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ANNEX

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to the Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank

Building a Strategic Battery Value Chain in Europe

ANNEX

Progress on Key Actions[1]

1. SECURING THE SUPPLY OF RAW MATERIALS

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).	Preliminary analysis was presented in the Commission Staff Working Document "Report on Raw Materials for Battery Applications", issued in November 2018.[2] This analysis is being complemented and deepened in cooperation with experts from EU Member States within the Raw Materials Supply Group. Recommendations were presented during the European Innovation Partnership(EIP) High Level Conference on 14 November 2018 and its implementation has started, in particular, those on incentives and data collection of mineral exploration activities. Modelling of the current and future value chain for battery raw materials such as cobalt, lithium, natural graphite and nickel is being carried out by the Joint Research Centre.[3] Work on improving EU statistics on industrial production (PRODCOM) relevant for battery raw materials has also been launched and new codes for non-energy raw materials and batteries (primary and secondary battery types; chemical compounds; parts of batteries) have been approved by the PRODCOM Member States' Working Group. A new International Energy Agency Task Force 40 "Hybrid and Electric Vehicle" (HEV) has been created on "Critical Raw Materials for Electric Vehicles". This is a Technology Collaboration Programme of the Agency, which aims at providing accurate, credible and up to date information on materials which are considered as (potentially) critical for a quick ramp up of electric vehicles sales. Batteries raw materials and Rare Earth Elements (used in permanent magnets for electrical motors) have a central role to play. This is due to report in 2019. JRC is involved in Collaboration Agreement with EGS (EuroGeoSurveys, The Geological Surveys of Europe) and one of the topics for collaboration is sharing geo-scientific information and knowledge in the remit of Raw Materials including sharing of data and information through the Raw Material Information System. The EGS includes 37 National Geological Surveys and some regional Surveys in Europe, therefore assures vast Member State representation in sharing data on raw materials. A key output of the first raw materials mapping exercise by the Commission is that Europe lacks a processing facility for lithium. Since the beginning of 2019, EIT RawMaterials finances two projects in the field: "EuGeLi" aims to extract lithium as a by-product from geothermal brines currently used in electricity generation; "LiRef" aims to install a multifeed processing unit for lithium from multiple European sources.

[1] This Annex provides an update on those key actions in the Strategic Action Plan where significant progress has been made.
[2] SWD(2018) 245/2 final
[3] Alves Dias P., et., al., Cobalt: demand - supply balances in the transition to electric mobility, EUR 29381 EN, Publications Office of the European Union, Luxembourg, 2018.

2. SUPPORTING PROJECTS COVERING DIFFERENT SEGMENTS OF THE BATTERY VALUE CHAIN, INCLUDING CELL MANUFACTURING

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.	Several projects and investments have been announced in the framework of the European Battery Alliance. One is already starting construction of a pilot line in Sweden with support from the European Investment Bank[4], another is investing in the development of cheaper, more efficient solid-state batteries, which could begin production in seven years, and a materials and recycling group is building a plant in Poland to produce cathode materials, key for electric vehicles batteries, by 2020. Further details on battery-related projects can be found in this Press Release: https://ec.europa.eu/growth/content/eu-battery-alliance-major-progress-establishing-battery-manufacturing-europe-only-one-year_en Two European companies have made significant investment decisions to install two raw materials processing facilities in Finland to produce battery grade precursor materials by 2021. The second High Level Meeting on batteries with 13 Member States and 18 senior representatives from industry was held on 15 October 2018. There was recognition that there had been significant progress since the launch of the Alliance. Member States and industry took the opportunity to highlight planned investments. There was also strong support for the Commission's Strategic Action Plan. See press release from the European Commission: http://europa.eu/rapid/press-release_IP-18-6114_en.htm This engagement will continue with the next High Level Meeting with Member States and industry on 30 April 2019. EIT InnoEnergy, which is supporting the Commission in mobilising the European industrial ecosystem on batteries, organised on 29 January 2019 its fifth meeting with notably the aim of facilitating match-making between industrial initiatives and investors (public/private investors). 220 people attended the meeting. The next step is to facilitate deals between these two groups of stakeholders.

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.	The European Battery Alliance is examining the potential for innovative projects related to the battery strategic value chain, including on cell technology and related first industrial deployment to access public funding that could be compatible with the EU's international commitments and with its State Aid rules under the Important Projects of Common European Interest (IPCEI) framework.[5] It is encouraging that some EU Member States have launched processes to identify potential consortia and work together to design one or more IPCEI in this field.[6] They aim to seek approval by the Commission as soon as possible. The Strategic Forum on Important Projects of Common European Interest (IPCEI) was set up in May 2018 and has identified nine key

[4] Northvolt ETT-large scale battery plant, EIB press release, 19/09/2018

[5] 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.

[6] Including calls for interest published in Belgium, France, Germany and Italy

	strategic value chains of specific importance for industrial competitiveness and decarbonisation. Three of these identified value chains are already addressed by significant initiatives at EU level, with the batteries value chain being among them. For the other six key strategic value chains the Strategic Forum will develop recommendations for well-coordinated or joint investments and actions across several Member States by June 2019. Two of these value chains are relevant to batteries and mobility: Connected, clean and automated vehicles, and Hydrogen Technologies. Within the Strategic Forum initiative the Commission is facilitating cooperation between Member States and industry to encourage large-scale investments in innovation and industrial deployment.

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.	In September 2018, Slovenia proposed to lead a new interregional partnership on "Advanced materials for batteries for electromobility and stationary energy storage", together with Castille and Leon, Andalusia, the Basques country, Auvergne Rhone Alpes, Eindhoven, and Nouvelle Aquitaine. With support from the European Commission, this new partnership was successfully launched at a workshop organised by the Commission on 8 October 2018. The workshop gathered over 25 regions interested in joining forces in interregional partnerships for research and innovation on batteries under the Member States' smart specialisation strategies (industrial modernisation thematic platform). Other interested regions across Europe were invited to join the effort. By early 2019, the partnership had grown to include 22 European regions. The mission of this partnership is to accelerate the volume manufacture and deployment of advanced materials and battery cells using sustainable and competitive technologies, for mobility and stationary batteries across Europe between now and 2025. To do so, it will generate a pipeline of business investment projects by building upon existing regional assets to leverage complementary assets available across the partnership. It will identify and address key missing elements in the regional ecosystem and the industrial value chain to reach out to the end user. The partnership has the ambition to represent the regional dimension of the European Battery Alliance stakeholders. The partnership is currently concluding a scoping exercise and common areas of interest identified so far include: 1 Innovative cell manufacturing for generation 4 (solid state) - advanced material & manufacturing & cell production (Lead Region: Bavaria)Partner regions: Auvergne Rhone Alpes (FR)/ N. Aquitaine (FR)/ Flanders (BE)/ Brussels (BE)/ Basque Country (ES)/ Valencia (ES)/ Aragon (ES) / Viken (NO)/ Baden-Würtemberg (DE). 2 Sustainable raw material extraction & processing (Lead Region: Castilla y León) Partner regions: Nouvelle-Aquitaine (FR), Finland, Vestland (NO), Valencia (ES). 3 Recycling of existing Lithium Ion batteries (Lead Region:

	Bavaria) Partner regions: Flanders (BE). 4 Liquid based batteries (stationary) (Lead Regions: Basque/ Valencia) Partner regions: Basque Country (ES)/ Valencia (ES)/ Aragon (ES)/ Slovenia, Finland/ Bavaria (DE). 5 Network of research & testing centers (Lead Region: Slovenia) Partner regions: West Slovenia (SL), Hordaland (NO), Viken (NO), Andalusia (ES). 6 Improved lithium-ion batteries (Generation 3b) - (Lead Region: Auvergne Rhone Alpes) Partner regions: Auvergne Rhone Alpes (FR)/ N. Aquitaine (FR)/ Flanders (BE)/ Brussels (BE)/ Baden-Würtemberg (DE). The objective is to move towards concrete joint innovation investments in the above areas (and possibly additional ones). The partnership is open to all European regions expressing an interest in becoming a member.

3. TARGETING RESEARCH AND INNOVATION TO SUPPORT A COMPETITIVE BATTERIES VALUE CHAIN

In collaboration with Member States make available, research and innovation funds (H2020) for battery-related innovation projects, according to pre-identified short- and longer-term research priorities across the batteries value chain. This should comprise also innovative deployment projects, including pilot lines for batteries manufacturing and primary / secondary raw materials processing.	See below for H2020 (Work Programme 2018-2020) From the legislative package proposed by the Commission for Horizon Europe, clear possibilities are identified for energy storage (both electro-mobility counting for 90% of the market and stationary applications) in the cluster 4 (climate, energy, mobility) as well as in cluster 3 (industry). Next milestone will be the draft Strategic Planning to be adopted end of year (SWD). EIT RawMaterials launched a dedicated Lighthouse innovation programme called “Sustainable Materials for Future Mobility”. The programme comprises an annual match-making event, start-up booster calls, educational workshops, and funding for innovation and education projects. EIT InnoEnergy has launched in September 2018 a dedicated call on “electrical storage”, that has collected more than 220 applications. Final selection will take place in Amsterdam on 21 March 2019 (https://eit.europa.eu/newsroom/eit-innoenergy-call-electrical-storage-start-ups).
Launch calls for proposals in 2019 and 2020 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 European package.	A new dedicated cross-cutting call "Building a low carbon, climate resilient future: next-generation batteries" was included in the revised H2020 Work Programme 2019 (Annex 20) published in July 2018. In 2019, 7 topics with a budget of EUR 114 M will be published. The opening date for applications is 24 January 2019 with a deadline on 25 April 2019. Projects are estimated to start in January 2020.. The updated 2020 call on batteries will consist of two parts: firstly, four topics on batteries for transport and energy are released (EUR 90 million), and secondly four topics of total amount of EUR 42

	million are also foreseen to prepare for a large-scale and long-term research initiative on future battery technologies (see below). The Work Programme 2020 releasing these topics will be published in June 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.	The transition from the SET-Plan WG on batteries towards ETIP (the R&I platform of the European Battery Alliance) took place in January 2019 and was officially launched during the Industry Days https://ec.europa.eu/info/news/consolidating-industrial-basis-batteries-europe-launch-european-technology-and-innovation-platform-batteries-2019-feb-05_en . The Commission is financing the Secretariat of the new ETIP through a service contract. The new ETIP follows up on the achievements of the SET Plan and aims at federating all relevant work-streams, including battery strand of STRIA, FET flagship on batteries, and the interregional partnership on advanced battery materials. The ETIP will develop the Strategic Research Agenda and technology roadmaps. New participants are being engaged in particular to strengthen representation of industrial stakeholders. Direct engagement of additional stakeholders will be followed by an open call for expression of interest. Member States and regional representatives will be invited to be involved in the National Stakeholders group of ETIP to ensure better coordination of national and regional research and innovation efforts. Currently provisional leaders for the ETIP technical working groups are being identified and include several experts from the former SET-Plan WG which will help ensure continuity. A major launch event is planned for June 2019 when ETIP membership is complete.

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.	The first phase of the preparation has been completed with the publication in December 2018 of the Battery 2030+ Manifesto which outlines the vision, rationale, objectives and priorities of this large-scale and long-term research initiative on future battery technologies. The Battery 2030 Manifesto is published on the website http://battery2030.eu/). This is the outcome of a number of workshops and meetings that took place in 2018 with academic and industrial research stakeholders. A call for a Coordination and Support Action (CSA) was published in July 2018 under the FET Work Programme 2019 (EUR 0.5 M). This one year action started in March 2019 and will prepare a detailed research roadmap for the Battery 2030 initiative and further mobilise the academic and industrial research community. Funding is foreseen under the H2020 Work Programme 2020 for kickstarting the initiative and providing support to R&I priorities identified in the Battery 2030+ Manifesto. A budget of EUR 42 M is proposed as part of an updated 2020 cross-cutting call on "Next Generation Batteries". Additional funding support from an ERA-NET is also under discussion (EUR 5 M). Further support will be considered as part of the discussion on Horizon Europe.
Support breakthrough market-creating innovation in areas such as batteries through the pilot of the European Innovation Council. A budget of EUR 2.7 billion is made available for 2018-	As part of EIC Pilot a EUR 10 M Horizon Prize on "Innovative Batteries for eVehicles" has been published with a deadline in December 2020.

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.).	

Build on the experience of Joint Technology Initiatives and the European Institute of Technology / Knowledge and Innovation Communitities to explore the feasibility and suitability of different forms of public-private partnerships, including for batteries development.	Currently, the proposal for a co-programmed research partnership on batteries under Horizon Europe is under discussion at EU level. A dedicated information session on partnerships and European batteries research and innovation is planned during the R&I Days on 24-26 September 2019 in Brussels.

4. DEVELOPING AND STRENGTHENING A SKILLED WORKFORCE IN ALL PARTS OF THE VALUE CHAIN

Open access to the EU's battery testing laboratories hosted by the Commission's Joint Research Centre for skills and capacity-building. Other research centres will be encouraged to follow suit.	The call to open access to the JRC's battery research infrastructure in Petten (The Netherlands) has been launched - https://ec.europa.eu/jrc/en/research-facility/open-access/calls/relevance/2018-1-RD-BESTEST. The first call deadline is 29 March 2019 and communication of the assessment of proposals will follow.

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.	Following agreement that batteries will be included in the third wave of Blueprint implementation under Erasmus+ the call was launched on 24 October 2018 with a deadline of 28 February 2019. Evaluation of the proposals received is underway and the successful project is expected to be selected during the summer of 2019 with the 4-year project due to start by the end of 2019. This project will also work closely with the existing Blueprint project on automotive skills, 'DRIVES', and a recently launched COSME project on identifying best practices for supporting automotive SMEs and their upskilling needs. EIT InnoEnergy has organised on 5 November 2018 a workshop called "Building the battery workforce": http://www.innoenergy.com/event/eba-skills-brokerage-event/. Skills in that field is already a clear priority for InnoEnergy, a mapping of the needs along the value chain has been made, and training programmes developed.

5. MAKING EUROPE THE GLOBAL LEADER IN SAFE AND SUSTAINABLE BATTERY TECHNOLOGY AND SETTING THE PATH FOR SUSTAINABLE BATTERIES IN THE CIRCULAR ECONOMY

Launch a study on the key determining factors for the production of safe and sustainable ('green') batteries.	The Commission launched a preparatory study and impact assessment study in September 2018, with a duration of 10 months.
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).	The Commission's preparatory study is ongoing and its conclusions will provide the basis for the development of European harmonised and other standards to support the implementation of a new legislative framework. A Standardisation Request to the European Standardisation Organisations will be made once the Commission has identified the scope of its legislative proposal.. It will also take account of the Technical Report issued by the Commission's Joint Research Centre of October 2018 which described existing standards and standards under development relevant to electric vehicle battery performance, degradation and lifetime. It also identified measuring and testing methods, which may be used in the compliance assessment of electric vehicle batteries in order to meet potential requirements. Additionally, gaps and needs not covered by existing standards are being identified. Standards at both European and international level have been analysed, aiming at assessing the feasibility of EU legislation including specific requirements for this product group. The CERA project funded by EIT RawMaterials develops raw materials certification schemes, using three perspectives: Readiness Standards, Performance Standards, and Chain of Custody Standards. The system will allow for a certification of the complete mineral resources recovery chain.
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.	In July 2018 the Commission and CEN/CENELEC agreed on the need to develop appropriate standards in support of the Strategic Action Plan on Batteries' objectives to create a robust competitive and sustainable battery value chain in Europe. As part of this process it was agreed that the JRC and CEN/CENELEC should carry out a screening of the already available standards (at EU or global level). The JRC published its study on 15 October 2018 and the CEN/CENELEC Sector Forum Energy Management is expected to produce its full report shortly. This has been followed by a workshop with CEN/CENELEC, JRC and EIT InnoEnergy on standardisation. The crucial next step will be the proposals from the Commission's study on standardisation needs for batteries. This will be the basis for developing a standardisation request to CEN/CENELEC for any new standards requirements identified. The CEN/CENELEC eMobility Coordination Group has set up the Working Group on 'Putting e-mobility sciences into standards'. This group aims at identifying "who does what by when" to address the gaps in battery standardisation and in pre-normative research. It covers 4 areas – battery performance, safety, second use and recycling. In addition, the Commission has requested the European

	Standardisation Organisations to further develop European standards for material-efficient recycling of waste batteries and electronic waste, with the objective of increasing high-quality recycling of Critical Raw Materials. This is a joint action with the Circular Economy Action Plan.
Analyse how best to promote the second-use of advanced batteries and the use of bi-directional batteries.	Part of the evaluation of the Batteries Directive and any follow-up studies. The Commission will issue its evaluation report in April 2019. The JRC has completed a project on the sustainability assessment of second use application of automotive batteries. The results of this study was disseminated to relevant Commission departments at a workshop held on 5 June 2018 for their consideration on potential policy implications.. Through the Innovation Deals model, a Joint Declaration "From e-mobility to recycling: the virtuous loop of the electric vehicle" was signed on March 2018 between the Commission and a consortia (represented by national authorities and private companies) to identify regulatory obstacles which can hinder second life of batteries. Waste and Energy regulatory frameworks on EU and national levels will be examined.

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.	The Report on the implementation of the Batteries Directive, its impact on the environment and the internal market will be adopted by the Commission in April 2019. The results of the Commission's evaluation of the Directive will be annexed to this report. The assessment of current collection and recycling targets, their advantages and limitations is an essential part of the evaluation report. A study to identify and assess the feasibility of measures to enhance the impact of the Batteries Directive has been launched (to be completed in Q1 2020).
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.	Part of the evaluation of the Batteries Directive and any follow-up studies. The Commission will issue its evaluation report in April 2019. The SUPRIM project funded by EIT RawMaterials aims to deliver life-cycle impact assessment method(s), with a focus on improving Life-Cycle inventory datasets for metal production and data collection schemes from mining companies. Project ends in 2019.
Promote ethical sourcing of raw materials for the batteries industry.	The Commission will 1) take stock of sustainable mining practices in Europe and assess options for development of a common set of principles; 2) promote sustainable sourcing commitments among European Battery Manufacturers and 3) provide information on sustainable and responsible sourcing as elements for the Action Plan on Sustainable Finance; 4) deliver policy recommendations and network through the Horizon 2020 call on "Responsible sourcing of raw materials in global value chains" (start by end of 2019) and 5)

	deliver a capacity-building system on sustainability in supply chains for SMEs through SME Support System on Conflict Minerals Due Diligence (beginning 2020).