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Special report

The EU's industrial policy on batteries

New strategic impetus needed

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Executive summary

I The development and production of batteries has become a strategic imperative for the EU, enabling the clean energy transition and as a key component of the competitiveness of the automotive sector. To help the EU become a global leader in sustainable battery production and use, in 2018 the Commission published a strategic action plan on batteries. It covers the different stages of the value chain, identifies a number of strategic goals and proposes a range of tools to achieve them.

II In this audit, we assessed whether the Commission has been effective at promoting a European industrial policy on batteries. In particular, we examined the policy objectives and intervention tools set out in the Commission's 2018 action plan as well as the progress in its implementation. In addition, we reviewed current and projected battery production capacity in the EU, together with the risks that may affect it. Lastly, we examined the allocation and results achieved with the EU's financial support. Five years after the launch of the action plan, this report aims to contribute to the improvement of the policy framework and to a more efficient use of EU resources in this field.

III Overall, we conclude that the Commission's promotion of an EU industrial policy on batteries has been effective, despite shortcomings in monitoring, coordination and targeting, as well as the fact that access to raw materials remains a major strategic challenge for the EU's battery value chain.

IV We found that the Commission largely delivered the most significant actions in its action plan, putting in place key instruments in support of the battery sector. Important achievements include the creation of stakeholder platforms encompassing the whole value chain, a legislative proposal for a new regulation on batteries, and increased financial support for research, innovation and manufacturing projects.

V The Commission is monitoring the battery value chain in the EU based on limited and often outdated data. In addition, the 2018 action plan did not set quantified and time-bound targets and the Commission did not analyse the EU battery production that is needed to achieve the dual goal of climate neutrality and of maintaining a competitive automotive sector in the EU. This increases the risk that the Commission's zero-emission goal for 2035 will not be reached due to insufficient battery production, or that it will be reached on the basis of imported batteries or electric vehicles, to the detriment of the EU battery value chain and the associated jobs. It also increases uncertainty about the security of supply of the raw materials needed to sustain production in the EU.

VI Pushed by increasingly stringent CO_2 emission performance standards, production capacity of lithium-ion battery cells is developing rapidly within the EU-27 and could rise from 44 gigawatt hours in 2020 to approximately 1 200 by 2030. However, the actual deployment of such capacity is not ensured and may be put at risk by geopolitical and economic factors.

VII Despite policy initiatives that date back to 2008, the EU's battery value chain remains strongly dependent on supplies from outside the EU. From 2030 onwards, EU manufacturers face a looming shortage of battery raw materials. This is due to the combined effects of an increase in global demand, driven mostly by the electrification of road transport and the limitations of the EU's domestic supply of raw materials, which is both scarce and rigid. In 2023, the Commission renewed efforts to address this situation by issuing its proposal for a Critical Raw Materials Act.

VIII Multiple funding streams support new battery research and manufacturing projects. During the 2014-2020 period, the EU budget provided at least €1.7 billion in grants and loan guarantees, which add to state aid of up to €6 billion between 2019 and 2021. However, the Commission lacks an overview of the total public support given to the industry, which hinders its ability to ensure adequate coordination and targeting. We also found that the conditions for financial support for Important Projects of Common European Interest depend on the location of investments.

IX Over time, the Commission improved the alignment of funding by the key EU funding programmes for research and innovation – Horizon – with a common technological roadmap. However, the technical targets set are not yet achieved and the need for EU funding at project level is not assessed systematically.

X On the basis of these conclusions, we recommend that the Commission should:

- update the strategic action plan on batteries, with a particular focus on securing access to raw materials;
- strengthen monitoring with regular, up-to-date and comprehensive data;
- improve the overview of EU funding for the battery value chain;
- improve the coordination and targeting of EU funding for the battery value chain;
- ensure that all participants in Important Projects of Common European Interest on batteries have a level playing field in accessing public financial support.

Introduction

Batteries as key enablers of electric mobility and energy transition

01 The European Green Deal aims to transform the EU into a resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050[1]. The goal of climate neutrality entails further decarbonisation of the energy system and a major reduction in transport emissions by 2050. Among other things, this requires an EU-wide uptake of zero- and low-emission vehicles: from 13 million cars by 2025 to 30 million by 2030[2]. Moreover, from 2035 onwards, sales of new passenger cars and light commercial vehicles using CO_2-emitting combustion engines will likely be banned[3].

02 Batteries are one of several technologies for energy storage, but they are the most readily available for electric mobility from a technological standpoint. Given this context, the Commission designated battery development and production as a strategic imperative for Europe: it enables the clean energy transition (including the storage of intermittent renewable energy) and is a key component of the competitiveness of its automotive sector[4] – currently employing some 3.5 million workers in manufacturing activities[5]. Investments in the EU's battery value chain should also address the current strategic dependence on battery producers from outside the EU[6].

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1 Commission communication on the European Green Deal, COM(2019) 640.

2 Commission communication on Sustainable and Smart Mobility Strategy, COM(2020) 789.

3 Article 1 of the Commission proposal for a regulation strengthening the CO_2 emission performance standards for new passenger cars and new light commercial vehicles, COM(2021) 556.

4 Annex 2 to COM(2018) 293, Strategic Action Plan on Batteries.

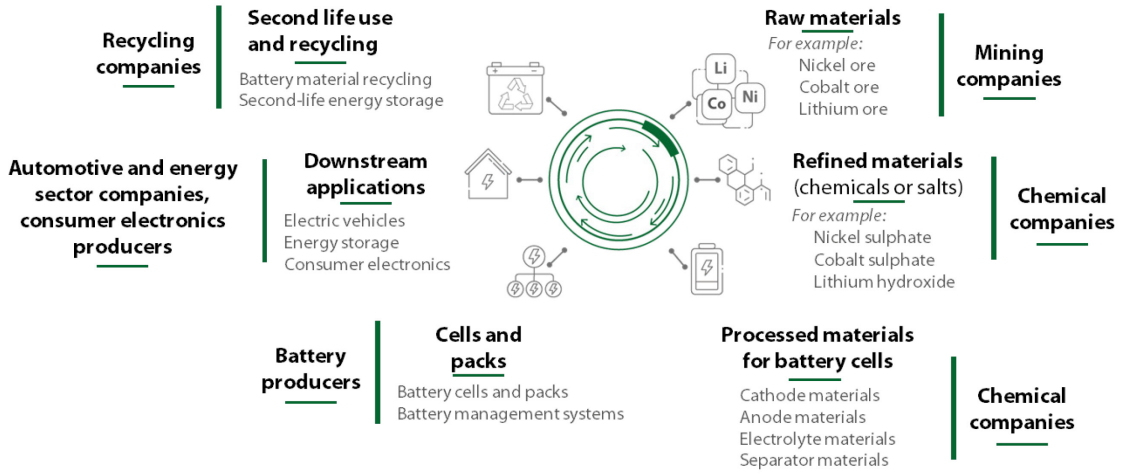
5 European Automobile Manufacturers' Association (ACEA) – The Automobile Industry – Pocket Guide 2022/2023.

6 Commission staff working document on strategic dependencies and capacities, SWD(2021) 352.

03 Batteries are electrochemical cells that store energy in a chemical form and are able to convert it into electrical energy. A battery cell typically comprises an anode, cathode, electrolyte and a separator, using different chemistries, such as lead-acid and nickel-cadmium. Lithium-ion batteries, the current state of the art in powering electric vehicles, typically use a blend of five key materials: cobalt, lithium, manganese, natural graphite and nickel.

04 The battery value chain comprises multiple stages that range from the extraction and refining of raw materials, production of battery components, cell manufacturing and assembly and battery recycling or repurposing. The chain is circular and involves different stakeholders (see ***Figure 1***).

Figure 1 – The stages of the battery value chain



Source: ECA.

EU's battery industry lags behind in global competition

05 The EU's fleet of passenger cars and vans is gradually becoming electrified. In 2021, 18 % of new registrations had an electric plug[7]. However, manufacturing of lithium-ion batteries that typically power such vehicles is currently concentrated in Asia building on its decades-long history as a global supplier of electronic equipment and components. The research and innovation (R&I) investment associated with large-scale production has also allowed Asia to build and so far retain technological leadership both in contemporary lithium-ion and in other battery technologies[8].

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[7] ACEA – The Automobile Industry – Pocket Guide 2022-2023.

[8] Joint Research Center, Batteries – Technology development report, 2020.

06 China in particular has become by far the world's largest battery producer. In 2021, China had a production capacity of 655 gigawatt hours (GWh), or 76 % of global capacity, well ahead of the EU (7 %), the United States (7 %) and South Korea (5 %)[9]. Moreover, China is also the dominant player in the upstream stages of the value chain, notably the supply of several battery raw and/or refined materials, in particular cobalt, lithium, nickel and natural graphite (see paragraphs ***29*** and ***48***-***56***).

07 Although the electrification of road fleets in the United States is lagging behind (630 000 electric vehicles sold in 2021 in the US, 5 % of sales in that year, as against 2.3 million in Europe, 18 % and 3.3 million in China, 16 %)[10], its government enacted significant public policies, such as direct grants and tax credits, to promote the growth of both the electric vehicle market and the battery value chain. Most notably, the US government is providing:

- direct grants in support of investments in the domestic production of batteries as well as the related materials and components (USD $6 billion to be funded from the Bipartisan Infrastructure Law between 2022 and 2026[11]);
- tax credits for the production of battery cells or modules of up to USD $45 per kilowatt hours (kWh) and 10 % of the production cost of critical minerals and materials for batteries (authorised by the Inflation Reduction Act)[12], with an estimated overall budgetary impact, also including similar credits for solar and wind components, of approximately USD $15.9 billion[13] over the 2022-2031 period);

[9] IEA (2022), Global Supply Chains of EV Batteries.

[10] IEA (2022), Global EV Outlook 2022, and IEA (2022), Electric Vehicles.

[11] Public Law 117–58 "Infrastructure Investment and Jobs Act", section 40207.

[12] Public Law 117-169 amending the Internal Revenue Code, section 13502 – Advanced Manufacturing Production Credit.

[13] Congressional budget office, "Estimated Budgetary Effects of Public Law 117-169".

- tax credits of up to USD $7 500 for each electric vehicle placed on the US market that meets predefined thresholds requiring materials, components and final assembly to be sourced from or occur in the United States or a country with which it has a free trade agreement. These tax credits are to be funded from the Inflation Reduction Act[14] with an estimated total budgetary impact of approximately USD $7.5 billion[15] over the 2022-2031 period.

EU stakeholders role in supporting the battery value chain

08 The EU intervenes in the battery value chain in three key areas:

- **Strategic leadership:** through its communications on industrial policy[16], the Commission provides a vision of how the EU industry can be steered through the twin green and digital transitions, while ensuring its strategic sovereignty. The policy also provides a new focus on industrial ecosystems taking account of all players in a value chain – in the case of batteries translated into the 2018 strategic action plan on batteries (hereinafter referred to as 'action plan')[17]. Strategic leadership is also exercised by the Commission, when it uses its convening power to promote the gathering of stakeholders across the value chain in dedicated fora, such as the European Battery Alliance.

[14] Public Law 117-169 amending the Internal Revenue Code, section 13401 – Clean Vehicle Credit.

[15] Congressional budget office, "Estimated Budgetary Effects of Public Law 117-169".

[16] Commission communications on A Green Deal Industrial Plan for the Net-Zero Age, COM(2023) 62 as well as earlier documents: A New Industrial Strategy for Europe, COM(2020) 102 and Investing in a smart, innovative and sustainable Industry A renewed EU Industrial Policy Strategy, COM(2017) 479.

[17] Annex 2 to COM(2018) 293, Strategic Action Plan on Batteries.

- **Regulatory framework:** Directive 2006/66/EC[18] on batteries and waste batteries seeks primarily to improve the environmental performance of batteries, by establishing rules for placing them on the market (in particular, by prohibiting certain hazardous substances) and rules for collecting, recycling and disposing of them. Member states must ensure minimum collection and recycling targets and report on their achievement to the Commission. The Directive is due to be replaced by a Regulation of the European Parliament and of the Council[19], which will be broader in scope (see paragraph ***28***). Moreover, in March 2023, the Commission published two proposals for regulations aiming at innovating and scaling up the European manufacturing capacity of, inter alia, batteries[20], and at ensuring a secure and sustainable supply of critical raw materials[21]. In addition, the Commission's 2022 proposal for a revision of the Industrial Emissions Directive (Directive 2010/75/EU)[22] includes an extension of its scope to battery factories.

- **EU financial support**: through several instruments – the Horizon framework programmes, the European Regional Development Fund (ERDF), the European Fund for Strategic Investments (EFSI) operated by the European Investment Bank (EIB) and more recently the Innovation Fund and the Recovery and Resilience Facility (RRF) – the EU provides grants and loan guarantees for research, demonstration and manufacturing projects in the field of batteries. For the 2014-2020 period, we identified EU grants totalling €1.2 billion and EU-backed loans of €495 million. EU grants may either be managed directly by the Commission or its executive agencies, namely the European Climate, Infrastructure and Environment Executive Agency and the European Health and Digital Executive Agency (Horizon programmes); or together with member states (ERDF).

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[18] Directive 2006/66/EC of the European Parliament and of the European Council on batteries and accumulators and waste batteries and accumulators.

[19] Proposal for a regulation concerning batteries and waste batteries, COM(2020) 798.

[20] Proposal for a regulation on establishing a framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem (Net Zero Industry Act), COM(2023) 161.

[21] Proposal for a regulation establishing a framework for ensuring a secure and sustainable supply of critical raw materials, COM(2023) 160.

[22] Proposal for a directive amending Directive 2010/75/EU on industrial emissions and Directive 1999/31/EC on the landfill of waste, COM(2022) 156.

Member state financial support for battery producers is subject to the EU's state aid rules

09 As a rule, member states are prohibited from granting aid to undertakings – such as manufacturers in the battery value chain – that distorts or threatens to distort competition in the internal market[23]. Notwithstanding this principle, certain forms of aid may be considered compatible with the internal market, as long as they conform to specific state aid rules and, in certain cases, receive Commission approval.

10 The Commission details these exceptions further in regulations and communications including the General Block Exemption Regulation[24] and specific frameworks applicable to certain activities, regions or temporary circumstances. Within these frameworks, the Important Projects of Common European Interest (IPCEIs)[25] are particularly relevant: two such projects have so far been approved by the Commission in the field of batteries, authorising up to €6 billion in state aid (see paragraphs ***65***-***69***).

11 In March 2020, the Commission adopted a state aid temporary framework[26] to increase the scope for public support in the context of COVID-19, in order to protect jobs and to support the economy. In March 2022, in response to the Russian invasion of Ukraine, the Commission relaxed the EU's state aid rules further to provide short-term relief for companies affected by the crisis, or by the sanctions and countersanctions. While these frameworks are not specific to this sector, they can also be used by battery producers in support of their activities.

12 In addition, as of 2022, a majority of EU-27 member states had established some form of incentives to the purchase of electric vehicles, be it in the form of tax benefits or direct subsidies. However, typically, these are not dependent on the origin of the vehicle and would not necessarily be classified as state aid.

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[23] Treaty on the Functioning of the European Union, Article 107.

[24] Regulation (EU) 651/2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty.

[25] Commission communication C(2021) 8481.

[26] Commission communication, Temporary Framework for State aid measures to support the economy in the current COVID-19 outbreak, C(2020) 1863.

Audit scope and approach

13 This report assesses whether the Commission has been effective at promoting a European industrial policy on batteries. To this end, we examined:

- the relevance of the policy objectives and intervention tools set out in the Commission's action plan, their consistency with national strategies, and the key actions delivered to date by the Commission;
- the Commission's monitoring of the battery value chain and of its potential to contribute to wider EU climate goals;
- the production capacity of the EU-based battery industry, both current and projected until 2030, together with the risks that may impact that future capacity;
- on the basis of available data, the security of supply of key raw and refined materials for batteries;
- the allocation and coordination of the different EU and national funding streams that provide financial support for the battery value chain during the 2014-2020 period; and
- the need for EU-funded research in this sector, its technological prioritisation, and the results that have been achieved so far.

14 We analysed evidence from a range of sources:

- reviews of existing legislation, evaluation reports and policy papers;
- interviews with officials from the European Commission, from its executive agencies responsible for the management of the Horizon programmes, and from national and regional authorities relevant to the battery value chain in Germany, Spain, France, Poland, Portugal and Sweden – member states where projects with material financial support from the EU budget were being implemented, or with relevance in particular stages of the value chain, namely the extraction of raw materials and battery manufacturing;

- interviews with representatives of industrial companies and research institutions active in the battery value chain, as well as the Knowledge Innovation Community[27] dedicated to sustainable energy (EIT Innoenergy);
- analysis of publicly-available data on current and planned battery production capacity;
- analysis of budgetary information on EU and national funding for the battery value chain;
- a review of results of EU-funded research activities for batteries; and
- an examination of supporting documentation on the selection and implementation of a sample of co-funded R&I or manufacturing projects along the battery value chain, including an on-the-spot visit for some of these projects (see ***Annex I***).

15 We also reviewed the main principles set out in the Commission's 2020 proposal for a regulation on batteries and waste batteries[28] (which in December 2022 received a provisional political agreement by the co-legislators but at the time of publication of this report was yet to be formally adopted and published) because of its potential to change the battery landscape in Europe. We did not review in detail the new Critical Raw Materials Act and Net-Zero Industry Act, proposed by the Commission in March 2023.

[27] What is an Innovation Community?

[28] Proposal for a regulation concerning batteries and waste batteries, COM(2020) 798.

16 In 2019, we published a review[29] in which we described EU support since 2014 for various energy storage technologies (including batteries, but also pumped-hydro, hydrogen and thermal storage) and identified a number of challenges to EU support for the development and deployment of energy storage technologies. Moreover, in 2022 we looked at synergies between Horizon 2020 and the ERDF[30], a subject which is also relevant to the battery value chain given that the bulk of the EU's financial support so far has been delivered primarily through these two instruments. In that report, we noted that it was difficult for the Commission and national or regional authorities to identify and explore possible synergies of this type, and that cooperation between the funds' stakeholders remained limited.

17 The battery value chain has evolved rapidly in recent years, both at global and European levels. Five years after the adoption of the 2018 action plan, this report aims to contribute to the improvement of the policy framework and to a more efficient use of EU resources in this field.

[29] Review 04/2019: "EU support to Energy Storage".

[30] Special report 23/2022: "Synergies between Horizon 2020 and European Structural and Investment Funds".

Observations

The Commission's strategy for batteries is relevant to the needs of European stakeholders, despite shortcomings in monitoring

18 We reviewed the development of the Commission's action plan, and the relevance of the policy objectives it pursued and of the actions it proposed. We compared the action plan with national strategies, where they existed, to assess their consistency. We examined the key achievements of the Commission in implementing the action plan after it was published in 2018. Lastly, we examined how the Commission is monitoring the battery value chain and the potential of the EU's battery production to contribute to the achievement of the EU's wider climate neutrality and competitive automotive sector goals.

The 2018 action plan is the result of Commission's efforts to promote the EU industrial policy for batteries since 2015

19 Since 2015, following the revision of the Strategic Energy Technology (SET) plan,[31] battery production has become a cornerstone of the EU's industrial policy. This plan identifies the need to "become competitive in the global battery sector" and its 2017 implementation plan[32] presents specific R&I activities needed to achieve that goal. In the same year, the Commission's communication on a renewed EU industrial policy strategy[33] classified investments in batteries as being of strategic importance and announced its intention to gather stakeholders and "kick-start industry-led initiatives for a full battery value chain in the EU, both for mobile and stationary applications".

20 In October 2017, the Commission hosted a high-level meeting on battery development and production and announced the launch of an industry-led platform, known as the European Battery Alliance. Using this platform, industrial stakeholders

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[31] Commission communication, Towards an Integrated Strategic Energy Technology (SET) Plan: Accelerating the European Energy System Transformation, C(2015) 6317.

[32] Set Plan Information System, Become competitive in the global battery sector to drive e-mobility and stationary storage forward.

[33] Commission communication, A renewed EU Industrial Policy Strategy, COM(2017) 479.

and the research community continued to work between 2017 and 2018 on preparing a list of actions needed to develop the battery value chain.

21 In April 2018, and building on the contributions received from the European Battery Alliance, the Commission published its action plan as an annex to the Commission's communication on Sustainable Mobility for Europe[34], with the overall aim of making 'Europe a global leader in sustainable battery production and use'. It covers the different stages of the value chain, from extraction of raw materials to their recovery from end-of-life batteries (see ***Box 1***). It also proposes a range of tools that include facilitating partnerships between stakeholders, legislative intervention and funding for battery-related projects.

Box 1

The Commission's 2018 strategic action plan on batteries

The action plan identifies six objectives in the following areas:

(1) securing access to raw materials,

(2) supporting European battery cell manufacturing at scale,

(3) supporting EU research and innovation on advanced and disruptive technologies,

(4) strengthening the workforce and skills,

(5) supporting the sustainability of EU battery cell manufacturing industry,

(6) ensuring consistency with the broader enabling and regulatory framework.

In each of these areas, the document identifies actions to be taken by the Commission, in some cases together with member states and industry stakeholders across the battery value chain. Most actions have a deadline for implementation between 2018 and 2020.

[34] Annex 2 to COM(2018) 293.

22 Based on our analysis, we found that the 2018 action plan provides a relevant framework for developing a European industrial policy on batteries. In particular, its different actions simultaneously address a range of issues (such as global competition for scarce resources, economies of scale and strong interdependencies along the battery value chain), where a fragmented approach by the various stakeholders would be inadequate. However, we note that, having been designed in 2018, the action plan does not directly address the risk posed by subsequent increases in energy prices, notably as the result of the conflict in Ukraine. The energy-intensive battery manufacturing industry is typically a large consumer of gas and electricity, the prices of which increased by approximately 60 % during the first half of 2022[35].

The action plan is supported by the European automotive and energy industry and is broadly in line with similar strategies in member states

23 Our analysis also showed that the Commission's action plan essentially reflects the proposals made by the industry-led European Battery Alliance, which includes many European car manufacturers and stakeholders in the energy sector such as producers and distributors of electricity. Moreover, our interviews with national and regional authorities, as well as with representatives of industry and research institutions we visited during the audit indicate broad-based support for the Commission's initiative and for the action plan itself.

24 Of those member states covered by our audit, Germany (in 2018[36]) and Sweden (in 2020[37]) developed their own national strategies. We found that both strategies were consistent with the Commission's in that they also derive from contributions from industrial and research stakeholders, and pursue similar objectives with similar tools. In particular, they also aimed to upscale sustainable production, including its recycling dimension, and planned to use the national funds to support R&I and train the workforce.

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[35] Eurostat, Electricity and gas prices for non-household consumers – bi-annual data (NRG_PC_205, NRG_PC_203).

[36] Batterien "made in Germany" – ein Beitrag zu nachhaltigem Wachstum und klimafreundlicher Mobilität.

[37] Strategi för fossilfri konkurrenskraft en hållbar batteri värdekedja.

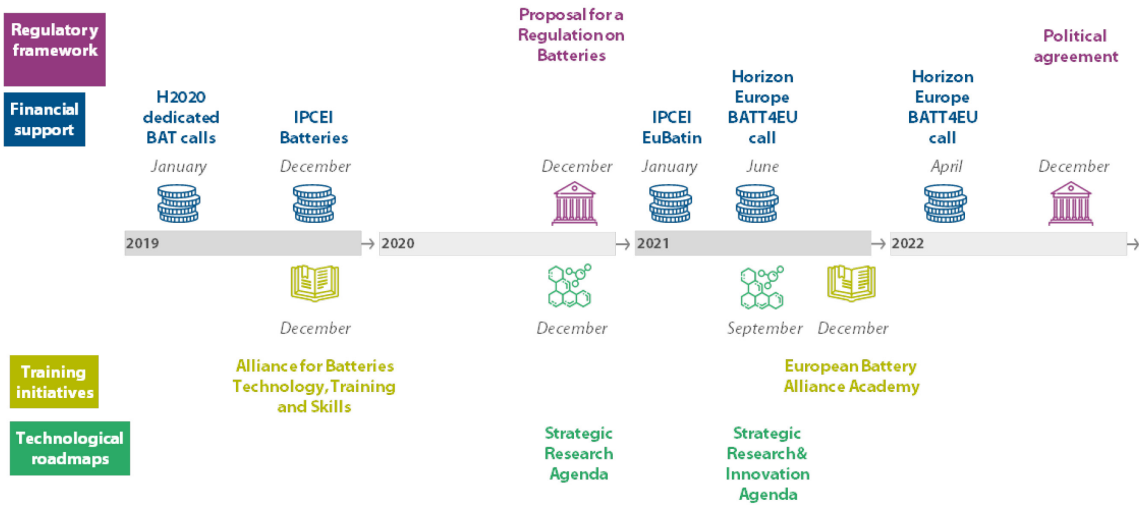
25 In 2018, Portugal adopted a strategy for exploiting national lithium resources. Spain, France and Poland do not have formal national strategies specifically dedicated to the battery value chain.

The action plan implementation delivered key instruments in support of the EU battery value chain

26 Along with actions listed in the action plan that refer to continuous work by different Commission services when engaging with member states and private stakeholders, we found that where the action plan defined specific outputs (15 of 37 actions), these were generally delivered. ***Annex II*** provides a list of these actions together with their key achievements and our analysis thereof.

27 ***Figure 2*** highlights the most significant Commission actions during the 2018-2022 period and stemming from the action plan, as regards regulatory intervention, financial support, technology and skills development.

Figure 2 – A timeline of key outputs from Commission actions in support of the EU battery value chain



Note: 'BAT' and 'BATT4EU' refer to battery-specific topics within calls for proposals launched under Horizon 2020 ("Building a Low-Carbon, Climate Resilient Future: Next-Generation Batteries") and under Horizon Europe ("Cross-sectoral solutions for the climate transition"), in the latter case under a co-programmed European partnership "BATT4EU".

Source: ECA analysis.

28 Several action plan deliverables expanded Commission's intervention in the battery value chain, with significant potential future impact:

- A proposal for a new regulation on batteries (2020)[38]: Directive 2006/66/EC remains the only legislative instrument specifically dedicated to batteries. It focuses primarily on the end-of-life stage of batteries and their environmental impact. The Commission's proposal opts for a directly applicable EU regulation rather than a directive requiring transposition by member states, and expands the scope of legislative intervention to include the complete battery life-cycle. It aims to ensure a level playing field in the internal market, promote the circular economy and reduce the environmental and social impacts of the battery value chain. Key new features include supply-chain due diligence requirements, a minimum recycled content in each new battery, a mandatory carbon footprint declaration and minimum performance and durability requirements. In December 2022, a provisional political agreement was reached by the co-legislators but at the time of publication of this report, the regulation was yet to be formally adopted and published.

- Approval of two IPCEIs: through decisions adopted in December 2019 and January 2021, the Commission approved state aid amount of up to €6 billion, that 12 member states notified in support of 74 individual projects along the European battery value chain. Fifty-three companies are directly involved in the IPCEIs, in addition to collaborations with other partners, namely research organisations. By 2031, the Commission expects these projects to generate total investments worth €14 billion.

- Support for the establishment of stakeholder platforms, such as the European Technological and Innovation Platform on Batteries (2018), which, among others, developed a new technological roadmap for European R&I work on batteries.

[38] Proposal for a regulation concerning batteries and waste batteries, COM(2020) 798.

- As part of the EU's Horizon R&I framework programmes, the Commission launched calls for proposals specifically dedicated to R&I projects in the battery value chain. The budget initially allocated to these calls amounted to €246 million (within the 2018-2020 work programme in Horizon 2020) and €293 million (within the 2021-2022 work programme in Horizon Europe, under a co-programmed partnership[39] for batteries). This represents an evolution relative to prior funding of battery projects, which was scattered among other non-battery specific calls.

29 We also noted that, in a small number of cases, the actions have not yet produced the expected deliverables:

- As regards financial support for European battery cell manufacturing at scale, the Commission had, in cooperation with the EIB, envisaged creating a dedicated batteries funding and financing portal to facilitate stakeholder access to appropriate financial support and assist in the blending of financial instruments. Despite the creation of the more comprehensive InvestEU Portal[40] in 2021, which aimed to bring together investors and project developers, such a portal dedicated to the EU battery value chain does not yet exist.

- As regards securing a sustainable supply of raw materials, the Commission had envisaged the use of all appropriate trade policy instruments (such as free-trade agreements) to ensure fair and sustainable access to raw materials in third countries. Despite on-going negotiations and the signing of strategic partnerships with a number of countries, the EU still lacks free trade agreements with the largest global producers of raw or refined materials for batteries, most notably China (raw natural graphite and refined cobalt, lithium, nickel and natural graphite), Democratic Republic of the Congo (raw cobalt), and Australia (raw lithium).

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[39] Article 10 of Regulation (EU) 2021/695 of the European Parliament and of the Council establishing Horizon Europe – the Framework Programme for Research and Innovation.

[40] Commission Implementing Decision (EU) 2021/626 of 14 April 2021 establishing the InvestEU Portal and setting out its technical specifications.

The Commission is monitoring the battery value chain on the basis of limited and often outdated data

30 The Commission's monitoring of the development of the EU's battery value chain draws on multiple sources, most importantly:

- Eurostat, which collects data on employment, the number and turnover of enterprises in the battery production sector, the production of different categories of batteries, collection rates for portable batteries, the recycling of batteries according to the 2006 battery directive classification, and imports and exports of raw materials and batteries;

- the Commission's Joint Research Centre, which prepares reports and analyses related to the battery value chain at the request of Commission services, runs the newly created Clean Energy Technology Observatory and the Raw Materials Information System – a comprehensive database on trade, production and consumption of various raw and processed materials, including those relevant for batteries;

- ad hoc announcements, analyses and reports prepared by research institutes, consultants, industrial stakeholders and various industry associations, including EIT InnoEnergy;

- regular meetings of stakeholder platforms such as the European Battery Alliance, and of the Supervisory Boards of both IPCEIs on batteries.

31 The information the Commission collects supports its policy-making. The Commission uses it to develop and monitor its policies and strategies, to design calls for proposals for battery projects, and to conduct the criticality assessment process leading to the adoption of the EU list of Critical Raw Materials[41]. It also feeds not only the annual progress reports on the competitiveness of clean energy technologies[42], which include a section dedicated to batteries, but also the Commission's foresight activities.

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[41] Commission communication on Critical Raw Material Resilience, COM(2020) 474.

[42] Commission reports COM(2020) 953 and COM(2021) 952.

32 However, the Commission's monitoring is affected by shortcomings, resulting in particular from the lack of a system to collect up-to-date and comprehensive data. As regards raw, refined and processed materials for batteries, we note that the Commission's assessment of critical raw materials[43], although updated in 2023, is based on data covering the 2016-2020 period; that it is incomplete for raw cobalt, raw lithium and refined natural graphite; and does not cover the manufacturing of processed materials (anodes and cathodes). Moreover, the Commission's Raw Materials Information System, which records a vast array of data and makes it publicly available in a structured form, still mainly reflects data up to 2016, as regards materials which are relevant to the battery value chain. As regards other materials, more up-to-date information is available.

33 Crucially, the Commission does not monitor EU production of battery cells sufficiently. Eurostat currently reports on quantities (units) of batteries produced[44] regardless of their energy capacity in Watt-hours, which is the essential market indicator. In the absence of actual data from manufacturers, the Joint Research Centre could only estimate the 2021 production of lithium-ion battery cells (16 GWh)[45] on the basis of assumptions and correlated variables. The EU's production capacity, cited in each of the Commission's Clean Energy progress reports[46] and commonly shown in several other sectorial publications, is based on manufacturers' announcements, which are often withdrawn and are not independently verified.

34 The lack of up-to-date and comprehensive data limits the Commission's capacity to monitor the competitiveness of the European value chain and to identify risks to growth and to the balance between supply and demand.

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[43] European Commission, Study on the Critical Raw Materials for the EU 2023.

[44] Sold production, exports and imports [DS-056120__custom_3519735] – Eurostat, data extracted on 06/10/2022.

[45] Joint Research Centre, Batteries for Energy Storage in the European Union – 2022 Status report on technology development, trends, value chains and markets.

[46] Most recently: Progress on competitiveness of clean energy technologies, COM(2022) 643.

Assessing the contribution of European batteries to the climate neutrality goals remains difficult

35 The Commission's action plan breaks down the overall goal of making Europe a "global leader" into objectives in six areas, all of which are relevant to the battery value chain (see ***Box 1***). However, although the Commission's actions in the plan are in some cases quantified and are generally time-bound, this is not the case for the six objectives. Moreover, the action plan does not include a definition of indicators and interim milestones that make it possible to measure progress towards achieving them. This is particularly significant in the case of battery manufacturing.

36 The Commission did not analyse the expected contribution by the EU's battery value chain to the climate neutrality goals, notably for the 2035 zero-emissions target for new passenger cars and light commercial vehicles. While the Commission expects some 30 million zero-emission vehicles on European roads in 2030[47] and 90 % of new registrations in 2035 to be battery electric vehicles[48], its current strategy on batteries does not assess the European capacity to serve such a market.

37 These gaps limit the Commission's ability to monitor and mitigate several key risks. We note, in particular, the risk that the stated zero-emissions targets will be missed due to insufficient battery production, or that they may be reached largely through imported batteries or electric vehicles, to the detriment of the European battery value chain and the associated jobs. Lastly, the lack of a quantification of expected EU battery production growth also increases uncertainty about the security of supply of the raw materials needed to sustain that production.

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[47] Sustainable and Smart Mobility Strategy – putting European transport on track for the future, COM(2020) 789.

[48] Impact assessment accompanying the proposal for a Regulation as regards strengthening the CO_2 emission performance standards for new passenger cars and new light commercial vehicles, SWD(2021) 613.

38 In March 2023, the Commission published a proposal for a regulation, known as the Net Zero Industry Act, aiming at innovating and scaling up the European manufacturing capacity of technologies that are key to meet the EU's climate targets (see paragraph ***08***). For these technologies, which include but are not limited to batteries, the proposal establishes the objective of domestically producing, by 2030, 40 % of the annual deployment needs consistent with achieving those targets. The proposal includes also an indicative battery-specific objective of domestically producing 90 % of the Union's annual demand in 2030, translating into a manufacturing capacity of 550 GWh[49].

Battery production in the EU is projected to increase rapidly until 2030 but faces a looming shortage of raw materials

39 We analysed the EU's battery production capacity, both current and projected until 2030, the sufficiency of that capacity to serve the EU's demand and the risks that may impact actual deployment. The projected 2030 production capacity is based on announcements by European and non-European companies of their planned future investments within the EU. These announcements were originally compiled by Germany's Federal Ministry of Economic Affairs and Climate Action in May 2022, and revised by our audit work. Depending on the timeframes and strategies of each battery manufacturer, these investments are at different stages of maturity and may yet be reversed, for example in response to incentives offered by governments in other world regions or rising raw material and energy costs. Based on the available data, we also examined to what extent the EU is self-sufficient in obtaining key materials for batteries and whether domestic producers can maintain adequate access to such materials in the future.

[49] Proposal for a regulation on establishing a framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem (Net Zero Industry Act), COM(2023) 161.

The EU's battery production capacity may increase from 44 GWh in 2020 up to 1 200 GWh by 2030

40 Pushed by increasingly stringent CO_2 emission performance standards[50], battery production capacity in the EU-27 member states is developing rapidly. For lithium-ion battery cells, which are currently the state of the art in electric vehicles, it reached 44 GWh in 2020[51], approximately 70 GWh in 2022 and could rise up to 520 GWh by 2025[52]. The Commission estimates that this increase in production capacity will create 800 000 new jobs[53] and refers to a potential market value of some €250 billion per year in terms of economic activity[54].

41 Subsidiaries of non-EU companies currently own most of these manufacturing sites but EU-based companies are projected to gradually own a larger share of this production capacity, which could account for as much as 56 % of overall EU production capacity in 2025.

42 By 2030, if companies implement the announced projects successfully, the EU could reach battery production capacity in the range from 714 GWh to 1 200 GWh. ***Annex III*** provides a breakdown of current production capacity per member state and of planned capacity for 2025 and 2030.

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[50] Regulation (EU) 2019/631 of the European Parliament and of the Council setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles.

[51] Progress on competitiveness of clean energy technologies, SWD(2021) 307.

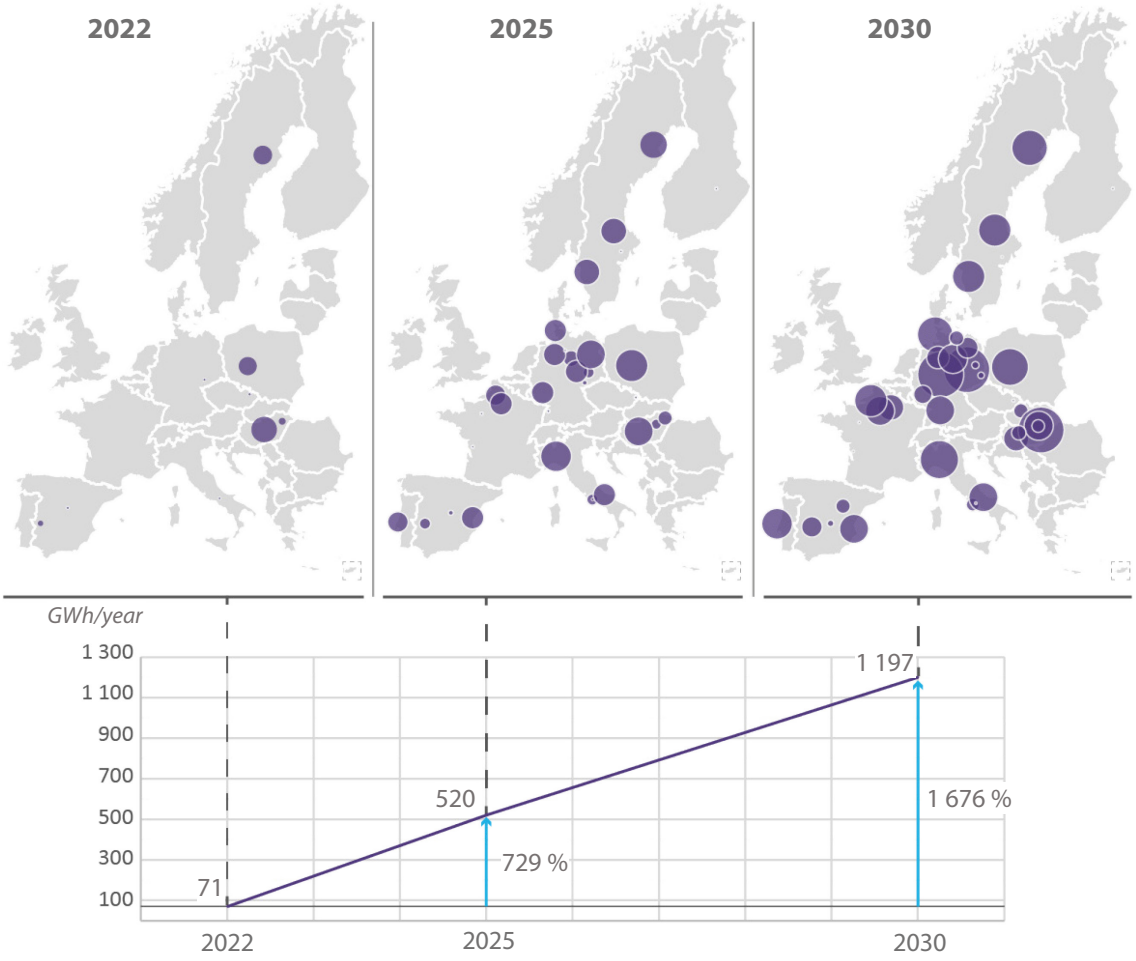
[52] ECA analysis, based on German Federal Ministry of the Economic Affairs and Climate Action, May 2022.

[53] Progress on competitiveness of clean energy technologies 6 & 7 – Batteries and Hydrogen Electrolysers, SWD(2021) 307.

[54] Annex 2 to COM(2018) 293, Strategic Action Plan on Batteries.

43 Our analysis also showed that the planned additional production capacity may be spread more widely across EU member states, as illustrated in ***Figure 3***.

Figure 3 – EU battery production capacity – Current (2022) and planned (2025 and 2030)



Source: ECA, based on data compiled by Germany's Federal Ministry of Economic Affairs and Climate Action and company announcements. Circles are proportionally sized to reflect production capacity in individual locations. Design of the maps: Eurostat.

44 Such domestic production could largely satisfy the expected EU demand by 2025 (400 GWh)[55]. By 2030, a domestic production capacity of 1 200 GWh would deliver up to 16 million electric vehicles powered by 75 kWh batteries – which exceeds the pre-COVID peak of new registrations of passenger cars and vans (approximately 14.8 million vehicles of all types of engines and motors[56]). We also note that these industry projections more than double the Commission's production target of 550 GWh for 2030 (see paragraph ***38***).

45 In any case, the scale of the envisaged transition is significant. According to our estimates actual EU production in 2021 accounted for only 27 % of EU battery demand for the e-mobility sector, based on EU registrations of battery electric vehicles and plug-in hybrid electric vehicles. In 2022, the EU's fleet of battery-electric vehicles (2.9 million) still represented only 1 % of its total fleet of passenger cars and vans (280 million)[57]. Currently, the average age of the fleet is 12 years[58] and continues to emit the pollutants and gases that reflect the less stringent norms in force at the time of their entry into circulation[59].

46 The inability of the EU battery industry to build up the production capacity projected and deliver a cost-competitive alternative to internal combustion engines could result in:

- prolonging emissions from internal combustion engine vehicles (together with an ageing EU fleet of such vehicles), resulting in a failure to achieve the Green Deal carbon-neutrality objectives; and
- transitioning towards a zero-emission fleet largely on the basis of imported batteries and electric vehicles, to the detriment of the European automotive industry.

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[55] Progress on competitiveness of clean energy technologies, SWD(2021) 307.

[56] ACEA, New passenger car registrations in the EU and New commercial vehicle registrations in the EU.

[57] European Alternative Fuels Observatory 2022.

[58] ACEA, Vehicles in use Europe 2022.

[59] Regulation (EU) 2017/1151 on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6).

The deployment of the projected battery production capacity remains subject to significant risks

47 The actual deployment of projected production capacity is subject to a number of risks:

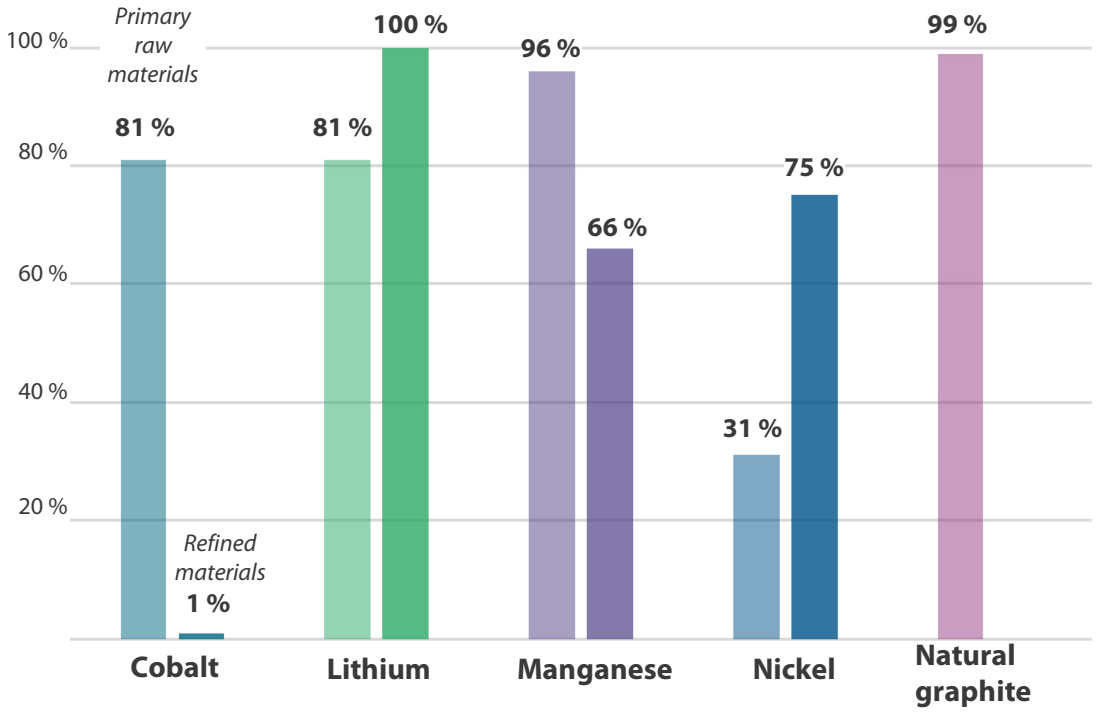
- there may be a significant time lag until projected capacity is deployed since newly opened production facilities will need to be ramped up to operate at full scale. For example, in 2021, battery production in the EU reached only 16 GWh (26 %) out of 62 GWh of announced capacity[60];
- battery manufacturers may reverse their plans to deploy production capacity in the EU in response to more attractive financial conditions offered by other world regions, notably the Infrastructure Investment and Jobs Act and the Inflation Reduction Act in the United States, which provide a range of incentives for companies choosing to locate their battery production facilities within the US. The Inflation Reduction Act in particular differs from the EU's current financial support, in that it directly subsidises the production of minerals and batteries as well as the acquisition of electric vehicles as long as they and their components are made in the US (see paragraph ***07***);
- increases in the cost of production factors such as energy and raw materials may render batteries, and consequently electric vehicles, unaffordable to a large segment of fleet owners and operators, thereby reducing demand for electric vehicles and the economic rationale for investing in production facilities (see also paragraphs ***48***-***54***).

[60] Joint Research Centre, Clean Energy Technology Observatory, Batteries for Energy Storage in the European Union, November 2022.

Self-sufficiency in key battery raw materials and refining capacity is very low

48 According to data presented in the Commission's 2023 study on critical raw materials[61], the EU relies heavily on international markets to secure the primary raw materials used for batteries: import reliance on five such materials (cobalt, nickel, lithium, manganese and natural graphite) averaged 78 %. For refined materials, reliance is generally lower, at 61 %[62], even if for refined lithium the EU's consumption depends entirely on imports (see ***Figure 4***).

Figure 4 – EU import reliance on selected battery materials



Note: for each material, the figure shows data for raw (first column) and refined (second column) state. Data for refined natural graphite is not available in the study.

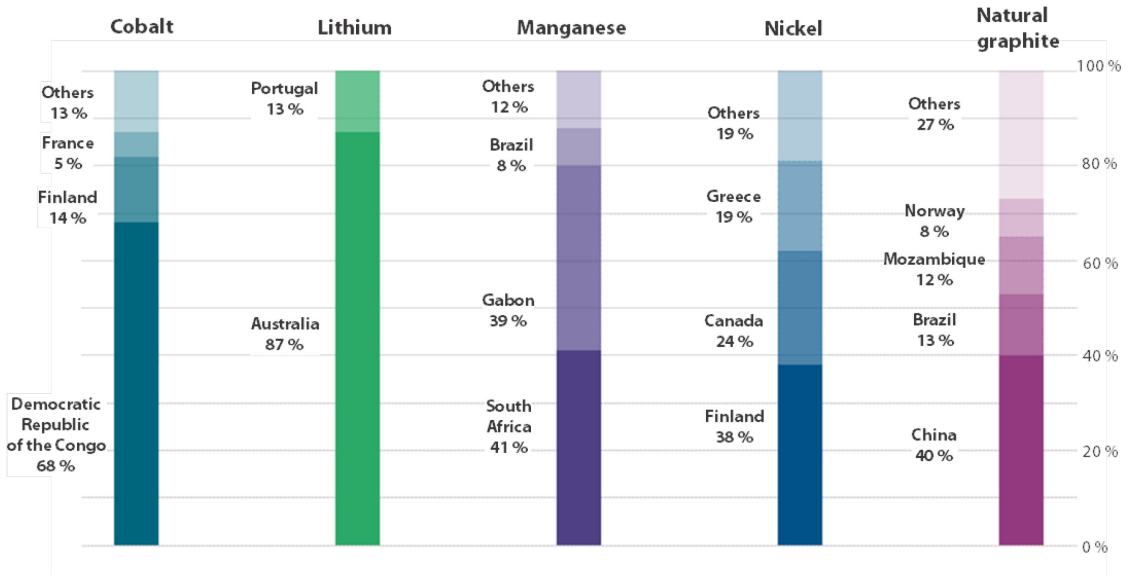
Source: Study on the Critical Raw Materials for the EU 2023.

[61] European Commission, Study on the Critical Raw Materials for the EU 2023.

[62] Raw Materials Information System, data for 2012-2016.

49 Moreover, the supply of these materials remains highly concentrated on imports from a few countries. Approximately 87 % of imported raw lithium, 68 % of raw cobalt, 41 % of manganese and 40 % of raw natural graphite are sourced from single countries (see ***Figure 5***). A similar concentration applies to the supply of processed materials. In particular, 79 % of the EU's supply of refined lithium originates in Chile, while 29 % of imported processed nickel comes from Russia.

Figure 5 – EU supply sources of raw materials for batteries



Source: Data for raw manganese, nickel and natural graphite sourced from the 2023 Study on the Critical Raw Materials for the EU (referenced to the 2016-2020 period). Data for raw cobalt and lithium is not available in the 2023 study and was instead retrieved from the Raw Materials Information System (referenced to the 2012-2016 period and sourced from the 2020 Critical Raw Materials assessment).

50 Several of the main EU supplier countries are developing countries associated with low governance indicators[63], thus raising concerns about the social and environmental conditions under which these raw materials are extracted. For others, there are geopolitical risks which may lead to trade restrictions affecting the sustainability and predictability of supply. These geopolitical risks were also noted by the Commission in its 2020 communication on critical raw materials[64].

[63] Worldwide governance indicators.

[64] Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability, COM(2020) 474.

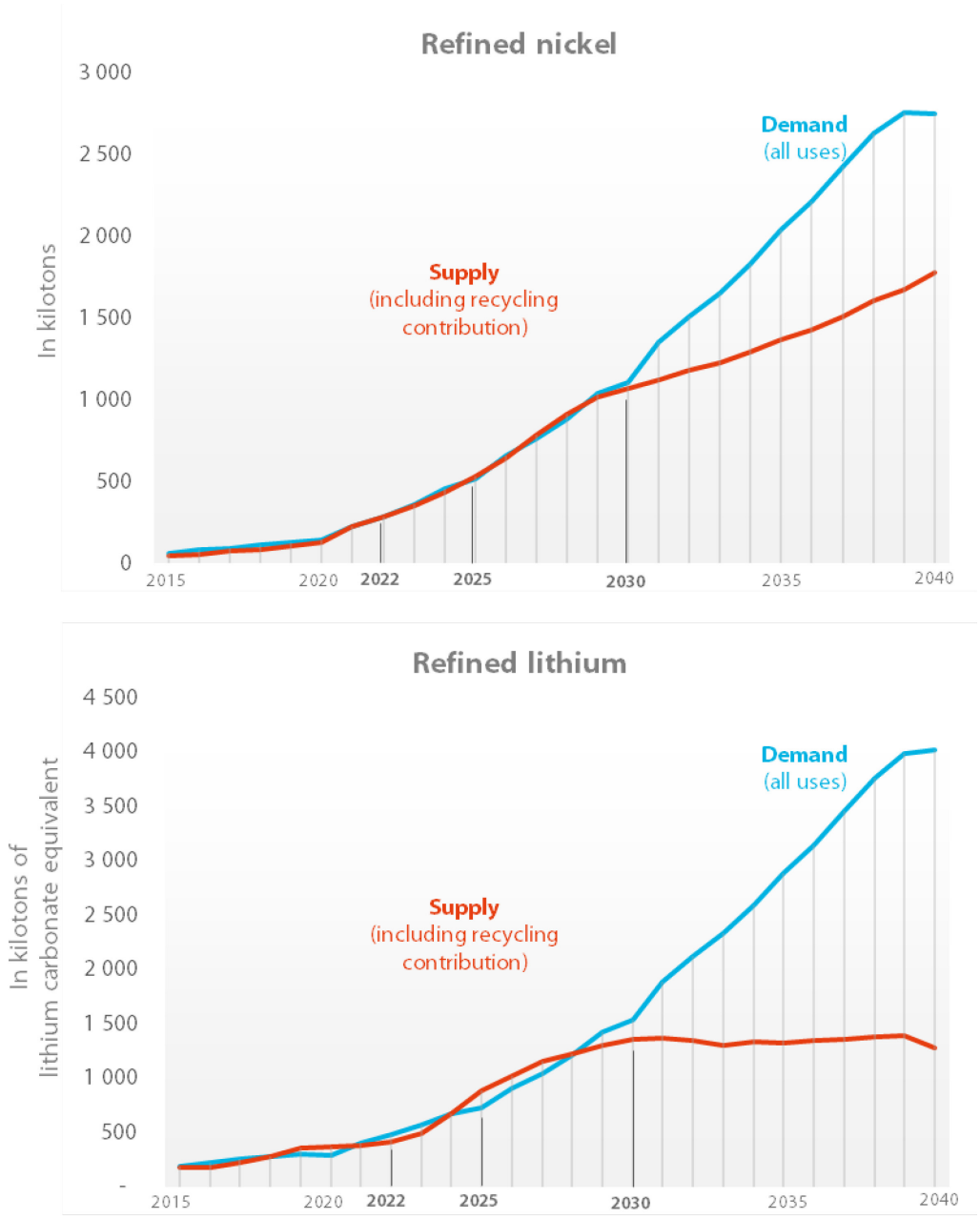
European battery production faces a looming global shortage of key raw materials

51 Forecasts predict a growing gap between global supply and demand for key battery materials, in particular cobalt, lithium and nickel. According to the projections produced by the Joint Research Centre, the global shortage will become significant by 2030, when most of the EU's battery production capacity will become operational[65]. Other estimates envisage some materials becoming scarcer even earlier[66].
The expected global shortage is illustrated by the example of lithium and nickel in ***Figure 6***.

[65] ECA analysis, based on data compiled by Germany's Federal Ministry of the Economic Affairs and Climate Action and company announcements.

[66] IEA, Committed mine production and primary demand for lithium, 2020-2030.

Figure 6 – Global supply-demand balance for lithium and nickel



Source: Joint Research Centre, Analysis of supply chain challenges for batteries, medium demand scenario for lithium carbonate and refined nickel. In order to take into account the uncertainty inherent to long-term forecasts, the full analysis also includes high and low demand and supply scenarios.

52 There is a risk that the global race for these raw materials will lead to supply shortages and price increases that may affect the competitiveness of EU battery production. Over the last two years, the price of nickel has risen by over 70 %[67], and the price of lithium by 870 %[68]. The International Energy Agency estimated that such increases will have led to a 15 % increase in the price of battery packs in 2022[69].

53 The shortage depicted above is compounded by rigidity in supply:

- The lead times of mining projects from discovery to first production, although varying greatly depending on the mineral, location and mine type, are long – on average between 12 and 16 years[70]. Variations in permit granting procedures which are in some cases delegated to regional or even local authorities can also add to this. This makes supply from primary sources rigid and unable to respond quickly to increases in demand. We observed such a situation in Portugal, the member state with the largest known reserves of lithium in the EU. Although the reserves were quantified already in 2017, and exploitation requests were received from operators already active in the concerned areas, the necessary permit procedures were still on-going in December 2022. Even if this process is successful, the authorities do not expect exploitation to begin before 2026.

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[67] World Bank Commodity Price Data, Monthly prices, data retrieved for period December 2020 – December 2022.

[68] Benchmark Mineral, Lithium Price Assessment.

[69] IEA (2022), Global EV Outlook 2022, p. 6.

[70] European Commission, EIP on Raw Materials, Raw Materials Scoreboard 2021 and IEA, The Role of Critical Minerals in Clean Energy Transitions, 2021, based on data from S&P Global.

- Secondary sources of raw materials, namely the recycling of end-of-life products, currently mitigates this critical supply situation only to a limited extent, since it accounts on average for just 10 % of material demand[71]. According to Commission forecasts, the contribution from secondary sources of raw materials will increase only gradually and modestly: by 2040 recycling and new production scrap will represent on average 25 % of the consumption of key battery raw materials, with the highest shares being cobalt (51 %) and lithium (42 %)[72]. The Commission's proposal for a new regulation on batteries sets new targets for recycling and is likely to have a positive contribution to the domestic supply of raw materials, which however cannot yet be quantified.

54 Against this backdrop, we noted that two European battery manufacturing projects financially supported by the EU's budget and examined by our audit have contractual arrangements securing the supply of raw materials for only 2-3 years of forward production. Beyond that timeframe, supply conditions will depend on the negotiations by project developers, but conducted in a context of the growing global imbalance depicted above.

The Commission is seeking a new approach to secure supply of battery materials

55 For more than a decade, the Commission has pursued access to raw materials using several tools: negotiating trade policy instruments to ensure supplies from resource-rich third countries, promoting domestic production by identifying EU-based mining and refining opportunities, and developing recycling and substitution technologies by means of EU-funded research and innovation. These very same tools can be found in the 2008 Raw Materials Initiative[73], and again in the 2018 action plan and the 2020 Critical Raw Materials Action Plan. However, so far, the Commission's efforts have not resulted in significant improvements in the EU's raw material strategic dependencies.

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[71] Study on the EU's list of critical raw materials.

[72] Raw Materials Information System, Raw materials in batteries – Analysis of supply chain challenges, Figure 4.

[73] Commission communication on the raw materials initiative, COM(2008) 699.

56 On 16 March 2023, the Commission presented a new initiative aimed at reducing EU dependencies in this area, in the form of a proposal for a regulation known as the Critical Raw Materials Act[74]. In addition to identifying critical and strategic raw materials, the proposed regulation focuses on three new areas:

- supporting targeted strategic raw material projects, through streamlined permitting procedures and facilitated access to financing;
- setting up mechanisms for the monitoring of critical raw materials supply chains and for risk mitigation, based on a European network of national raw materials agencies, the coordination of strategic stocks, the audit of supply chains and joint purchases of strategic raw materials; and
- establishing common rules on the circularity of critical raw material markets and on the environmental footprint of these materials.

Public funding of the EU's industrial policy on batteries is insufficiently coordinated, location-dependent and its results fall short of ambitions

57 In this section, we present the EU's financial support for the EU's battery value chain. We examine how the Commission coordinates its allocation between the different funds and with national public funding and whether that support was implemented in line with a commonly agreed technological roadmap. We reviewed the results achieved by EU funding in this field on the basis of publicly available data and, on a sample of R&I projects, whether they eventually led to applications in the marketplace. Lastly, we also assessed whether the need for EU funding was properly checked when selecting the project. ***Annex I*** provides additional information on the way we selected the projects we examined in our audit.

[74] Proposal for a regulation establishing a framework for ensuring a secure and sustainable supply of critical raw materials, COM(2023) 160.

The lack of Commission's overview of actual EU and national funding outflows hampers coordination

58 Multiple funding streams from EU sources (such as the Horizon framework programmes, the Innovation Fund, the ERDF and loans from the EIB) and from national sources provide financial support for projects in the battery value chain. In addition, the RRF may also support the battery value chain in those member states whose national recovery and resilience plans included milestones and targets potentially related to batteries. However, member states usually integrate such battery-related projects into wider investments in electric mobility, clean energy and research. Actual RRF payments will depend on the selection processes of individual projects in the member states in question, and on the fulfilment of the milestones associated with wider investment.

59 This EU funding complements national public financing, which can be either direct (e.g. grants, loans or guarantees, and tax breaks) or indirect (e.g. subsidies for the purchase of electric vehicles or charging devices).

60 In the course of this audit, we identified EU grants and loans in support of investments in the battery value chain during 2014-2020 worth approximately €1.7 billion. These different funding streams are managed or overseen by various Commission services, national or regional authorities, and the EIB. Moreover, between 2019 and 2021, the Commission authorised direct state aid of up to €6 billion for IPCEIs on batteries. Additional public support may also be provided at national or regional level without requiring a notification to the Commission, either because it falls under certain exemptions or because of a temporary state aid framework.

61 ***Table 1*** presents the amount of support we identified and ***Annex IV*** provides a more comprehensive description of how these sources support different research and manufacturing projects in the battery value chain.

Table 1 – EU and national financial support to the European battery value chain

Funding source	Type of support	Managed by	2014-2020 (m €)	2021-2027 (m €)
EU Framework Programmes for R&I (Horizon)	Grants	Directorate-General for Research and Innovation	873	925 (predefined)
European Regional Development Fund in selected member states	Grants	Directorate-General for Regional and Urban Policy and managing authorities in the member states	319	On-going
Innovation Fund	Grants	Directorate-General for Climate Action	-	161 (calls on-going)
Subtotal for grants funded by the EU budget			**1 192**	**1 086 (on-going)**
European Investment Bank	Loans with EU budget guarantees	EIB	495	On-going
Total EU support (grants and loans)			**1 687**	**On-going**
Important Projects of Common European Interest	State aid authorisation (different forms of support)	National funding (oversight by Directorate-General for Competition)	3 191	2 858

Source: ECA analysis, figures are not exhaustive. Grants from Horizon, ERDF, Innovation Fund and loans from the EIB during the 2021-2027 period depend on programming and planning processes that are on-going.

62 However, our analysis also showed that the Commission lacks a process for consolidating the different funding streams and gaining a clear overview of their magnitude. This is compounded by the fact that the scope of the rules for each funding stream is broad enough to allow for potential overlaps between them: as long as there is no double funding of the same cost items, a single project or project category (research, first industrial deployment, manufacturing) may receive financing from different funding sources. For example, we found that three sampled stakeholders whose core activity relates to battery manufacturing were simultaneously benefiting from national aid (via an IPCEI) and one or more forms of EU financial support. We also noted that three sampled projects funded by the ERDF during the 2014-2020 period are developing technologies that also receive support from Horizon Europe during 2021-2027.

63 As regards the ERDF, the nomenclature adopted by the Commission[75] for classifying co-funded projects by categories of intervention does not establish a specific category for battery-related projects. The Commission does not have procedures in place for monitoring the amount of ERDF expenditure allocated to the battery value chain, nor do the national authorities we visited. This prevents EU-wide monitoring of the overall level of subsidies allocated to the European battery industry.

64 This lack of overview of actual EU and national financial support for the battery value chain combined with the broad scope of the different funding streams also makes it more difficult for the Commission to ensure adequate coordination and appropriate targeting of support measures. This corroborates the observation made in our earlier report[76] that the absence of an interoperable database between Horizon and European Structural and Investment Funds hampers the identification of synergies and complementarities between these funds.

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[75] Regulation (EU) 215/2014 on the determination of milestones and targets in the performance framework and the nomenclature of categories of intervention for the European Structural and Investment Funds.

[76] Special report 23/2022: "Synergies between Horizon 2020 and European Structural and Investment Funds – Not yet used to full potential".

IPCEIs on batteries represent a common European interest, but access to funding varies across member states

65 In December 2019 and again in January 2021, the Commission approved two IPCEIs labelled IPCEI Batteries and EuBatIn (see ***Table 1***).

66 Although IPCEIs are primarily a member state initiative, they inherently contain a European dimension due to the number of participating member states and the prescribed collaborations between individual projects. Their structure, including their governance, reflects their common European interest.

67 The approval followed a process of assessment by the Commission of the notifications sent by member states about their intention to provide state aid for specific projects and companies. In particular, the Commission reviewed the need for these projects, their complementarity, and, crucially, the need and proportionality of the aid that states intended to grant them. Eventually, in both cases, the Commission concluded that public support for those IPCEIs was compatible with the EU's state aid rules[77].

68 However, participation in IPCEIs does not guarantee that production sites located in different member states have a level playing field in accessing to public funding. We note that:

- three member states (Germany, France and Italy) account for 87 % and 83 % of the state aid authorised by the IPCEI Batteries and IPCEI EuBatIn, respectively,
- the Commission decisions approving IPCEIs correspond to an authorisation for member states to grant state aid up to the prescribed amounts, but they do not generate any entitlement for the participant companies to such aid or any obligation for member states to actually deliver it,

[77] Article 107 of the Treaty on the Functioning of the European Union.

- participating companies, which have already been through a selection procedure at national level for inclusion in the IPCEI, must then secure actual funding through a variety of different procedures that may include purely national funding, purely EU-funding, or a combination of both. Three of the 16 projects we sampled were selected by member states to participate in the 2019 IPCEI on Batteries, received the Commission's approval to do so and still later needed to apply for ERDF funding. The whole process, from the launch of national pre-selection calls to the granting of EU funding, lasted between two years (France) and three and a half years (Poland, where nearly two years were needed to complete an application for a major project in accordance with applicable ERDF rules)[78]. In a separate case relating to the 2019 IPCEI Batteries, one company was even excluded from the integrated project following its failure to secure ERDF funding.

69 The lack of a level playing field in the financial framework supporting IPCEIs entails the risk that companies from certain countries may have easier access to IPCEIs. Companies may also face delays before they can actually participate and collaborate in IPCEIs as the process of securing funding takes additional time.

The Commission has improved the alignment of its battery research funding under Horizon with a technological roadmap

70 Until 2017, there was no EU-wide commonly agreed technological roadmap to guide the Commission (in the case of Horizon) or national and regional authorities (ERDF) in setting priorities for co-funded battery research in a comprehensive manner, i.e. covering all stages of the value chain and the various readiness levels of relevant technologies[79]. In addition, EU funding to battery related projects was scattered among different calls covering a wide spectrum of research areas and technologies. In the case of Horizon 2020 (commitments of approximately €500 million between 2014 and 2018), this meant that battery-specific projects were competing for funding with others in wider calls, be it in relation to green vehicles, raw and advanced materials, or different forms of energy storage. The absence of a technological roadmap, predefined envelopes and monitoring processes specific to batteries reduced the Commission's capacity to steer the related funding and maximise consistency between projects.

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[78] Articles 100-103 of Regulation (EU) 1303/2013 of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund.

[79] Annex G to the Horizon 2020 Work Programme 2014-15.

71 Starting in 2017, the Commission promoted the development of specific technological roadmaps for batteries based on the contributions from industrial stakeholders, research institutions and member states. This led to the 2017 SET Implementation Plan on batteries[80], a list of ten R&I activities, including technical targets and associated timeframes. This roadmap was gradually included as a source of reference for applicants in Horizon's calls for proposals, starting in 2018 with certain topics relevant to the battery value chain.

72 In delivering on the action plan, the Commission decided in 2019 to launch multiannual calls (2019-2020) under the Horizon 2020 programme, specifically dedicated to the battery value chain (commitments of €272 million). Of the 15 different battery-related topics in those calls, eight referred to the 2017 SET Implementation Plan on batteries. We note, however, that an additional amount of €100 million was committed to battery-related projects outside these calls, thus partially extending the dispersion observed in 2014-2018.

73 The Commission's implementation of the action plan also led to new editions of the roadmap through the 2020 Strategic Research Agenda[81] and the 2021 Strategic Research and Innovation Agenda[82]. The Commission used the latter as the technological basis for the first two years of the Co-programmed European Partnership in 2021-2027 under Horizon Europe[83] (with a maximum EU contribution estimated at €925 million).

74 By contrast, we found that managing authorities in member states awarded ERDF support to projects in our sample without requiring an alignment with any of the technological roadmaps promoted at the European level. This is primarily due to the fact that funding for batteries was typically provided under the ERDF's wider thematic objective 1 (strengthening research, technological development and innovation) and that the corresponding operational programmes, smart specialisation strategies and calls for proposals were not specific to the battery value chain.

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[80] Set Plan Information System, Batteries.

[81] European Technology and Innovation Platform Batteries Europe, Strategic Research Agenda for batteries, December 2020.

[82] Batteries European Partnership, Strategic Research & Innovation Agenda, September 2021.

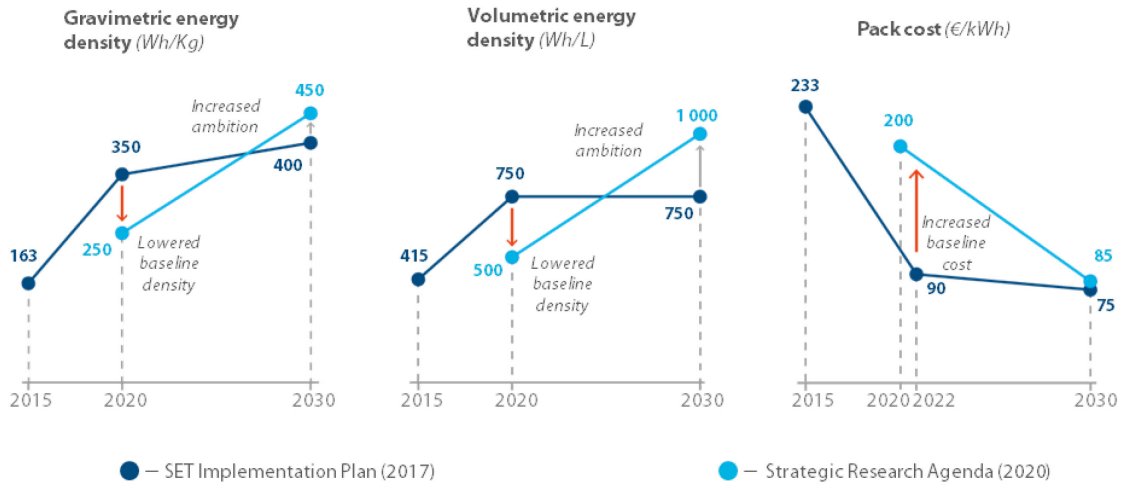
[83] Article 10 of Regulation (EU) 2021/695 of the European Parliament and of the Council on establishing Horizon Europe – the Framework Programme for Research and Innovation.

75 Our analysis of 15 grants to battery R&I projects revealed that six were not guided by nor formed part of any commonly agreed technological roadmap. In two additional cases, we found that only a part of the scope of the respective projects addressed the priorities of the roadmap. The fact that a technological roadmap is not systematically used as one of the criteria for the awarding of EU funding to battery projects is detrimental to the EU's R&I effort because it increases the risk of gaps and overlaps in the research work conducted by different stakeholders at EU level. This also scatters EU support to batteries over a wide range of R&I projects that do not always contribute to the common EU technological strategy.

The EU funded R&I effort is falling short of its ambitions

76 Both the 2017 SET Implementation Plan on Batteries and the 2020 Strategic Research Agenda set concrete performance targets expected from the research effort proposed by the roadmaps. ***Figure 7*** presents the baselines and targets for selected key performance indicators and shows that the 2020 targets set in 2017 have not yet been met by the industrial and research stakeholders participating in that implementation plan.

Figure 7 – Selected key performance indicators presented in the 2017 and 2020 technological roadmaps for automotive batteries



Source: ECA, based on 2017 SET Implementation Plan on batteries and 2020 Strategic Research Agenda.

77 Energy density according to the 2020 baseline missed the target set in the SET Plan for that year by approximately 30 %, while the cost of a battery pack remained more than double its target (200 €/kWh in 2020 against 90 €/kWh expected in 2022). Notwithstanding these shortfalls, the 2020 Strategic Research Agenda further increases the ambition for 2030, aiming at energy density targets higher than those envisaged in the 2017 SET Implementation Plan.

78 This shortfall in results is corroborated by our analysis of the eight completed R&I projects included in our sample. Of these, two fully delivered on their technical promises, while six others only partially reached the technical targets they had initially aimed at. Although most of audited projects resulted in further research and/or contributed to the submission of battery-related patents, none were able to demonstrate that the technology or prototype developed had successfully entered the marketplace.

79 However, even where co-funded projects were contributing to a specific technological roadmap, we found that the respective granting authorities (the Commission in the case of Horizon 2020, national or regional managing authorities in the case of ERDF) do not monitor the extent to which project completion has delivered progress towards the technical targets envisaged by the roadmaps. Instead, they focus on monitoring outputs – typically research reports or prototypes – as established in grant agreements. Moreover, there is neither an agreed procedure for transmitting such technical results obtained by EU-funded projects nor a dedicated body in charge of aggregating and analysing them. Consequently, there is no consolidated information on the results of the co-funded projects or on the technological progress achieved. This hinders the assessment of the effectiveness of the EU's effort to develop better performing EU batteries.

The Commission and national managing authorities often do not assess the need for EU funding for research on battery technologies

80 Research and innovation activities have an inherent degree of uncertainty as regards their results. Financial support from national or EU sources contributes to sharing the risks involved, and thus allows private stakeholders to implement certain projects that they would otherwise be unwilling to pursue. Moreover, particularly in the case of the Horizon programmes, EU co-funding also allows research to be conducted in collaboration with international partners, thereby increasing the dissemination of results and the sharing of experience. This is even more likely when research projects are part of a commonly agreed technological roadmap, as described in paragraph ***71***.

81 Nevertheless, our analysis of a sample of EU-funded R&I projects showed that the authorities responsible for managing Horizon 2020 or the ERDF do not always include an assessment of the need for public funding in their project selection procedures. In 15 Horizon and ERDF grants examined, we found that such a need was not demonstrated in five Horizon grants, either because the project covered technologies that already had a high maturity level that could potentially be funded by market players alone; or because project developers were industrial stakeholders that already had a prior R&I activity in the related technology and an associated commercial interest.

82 A cost-benefit analysis demonstrating a funding gap would help assess the need for EU funding in research projects with high technological maturity levels. Applicants only had to submit such analyses in cases where the project was part of an IPCEI (3 of 15 R&I grants in our sample). Moreover, we note that the Commission's decisions approving the two IPCEIs on batteries include a claw-back mechanism obliging beneficiaries to return public funding where the actual implementation of the project proves that the estimated funding gap was excessive. However, such a mechanism does not specifically mandate member states to return the related funding to the EU budget.

83 The risk of a deadweight effect on EU support for the later stages of R&I and first industrial deployment is even more relevant given the rate at which battery production capacity is currently expanding in the EU.

Conclusions and recommendations

84 Overall, we conclude that the Commission's promotion of an EU industrial policy on batteries has been effective, despite shortcomings on monitoring, coordination and targeting, as well as the fact that access to raw materials remains a major strategic challenge for the EU's battery value chain.

85 The Commission largely delivered on its 2018 strategic action plan on batteries. Significant achievements include the creation of stakeholder platforms encompassing the whole value chain, the proposal for a new regulation on batteries which significantly expands the scope of the previous legislative framework, and increased financial support for research, innovation and manufacturing projects, including national aid through two Important Projects of Common European Interest (IPCEI) (paragraphs ***18***-***29***).

86 At the same time, we found that although the strategic action plan identifies relevant strategic goals, it does not set corresponding quantified, time-bound targets, most notably as regards expected EU battery production. This makes it more difficult for the Commission to monitor whether the build-up of the EU's battery production capacity is sufficient to reach the zero-emission targets set for passenger cars and vans in 2035; or whether they will be reached largely on the basis of imported batteries or electric vehicles, to the detriment of the European battery value chain and the associated jobs. It also increases uncertainty about the security of supply of the raw materials needed to sustain European production (paragraphs ***30***-***38***).

87 The production capacity of the EU-based battery industry, although still limited, is developing rapidly and could satisfy expected EU demand for electric vehicle batteries by 2025. However, the actual deployment of this capacity may be put at risk if battery manufacturers are attracted by financial incentives offered by other world regions; or if their competitiveness is compromised by increases in the price of raw materials or energy, leading them to reduce their overall production targets (paragraphs ***39***-***47***).

88 Despite Commission initiatives that date back to 2008, the EU's battery value chain remains strongly dependent on foreign supplies and faces a looming shortage of battery raw materials, in particular after 2030. This is due to the combined effects of an increase in global demand, driven mostly by the electrification of road transport; and limitations in the EU's domestic supply of raw materials, which is both scarce and rigid: mining projects have long lead times between exploration and production and recycling of end-of-life batteries is still limited. The Commission has recently put forward a proposal for a Critical Raw Materials Act which aims at reversing this situation (paragraphs ***48***-***56***).

89 Multiple EU and national funding streams support new battery research and manufacturing projects. Overall, since 2014, the EU budget provided at least €1.7 billion in grants and loan guarantees, which add to state aid of up to €6 billion to the European battery industry notified by member states and authorised by the Commission between 2019 and 2021. However, the fact that the Commission lacks a process for consolidating funding streams and gaining a clear overview of their magnitude makes it more difficult to ensure that support is adequately coordinated and appropriately targeted. This also prevents EU-wide monitoring of the overall level of subsidies allocated to this industry. Moreover, the two battery-related IPCEIs that the Commission has authorised so far do not provide level playing field in accessing state aid. Individual participants must navigate their way through a variety of financing conditions depending on where their investments are located, a situation which is detrimental to the timely implementation of the overall project (paragraphs ***57***-***69***).

90 Over time, the Commission has improved the alignment of funding from the Horizon framework with a common technological roadmap developed by stakeholders across the value chain and research institutions. However, the technical targets set in the various editions of that roadmap are not always being achieved and the need for EU funding at project level is often not assessed. This is particularly true of more advanced stages of research and innovation and first industrial deployments, given the revenue generated in the rapidly growing market for batteries (paragraphs ***70***-***83***).

Recommendation 1 – Update the strategic action plan on batteries, with a particular focus on securing access to raw materials

Following the adoption by the European Parliament and the Council of the Commission's legislative proposal for a Net-Zero Industry Act, the Commission should update its strategy for a sustainable and competitive European battery value chain. A renewed strategy should:

(a) reflect the global evolution of the battery sector since 2018 as well as its current strategic challenges, especially the access to raw materials;

(b) include quantified and time-bound targets for the twin goals of achieving climate neutrality and a competitive automotive sector in the EU. In particular, targets for domestic production of batteries should be consistent with the 2035 ban on emissions for passenger cars and vans, and with the supply of the raw and advanced materials needed to sustain that production.

Target implementation date: End of 2025.

Recommendation 2 – Strengthen monitoring with regular, up-to-date and comprehensive data

Following the adoption by the European Parliament and the Council of the Commission's legislative proposal for a Net-Zero Industry Act and a Critical Raw Materials Act, the Commission should:

(a) strengthen its monitoring of the battery value chain by basing it on timely and independently verifiable data, thus enabling it to track actual progress towards the EU's objectives and alerting it to potential risks to achieving them;

(b) ensure that the monitoring covers the critical stages of the EU battery value chain. Data should include in particular actual battery production, measured in gigawatt hours, and the domestic production of the main raw and advanced materials needed to deliver the current and future generations of batteries. Where possible, such monitoring should draw from existing processes in EU bodies such as Eurostat and the Joint Research Centre.

Target implementation date: End of 2024.

Recommendation 3 – Improve the overview of EU funding for the battery value chain

The Commission should build and maintain a consolidated overview of the various EU and, where information is available, national funding sources that provide financial support for projects in the battery value chain.

Target implementation date: End of 2024.

Recommendation 4 – Improve the coordination and targeting of EU funding for the battery value chain

The Commission should improve the coordination and targeting of the EU's financial support for the battery value chain, taking account of the national funding already provided to the industry. To achieve that goal it should:

(a) strengthen the coordination between Horizon Europe, ERDF and the Innovation Fund for funding the battery value chain, thereby enhancing the impact of EU funding;

(b) take action to raise awareness among ERDF managing authorities in the member states and relevant industry actors about a commonly agreed technological roadmap for batteries;

(c) ensure that the need for EU funding is adequately assessed at project selection stage, in particular for research projects aiming at higher technological readiness levels or for first industrial deployments.

Target implementation date: End of 2024.

Recommendation 5 – Ensure that all participants in Important Projects of Common European Interest on batteries have a level playing field in accessing public financial support

The Commission should ensure that potential participants in an IPCEI on batteries have a level playing field in accessing public funding and financial support, so that the collaborations envisaged by the IPCEI can be implemented as scheduled. To this end, it should include in its criteria for the analysis of IPCEIs a requirement that notifications from member states should contain specific timeframes for the planned provision of state aid once it has been approved by the Commission.

Target implementation date: End of 2023.

This report was adopted by Chamber II, headed by Mrs Annemie Turtelboom, Member of the Court of Auditors, in Luxembourg at its meeting of 26 April 2023.

For the Court of Auditors

Tony Murphy
President

Annexes

Annex I – Sample of EU-funded projects in the battery value chain examined for this audit

- We compiled a list of battery-related projects to which EU funding was awarded in the 2014-2020 period, based on information provided by the Commission (for Horizon 2020) and by national or regional managing authorities (for the ERDF). We also obtained from the European Investment Bank a list of relevant loans it had financed with the backing of the EU budget. We did not select projects funded through the RRF, as these projects were only at an early stage of implementation at the time of our audit.

- From that population, we drew a sample of projects, using as selection criteria the materiality of the projects and the need to ensure coverage of different stages of the value chain, different stages of technological maturity and different stages of project implementation (on-going or completed). During this process, we selected 16 projects partly or fully conducted in five member states: Germany, Spain, France, Poland and Sweden. This total sample can be categorized as shown below:

Funding source	Form of support	Nature of projects	Sample items
Horizon 2020	Grants	Research and innovation activities	7
ERDF	Grants	Research, technological development and innovation	8
Total grants in support of R&I projects			15
EFSI	Loan guarantee	Manufacturing	1
Total sampled projects			16

Source: ECA.

Annex II – ECA analysis of selected actions in the 2018 strategic action plan on batteries

Strategic areas and actions defined in the action plan	Outputs delivered	Date delivered
1. Securing the sustainable supply of raw materials		
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	Study on the EU's list of Critical Raw Materials – Factsheets Critical Raw Materials for Strategic Technologies and Sectors in the EU – A Foresight Study COM(2020) 474 – 2020 EU Critical Raw Materials List and action plan	2020
Use all appropriate trade policy instruments (such as Free Trade Agreements) to ensure fair and sustainable access to raw materials in third countries	Strategic partnerships with Canada and Ukraine, no free trade agreement with largest suppliers of key raw materials (China, Democratic Republic of the Congo and Australia)	2021
2. Supporting European projects covering different segments of the battery value chain, including cells manufacturing		
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	Advanced Materials for Batteries Partnership	2020
Establish, in cooperation with the EIB, a dedicated batteries funding and financing portal to facilitate stakeholders' access to appropriate financial support and assist in any blending of financial instruments	/	/
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	IPCEI on Batteries IPCEI EuBatIn	2019 2021

Strategic areas and actions defined in the action plan	Outputs delivered	Date delivered
3. Strengthening industrial leadership through stepped-up EU research and innovation support covering the full value chain		
Launch calls in 2018 and 2019 for an amount of €110 million for battery-related research and innovation projects (in addition to €250 million already allocated to batteries under Horizon 2020; and €270 million to be allocated in support of smart grids and energy storage projects as announced in the Clean Energy for all European package)	Horizon 2020 Work Programme 2018-2020: LC-BAT-2019-2020 battery-specific calls for proposals	2019
Support the creation of a new European Technology and Innovation Platform (ETIP) to advance on battery research priorities, define long-term visions, elaborate a strategic research agenda and road-maps. The leadership of the ETIP will be taken by the industrial stakeholders, research community and MS. The Commission will support the setting-up process and contribute in their respective areas of responsibility	European Technology and Innovation Platform on batteries 'Batteries Europe'	2018
Support breakthrough market-creating innovation in areas such as batteries through the pilot of the European Innovation Council. This pilot scheme can be helpful for batteries breakthrough technology (expected to be part of projects for applications in transport, energy system, manufacturing etc.)	Horizon 2020 Work Programme 2018-2020: calls EIC-SMEInst-2018-2020 and EIC-FETPROACT-2019-2020	2019
4. Developing and strengthening a highly skilled workforce in all parts of the value-chain		
Map out the skills needed along the value chain, identifying also means to fill the gap and relevant timeframe for implementation	Launch of the Alliance for Batteries Technology, Training and Skills (ALBATTS)	2019
Open access to the EU's battery testing laboratories hosted by the Commission's Joint Research Centre for skills and capacity-building.	Battery Energy Storage Testing for Safe Electric Transport laboratory – calls 2018-1-RD-BESTEST and 2019-1-RD-BESTEST	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	Launch of the Alliance for Batteries Technology, Training and Skills (ALBATTS)	2019
Help universities and other education / training institutions to build new degree courses in cooperation with industry	Launch of the European Battery Alliance Academy	2021

Strategic areas and actions defined in the action plan	Outputs delivered	Date delivered
5. Supporting a sustainable battery value chain – i.e. requirements for safe and sustainable batteries production – as a key driver for EU competitiveness		
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)	SWD(2019) 1300 – Evaluation of the Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators	2019
Launch a study on the key determining factors for the production of safe and sustainable ('green') batteries	SWD(2020) 335 – Impact Assessment Report accompanying the document 'Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries'	2020
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)	SWD(2020) 335 – Impact Assessment Report accompanying the document 'Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries'	2020
6. Ensuring consistency with the broader enabling and regulatory framework		
/	/	/

Source: ECA analysis of Strategic Action Plan on Batteries.

Annex III – Battery production capacity per member state: current (2022) and planned (2025 and 2030) (in GWh/year)

Member state	Current capacity	Capacity 2025	Capacity 2030 (min.)	Capacity 2030 (max.)
Czechia	0	1	1	1
Finland	0	0	0	0
France	0	40	64	122
Germany	0	155	151	416
Hungary	38	58	178	188
Italy	0	77	76	118
Poland	15	50	50	65
Portugal	0	15	45	45
Slovakia	0	0	10	10
Spain	2	28	42	72
Sweden	16	96	96	160
Total	**71**	**520**	**713**	**1 197**

Source: ECA, based on data compiled by Germany's Federal Ministry of the Economic Affairs and Climate Action and monitoring of company announcements.

Annex IV – EU and national funding of the battery value chain

- The **Horizon programme** is Europe's framework research and innovation programme, with a total budget of nearly €80 billion for 2014-2020 and over €100 billion for 2021-2027. It provides financial support for the whole spectrum of research, technological development, demonstration and innovation activities. Over the 2014-2020 period, Horizon 2020 funded 307 research projects in the field of batteries, worth a total of approximately €873 million.

- The more recently created **Innovation Fund** focuses on mature projects that aim to finance highly innovative technologies, processes or products and have a significant potential to reduce greenhouse gas emissions. Between 2021 and 2022 the Fund awarded some €161 million to eight such projects in the field of batteries.

- The **European Regional Development Fund** is a key instrument of the EU's Cohesion Policy. Under shared management between the Commission and member states its scope includes, with relevance to the battery value chain, not only technological and applied research (as does Horizon), but also research infrastructure, pilot lines, early product validation actions, advanced manufacturing capabilities and first production. We were able to identify 459 relevant projects in 14 member states, to which the ERDF contributed with approximately €319 million.

- The **European Investment Bank** provides financing for eligible R&I projects and innovative investments such as the development of metallurgical processes, pilot lines and battery manufacturing facilities. With the backing of EU guarantees, the bank contracted €495 million of loans in the 2014-2020 period in support of seven projects in the value chain.

- According to the Treaty on the Functioning of the European Union, aid granted by a member state or through State resources which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in-so-far as it affects trade between member states, be incompatible with the internal market. However, where private initiatives supporting innovation fail to materialise because of the significant risks such projects entail, an **Important Project of Common European Interest** allows member states to fill the gap by joining forces to overcome these market failures and boost the realisation of innovative projects. Member states must notify the Commission of their intention to provide State aid under an IPCEI and that notification is then assessed

according to published criteria[84]. In the field of batteries, the Commission approved one IPCEI in 2019 and another in 2021, providing combined authorised State aid of approximately €6 billion.

[84] C(2021) 8481.

Abbreviations

EFSI: European Fund for Strategic Investments

EIB: European Investment Bank

ERDF: European Regional Development Fund

GWh: Gigawatt hours

H2020: Horizon 2020

IPCEI: Important Project of Common European Interest

KWh: Kilowatt hours

R&I: Research and innovation

RRF: Recovery and resilience facility

SET Plan: Strategic Energy Technology Plan

Glossary

Battery cell: Basic unit of a battery, consisting of a positive electrode (**cathode**), a negative electrode (**anode**), a conducting substance (**electrolyte**) and a separator.

Battery pack: Set of two or more interconnected batteries.

Battery value chain: An economic sector comprising multiple stages that range from the extraction and processing of raw materials, battery components, cell manufacturing and assembly and battery recycling or repurposing. It has a circular dimension and involves different actors.

Blending: The practice of teaming EU grants with loans or equity from public and private financiers.

Climate neutrality: Situation in which human activities result in no net effect on the climate.

Convening power: The ability to catalyse collective action by relevant actors to address global and regional development challenges.

Co-programmed European partnership: A partnership set up on the basis of a memorandum of understanding between the Commission and private and/or public partners, specifying its objectives, commitments, indicators and results to be delivered in support of EU-funded research and innovation activities.

Deadweight: Situation where an EU-funded activity would have gone ahead even without receiving public aid.

Digital transition: Introducing digital technology and digitised information to processes and tasks.

Energy density: Key performance indicator for batteries, typically presented as gravimetric energy density (amount of energy in a battery per weight) and volumetric energy density (amount of energy in a battery per volume).

European Fund for Strategic Investments: Support mechanism launched by the EIB and the Commission, as part of the Investment Plan for Europe, to mobilise private investment in projects of strategic importance for the EU.

European Investment Bank: EU bank, owned by the member states, which provides financing for projects in support of EU policy, mainly in the EU, but also externally.

European Regional Development Fund: EU fund that strengthens economic and social cohesion in the EU by financing investments that reduce imbalances between regions.

Free-trade agreement: Agreement between countries or groups of countries (such as the EU) to grant each other preferential market access.

Green transition: Shift to an economy in which growth is not at the expense of environmental sustainability and social inclusion.

Horizon 2020 / Horizon Europe: The EU's research and innovation programmes for the 2014-2020 and 2021-2027 periods respectively.

Important Projects of Common European Interest: Member state-led cross-border innovation and infrastructure projects that can contribute significantly to the achievement of EU strategies, including the European Green Deal and the Digital strategy, while generating positive spill-over effects benefiting the EU economy and its citizens at large beyond the participating member states. Public support by member states to the projects and companies participating under the IPCEI, which constitutes State aid under EU rules, has to be notified to the Commission for assessment and approval.

Industrial Policy: A set of actions aimed at ensuring that the conditions necessary for the competitiveness of the Union's industry exist. Industrial policy is sometimes also referred to as industrial strategy.

Innovation Fund: EU programme that uses revenue from the EU's emissions trading system to support innovative low-carbon technologies.

Intermittent renewable energy: Energy from a source that does not generate continuously, such as solar or wind.

Knowledge innovation community: Partnership of higher-education institutions, research organisations, companies and other stakeholders in the innovation process.

Level playing field: A set of common rules and standards that prevent businesses in one location gaining a competitive advantage over those operating in other locations.

Recovery and Resilience Facility: The EU's financial support mechanism to mitigate the economic and social impact of the COVID-19 pandemic and stimulate recovery, while promoting green and digital transformation.

Value chain: Sequence of activities undertaken to add value to a product, encompassing the various stages of its production, as well as marketing, sales, service and recycling.

Replies of the Commission

https://www.eca.europa.eu/en/publications/sr-2023-15

Timeline

https://www.eca.europa.eu/en/publications/sr-2023-15

Audit team

The ECA's special reports set out the results of its audits of EU policies and programmes, or of management-related topics from specific budgetary areas. The ECA selects and designs these audit tasks to be of maximum impact by considering the risks to performance or compliance, the level of income or spending involved, forthcoming developments and political and public interest.

This performance audit was carried out by Audit Chamber II Investment for cohesion, growth and inclusion spending areas, headed by ECA Member Annemie Turtelboom. The audit was led by ECA Member Annemie Turtelboom, supported by Eric Braucourt, Head of Private Office and Celil Ishik, Private Office Attaché; Valeria Rota and Niels-Erik Brokopp, Principal Managers; Afonso de Castro Malheiro, Head of Task; Katarzyna Solarek, Francisco Carretero Llorente, Marcel Bode, Sabine Maur-Helmes and Markku Pottonen, Auditors. Mark Smith and Tomasz Surdykowski provided linguistic support. Agnese Balode provided graphical support.

From left to right: Agnese Balode, Celil Ishik, Tomasz Surdykowski, Afonso de Castro Malheiro, Francisco Carretero Llorente, Annemie Turtelboom, Eric Braucourt, Katarzyna Solarek, Sabine Maur-Helmes, Marcel Bode.

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Batteries enable the clean energy transition and have become a key component of the competitiveness of the automotive sector. In 2018, as part of the EU's industrial policy, the Commission designated batteries as a strategic imperative for the EU's clean energy transition, and launched an action plan aimed at making Europe a global leader in sustainable battery production and use.

We assessed the relevance of that plan, its implementation, and the results achieved to date. We concluded that the Commission has been effective at promoting an EU industrial policy on batteries, despite shortcomings in monitoring, coordination and targeting, as well as the fact that access to raw materials remains a major strategic challenge. We make recommendations towards a renewed strategic impetus in support of the EU's battery value chain.

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EUROPEAN COURT OF AUDITORS

Publications Office of the European Union

EUROPEAN COURT OF AUDITORS
12, rue Alcide De Gasperi
1615 Luxembourg
LUXEMBOURG

Tel. +352 4398-1

Enquiries: eca.europa.eu/en/Pages/ContactForm.aspx
Website: eca.europa.eu
Twitter: @EUAuditors