



Brussels, 17.5.2018
COM(2018) 293 final

ANNEX 2

ANNEX

to the

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**EUROPE ON THE MOVE
Sustainable Mobility for Europe: safe, connected and clean**

ANNEX 2 – Strategic Action Plan on Batteries

I. Policy context

Batteries development and production is a strategic imperative for Europe in the context of the clean energy transition and is a key component of the competitiveness of its automotive sector.

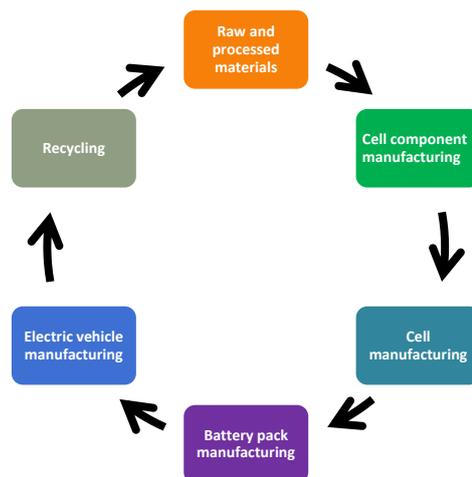
In October 2017, the European Commission launched the '**European Battery Alliance**'¹ cooperation platform with key industrial stakeholders, interested Member States and the European Investment Bank.

The immediate challenge to create a competitive and sustainable battery manufacturing industry in Europe is immense, and Europe has to move fast in this global race. According to some forecasts, from 2025 onwards Europe could capture a batteries market of up to EUR 250 billion a year, served by at least 10 to 20 Gigafactories (battery cells mass production facilities)² to cover EU demand. Given the scale and speed of investment needed, this strategic challenge cannot be dealt with in a fragmented manner.

With this Strategic Action Plan, the Commission aims to put Europe on a firm path towards leadership in a key industry for the future, supporting jobs and growth in a circular economy, whilst ensuring clean mobility and an improved environment and quality of life for EU citizens.

The Commission is promoting a **cross-border and integrated European approach** covering the **whole value chain** of the batteries ecosystem, and focusing on **sustainability**, starting with the extraction and processing of raw materials, the design and manufacturing phase of battery cells and battery packs, and their use, second use, recycling and disposal in a circular economy context..

Batteries Value Chain



Such an approach will promote the production and use of high-performing batteries and set sustainability benchmarks throughout the value chain.

¹ https://ec.europa.eu/growth/industry/policy/european-battery-alliance_en

² Source: European Institute of Innovation and Technology (EIT) Inno-energy <http://www.innoenergy.com/>

This Strategic Action Plan has been developed in close consultation with stakeholders including industry and Member States in the framework of the 'European Battery Alliance', and builds on the industry-led approach whereby EU industry players have themselves adopted and are starting to implement targeted actions.³

This Strategic Action Plan combines targeted measures at EU level including in raw materials (primary and secondary), research and innovation, financing/investment, standardisation / regulatory, trade and skills development, in order to **make Europe a global leader in sustainable battery production and use, in the context of the circular economy.**

More specifically its aims to:

- **secure access to raw materials** from resource-rich countries outside the EU, facilitate access to European sources of raw materials, as well as accessing **secondary raw materials** through recycling in a circular economy of batteries;
- **support European battery cells manufacturing at scale and a full competitive value chain in Europe:** bringing key industry players and national and regional authorities together; working in partnership with Member States and the European Investment Bank to support innovative manufacturing projects with a important cross-border and sustainability dimensions throughout the battery value chain;
- **strengthen industrial leadership through stepped-up EU research and innovation** support to advanced (e.g. Lithium-ion) and disruptive (e.g. solid state) technologies in the batteries sector. This should target support in all the steps of the value chain (advanced materials, new chemistries, manufacturing processes, battery management systems, recycling, business model innovations), be closely integrated with the industrial ecosystem and contribute to accelerating the deployment and industrialisation of innovations;
- **develop and strengthen a highly skilled workforce in all parts of the battery value chain** in order to close the skills gap through actions at EU and Member State level providing adequate training, re-skilling and upskilling, and making Europe an attractive location for world class experts in batteries development and production;
- **support the sustainability of EU battery cell manufacturing industry with the lowest environmental footprint possible**, for example by using renewable energy in the production process. This objective should be notably implemented through setting out requirements for safe and sustainable batteries production;
- **ensure consistency with the broader enabling and regulatory framework**⁴ (Clean Energy Strategy, Mobility Packages, EU Trade Policy, etc.) in support of batteries and storage deployment.

³ More than 120 industrial and innovation actors have participated in this exercise and collectively endorsed recommendations for priority actions, which are being implemented. <http://www.innoenergy.com/eit-innoenergys-role-within-the-european-battery-alliance/>

⁴ Clean Energy for All Europeans Strategy: COM(2016) 860; Low-Emission Mobility Strategy COM(2016) 501; Europe on the Move – Mobility Package I: COM(2017)283; Mobility Package II: COM(2017) 675.

II. Strategic Action Areas

1. Securing the sustainable supply of raw materials

The EU raw materials strategy aims at securing access to raw materials for the EU economy.⁵ The policy which was given new impetus in 2012 with the launch of the European Innovation Partnership on Raw Materials is based on: (1) sustainable sourcing of raw materials from global markets; (2) sustainable domestic raw materials production; and (3) resource efficiency and supply of secondary raw materials. In September 2017, the Commission adopted a renewed EU industrial policy strategy which highlighted the importance of raw materials, particularly critical raw materials, for the competitiveness of all industrial value chains, for the EU economy.⁶

The EU must therefore secure access to the supply chains for batteries raw materials. Lithium-ion is currently the main chemistry of choice for electro-mobility and will dominate the market in the coming years. Various raw materials are required in lithium-ion batteries including lithium, cobalt, nickel, manganese, graphite, silicon, copper and aluminium. The supply of some of these materials, in particular cobalt, natural graphite and lithium, is of concern today and for the future in view of the large quantities needed and/or very concentrated supply sources. The sustainability of the extraction and exploitation of these resources is fundamental and recycling of materials will increasingly become important for diversifying the EU's supply and should be encouraged in the context of the transition to a circular economy.⁷

The EU should therefore secure access to raw materials from resource-rich countries outside the EU, while boosting primary and secondary production from European sources. It should also promote eco-design, substitution and more efficient use of critical battery materials, their second use and recycling.

Key Actions

The Commission will:

- build on the EU list of Critical Raw Materials, established in 2017, to map the current and future primary raw materials availability for batteries; assess the potential within the EU for sourcing battery raw materials including Cobalt (Finland, France, Sweden, and Slovakia), Lithium (Austria, the Czech Republic, Finland, Ireland, Portugal, Spain, and Sweden), Natural Graphite (Austria, Czech Republic, Germany, Slovakia and Sweden), Nickel (Austria, Finland, France, Greece, Poland, Spain and the United Kingdom); assess the potential in the whole EU for sourcing of secondary raw materials; put forward recommendations aimed at optimising the sourcing of batteries raw materials within the EU. [Q4 2018]
- use all appropriate trade policy instruments (such as Free Trade Agreements) to ensure fair and sustainable access to raw materials in third countries and promote socially responsible mining. [ongoing]

⁵ COM(2008) 699. See also forthcoming Staff Working Document Report on Raw Materials for Battery Applications.

⁶ A Renewed Industrial Policy Strategy: COM(2017) 479.

⁷ There is for example a risk reducing factor in the assessment of the supply risk of the criticality assessment methodology (JRC report, 2017, <https://publications.europa.eu/s/gcBP>).

- support research and innovation aimed at cost-effective production, substitution and more efficient use of critical raw materials for batteries, with a view to develop standards (see strategic action area 5 below). [2018-2020]
- launch a dialogue with Member States, through the Raw Materials Supply Group and the High Level Steering Group of the European Innovation Partnership on Raw Materials (EIP Raw Materials), to determine the fitness of their raw materials policies, mining codes and incentives for exploration to address the strategic needs of materials for batteries. Present the results of this exercise at the High Level Conference of the EIP Raw Materials in November 2018. [Q4 2018]

2. Supporting European projects covering different segments of the battery value chain, including cells manufacturing

The 'European Battery Alliance' is moving fast. Since its launch in October 2017, there have already been tangible developments with the announcements of industrial consortia or partnerships aiming at development of battery cell manufacturing and related ecosystems. To remain the world leader for automotive manufacturing and innovation, action is needed – and is already taking place - to ramp up battery cells manufacturing in Europe, and to build on and reinforce the other segments of the battery value chain (e.g. materials, manufacturing machinery and processes, battery management systems, etc), as part of an integrated and competitive ecosystem.

Member States and the industry have called on the Commission to continue acting as a facilitator in bringing key industry players together and to support manufacturing projects with an important cross-border dimension and which integrate different elements of the batteries value chain.

Key Actions

The Commission will:

- pursue its partnership work with stakeholders across the battery value chain to promote and facilitate large-scale projects leading to manufacturing of the next generation of batteries, and to establish an innovative, integrated, sustainable and competitive battery value chain in Europe. [2018-2019]
- engage in a regular dialogue with the relevant Member States to explore efficient ways to jointly support innovative manufacturing projects going beyond the state-of-the-art, and best pool EU and national resources to that end. This could for instance take the form of an Important Project of Common European Interest.⁸ [Q4 2018]
- continue to work closely with interested Member States and the European Investment Bank to make public funding or financing for battery cells manufacturing projects available in order to incentivise, leverage and 'de-risk' private sector investment. For this purpose, the Commission will coordinate, raise awareness of and facilitate access to the various funding and financing instruments available (e.g. European Investment Bank⁹,

⁸ Important Projects of Common European Interest are projects involving more than one Member State contributing to the Union's strategic objectives and producing positive spillovers on the European economy and society as a whole. In case of research, development and innovation projects, such projects must be of a major innovative nature, going beyond the state of the art in the sectors concerned – see Commission Communication 2014/C 188/02 of May 2014.

⁹ <http://www.eib.org/>

InnovFin Energy Demo Projects¹⁰, Horizon 2020¹¹, European Regional Development Fund¹², European Fund for Strategic Investments¹³, Innovation Fund¹⁴) in support of innovative battery-related deployment projects, including pilot lines and the deployment at scale of cutting-edge technologies. This will include transparent and inclusive information sessions on the eligibility criteria for these instruments to those companies and Member States with an established interest in the subject matter. [2018-2019]

- at the request of interested regions and in cooperation with relevant Member States, facilitate the development of an "interregional partnership on batteries" in the framework of the existing Smart Specialisation thematic platforms on energy or industrial modernisation.¹⁵ [Q1 2019]
- work in close cooperation with the relevant Member States and regions to channel the available research and innovation funding under Cohesion Policy (2014-2020: EUR 44 billion) that may be used *inter alia* for batteries).¹⁶ [2018-2020]
- establish, in close cooperation with the European Investment Bank, a dedicated batteries funding and financing portal (single investment hub) to facilitate stakeholders' access to appropriate financial support and assist in any blending of financial instruments. [Q4 2018]
- more generally, encourage private investors across the value chain to make full use of the possibilities available through sustainable finance as set out in the Commission's Action Plan on financing sustainable growth.¹⁷ [2018-2019]

3. Strengthening industrial leadership through stepped-up EU research and innovation support covering the full value chain

In order to drive European competitive advantage, significant resources should be targeted at supporting constant incremental (e.g. advanced lithium-ion) and disruptive (e.g. solid state) research and innovation. Research should be conducted in advanced (primary and secondary, i.e. recycled) materials, battery chemistries, advanced manufacturing processes, recycling, and second-use. This should be well-connected with the industrial ecosystem of the value chain in order to accelerate industrialisation of EU innovations.

Key Actions

The Commission will:

¹⁰ <http://www.eib.org/products/blending/innovfin/products/energy-demo-projects.htm>

¹¹ <https://ec.europa.eu/programmes/horizon2020/>

¹² http://ec.europa.eu/regional_policy/en/funding/erdf/

¹³ http://ec.europa.eu/growth/industry/innovation/funding/efsi_en

¹⁴ The Innovation Fund established under the EU Emissions Trading Scheme aims at supporting innovative first-of-a-kind demonstration projects in the field of energy storage, innovation in low-carbon technologies in industrial sectors, environmentally-safe carbon capture and storage, and innovative renewables. It will be created through the sales of 450 million allowances under the EU Emissions Trading Scheme, which may represent EUR 4.5 billion at price of EUR 10 per allowance or EUR 11 billion at price of EUR 25 per allowance. The first call is planned for 2020.

¹⁵ <http://s3platform.jrc.ec.europa.eu/>

¹⁶ 121 Smart Specialisation Strategies have been developed in a bottom-up process based on broad stakeholders involvement. The EUR 44 billion that can be channelled through these Smart Specialisation Strategies complements an estimated EUR 70 billion from the European Regional Development Fund for supporting an energy-efficient and decarbonised transport sector. They assist in using European Regional Development Fund and generate pipeline of industrial projects through interregional cooperation, cluster participation and industry involvement. [Q1 2019].

¹⁷ https://ec.europa.eu/info/publications/180308-action-plan-sustainable-growth_en

- in collaboration with Member States make available, research and innovation funds (H2020¹⁸) for battery-related innovation projects, according to pre-identified short- and longer-term research priorities across the batteries value chain.¹⁹ This should comprise also innovative deployment projects, including pilot lines for batteries manufacturing and primary / secondary raw materials processing. [2018-2020]
- launch calls in 2018 and 2019 for proposals for an additional total amount of EUR 110 million for battery-related research and innovation projects (in addition to EUR 250 million already allocated to batteries under Horizon 2020; and EUR 270 million to be allocated in support of smart grids and energy storage projects as announced in the Clean Energy for all Europeans package.²⁰ [2018-2019]
- support the creation of a new European Technology and Innovation Platform to advance on battery research priorities, define long-term visions, elaborate a strategic research agenda and road-maps. The leadership of the European Technology and Innovation Platform will be taken by the industrial stakeholders, research community and Member States, while Commission services will support the setting-up process and contribute in their respective areas of responsibility. [Q4 2018]
- prepare the launch of a large-scale Future Emerging Technologies Flagship research initiative, which could support long-term research in advanced battery technologies for the 2025+ timeframe. These Future Emerging Technologies Flagships run typically for a period of 10 years with an overall support of around EUR 1 billion, co-funded from the EU budget.²¹ [Q4 2018]
- support breakthrough market-creating innovation in areas such as batteries through the pilot of the European Innovation Council.²² A budget of EUR 2.7 billion is made available for 2018-2020 to support 1,000 potential breakthrough projects and 3,000 feasibility awards. This pilot scheme can be helpful for batteries breakthrough technology (expected to be part of projects for applications in transport, energy system, manufacturing etc.). [2018-2020]
- optimise solutions for integration of stationary storage and electric vehicles in the grid within Horizon 2020 smart grid and storage projects²³ as well as Smart Cities and Communities' projects.²⁴ Promote successful battery integration solutions with a clear

¹⁸ An additional EUR 110 million has been made available specifically for batteries research and innovation under Horizon 2020. Around EUR 200 million will be allocated specifically to battery research and innovation between 2018-2020 in addition to almost EUR 150 million already spent under Horizon 2020. The Clean Energy for all Europeans package announced EUR 270 million to be allocated in support of smart grids and storage projects, which are also expected to contain substantial battery-related components.

¹⁹ As of today, they are based on the Strategic Energy Technology Plan Action 7 Implementation Plan <https://setis.ec.europa.eu/batteries-implementation>, the conclusions of the European Commission (DG Research and Innovation) European Battery Cell Research and Innovation Workshop held on 11-12 January 2018 focused on programming additional EU funding for batteries research and innovation under H2020, and the Strategic Transport Research and Innovation Agenda roadmap on transport electrification (SWD(2017) 223 of 31 May 2017).

²⁰ Smart grids and storage projects are expected to contain substantial battery-related components. In addition, the JRC has a dedicated project on batteries for energy storage primarily for transport applications.

²¹ <https://ec.europa.eu/digital-single-market/fet-flagships>. The Flagship preparatory phase action should be completed by Q4/2018 and funding would start under the next research and innovation framework programme.

²² <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/european-innovation-council-eic-pilot>

²³ Approximately EUR 90 million per year; battery integration (including also second use and vehicle to grid solutions) traditionally attracts non-negligible part of this financing, even if calls are technology neutral. The cluster of smart grid and storage projects (BRIDGE) goes beyond technical innovation aspects and looks into improvements of business models, regulatory issues, data management and consumer acceptance.

²⁴ Also approximately EUR 90 million per year, with many projects proposals including also (battery-based) storage elements, even if calls are technology neutral.

replication potential becoming part of the match-making exercise being launched by the European Innovation Partnership on Smart Cities and communities (matchmaking between cities, businesses, banks, investors and project promoters). [2018-2019]

- build on the experience of Joint Technology Initiatives and the European Institute of Technology / Knowledge and Innovation Communities to explore the feasibility and suitability of different forms of public-private partnerships, including for batteries development.²⁵ [2020-]

4. Developing and strengthening a highly skilled workforce in all parts of the value-chain

The EU labour force is highly qualified but sufficient specialised battery related skills are missing, especially on applied process design and cells manufacturing. Actions at EU and Member State level should be taken to close the skills gap.

Key Actions

The Commission will:

- map out the skills needed along the value chain, identifying also means to fill the gap and relevant timeframe for implementation. [Q4 2018]
- open access to the EU's battery testing laboratories hosted by the Commission's Joint Research Centre for skills and capacity-building.²⁶ Other research centres will be encouraged to follow suit. [Q4 2018]
- propose batteries as a key topic for funding in the framework of the Blueprint for Sectoral cooperation on skills in order to address short and medium term skills needs throughout the battery value chain.²⁷ [2018-2019]
- work with relevant stakeholders to make available to companies the pool of experts specialised in cell chemistries, manufacturing processes, battery management systems, etc. [2018-2019]
- work with relevant stakeholders to create links between the educational network and the European pilot line network to gain manufacturing experience and know-how. [2018-2019]
- encourage Member States to make use of the European Social Fund funds in addressing training needs for professionals in the area of batteries. [ongoing]
- help universities and other education / training institutions to build new degree courses in cooperation with industry. [2018-2019]

²⁵ The Joint Undertakings launched under Article 187 of the Treaty on the Functioning of the European Union, are a special legal instrument implementing Horizon 2020 through a public-private partnership (PPP) in key strategic areas. Their aim is to implement research and innovation activities to enhance competitiveness and to tackle the grand societal challenges with the active engagement of Europe's industry. The seven Joint Undertakings currently in operation implement specific parts of Horizon 2020 in the areas of transport (CleanSky2, Shift2Rail and SESAR), transport/energy (FCH2), health (IMI2), bio-economy (BBI) and electronic components and systems (ECSEL).

²⁶ <https://ec.europa.eu/jrc/en/research-facility/open-access>

²⁷ The Blueprint for Sectoral Cooperation on Skills is a framework for strategic cooperation to address short and medium-term skills needs in a given economic sector. The Blueprint currently focuses on five pilot sectors including: Automotive; Maritime Technology; Space (geo-information); Textile, Clothing, Leather & Footwear (TCLF); and Tourism. It will be extended to additional sectors in the future. It is funded under Erasmus Plus.

5. Supporting a sustainable battery value chain – ie requirements for safe and sustainable batteries production - as a key driver for EU competitiveness

A sustainable battery value chain should be well-integrated into the circular economy and drive the competitiveness of European products. The EU must therefore support the growth of a high performing, safe and sustainable battery cells and battery packs/modules production with the lowest environmental footprint possible. Various instruments could be considered to drive robust environmental and safety requirements that could be a trend-setter in global markets. To this end, full advantage should notably be taken of the EU Batteries Directive, currently under review and the Eco-design Directive framework, where opportunities to design an innovative and future-proof regulation could be pursued.

A prerequisite to the sustainability of a European battery value chain, notably in the context of the circular economy, is to analyse in detail the key determinants for the production of safe and sustainable batteries.

This should also cover the entire value chain, from sustainable and responsible supply of raw materials to production processes, system integration and recycling.

Key Actions

The Commission will:

- assess current collection and recycling targets for batteries at the end of their life, in the context of the review of the EU Batteries Directive including the recovery of materials (evaluation expected to be completed in September 2018).²⁸ [Q4 2018]
- launch a study on the key determining factors for the production of safe and sustainable ('green') batteries. [Q4 2018]

On that basis:

- identify the possibility of developing a standardised EU life cycle assessment scheme for batteries, in particular by taking into account the results of the "Product Environmental Footprint" pilot project in close cooperation with industry.²⁹
- put forward battery sustainability 'design and use' requirements for all batteries to comply with when placed on the EU market (this comprises an assessment and suitability of different regulatory instruments such as the Ecodesign Directive and the Energy Labelling Regulation and the EU Batteries Directive). [Q4 2018]
- monitor the coherence of different regulatory instruments (e.g. REACH, Waste Framework Directive, etc) to ensure smooth functioning of the internal market for batteries, waste batteries and materials obtained from recycled batteries.
- advance interaction with stakeholders and the European standardisation bodies in order to develop European standards for enabling the safe and sustainable production, (re-)use and recycling of batteries, amongst others through the use of prenormative research. [2018-2019]
- analyse how best to promote the second-use of advanced batteries and the use of bi-directional batteries [Q4 2019]

²⁸ Directive 2006/66/EC, OJ L 266, 26.9.2006, p. 1.

²⁹ i.e. capable of Grid-to-Vehicle and Vehicle-to-Grid operating mode.

- promote ethical sourcing of raw materials for the batteries industry. [Q1 2019]

6. Ensuring consistency with the broader enabling and regulatory framework

Due to the global value chains, batteries need to be an important element of the European Union relations with its global trading partners.

Under the Energy Union, and most notably under the Clean Energy for all Europeans Strategy and the Low-Emission Mobility Strategy, the Commission has also adopted a wide range of proposals and enabling measures to accelerate the uptake of renewable and clean energy, notably with respect to energy storage and electro-mobility. The rapid finalisation at EU level and ambitious and swift implementation at national level of these supply- and demand-side measures can stimulate and remove obstacles for the establishment of an EU innovative, sustainable and competitive batteries 'ecosystem'.

The Commission will:

- monitor and tackle unfair practices in third countries, such as the subsidisation of raw materials or other production inputs, through the application of EU Trade Defence Instruments measures. If the legal conditions are fulfilled, the Commission may launch anti-dumping and/or anti-subsidy investigations with a view to determining whether the adoption of trade defence measures would be warranted. [ongoing]
- monitor and tackle market access distortions/barriers by continuing – in line with the EU Market Access Strategy – to focus on and remove third country and investment barriers in the automotive and other sectors relevant to batteries.³⁰ [2018-2019]
- ensure consistency between rules of origin for electric vehicles and battery cells in the framework of the EU's external trade policy by providing that Free Trade Agreement negotiations covering rules of origin for electric cars and/or batteries take full account of the development of the production and trade of electric cars and batteries. [2018-2019]
- ensure that the EU policy / broader regulatory framework coherently addresses emerging human, health and environmental concerns related to batteries and is conducive to the development and deployment of innovation in new battery technologies [ongoing].

and calls on the European Parliament and Council to swiftly adopt:

- the revised Clean Vehicles Directive
- the new CO₂ emission standards for cars and vans, and heavy duty vehicles
- the recast of the Renewable Energy Directive (RED II)
- the recast of the Electricity Market Regulation and Directive

and will work closely with the Member States to:

- ensure timely transposition and effective implementation of this legislation and of the amended Directive on Energy Performance of Buildings
- accelerate the deployment of Alternative Fuel Infrastructure as recommended in the Action Plan and supported by Connecting Europe Facility deployment

III. Conclusions and next steps

³⁰ This will be carried out using the main platforms of coordination that already exist such as the Market Access Advisory Committee (MAAC) and expert Working Groups (MAWG) in Brussels, as well as in the Market Access Teams (MATs) on the ground in third countries.

The Commission calls on

EU industrial stakeholders participating in the 'European Battery Alliance' to:

- take forward and implement industry-led initiatives³¹ and projects in order to establish a competitive battery value chain in Europe.

the participating Member States to:

- step up their support to industry-led projects related to battery cell manufacturing or other parts of the supply chain using national instruments and/or appropriate EU funding mechanisms for which they are responsible (i.e. structural funds), as appropriate.
- simplify and accelerate approval and permitting procedures (environmental, manufacturing, construction) for pilot lines and relevant industrial projects.

The Commission will continue to work in partnership with both interested Member States and the industry in the framework of the European Battery Alliance to keep up the momentum and ensure that these actions are implemented in accordance with deadlines, and that tangible results are delivered as a result.

The Commission will issue a report on the implementation of this strategic action plan in 2019.

³¹ European Institute of Innovation and Technology (EIT) Inno-energy <http://www.innoenergy.com/eit-innoenergys-role-within-the-european-battery-alliance/>