

# EUROBAT



## Improving Safety and Performance Testing for EV Batteries

Alfons Westgeest  
EUROBAT Executive Director

*World of Energy Solutions  
Stuttgart, 1 October 2013*

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# Key messages on Safety

- *Safety across the value chain* in manufacturing and supply, integration, use until the recycling
- *Enhance using scientific support and skills* to recognize collaboration between industry, researchers & institutes.
- *Global market to grow* opportunities for investments and jobs in EU and safety will play a background role.
- *Governments* works via regulatory and legislative; *industry* works via standards that may lead to regulation
- *Collaboration* is key for any emerging product or service

*(this presentation does not intend to cover all)*



# 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 – high level meetings
- 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
- AKOM Group
- Banner
- EnerSys
- Exide
- Eternity Technologies
- FIAMM
- Hoppecke
- Inci Akü
- Johnson Controls Power Solutions
- MIDAC
- Moll
- Mutlu
- S.C. ROMBAT
- SAFT
- Systems Sunlight
- TAB
- Yuasa
- Dow Kokam (Battery System Integrator)



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# Membership

## Supply Chain

- Abertax
- Accuma
- Accumalux
- Amer-Sil
- Berzelius
- BM Maschinen
- Daramic
- DEKRA Certification
- Entek
- Evonik
- ECOBAT
- Frötek
- Glatfelter
- Hollingsworth & Vose Company
- Hammond Expanders
- HOFMANN Power Solutions
- Mecondor
- Midtronic
- Mitsui Chemicals
- MTH Metalltechnik Halsbrücke
- Nissan
- Recylex
- SOVEMA
- TBS
- Water Gremlin Aquila



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# Battery Industry & R&D

Pillar of Europe's sustainable economic development:

- Highly efficient clean production; ahead of regulatory
- Support climate objectives and footprint
- Enhanced platforms for all Lead-, Lithium- Sodium- and Nickel-based batteries

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



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# EUROBAT

## Member Operations in Europe and Neighbouring Countries



**ALGERIA**

|           |         |
|-----------|---------|
| Spain     | Germany |
| Germany   | Germany |
| EU-Centre | Germany |

**ANDORRA**

|         |         |
|---------|---------|
| Spain   | Germany |
| Germany | Germany |

**ANDORRA (PERIPHERAL ZONE)**

|       |         |
|-------|---------|
| Spain | Germany |
|-------|---------|

**ARMENIA**

|         |         |
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| Spain   | Germany |
| Germany | Germany |

**AUSTRIA**

|         |         |
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| Spain   | Germany |
| Germany | Germany |

**BELARUS**

|       |         |
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| Spain | Germany |
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**BELGIUM**

|           |         |
|-----------|---------|
| Spain     | Germany |
| Germany   | Germany |
| EU-Centre | Germany |
| Germany   | Germany |
| EU-Centre | Germany |
| Germany   | Germany |

**BELGIUM (PERIPHERAL ZONE)**

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| Spain   | Germany |
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**BULGARIA**

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| Spain   | Germany |
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**CYPRUS**

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| Spain   | Germany |
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**CYPRUS (PERIPHERAL ZONE)**

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| Spain   | Germany |
| Germany | Germany |

**CZECH REPUBLIC**

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| Spain   | Germany |
| Germany | Germany |

**EUROBAT Regional Member Operations**  
Number of Regions per Region

| Region                               | Number of Regions |
|--------------------------------------|-------------------|
| Central Europe                       | 100               |
| Eastern Europe and Mediterranean     | 100               |
| Western Europe                       | 100               |
| North-Western Europe and Scandinavia | 100               |

**EUROBAT Associate Member Operations**  
Number of Regions per Region

| Region                               | Number of Regions |
|--------------------------------------|-------------------|
| Central Europe                       | 100               |
| Eastern Europe and Mediterranean     | 100               |
| Western Europe                       | 100               |
| North-Western Europe and Scandinavia | 100               |

- ▲ **ASSOCIATE**
- **MEMBER**
- **BASE**
- **CONTRACTOR**



**ANDORRA (PERIPHERAL ZONE)**

|           |         |
|-----------|---------|
| Spain     | Germany |
| Germany   | Germany |
| EU-Centre | Germany |
| Germany   | Germany |

**BELARUS (PERIPHERAL ZONE)**

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| Spain   | Germany |
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**BELGIUM (PERIPHERAL ZONE)**

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**BULGARIA (PERIPHERAL ZONE)**

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**CYPRUS (PERIPHERAL ZONE)**

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**CYPRUS (PERIPHERAL ZONE)**

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**CZECH REPUBLIC (PERIPHERAL ZONE)**

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**CZECH REPUBLIC (PERIPHERAL ZONE)**

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**CYPRUS (PERIPHERAL ZONE)**

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**CZECH REPUBLIC (PERIPHERAL ZONE)**

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|---------|---------|
| Spain   | Germany |
| Germany | Germany |

This map may be updated by EUROBAT following any changes to the membership of the Association. For more information, please contact the EUROBAT Regional Office in Brussels. The information is provided for information only and does not constitute an offer of any services. The information is provided for information only and does not constitute an offer of any services. The information is provided for information only and does not constitute an offer of any services.

# Batteries: Sustainable & Efficient Technologies

Four major battery families are considered to effectively contribute to the efficient and sustainable use of electrical energy storage and e-Mobility. Each have specific attributes:

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





# Research & Development

Untapped potential of existing battery technologies:

- Li-ion batteries and power density improvements
- Developments in Lead-based batteries for grid/ off-grid
- Sodium Nickel commercialized in US and Europe

And long term opportunities

- Metal – air and other research for commercialization
- Increase performance, reduce manufacturing costs.

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# Opportunities

## Growing demand for energy storage in:

### Industrial

- Motive Power – Public Transport
- Electricity Grid Functionality; Energie-wende
- Renewable Energy; Photovoltaic, Wind



### Automotive

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

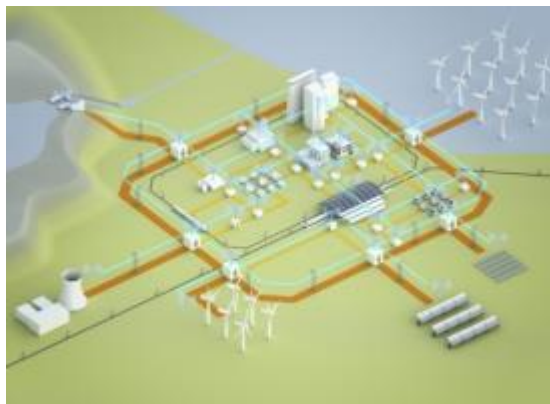


# Solutions: Battery Energy Storage in Smart Grid

*“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*

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

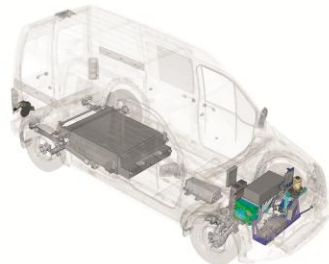


# Solutions: Competitiveness for Electro-Mobility

*“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



# Safety & Standardisation

- *Development of HEV and EV require adequate standardisation and testing specification procedures*

***Different actors: CEN CENELEC; IEC; ISO; UN-ECE WP.29***

Benefits of internationally harmonising safety and environmental testing processes:

- Interoperability of (H) EVs;
- Increased administrative efficiency;
- Increased research collaboration and reduced testing overlap;
- Optimised tests through pooling of resources



# Standards Batteries used in 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



# BESTEST – Battery EV Testing



**EUROBAT**

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

**Actors:** EUROBAT Members, JRC and overall industry developing battery energy storage testing for safe electric transport (BESTEST)

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# BESTEST – Battery EV Testing



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

## EUROBAT

### Terms of the Collaboration:

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***

- (*Under consideration*) online database containing descriptions of events involving batteries, battery systems
- Information may include type of battery, situational background, cause, consequences, corrective actions taken and lessons learned



# **EUROBAT**

EUROBAT will be working with members and other stakeholder to validate an approach for this database.



# Transatlantic e-Mobility Plan

EU-US coordination on *Batteries, components, smart grids* and *e-vehicles* to improve:

- Testing methods
- Standardisation
- Interoperability

Main actors :

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

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U.S. DEPARTMENT OF  
**ENERGY**



Joint Research Centre



TRANS-ATLANTIC  
BUSINESS COUNCIL

# Accelerating acceptance of new technologies

- *These were examples* of industry and regulators partnering for the development of future transport modes
- Tackling misconceptions and educating consumers is key to ease the acceptance of new technologies
- Improving the public awareness and trust will benefit the market deployment and uptake of battery storage technologies

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- Thank You -

For more information  
please visit [www.eurobat.org](http://www.eurobat.org)  
or contact us at [eurobat@eurobat.org](mailto:eurobat@eurobat.org)

# 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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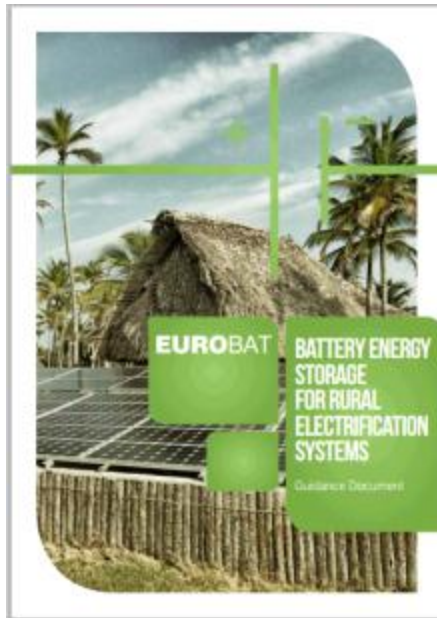


# EUROBAT Secretariat

- *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*



# 2013 Publications



**Battery Energy Storage for Rural Electrification Systems**



**Battery Energy Storage for Smart Grid Applications**



**2012 Annual Report**

*For more information*  
visit [www.eurobat.org](http://www.eurobat.org) or contact [eurobat@eurobat.org](mailto:eurobat@eurobat.org)

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# What's coming next for EUROBAT

➤ ***EUROBAT Blood Lead Mitigation Programme***  
*continuous improvement of the health and safety of battery plant workers*

EUROBAT member companies committed to **reduce blood lead** levels for all employees below 30 microgrammes per deciliter ( $\mu\text{g}/\text{dl}$ ) by the end of 2016.

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

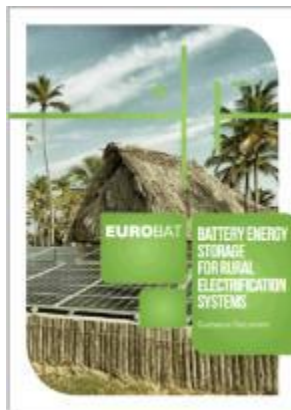
EUROBAT is the dissemination party of the 3-year project looking at the technology advancements in EV and HEV batteries and second life applications for renewable energy systems. The Consortium includes Abengoa, Umicore, CRF, Leclanché, research Institutes and Universities in different countries





# What's coming next for EUROBAT

- *More publications on Batteries for Electro-Mobility and Renewable Energy Storage*



- *EUROBAT AGM and Forum in Brussels, Belgium  
5 and 6 June 2014*

With over 110 participants in 2013, the EUROBAT Forum proved to be the meeting point for Battery Manufacturers and supply chain in Europe

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