ADVANCED MATERIAL FOR BATTERIES
PARTNERSHIP – AMBP

Cross-Regional Innovation Partnership falling under the Thematic Smart Specialisation Platform on Industry Modernisation

AMB at a Glance – Fifth update

Coordinator

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Purpose:
This “AMB at a glance” is extracted from the Scoping Note of the AMBP Partnership. It shall provide a clear picture of where the Partnership stands in terms of scope and activities as well as process-wise. The scoping Note is a living document formalizing the state of play. It will be updated along the progress of the Partnership.
1. Introduction to the process

The Advanced Materials for Batteries Partnership (AMBP) is the “interregional partnership on batteries” put forward by the European Battery Alliance (EBA 250) in its action plan.

The AMBP Partnership was launched on 8 October 2018 in Brussels, by three leading regions: West Slovenia (coordinator), Andalusia, and Castile and Leon. The Partnership facilitates the development of innovation investment projects through interregional cooperation. The process is bottom-up, open, inclusive and based on a transparent governance.

The role of the European Commission is to facilitate the process through dedicated EU actions and specialized experts. It has setup three Thematic Smart Specialisation Platforms (managed by the Joint Research Centre, Institute for Prospective and Technological Studies) on: Industry Modernisation, Agri-Food, and Energy. The AMBP Partnership is one of 21 partnerships under the Industry Modernisation platform and benefits from this support.

2. The AMBP Partnership ambition and achievements

The AMBP Partnership has defined its ambition and taken steps to achieve it.

**AMBP ambition.** The future of the battery market is expected to reach a yearly level of €250 billion from 2025 onwards, offering the opportunity of creating 4-5 million jobs. Regional actors are willing to act together to combine their forces to create jobs. The AMBP Partnership aims to take stock of this opportunity and accelerate the volume manufacture and deployment of advanced materials and battery cells with a 2025 Horizon. The Partnership works toward the generation of a pipeline of business investment projects and build upon existing regional assets to leverage complementary assets across the Partnership.

Failing to do so would translate in many jobs lost in Europe for the transportation sector (jobs currently devoted to manufacturing the engine and its components) because the battery captures 40% of the value of the product (cars, trucks, boats, bicycles, etc.). In addition, manufacturing electrical vehicles (or trucks, boats, etc.) need far less manpower than a conventional vehicle (automotive suppliers are already closing some of their plants) because components of an electrical vehicle are simpler (the electrical engine is far simpler than the diesel or gasoline engines).

As there is a lack of integration of value chain segments across regions, collaboration is needed by linking complementary competences across regions. It is also necessary to reach a critical mass of investment which is lacking while batteries are an expensive technology field with very high levels of capital expenditures (e.g. a Gigafactory cost is about 1 billion with 50% depreciation after 2 years), double-spending (many regional actors), sub-critical investments in innovation (China, Japan and Korea are leading the sector), and information asymmetries at many levels (technology watch, players not knowing each other, market intel, etc.).

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1. [https://s3platform.jrc.ec.europa.eu/batteries](https://s3platform.jrc.ec.europa.eu/batteries)
2. Source: [https://www.eba250.com](https://www.eba250.com)
Steps taken so far. The following activities have been conducted (selection):

1. Mapping of key capabilities and areas of common interest;
2. Scoping meetings with 38 representatives on 22 & 23 January 2019;
3. Four thematic areas meetings (May-June 2019);
4. Pitching meeting in Brussels to take stock of AMBP progress and review future opportunities (September 2020);
5. Aligning with other EU battery initiatives both at national and EU levels: such as the Important Project of Common European Interest (IPCEI) on batteries, or the European Battery Alliance (EBA 250), Battery Europe (the ETIP on batteries/formerly SET-Plan Working Group on Batteries), the newly created (June 2020) European Partnership for an Industrial Battery Value Chain, Battery 2030+, ERRIN Energy Working Group, Alistore ERI Community, EIT KIC Raw Material KIC Inno Energy, etc.
6. Multiple bilateral and group interactions;
7. Several notes and reports including the scoping note.

Geographical Coverage. The number of regions committed to the Partnership grew from 8 (October 2018) to 29 (July 2020). Three more regions have expressed interest: Västerbotten (North Sweden), Extremadura (ES), Catalunya (ES) and few more regions are under discussion depending on the business cases developed where stakeholders may seek the adhesion of their region to be able to participate in the business cases.

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3 The partnership is open to all regions willing to join providing they sign the ‘letter of intent’ and fill in the short mapping as the Partnership includes/covers only some of the capabilities necessary to achieve its current goals. We are open to any other capability needed/identified along the way. Many more stakeholders/regions could be involved.
Achievements. The Partnership has identified and reported:

- Driving challenges and resulting Mission, Vision, and Rationale;
- 6 priority thematic areas and their description (see next section);
- AMBP projects. The partnership is working on a list of about 10 projects. Among the 10 projects: 3 projects are still under discussion and may not go further, 1 project is working on its first project description, and 6 projects provided a first description (even a preliminary one).

Each investment project should comply with a set of minimum requirements: a minimum Technology Readiness Level (TRL) of 5 or 6 to technically reach TRL 8, commercialisation reached in the end of the project (TRL9), be industry-driven, be based on a cross-regional setting with triple helix organisations from at least 3 Member States, and demonstrate cross-regional added value.

The goal is to create synergies between private and public investments to commercialise and scale-up interregional innovation projects.

- Business case development. Projects 5 (NextBatt4EU) and 9 (Network of prototyping & testing centres) are more advanced. Their description is not final yet as they are both working with their partners to get the most difficult details on involvement and costs, but both will develop a business case.
Business Investment Platform (BIP). Preliminary discussions were held with representative of the BIP Platform from the European Battery Alliance. The platform was launched officially at the September 25th EBA meeting. It finances projects along the entire battery value chain. The launch of BIP was attended by more than 20 EU banks committed to support projects. The platform might accept projects with a budget above € 50 millions for funding.

TAF applications. In order to obtain financial expertise to complete the business case, two projects have been submitted to TAF. The project “Network of prototyping & testing centres” lead by the Slovenian National Institute of Chemistry was submitted on 31/10/2019 to the Technical Assistance Facility (TAF). The project was rejected as too premature. The project “NextBatt4EU (Next battery for Europe) - Novel anode and cathode materials for 3b generation of lithium-ion batteries” lead by ENWIRE was submitted at the 14/02/2020 deadline. The project was rejected as the business plan needs further developments.

Exit strategy. an “Exit Strategy” should set the conditions for the sustainability of the partnership/business cases (resources, etc.) when the support for the central coordination ends (which is end of September for AMBP). The strategy will be further developed in the coming months. As an intermediary step, Slovenia, and Andalusia (two of the leading regions) are currently leading the partnership with the support of ReConfirm and the expert financed by DG REGIO.

3. The AMBP thematic areas and projects

The AMBP Partnership has identified 6 Priority thematic areas (also called Pilots). Each thematic area consists in an application area in which innovation investment projects are delineated and operationalised with industry.

<table>
<thead>
<tr>
<th>#</th>
<th>Thematic area / Coordinator</th>
</tr>
</thead>
</table>
| 1 | Solid state lithium-ion batteries (Generation 4)  
Coordinator: Victor Trapp, Fraunhofer ISC (Bavaria) |
| 2 | Sustainable Raw Material, Extraction and Processing  
Coordinator: Santiago Cuesta, Icamcy (CASTILLA Y LEÓN) |
| 3 | Recycling of existing Lithium-ion Batteries  
Coordinator: Victor Trapp, Fraunhofer ISC (Bavaria) |
| 4 | Liquid-based batteries (stationary)  
Coordinators: Mario Sanchez, Technological Institute for Energy (Basque Country) & Amaya Igartua, Tekniker (Valencia) |
| 5 | Network of research & testing centers  
Coordinator: Robert Dominko, National Institute of Chemistry (West Slovenia) |
| 6 | Improved lithium-ion batteries (Generation 3b)  
Coordinator: Simon Perraud, CEA (Auvergne Rhone Alpes) |
**Complementary:** the Partnership complements other EU initiatives to achieve a complete battery value chain in Europe (e.g. the European Battery Alliance and the Important Project of Common European Interest - IPCEI). The Partnership will add value by developing key components in the value chain through cross-regional collaboration (raw materials, active materials, battery cells components, and recycling). The graph below positions the thematic areas to achieve a comprehensive battery value chain in Europe.

The partnership is working on a list of about 10 projects. Among the 10 projects, 5 are based on the thematic area 6, 2 on the thematic area 3, and 1 on the thematic area 1, 4, and 5. The thematic area 2 has not reached the stage of a project yet. The progress status column reports the stage of development of the projects:

- 3 projects are still under discussion and may not go further
- 1 project is working on its first project description
- 6 projects provided a first description (even a preliminary one), they are in blue.

<table>
<thead>
<tr>
<th>#</th>
<th>Project leaders</th>
<th>Thematic area / Project</th>
<th>Progress status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Baikowski</td>
<td>Thematic area 6: Efficient manufacturing process for speciality alumina for Li-ion batteries</td>
<td>1st description, but SOLVAY is not responding</td>
</tr>
<tr>
<td>2</td>
<td>Carbone Savoie</td>
<td>Thematic area 6: Artificial graphite for battery anode material</td>
<td>Selected for the 2nd wave IPCEI lead by Germany and will be acquired by Tokai Carbon</td>
</tr>
<tr>
<td>3</td>
<td>Manz Italy srl</td>
<td>Thematic area 6: Battery Module Manufacturing Enabling Technologies</td>
<td>Under preparation</td>
</tr>
<tr>
<td>4</td>
<td>Marposs</td>
<td>Thematic area 6: In process Testing for electrodes, cells and assembly</td>
<td>Under preparation</td>
</tr>
<tr>
<td>5</td>
<td>ENWIRES</td>
<td>Thematic area 6: NextBatt4EU (Next battery for Europe) -Novel anode and cathode materials for 3b generation of lithium-ion batteries</td>
<td>TAF application rejected. 4th description under preparation. Reduced the number of partners</td>
</tr>
<tr>
<td>#</td>
<td>Project leaders</td>
<td>Thematic area / Project</td>
<td>Progress status</td>
</tr>
<tr>
<td>----</td>
<td>----------------</td>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>MTB</td>
<td>Thematic area 3: Battery recycling process</td>
<td>Under preparation</td>
</tr>
<tr>
<td>7</td>
<td>Fraunhofer</td>
<td>Thematic area 1: Modular processing platform (MPP) for Gen4</td>
<td>Preliminary description, difficulty to progress due to the high number of partners</td>
</tr>
<tr>
<td>8</td>
<td>Fraunhofer</td>
<td>Thematic area 3: European trans-regional recycling network</td>
<td>Preliminary description</td>
</tr>
<tr>
<td>9</td>
<td>National Institute of Chemistry</td>
<td>Thematic area 5: Network of prototyping &amp; testing centres</td>
<td>Positive feedback from the SI government for funding - 4th description, reduce the number of partners Prepare TAFF application for October 2020</td>
</tr>
<tr>
<td>10</td>
<td>CEGASA</td>
<td>Thematic area 4: Development and upscaling of Zn-air batteries</td>
<td>Preliminary description, hard discussion about IP but still discussing</td>
</tr>
<tr>
<td>11</td>
<td>NANOPow</td>
<td>Thematic area 6: pure carbon coated crystalline nano silicon powder</td>
<td>Preliminary description. Rejected BIP. Prepare TAFF application for October 2020</td>
</tr>
</tbody>
</table>

Recent progress should also be noted for three projects:

1. Project 2 - Artificial graphite for battery anode material – has been selected for the 2nd wave IPCEI from the French government⁴ and will acquired by Tokai Carbon⁵;
2. Project 5 - NextBatt4EU (Next battery for Europe) - TAF application has been rejected and is currently competing for French funding (Bpifrance Deeptech⁶);
3. Project 9 - Network of prototyping & testing centres – has positive feedback from the Slovenian government (ministry of education and research) for funding materials but need to confirm with the new government - 4th description under preparation. Prepare TAFF application for October 2020;
4. Project 10 (CEGASA) - Still discussing;
5. Project 11 (NANOPow) is a project from Norway under preparation. Preliminary discussion with the BIP platform failed due to the high demand for equity - prepare TAFF application for October 2020;
6. FinnCOBALT (not in the list but identified during the FI regional meeting - https://www.finncobalt.com) - has received funding from a Swedish company for it startup phase.

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⁵ https://contents.xj-storage.jp/xcontents/AS04435/04cd96c3/50ca/432e/a624/f4b365c011d8/20200410140247908s.pdf

⁶ https://www.bpifrance.fr/Toutes-nos-solutions/Aides-concours-et-labels/Aide-au-developpement-deepTech
The table below provides the basic (tentative) characteristics of the projects:

<table>
<thead>
<tr>
<th>#</th>
<th>Project leaders</th>
<th>Thematic area / Project</th>
<th>Basic characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Baikowski</td>
<td>Thematic area 6: Efficient manufacturing process for speciality alumina for Li-ion batteries</td>
<td>7 partners, budget €3 240 000 / 3 years</td>
</tr>
<tr>
<td>2</td>
<td>CARBONE SAVOIE</td>
<td>Thematic area 6: Artificial graphite for battery anode material</td>
<td>15 partners, budget €25 267 000, requested support €14 157 000 / 3 years</td>
</tr>
<tr>
<td>5</td>
<td>enwires</td>
<td>Thematic area 6: NextBatt4EU (Next battery for Europe) - Novel anode and cathode materials for 3b generation of lithium-ion batteries</td>
<td>3 partners, budget €5 500 000, requested support €3 000 000 / 2 years</td>
</tr>
<tr>
<td>7</td>
<td>Fraunhofer</td>
<td>Thematic area 1: Modular processing platform (MPP) for Gen4</td>
<td>15+ partners, budget under preparation / 6 years</td>
</tr>
<tr>
<td>9</td>
<td>National Institute of Chemistry</td>
<td>Thematic area 5: Network of prototyping &amp; testing centres</td>
<td>4 partners, budget €18 million / 5 years</td>
</tr>
<tr>
<td>10</td>
<td>CECASA</td>
<td>Thematic area 4: Development and upscaling of Zn-air batteries</td>
<td>Preliminary description</td>
</tr>
<tr>
<td>11</td>
<td>SNanoPow</td>
<td>Thematic area 6: pure carbon coated crystalline nano silicon powder</td>
<td>Preliminary description</td>
</tr>
</tbody>
</table>
4. Next steps

The partnership has progressed at a fast pace supported by the momentum created by the EBA250 and the regulation for CO2. Still, challenges remain, such as the delay of the IPCEI decision, the lack of financial expertise and the strong demand for visibility over funding/financing.

The main next steps. They are anticipated as follows:

- Finalise the project description of project 9 - Network of prototyping & testing centres but also others when ready following the guideline for investment projects;

  - The description of an investment project shall depict elements such as...
    - Scope (coverage, ambition, market)
    - Activities (project description, operations, planning, risks)
    - Basic financials (costs, income, revenue generation, impacts, funding and financing)
    - Organisational modalities (partners, structure, timeline, quality)
    - Cross-regional added value (additionality, hurdles...)

- Prepare commitments which has been made from each partner: commitments are currently indicative as no formality was operated yet (no contractual arrangement, MoU, NDA, etc.);

- Pursue AMBP meetings (virtual in September 21st in Brussels mainly focused on the exit strategy);

- Pursue regional meetings (brokerage events) to attract private stakeholders and build the portfolio of projects (Italy, and France are envisaged).