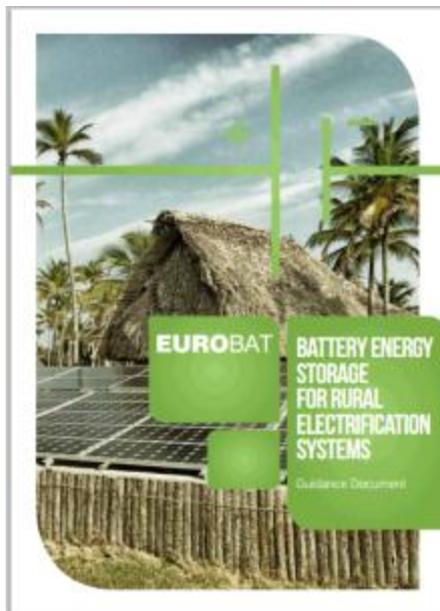


- Thank You -

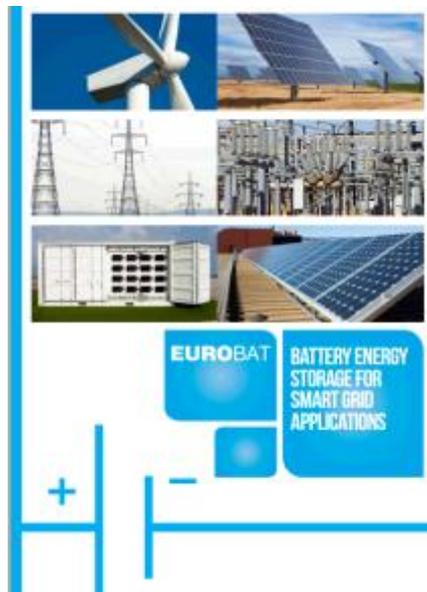
For more information
please visit www.eurobat.org
or contact us at eurobat@eurobat.org

2013 Publications

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Battery Energy Storage for Rural Electrification Systems

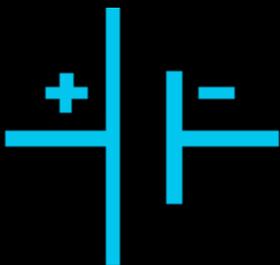


Battery Energy Storage for Smart Grid Applications



2012 Annual Report

For more information
visit www.eurobat.org or contact eurobat@eurobat.org



What's coming next

➤ ***EUROBAT Mitigation Programme***

Continuous improvement of health and safety of plant workers

➤ ***EUROBAT Studies***

Transition, jobs, and economy in Europe with hybridization of automotive and eMobility - with European Climate Foundation

➤ ***EU-funded project Batteries 2020***

EUROBAT is the dissemination party of the 3-year project

➤ ***More Publications***

for Electro-Mobility and Renewable Energy Storage

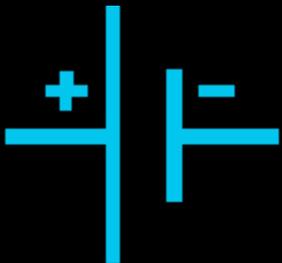
➤ ***EUROBAT AGM and Forum in Brussels, Belgium***

5 and 6 June 2014

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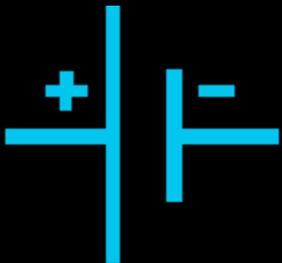
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Battery Development

Untapped potential of existing battery technologies:

- Li-ion batteries and the expected power density improvements;
- R&D developments and new market opportunities with regards to Lead-based batteries.
- Sodium Nickel commercialized in US and Europe
- New metal – air and other research for commercialization in decades to come
- Increase battery performance, reduce manufacturing costs and enhance safety.



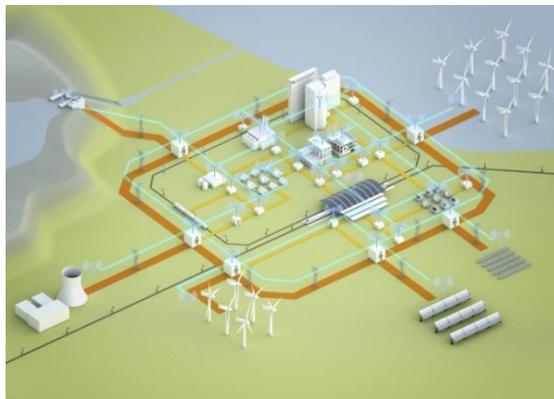
Solutions: Battery Energy Storage in Smart Grid

“Electricity storage is a clear key technology priority for the development of the European power system of 2020 and beyond”

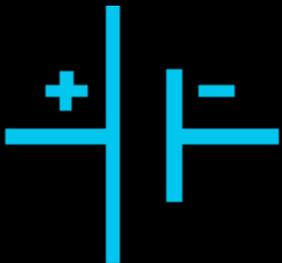
European Commission
Renewable Energy: a Major Player in the European Energy Market, 2012

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With increased levels of variable renewable energy in low and medium voltage grid, batteries will maintain flexibility and stability for grid operators and end-users:



- Decentralised energy storage connected to the smart grid
- Energy Management Systems in homes and buildings
- Smart load management for electric vehicles

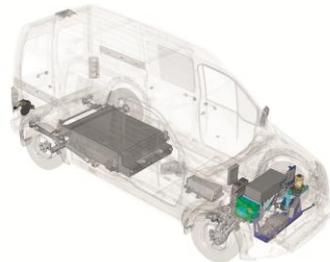


Solutions: Competitiveness for Electro-Mobility

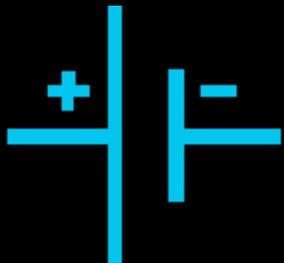
“In order to permit its industry to stay competitive, the EU must create the right framework for low carbon road transport technologies”

European Commission
2011 Strategy on Clean and Energy Efficient Vehicles

- Opportunity for EU battery and automotive industry to maintain global competitiveness
- Industrial innovation is happening, but needs government support
- Already high investment into advanced EV battery technologies from US, China and Japan



- More R&D funding at EU and Member State level needed to stay cutting-edge
- Economic and employment opportunities in a difficult climate



EUROBAT Leadership

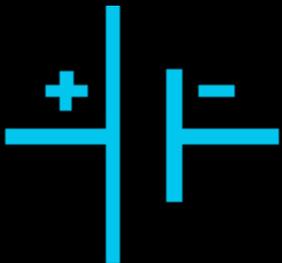
Including main CEOs of key battery manufacturing companies, battery systems integrators and their suppliers:

- **Johann-Friedrich Dempwolff**, EUROBAT President, VP Industry & Government Relations EMEA, Johnson Controls Power Solutions Europe
- **John Searle**, EUROBAT Vice-Chairman and Chairman of the Management Board of SAFT
- **Andreas Bawart**, EUROBAT Vice-Chairman and CEO Banner
- **David Shaffer**, President of EnerSys EMEA
- **Michael Ostermann**, President Exide Technologies
- **Nicola Cosciani**, Director New Business Unit Energy Storage Solutions, FIAMM
- **Marc Zoellner**, CEO Hoppecke Batterien
- **Charles-Louis Ackermann**, President Accumalux
- **Marcus Ulrich**, Sales & Marketing, Entek International

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EUROBAT Secretariat

- *Executive Director, Alfons Westgeest*
- *EU Affairs Manager, Michel Baumgartner*
- *Market Committees Manager, Erwin Marckx*
- *Communications Manager, Raquel Ponte Costa*
- *EU Affairs Officer, David Howard*
- *New Markets Officer, Chris Heron*
- *Managing Assistant, Veerle Guns*

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