European Commission and the use of scientific knowledge: an empirical study on sustainable battery regulation of the EU Green Deal

Muon, Ramech

Universiteit Leiden
Instituut Bestuurskunde

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Ramech Muon

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Supervised by Dr. Johan Christensen

MSc Public Administration: International and European Governance
Faculty of Governance and Global Affairs, Leiden University

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List of Abbreviations

EFSA	European Food Safety Authority
EBA	European Battery Alliance
EESC	The European Economic and Social Committee
DG GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DGs	Directorates General
DG ENVI	Directorate-General for Environment
IA	Impact Assessment
JRC	Joint Research Centre
LMT	Light means of transport

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1 Introduction

1.1 Tackling the climate crisis

Climate change and environmental degradation have become one of the most urgent and complex problems that pose an existential threat to Europe and to the world. Knowledge from robust and reliable source of expertise is particularly important to deal with the climate crisis. Facing this challenge, the European Union adopted a new European growth strategy: the European Green Deal, a commitment by the EU to meet the goals of the Paris Agreement to reach carbon neutrality by 2050 (European Commission, 2019e). As such, since the approval of the European Green Deal, the European Commission (hereafter: the Commission) has been putting forward, inter alia, (legislative) measures focusing on energy transition, circular economy, sustainable transport, biodiversity, and agriculture. The objective of the European Green Deal is for the EU to become climate neutral by 2050. Achieving this goal means creating new legislation and reviewing the current ones such as sustainable battery regulation. This is not a small task, the Commission needs to carefully assess the impacts of each new measure.

The issue of batteries is relevant to various policy areas and prevalent in our daily lives. It is a key regulation in the European Green Deal. Background batteries are integral to a wide range of devices, from mobile phones, laptops, and home appliances to transportation such as electric cars and bikes. Batteries touch upon policies such as transport, climate action, and energy, as well as waste and resources. Furthermore, battery regulation is fundamental in the green transition by electrifying road transport. The environment and human health are significantly impacted by road transportation. It is the primary source of air pollution in the city and accounts for 75% of the EU's transport-related greenhouse gas emissions (European Commission, 2020b). Due to the importance of transportation in achieving carbon neutrality, the European Commission has pledged to achieve a 90% reduction in transportation-related greenhouse gas emissions by 2050. This commitment requires new ambitious legislation to enact a significant shift towards using zero- and low-emission vehicles.

However, the deployment of batteries leads to its own set of environmental and practical challenges. Battery production for electric vehicles is energy intensive and polluting, requires scarce materials, and is linked to multiple social impacts from material extraction (Joint Research Centre, 2020).

1.2 A challenge for the Commission and the need for scientific knowledge

Facing these new challenges, the Commission is under tremendous pressure from other EU institutions, environmental and human rights NGOs, and the industry. The industry here refers to the car industry, battery manufacturers, the raw materials industry, and recycling firms. The issue of batteries is highly technical and requires specific scientific expertise to properly conduct its life cycle assessment. This is due to the presence of hazardous substances in batteries (Joint Research Centre, 2020). In addition, sourcing the critical material for batteries is damaging to human health and the environment. Studies included in the Joint Research Centre (2020) report have shown that sourcing the material impacted the livelihood of people living in the mining area due to environmental degradation, as well as the use of child labor in the process of mining in some sites. A joint NGO position paper on the EU battery regulation proposal demanded further assessment of the environmental impact of the battery life cycle, from mining to manufacturing, use, and recycling; and called for a higher recycling rate of batteries (European Environmental Bureau, 2021). The joint position paper of major industries argues, on the other hand, that higher recycling is not possible with the current resources (EUROBAT, 2022). Another intriguing factor at play for some Commissioners, European countries, and industries is that they aim to no longer rely on economic powerhouses like China which currently dominates battery manufacturing. They seek to increase EU competitiveness by investing in various funds, developing new alliances, and pushing battery regulation in their favor (European Commission, 2020d).

The Commission, in need of expert knowledge, intensely mobilizes resources from different DGs, in-house experts, and external experts to deal with complex issues (European Commission, 2020c). The battery regulation proposed by the Commission in 2020 has substantial ramifications for manufacturers, producers, importers, and distributors of batteries. This attracts many stakeholders' attention such as the biggest and most powerful car industry in Europe to the most prominent environmental and human rights NGOs (EUROBAT, 2022; European Environmental Bureau, 2021). In such a salient topic, it is crucial to uncover the strategies that were used by the Commission in introducing this policy.

1.3 Aims of the research and academic relevance

To understand the strategies that the Commission used, it is necessary to pay attention to how the Commission uses expert knowledge. There is an extensive scholarship on the utilization of knowledge in policy-making, there also are studies that focus particularly on EU policy-making (for example: Weiss,1999; Radaelli, 1995, 1999b, 2009; Boswell, 2008, 2009a, 2009b; Haverland, 2009; Hertin et al., 2009; Schrefler, 2010). The European Commission's science service, the JRC, argues that the world is moving at unprecedented speed. The severe and unexpected effects of changes in technology and in the climate present tremendous pressure on policy to deliver quick and effective solutions to challenging issues (Sucha & Sienkiewicz, 2016). In its science policy handbook, the JRC states state‘’The time is short and the stakes are high. Evidence, and in particular sound scientific evidence, is badly needed to inform policymaking.’’ (Sucha & Sienkiewicz, 2016, p.14). This leads to an important question of this thesis:

- *How does the European Commission use scientific knowledge in sustainable battery regulation, and how is that shaped by high internal capacity and high external pressure?*

Recent studies on expert knowledge distinguishes various modes of knowledge utilization in EU policy-making (Boswell, 2008; Haverland & Rimkuté, 2015). Knowledge can be used instrumentally to solve the issue (Haas, 1992). In this case, experts are consulted because decision-makers want to increase their understanding and decrease uncertainty while addressing current issues with reliable evidence. Expert knowledge can also be used strategically. The literature explains that there are two sub-categories, the agent seeks to justify its predetermined policy preferences, or seek to promote legitimization by using scientific knowledge as a mean to increase political influence and power (Boswell, 2008; Schrefler, 2010; Rimkutė and Haverland, 2014). There is still little study on how the Commission uses expert knowledge. As argued by Christensen (2021), the existing main literature either fails to operationalize the mode of knowledge such as that of the research of Radaelli (1990) or struggles to convert typologies into measures that can be identified empirically in the search of Boswell (2008) and Schrefler (2010). Rimkutė and Haverland's (2014) research using surveys, managed to turn typology into empirical results; the study finds that the Commission uses knowledge instrumentally. However, the research is limited to only scientists’ viewpoints. Another limitation of this research is that it only examines the early stage of the EU policy-making process. Developed on Boswell's (2008) and Schreffler's

(2010) approach to knowledge utilization, Rimkuté (2014) study applied the typology and it demonstrates that the Commission uses substantiating strategic use of knowledge in the case of the politics of pesticides. However, Rimkuté's (2014) single-case research strategy does not allow generalization across other cases.

As there is a scant empirical study that operationalizes the typology of knowledge, this study seeks to fill in the gaps in the literature, particularly in EU policy-making. This research aims to contribute to knowledge utilization literature by applying the knowledge utilization typology to a new case in the EU policy. The study will use the knowledge utilization typology and theoretical expectation to test if the case is unfolded as expected by the knowledge utilization theory. The research will use qualitative methods to investigate the research question. The deductive approach to process tracing will be applied to the single case study of battery regulation. The research uses process tracing and single-case research. These approaches are considered as essential tools to evaluate a hypothesis about the cause of a certain outcome in a case in qualitative research (Mahoney, 2012). The study will analyze the case systematically by examining the case in two stages. The first stage covers the period of 2017 to 2020, in the preparation of the proposal. The second stage covers the period of 2020 to 2022 after the proposal was published.

1.4 Thesis overview

To answer the research question, I first place the study in the existing body of literature by reviewing the stream of academic literature on knowledge utilization in EU policy-making, this is followed by an explanation of the theoretical approach, four hypotheses of knowledge utilization are presented in chapter 2. The research design and the data collection will be explained in chapter 3. Finally, the thesis will focus on the analysis and discussion of the finding in chapter 4 and the conclusion in chapter 5.

2. Literature overview and theoretical framework

To investigate how the EU uses scientific knowledge in policy-making, the study first explores the overarching literature on knowledge utilization. This is followed by an explanation of its typology. Next, the research focuses on examining why expertise is important in EU policy-making, and on how it is organized and provided. To further understand causal mechanism that lead to different use of knowledge, the study delves into research and arguments put forward by scholars on how knowledge is used in EU policy-making. The final section introduces theoretical expectations. This thesis argues that if there is high pressure and the Commission has a high capacity to produce expert knowledge, then one should expect the Commission to use expertise in line with the broader policy trajectory.

2.1 Knowledge utilization in policy-making

The knowledge utilization framework focuses on problem-solving, but it also recognizes that scientific knowledge can be used in different ways in the policy-making process.At first glance, one would expect that the goal of using expert knowledge is to help policymakers solve the problem at hand. Indeed, a strand of literature in evidence-based policy-making supports this argument (Head, 2008, 2015; Howlett, 2009; Newman et al., 2016). The strength of this literature is its systematic analysis of how evidence is used in the policy process, from the analytical capacity of the organization to the availability and validity of the data. For instance, it dives into the capacity of the organization to produce accurate information and utilize it (Head, 2008, 2015; Howlett, 2009, 2015, Giest 2017). This literature emphasizes evidence-based policy or data-driven policy, used as a means to increase the efficiency and effectiveness of a policy. That is its limitation. The literature assumes that evidence is neutral, and only used to make policy more efficient (Nutley et al., 2007; Howlett 2015; Giest 2017, Newman et al., 2016)

Scientific knowledge can be utilized for more than improving the efficiency of a policy. It can be used strategically to justify organizational preferences (Weiss 1986; Radaelli, 1995, Sabatier & Weible, 2007). This differs from the evidence-based policy literature rationale that bureaucracies will only draw on expert knowledge instrumentally. The model that is developed by Boswell (2008) further expands the alternate use of knowledge by demonstrating that expert knowledge can be used for symbolic purposes. The strength of

knowledge utilization literature is in its explanation of different uses of expert knowledge. In addition to the problem-solving purpose mode of knowledge, scientific studies can also be used for substantiating preferences, and for symbolic purposes (Boswell, 2008; Schrefler, 2010, Rimkuté & Haverland, 2015). This helps build many good starting points for further research. However, as pointed out by Christensen, the typology of knowledge utilization is ‘’difficult to distinguish empirically’’ and the studies ‘’run into trouble when trying to translate the typology into empirically identifiable measures‘’ (Christensen, 2021, p.459).

Nevertheless, one can observe the progress and lesson learned from many attempts to identify the use of knowledge in policy-making in this literature. Radaelli (1999) laid out key arguments that help Boswell (2008) expand and develops a different mode of knowledge utilization. Schrefler (2010) operationalized the typology by Boswell (2008) and the findings of Radaelli (2009). In addition, Schrefler (2010) incorporated factors such as issue saliency and problem traceability into the empirical analysis. The limitation of the study is, however, that it seeks to apply the typology to different cases, consequently leading to ambiguous conclusions in the findings. As acknowledged by Schrefler (2010), the combination of factors in some cases leads to two different possible results. Schrefler (2010) suggested that process tracing methods and case studies should be able to solve this issue and gain insight into causal processes and mechanisms. Rimkuté (2014) took on this task by operationalizing typology empirically to a single case study. Whereas Schrefler (2010) used issue saliency and problem traceability as key factors for which knowledge utilization will prevail. Rimkuté (2014) demonstrated that internal capacity and external pressure do in fact shape the way the EU Commission uses its expert knowledge in the EU pesticide case. The problem remains that, with the study of Rimkuté (2014), it is hard to generalize. Research by Rimkuté and Haverland (2015) sheds light on how scientists perceive their use of knowledge and how their knowledge is used. It shows that the experts consider that their experts are mainly used for the problem-solving purpose. The limitation of their study is the fact that it is restricted to scientists' perspectives, and it focused only on the first stage of the policy process.

Boswell argues that ‘’there is a striking lack of research on the utilization of expert knowledge in public policy’’ (Boswell, 2009, p.165). It’s been 14 years since Boswell (2009) made that statement in her study. By delving into different literature on knowledge utilization, that still remains true. The knowledge utilization literature suffers from a lack of conceptual clarity, leading to difficulty in operationalizing the concept in empirical studies. As noted by

Haverland and Rimkuté (2015), there is little empirical research on the mode of knowledge utilization. Most of the studies conducted have been qualitative. A comprehensive discussion on the role of expert knowledge and expert knowledge utilization ‘’has revealed significant theoretical weaknesses and barriers to empirical study that have not been seriously addressed within the respective literatures” (Christensen, 2021, p. 467).

2.2 Typology of knowledge utilization

Knowledge utilization literature suggests that knowledge can be used as an *instrument* by agents to improve their capacity for problem-solving (Boswell, 2008; Schrefler, 2010). This strategy, which is typically linked with rational interpretations of the policy process, is based on the idea that, after a problem has been diagnosed, knowledge can be used to choose the appropriate course of action. The European Commission, for instance, is tasked with an agenda-setting role and has to carry out its main activity to produce knowledge and draft policy proposals. Furthermore, regulatory agencies may apply instrumental use of information to enhance their capacity for problem-solving or to deepen their comprehension of a particular subject (Boswell, 2008; Schrefler, 2010).

The second type of knowledge utilization is the *symbolic* use of knowledge. Knowledge can be used, not for problem-solving purposes, but rather to gain legitimacy with respect to other actors and institutions (Boswell, 2008). In this regard, the organization uses knowledge as a means to prove its competency and capacities to produce highly specialized decisions (Radaelli, 1999). Given that an organization such as the Commission is a multilateral organization, and Directorates-General are involved in intra-departmental conflicts and tensions, they may feel the necessity for such epistemic authority, especially as an agenda-setter (Hix, 2005).

The third type of knowledge utilization *is strategic* use. Radaelli (2009) and Schrefler (2010) divided it into two subcategories: political and substantiating. Political strategic use is the use of knowledge in response to needs that are coming externally, for instance, it can be used to confront stakeholders in the political arena (Schrefler, 2010). It depends on the context in which the agency and actors are performing their duties (Sabatier & Jenkins-Smith, 1993). For instance, if an organization aims for better regulation policy goal that is in line ‘’with their electoral feasibility, with policy performance as a secondary goal. Innovations in better regulation are used to increase the political control of the core executive over the regulating

departments'' (Radaelli, 2009, p.1152).

The strategic substantiating typology by Boswell (2006) refers to the use of knowledge by organization to justify and promote a predetermined policy. For instance, this frequently occurs when impact assessment is conducted ex-post to support the adoption of a predetermined policy (Haas 2004). This strategy can also be used as political ammunition in an adversarial context (Boswell 2006). In this scenario, the organization will generate expert knowledge in a manner that supports and defends its chosen policy over those supported by other actors in the policy arena (Schrefler, 2010).

2.3 The importance of expertise in EU policy-making

Majone (1994) is a major figure in the study of the EU; he characterizes the EU's political system as a system that produces regulatory policies. Regulatory policy is not constrained by budget. Knowledge, is on the other hand, is the most crucial resource in regulatory policy-making process (Majone, 1994). The Commission, for instance, uses this resource make use of this resource subtaintially. Majone (1994) explains that regulatory policy aims at efficiency and not that of redistribution. To produce redistributive policy requires a significant amount of financial resources compared to the regulatory policy. Regulators require only the expert knowledge on how to produce regulations, entailing small internal cost in the process while the substantial expense of regulation falls upon the organizations and individuals that have to comply with the rule (Majone, 1994).

Given that the EU's main focus is on regulatory policy rather than redistributive policy, the regulatory policy tends to require advanced knowledge of expertise due to the complicated nature of the issues the EU addresses (Majone, 1994). Political actors highly depend on experts when they are facing a complex problem. Scholars argue not only that EU policy is mainly regulatory, but also that the EU's legitimacies derive from the effectiveness of its policy and its expertise, known as output legitimacy rather than input legitimacy from the participation of the public (Scharpf, 1999; Majone, 1996; Radaelli, 1999).

In the EU political system, policy-making revolves around a variety of functional policy areas. There are different Directorates of the Commissions, Commissioners, committees of the Parliament, Council advisory group, national administration, and various interest groups that form coalitions to compete for power (Peters, 1994; Richardson, 1996).

Another characteristic of EU policy-making is fragmentation, coalition formation, bargaining, and negotiating; this characteristic has significant repercussions (Peters, 1994). On one hand, the process of making decisions is often shielded from public scrutiny. On another hand, there is a fierce power struggle that characterizes the policy-making process, instead of a more collaborative problem-solving approach (Peters, 1994).

However, in certain cases, the major concern isn't institutions competing to conserve their power. EU policies typically deal with subjects that are highly uncertain. Radical uncertainty is a dominant theme in the field such as environmental policy. Nevertheless, in times of extreme uncertainty, crafting policy is of utmost important and not merely about power. This reflection highlights the importance of the political role of the experts and expert knowledge in the EU policy-making process.

A developing body of literature has recognized the existence of epistemic communities in the EU in response to the growing importance of scientific arguments and rising uncertainty (Adler & Haas, 1992; Radaelli 1997). Haas (1992) contends that when there is extreme uncertainty, it is difficult to determine an actor's interests. As a result, an epistemic community can produce a definition of interests by shedding light on specific aspects of a problem, from which an actor can infer their interests. Consequently, interest is turned into a dynamic dependent variable defined by expert knowledge (Haas, 1992).

2.4 How expertise is organized and provided in the EU

The Commission uses scientific knowledge as a tool to address policy concerns for a number of reasons. The Council and the European Parliament, which operate as the legislators, delegate responsibilities to the Commission in the expectation that it will act impartially, that is, that its judgments will be grounded in sound evidence and not on pre-determined preferences, or interests (Majone, 1996). Given that the Commission has authority in agenda-setting, other EU bodies rely on the Commission to produce unbiased and reliable policy (Pollack, 1997). The fact that delegation of drafting policy proposals falls upon the Commission, collective decisions are anticipated to be supported by sound and reliable expert knowledge. This consideration is reflected in the EU's institutional structure. The Commission can depend on many expert committees to help it create new proposals in its capacity as an agenda-setter (Gornitzka & Sverdrup, 2011). The largest organized information system in the EU is its expert committees (Gornitzka & Sverdrup, 2011). Almost all EU policies are

founded on recommendations made by the Commission. In other words, the use of expert knowledge is fundamentally at the core of the Commission (Radaelli, 1999).

The autonomy of the Commission is also supported by the fact the Commission tackle regulatory policy as opposed to redistribution-related ones. High levels of complexity and unpredictability are frequent characteristics of regulatory concerns.

The functionalist theory of delegation, however, also stresses that the agents who are given specific duties may have preferences distinct from those of the principals to whom these tasks were delegated. The core idea behind the P-A model is that agents gradually develop their own interests, which they may advance since they have the resources—expertise, especially scientific expertise—necessary for policy-making (Majone, 1997). The Commission may therefore, despite having the duty and resources to use scientific evidence objectively, strategically make use of the scientific committees it oversees and the evidence they create to achieve its institutional or policy goals (Majone, 1996; Boswell, 2008; Schrefler, 2010).

Institutional mechanisms to generate expert knowledge

The Commission draws its expertise from a wide range of sources. Expertise is drawn from expert groups that are managed by Directorates-General (DGs), and they are organized according to policy initiatives (European Commission, 2021a). Expert groups are composed of a wide range of actors, including institutional representatives from governmental authorities, civil society, industry, or independent specialists (Metz, 2014). Depending on the committee, the expert groups of the EU Commission are made up of a variety of stakeholders, from representatives of the member states only, to a group that is composed only of scientists, or a combination of the two. Government representatives from EU member states, however, typically are the key actors (Gornitzka & Sverdrup, 2011). They comprised more than 80% of expert groups in 2007 according to a study by Gornitzka and Sverdrup (2011).

One of the key mechanisms for generating expertise is stakeholders' consultation. According to the European Commission (2021a) Better Regulation Guidelines, stakeholder consultation refers to all consultations–public or targeted consultation–with stakeholders during the development of a policy initiative. The good practice, as explained by the agenda, is to collect all key relevant information from a wide range of stakeholders.

Another imperative mechanism for producing expertise derives from evaluation studies and impact assessment, to ensure the quality control of the better regulation agenda. Responsible DGs need to carry out evaluation studies, and impact assessments (hereafter: IA), in addition to carrying out stakeholder consultation (European Commission, 2021a). External experts such as research institutes or private consultancy are hired to conduct research in support of the evaluation studies and IA. According to the guidelines, in-house expertise such as JRC, for instance, provides relevant analytical methodologies and knowledge for IA.

To determine if the current EU legislation, policies, and funding programs are achieving the desired outcomes while incurring the minimum costs, the Commission uses IA. It plays a significant role in the Commission's Better Regulation agenda, which aims to draft and assess EU laws and policies in order to ensure that their goals are achieved in the most practical and cost-efficient way (Jordan & Schout, 2008). The Commission uses IAs to appraise policy before the formal decision to regulate is taken place, and this signals how the regulation will affect various stakeholders of the EU, for instance, the compliance cost, and environmental benefits (Jordan & Schout, 2008). Radaelli (2010) argues that although IAs draw mainly on economic and socio-environment sciences, their utilization occurs in a very political context.

The Better Regulation agenda's respective benefits and drawbacks are still controversial. On the one hand, impact assessments can help create a more open and evidence-based decision-making process, making it easier for stakeholders and individuals to participate. While Elantonio and Spendzharova (2015) argue that he Commission might employ IA to mask its political preferences under the guise of evidence-based policy-making. Through this lens, Better Regulation can serve as a justification for deregulation, promoting company competitiveness at the expense of employees and the environment. In addition, finding a reliable indicator of the value and expense of EU regulation is typically challenging (Torriti and Löfstedt, 2012).

2.5 How knowledge is used in EU policy-making

Scholars investigated knowledge utilization from various angles in an attempt to understand how knowledge is used in practice, particularly in EU policy-making (Boswell, 2008, Rimkuté, 2014, Rimkuté & Haverland, 2015).

First, Radaelli (1999) lays the groundwork for the academic discussion of knowledge utilization within the EU. The author points out the alternative modes of expertise that fall under the umbrella term of technocracy. He posits that the concept of technocracy is limited. For this reason, Radaelli (1999) suggests different scenarios in which knowledge can be utilized. As a result, other scholars take this distinction into account when they investigate knowledge utilization in the EU (Boswell, 2008; Schrefler, 2010)

Boswell (2008) recognizes the importance of developing the concept of knowledge utilization further. Her research was the first research to set up a framework that explains under which condition the different mode of knowledge is expected to prevail in the EU. Boswell's (2008) research is a qualitative analysis of the Commission's immigration policy. She analyzed the use of knowledge in the Commission by focusing on European Migration Network (hereafter: the Network). The author distinguishes knowledge utilization into three modes: instrumental, symbolic substantiating, and symbolic legitimizing. Organizations adopt instrumental use of knowledge when it aims to solve the policy problem. Boswell (2008) argues that the organization uses legitimizing the use of knowledge to enhance its legitimacy and it opts for substantiating the use of knowledge when it seeks to promote its preferences. It's important to note that the prevalence of specific knowledge depends on the feature of the organization and the features of the policy area in her study. Boswell (2008) finds the Commission does not necessarily have a fixed strategy on how to use the knowledge at the early stage. However, this changed as the Network's structure and activity evolved. The activity of the Network was considered to be too sensitive, leading the Commission to select a more instrumental use for the Network. The Commission also increasingly used the Network for substantiating purposes as its structure became clear. The finding of Boswell (2008) demonstrates that the Commission's reflection on the purpose of knowledge utilization can change over time and that the Commission is rather flexible.

Rimkuté (2014) investigated the use of expert knowledge in an EU regulatory agency, the European Food Safety Authority (EFSA). The in-depth analysis focuses on one case in the agency, the regulation of neonicotinoid pesticides. The author applied the process-tracing technique and combined different sources of evidences and semi-structured interviews with experts engaged in the policy process. Her study contributes to the understanding of knowledge utilization by investigating the conditions that lead to different uses of knowledge.

Rimkuté (2014) builds a theoretical expectation developed by Schreffler (2010) and this thus adds to the development of the theory of knowledge utilization. Rimkuté (2014) focuses on a theoretical explanation that leads to substantiation use of knowledge, a mode of knowledge that refers to the practice in which the organization aims to justify its predetermined preferences. The author expects that if the combination of two factors - high internal capacity and high external pressure - are present, the organization will adopt substantiation use of knowledge to promote the preferences that are supported by actors on which the organization depends. By applying an in-depth analysis through process tracing, the study of Rimkuté (2014) is able to uncover the causal mechanisms that lead to different use of knowledge in the case of the EU regulation of pesticides in EFSA. The research finds that a high degree of pressure coming from external actors and a high degree of internal capacity of the agency to produce scientific output does lead to substantiating the use of knowledge.

Rimkuté and Haverland (2015) examine the use of scientific knowledge by the Commission from a different angle. In contrast to previous studies which were only qualitative, Rimkuté and Haverland (2015) used a quantitative approach by focusing on the perception of experts in the Commission. The study generated new information on knowledge utilization through a survey members of the Commission's expert group on their perception of the use of expert knowledge. The authors draw three modes of knowledge utilization developed by Boswell (2008), instrumental, substantiating, and legitimizing. Whereas previous studies examine one policy area or one single case study, Rimkuté and Haverland (2015) use the large-N approach and operationalize the typology into the survey questions to the expert in different venues. This study contributes to the understanding of knowledge utilization significantly as it provides insight into how expert knowledge is generally used in the Commission according to the experts. Rimkuté and Haverland's (2015) study finds that the predominant use of knowledge, as perceived by experts, is the instrumental use of knowledge. The result of the survey suggests that scientific output does translate into the Commission's proposal. However, it is important to note that scientists also agreed that other types of knowledge utilization have been used in the past to substantiate the predetermined preference of the Commission or to prove its competency to other actors. Although the study only focuses on the early phase of the policy process, it does broaden the understanding of how the Commission uses its expertise according to experts themselves.

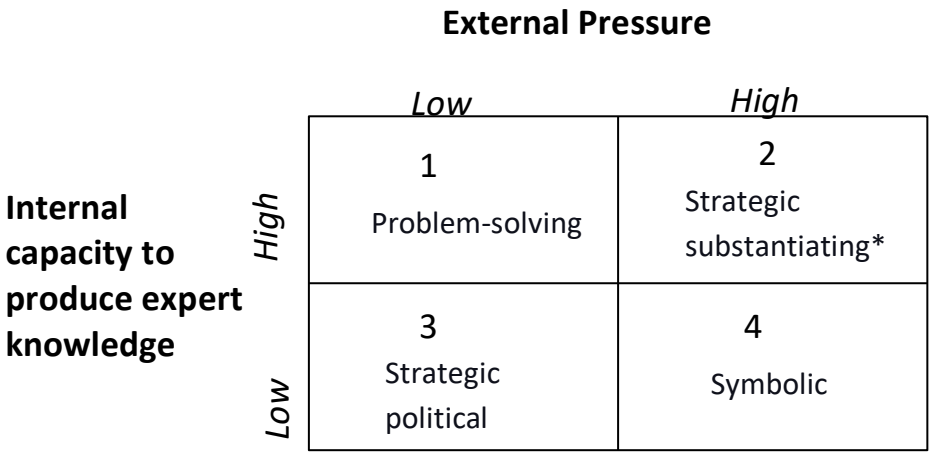
2.6 Theoretical expectation

The theoretical expectation is derived from Rimkuté's (2014) study on the differences in scientific expertise used in the politics of pesticides. It seeks to understand the conditions that lead to different use of knowledge, and in our case, lead to the understanding of which strategic knowledge was used by the Commission in introducing sustainable battery regulation.

The theoretical mechanism explanations are as follows:

1. If an organization has a high capacity for expert knowledge output, it can focus its efforts on problem-solving by utilizing the available scientific expertise due to the low amount of interference from outside players in its activities (Rimkuté, 2014).
2. The organization is more likely to adopt substantiating the use of evidence if it is under intense external pressure and has high levels of capacity because it will be able to respond to the demands and pressure by generating solid scientific evidence in line with a wider policy trajectory (DiMaggio & Powell, 1983; Radaelli, 2009).
3. In order to maintain their status, reputation, and influence, organizations are inclined to suppress their failure to provide scientific evidence. Instead of acknowledging that a task is beyond their capacity, organizations can use epistemic authority to strengthen their legitimacy, boost their resource base, and improve their prospects of survival. In order to do this, information is applied strategically and politically (Rimkuté, 2014).
4. The organization that has identical structures and responds to pressures by merely accepting what important actors have conclude when there is a high external pressure and the organization must act on it but lacks the scientific capacity (Schrefler, 2010; Radaelli, 2009). The information is then employed symbolically.

Table 1. Theoretical expectation



Source: Rimkutė, D. (2014). Explaining differences in scientific expertise use: The politics of pesticides.

This research argues that if there is high pressure on the policy at hand, and that the Commission has a high capacity to produce expert knowledge in this area, then one should expect the agency to use strategic substantiating use of expert knowledge in response to the pressure and demand by producing outputs that are in line with preferences that are considered legitimate by the wider institution and in line with broader policy trajectory.

3. Research Design

This chapter will explain and justify the methodological framework used to address the research question. The thesis will first describe the research design. Next, the case selection will be explained. The dependent variables and independent variables will then be conceptualized and operationalized. The data collection strategy will also be discussed along with the methods of data analysis.

This research will follow a qualitative methodology by using within-case-level analysis. The approach helps understand the theory-based explanations that link causal conditions and outcomes (Blatter & Haverland, 2012; Rohlfing, 2012). The analysis is centered on a single case. The single case study is well suited for our study as it helps explain the specific processes and results of political decision-making; it also seeks to understand the motivation of key actors and to trace processes by which this is formed and changed (Blatter & Haverland, 2012). In addition, it allows a broader range of theories, concepts, and analytical frameworks that can be applied when analyzing complex and transnational issues such as battery regulation (Blatter & Haverland, 2012). The variety of information collected thoroughly in the case study is crucial to test complex theories such as that knowledge utilization.

The application of causal process tracing will help achieve the study's theoretical objectives, which are to demonstrate a causal relationship with sufficient certainty and determine whether the causal process followed expectations. When tracing the development of causal mechanisms, a thorough explanation of the phenomena is necessary, which is made feasible by case study analysis. The research follows the deductive manner as it aims to test the knowledge utilization theory. As explained by George and Bennet ‘’the deductive development of typological theory attempts to provide theoretical reasons why particular conjunctions of variables lead to particular outcomes.’’ (George and Bennet (1997, p.13). The process tracing method, when applied in a deductive manner, enables researchers to test the theoretically alleged causal mechanism that leads to the outcome. It helps follow an actor's position and actions, reveals mechanisms of change, and at the same time brings time and context back to the explanation. Mahoney argues ‘’that process tracing is the most important tool of causal inference in qualitative and case study research’ and ‘can be used as a method

for evaluating hypotheses about the causes of a specific outcome in a particular case''. (Mahoney, 2012, p.571)

The design is focusing on examining whether the mechanisms of the theoretical expectation hold and unfolded as expected. The two interacting conditions - external pressure and internal capacity - are argued to influence the outcome in the absence of all other conditions related to the outcome (Rohlfing, 2012; Rimkuté, 2015). The casual process is explained as followed: if the Commission has a high level of capacity to produce scientific output and there is a high level of pressure coming from other EU institutions. The Commission will use expert knowledge to substantiate the preference that is in line with the broader policy trajectory supported by other EU institutions, in response to the pressure.

The independent variables are the degree of external pressure and the degree of internal capacity. To uncover what strategies are used by the Commission, the thesis will analyze the period from 2017 to 2022. It became evident that the Commission is interested in reforming the battery sector when it declared that it aims to ''become a global leader in sustaining battery production and use'' during the launch of the European Battery Alliance with EU countries and the industry in 2017 (European Commission, 2022b). The study will uncover major changes and interactions that happened from 2017 to 2022 - the present day.

When it comes to single case studies, where causation must be described in set-theoretical (deterministic) terms in order to test for causal processes in a highly rigorous deductive sense, process tracing and Bayesian statistics are similar in this regard (see Bennett, 2008; Mahoney, 2012). Beach and Pedersen argues that it is simpler to ''conduct theory tests using the method of process tracing by using the logic of Bayesian updating when one uses a deterministic understanding of a causal mechanism, in which each part of a mechanism is conceptualized as an individually necessary element of the whole" (Beach & Pedersen, 2013, p. 31). This is because it allows one to make specific and distinctive predictions on causal processes.

The most effective technique for examining causal mechanisms is process tracing (Mahoney, 2012). The more deductive technique is used to evaluate the theoretically proposed causal mechanism, whereas the more inductive approach is used to identify causal mechanisms (Mahoney, 2012). Process tracing studies have assisted in revealing the ''mechanisms of

changes - in preferences as well as institutional changes - while bringing time and context back into the explanations because they are able to follow actors' positions and activities'' (Mahoney, 2012, p.451). This is why process tracing is crucial for the advancement of social science theory-building and testing.

3.2 Case selection

There are a number of reasons why this thesis made the case for the selection of EU battery regulation. Firstly, the selected case is characterized by high capacity and high external pressure, and thus meets the theoretical requirements and is suitable for the hypothesis (Rohlfing, 2012). Since the case selection used in this study is typical, it enables generalization for situations that are similar to it in terms of distribution, such as when they have the same causative factors. In light of the fact that the Sustainable Battery Regulation was developed under the same internal and external conditions—high capacity and high external pressure—it is possible to argue that the empirical conclusion of the regulation can serve as a foundation for generalization for other cases within the Commission (Rohlfing, 2012).

The characteristics of the internal and external environments within the Commission had to be used to generate a scientific conclusion that makes the case for sustainable battery regulation appropriate (Rohlfing, 2012). It examines how the Commission's surroundings impact how it uses scientific knowledge. The case was chosen in particular because it effectively mobilized internal resources from two DGs, Directorate-General for Environment (DG ENVI) and Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW); from the JRC and other experts. As a result, it has a high capacity to produce scientific expertise.

Regarding external pressure, the environmental field in which the Commission produces its scientific conclusions consists of defined opposing positions (industry vs. environmental and human rights NGOs). In addition, other EU institutions also raise their concerns regarding the target and the timeline set by the expert. The topic was widely discussed in the media at national, international, and European levels. Reports from non-governmental organizations (NGOs) and media on this issue have significantly gain more attention since 2016, from Amnesty International's investigation to the Guardian report on child labor in mining these raw materials, this issue has captured the attention of the public.

3.3 Data collection and method of analysis

Causal process tracing studies depend on the quality and trustworthiness of the empirical evidence. It requires a rather wide range of factors to be taken into account and include the development of these factors through time as thoroughly documented as feasible (Blatter & Haverland, 2014) An important dimension of process tracing study is ‘’to recover in as much detail as possible the institutional context and reconstructing the chronology of events leading to an outcome of interest.’’ (Toshkov, 2016) This is essential first to build a comprehensive storyline and find smoking gun evidence. For macro and meso level analysis, the research will analyze EU legal documents of battery regulation, EU press releases, and briefings, amendments made during the policy-making process, debate in the Parliament and in the Council, scientific output especially impact assessment that is mandated by the Commission and opinions of advisory committees. Additional figures of timelines from 2017 to 2022 will be made by extracting information from these documents to build a chronology of key events.

Archival work is another important element to trace causal mechanisms. The research needs to do a micro analysis which involves collecting information that discloses the perception and motivations of relevant actors. This will help find the confession. To do so, this research opts to collect data from written sources such as speeches, press releases, briefings, minutes from meetings, and interviews from the media. Evidence from verbal and written sources, as argued by Blatter and Haverland (2014), can reveal an individual's motivations and ideas directly. To uncover the perception and motivation of actors. These sources would include important information, some of which would be utilized to support an explanation of the causal mechanism underlying various forms of knowledge consumption. To extract a detailed description of a crucial situation *comprehensive storyline*, that leads to strong evidence *of a smoking gun*, and provides deep insight into the perception and motivations of key actors' *confession*, this condensed empirical information needs to be combined with theoretical reflection on the causal mechanisms to identify the features of a constitution that are individually necessary and jointly sufficient for making the outcome possible.

As President von der Leyen explains, ‘’The Commissioners are at the center of the structure of the new college. They will manage the expertise provided by the Directorates-General’’ (European Commission, 2019f). Due to difficult access to the Commissioners in this policy, this research is unable to generate insight through conducting the interview. To complement

this, the study will collect information available related to them in press interviews, meetings with stakeholders, speeches, press announcements, and institutional debate to find out their perception and motivation. In addition, Blatter and Haverland (2014) warn the researcher to not take confession at face value and take into account the context the actors are in. For instance, the Commissioner might justify the goal of battery policy in economic benefits terms during EU industry meetings, while defending other goals such as breaking energy dependency from non-EU countries during the wake of the Ukraine war in the parliament. Collecting information from various sources in different contexts, therefore, allows the research to capture and critically examine an actor's motivation and perception. As DG GROW and DG ENVI are leading the initiative, the study looks into the Commissioners in these DGs who are leading the policy.

The study focuses on three Commissioners and the rapporteur of the proposal who are the main players:

- Maroš Šefčovič, former vice-president of the Energy Union and currently is Vice-President for Interinstitutional Relations and Foresight.
- Virginijus Sinkevičius, Commissioner for Environment, Oceans, and Fisheries
- Thierry Breton, Commissioner for Internal Market
- Simona Bonafè, rapporteur in charge of the battery regulation proposal

For macro and meso-level analysis, the research will analyze these materials:

- Appendix 1: EU documents analyzed.
- Appendix 2: Scientific outputs mandated by the Commission analyzed

For micro-level analysis, the research will analyze these materials:

- Appendix 3: Position papers and recommendations made by EU stakeholders
- Appendix 4: Speech, press releases, briefing, debates, minutes from meetings, and interviews with Commissioners, MEPs, and EU stakeholders.

By tracing the policy process from the beginning, I collect all official documents and sources of the EU that is related to battery regulation. I then sort them into different categories as seen in the Appendix above. This extensive source of information from 2017 to 2022 helps build a concrete timeline of what happened during the policy process (see the list of figures).

The construction of the timeline sheds light on the interaction between actors (Appendix 1, 3, 4), how they develop and adapt their strategy in the wake of big events such as the Ukraine war (Appendix 3, 4), and which scientific documents were produced–by whom, when and for what purpose (Appendix 1,2).

3.4 Operationalization

This section operationalizes the typology of knowledge utilization and the indicators. Next, variables used will be identified in the research to uncover which knowledge utilization was applied and how the Commission used it.

Scheffler warns that ‘’one of the most challenging issues in the proposed typology is to find indicators for each type of knowledge utilization’’ (Scheffler, 2010. p.62). In this regard, some preliminary assessments can be drawn from observing specific patterns in the behavior of the organization and the ways in which resources are related to the production and use of scientific outputs applied.

3.4.1 Type of knowledge use and indicators

Table 2. Indicators

Type of knowledge use	Literature	Indicators
Problem-solving	Strict adherence to scientific standards is observed, and these standards include an in-depth description of the data in the scientific outputs, a clear explanation of the inclusion/exclusion criteria of evidence, acknowledgement, identification, and description of any uncertainties, as well as independent and fair scientific conclusions (Rimkuté, 2014). Decision-makers use IAs to increase the effectiveness and efficiency of the regulation (Radaelli, 2010).	- Clear definition and methodology in the battery regulation proposal -The battery regulation proposal adopts the policy solution and measure that IA finds most effective to solve the problem
Strategic political	The organization makes an effort to take or keep its position in the wider institution. As a result, expertise is applied to earn respect from other players or institutions rather than to address a particular issue (Boswell, 2008). IAs therefore only used to stack the deck (Radaelli, 2010)	-IA and scientific studies are produced only to be used by Commissioners in political debate with other EU co-legislator but those studies do not translate into the final battery regulation proposal.
Symbolic	The organization replicates and reiterates conclusions reached by other groups to partially respond to pressure (Schreffler, 2010). There is a discrepancy between the knowledge that has been produced	-The Commission does not conduct new scientific studies to solve the problem

	and the organization's actual information needs. IAs are used to boost legitimacy rather than improve policy (Radaelli, 2010)	-Scientific studies that the Commission has only imitated what other organizations have already concluded. These studies do not translate into the final battery regulation proposal.
Strategic substantiating	Organizations tend to adapt and grow their power and influence. Organizations may attempt to change their objectives and results in order to conform to the external expectations of important actors, both political (such as other EU institutions) and nonpolitical (such as the general public) (i.e. organized interest groups) (Rimkuté, 2014). IA is modified to support wider policy trajectories (Radaelli, 2010).	-The final battery regulation proposal does not adopt fully what experts propose in the IAs document to be most effective, instead, it adopts what would fit with broader EU policy goals that are supported by other EU institutions.

3.4.2 Independent variable and dependent variable

The independent variables are the degree of external pressure coming from both political and non-political actors and the degree of internal capacity to produce scientific output. Strong political NGO pressure and media pressure can affect the environment in the European Commission during the policy-making process (Rimkuté, 2014). The issue of sustainable batteries not only affects the environment and human rights, but it’s also a politically contested issue that concerns many stakeholders. Political pressure from other institutions such as the European Parliament and the Councils can also affect the environment for the Commission. Facing high pressure, the capacity to produce adequate scientific knowledge within the commission is likely to impact its attitude to knowledge utilization (Schrefler,

2010). The value of these independent variables is based on the theoretical expectation in Rimkuté's (2014) research. These independent variables will then be examined empirically.

The dependent variables are the four types of knowledge utilization: problem-solving, symbolic, strategic political, and strategic substantiating. Explanatory typologies drawn from theoretical expectations about causality were used to give social-scientific explanations for complex empirical phenomena (Colement, 1990). It is crucial to define the dependent variable as clearly as possible when typology is applied. The key foundation of knowledge utilization is the motivation behind each type of usage (Schrefler, 2010). The literature identified three approaches to knowledge utilization: instrumental, symbolic, and strategic use of knowledge. Based on the theory expectations, high pressure and high capacity to produce scientific knowledge will trigger a strategic substantiating use of knowledge by the Commission. That means the Commission used scientific input to support the broader policy trajectory. The process-tracing method will find out whether this is unfolded as expected by the theory.

The process tracing method is appropriate for this project since it is described as an effort to pinpoint the causal mechanism that exists between an independent variable and a dependent variable (George & Bennett, 2005). Process tracing is described similarly by Checkel (2008, p. 115) as a technique that ''identifies a causal chain that links independent and dependent variables''.

4. Empirical Analysis

4.1 First stage: preparation for the proposal

Juncker's ambition and Paris Climate Agreement

In his State of the Union address of September 2017, former Commission President Juncker set out the goal for the EU and its industry to ''become number one in innovation, digitalization, and decarbonization'', he added, ''I want Europe to be the leader when it comes to the fight against climate change'' (The Commission, 2017). A Strategic Action plan on Batteries is one of the key actions in this third Europe on the Move initiative, a measure to reaffirm the EU's goal of reducing greenhouse gas emissions and meeting the Paris Agreement commitments (The Commission, 2017). A month later, the Commission Vice-president Maroš Šefčovic, aiming to reach this ambition, launched the initiative of the European Battery Alliance (hereafter: EBA) and later, in 2018, implemented the Strategic Action Plan on Batteries (European Commission, 2022). However, reaching the Paris Agreement is not the only incentive driving the Commission's actions. During the launch of EBA, Maroš Šefčovič raised concerns regarding the risks of not having independent battery cell production (European Commission, 2017b). The Commissioner emphasized the need to act quickly to address the issue, calling all industries into this joint effort. He also declared that a plan on batteries would be announced in the following year. In the context of the first meeting with key stakeholders in the industry, the Commissioner's goal was to convince them of the importance of working collectively and the emergency of the issue. Commissioner Maroš Šefčovič said:

> ''We need to act fast – and collectively – to overcome this competitive disadvantage and capitalize on our leadership in many sectors of the battery value chain, from materials to system integration and recycling.'' ''Since time is running out, we concluded that we will join our efforts to come up with a strategic plan early next year.' *(European Commission, 2017b).*

In his interview with the press, Commissioner Maroš Šefčovič compared the dependency on raw materials to oil, marking this topic even more strategic.

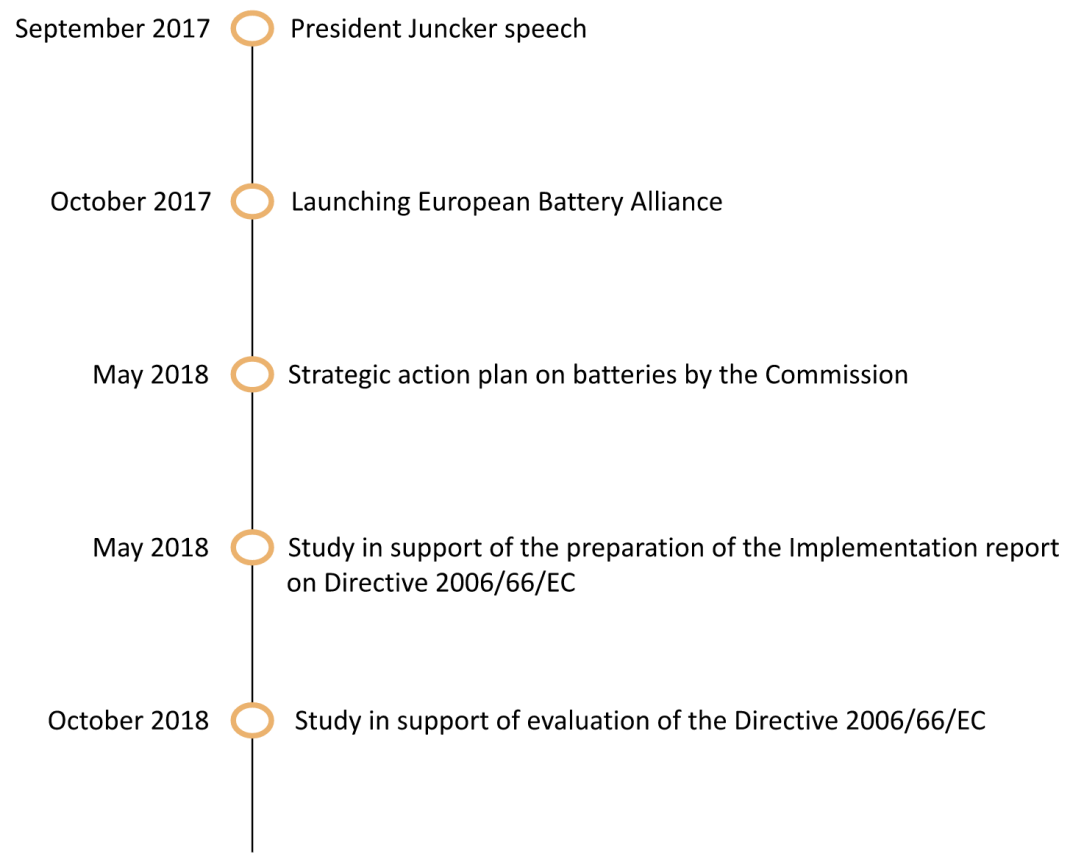
> ‘’We have to be very vigilant that today’s dependency on fossil fuels like oil and gas is not replaced by dependency on lithium, cobalt, copper and other raw materials that we need for the green transition, where Europe is leading the way.’’ *(Simon, 2018)*

The Commission plays a key role in breaking the EU dependence on fossil fuels. This is an important responsibility and as the Commissioner Maroš Šefčovič emphasized, the focus is on the Commission to solve the issue.

> ‘’All the focus now in the European Commission is to reduce dependency on fossil fuels. But we want to avoid trading our dependency on oil and gas with dependency on the precious metals and raw materials that we need for the green transition.’’ *(Simon, 2018)*

As promised by the Commissioner Maroš Šefčovič, the Strategic Action plan on Batteries was published in May 2018. In the key actions of the document, the Commission planned to review the 2006 battery directive and assess its current life cycle (European Commission, 2018). This evaluation was expected to finish by September 2018. Concurrently, the Commission also planned to launch a study to examine influential factors for the production of safe and sustainable batteries.
After the launch of EBA and Strategic Action Plan on Batteries, the Commission mandated two external studies mentioned above and several public consultations (see studies: Öko-Institut et al., 2018; Öko-Institut et al., 2018a). The first one aimed to support the preparation of the implementation report of the 2006 battery directive (hereafer: first external study), and the second supported the evaluation of the 2006 battery directive (hereafer: second external study). The studies showed many shortcomings on the existing directive, mainly its incapacity to integrate new technical innovation, problems with definitions and not enough recovery from batteries that are already used (Öko-Institut et al., 2018; Öko-Institut et al., 2018a). They concluded that the Commission therefore needs to submit a proposal for a revision or propose entirely new legislation for battery.

Figure 1. Timeline from 2017 to 2018



Source: made by author

The Commission's high capacity to produce scientific knowledge

In March 2019, the Council asked the Commission to present a long-term vision for the EU's industrial future and frameworks that need to be implemented by the end of 2019 (European Commission, 2019). In response to the Council, the Commission indicated that the new battery regulation is a ''test case for the EU's twenty-first century industry'' (European Commission, 2019).

Later that year, the Commission published three reports on the same day, the 9th of April 2019. The first one is the Commission's one-year report on the implementation of the Strategic Action Plan on Batteries (European Commission, 2019d). This report follows Juncker's Europe on the move initiative to lay out a plan for the EU to become an industry leader. This indicates the Commission's intention to break dependency with non-EU countries in this sector. The dependency lies in the fact that the EU's share of the world battery cell

manufacturing is only 3%, compared to Asia whose share is 85% (European Commission, 2019).

> ''If no action is taken to support the creation of a viable battery manufacturing sector, there is a risk that Europe falls irreversibly behind its competitors in the global batteries market, and becomes dependent on imports of battery cells and raw materials used in the supply chain.'' *(European Commission, 2019)*

To prevent the risk of falling behind its competitors on the global stage, the Commission is working together with Member States and key industry stakeholders to build a competitive and sustainable battery ecosystem through the EBA. The report states that Europe needs to move quickly to achieve that goal.

> ''To prevent a technological dependence on our competitors and capitalize on the job, growth and investment potential of batteries, Europe has to move fast in the global race to consolidate technological and industrial leadership along the entire value chain.'' *(European Commission, 2019)*

The second report addresses the impact of the Batteries Directive on the environment and on the internal market (European Commission, 2019a). This report is supported by the first external study by Öko-Institut and Tricnomic carried out in 2018. The report is prepared in accordance with the requirement of 2006 battery directive, article 23, to assess its implementation and impact (European Commission, 2006).

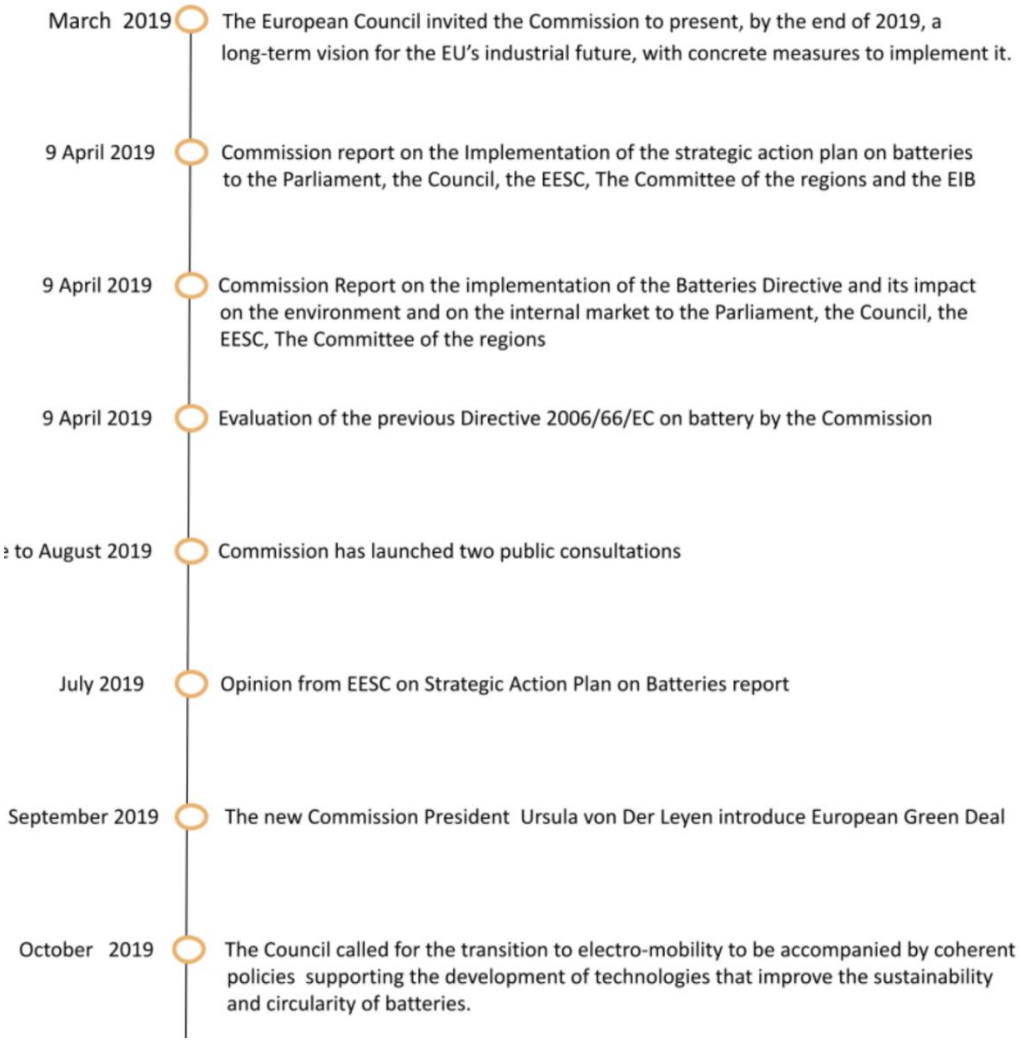
Lastly, the third one is an ex-post evaluation of the 2006 directive alongside two public consultations (European Commission, 2019b). This ex-post evaluation report is supported by the second external study of Öko-Institut and Trinomic in 2018. It is in line with Better Regulation Guidelines and brought about by various consultations with EU stakeholders and followed the criteria listed in the guidelines.

The European Economic and Social Committee (EESC) responded with a positive opinion and supported the Commission's plan to work with Member States and industries to end Europe's dependence on non-EU countries, especially Asian countries (European Economic and Social Committee, 2019). The EESC considers the report on the implementation and impact of the Batteries Directive to be ''concise but very effective'' (European Economic and

Social Committee, 2019). The EESC's positive opinion on action is particularly important for EU institutions, as its main role is to provide advice to improve policies and relay the view of civil society and citizens to the EU's institutions (European Economic and Social Committee, 2016). In another positive endorsement, the Parliament, in its resolution on the EU Green Deal, supported the Commission's plan to propose a new battery to ensure a safe, circular, and sustainable battery value chain for all, as Parliament promised to support all the objectives of the Green Deal (European Parliament, 2020). The Parliament also expected the proposal to incorporate measures on eco-design, targets for reuse and recycling, and sustainable, and ethical sourcing of batteries (European Parliament, 2020). Receiving endorsements from another actor within the EU is a positive indication of the Commission's efforts to tackle their concerns.

The key findings of process tracing from 2017 to 2019 found that the Commission can significantly mobilize scientific knowledge in response not only to its legal obligation but also to the demand of other EU institutions. This came to light in April 2019 when it communicated its reports and evaluation, conducted in the last few years to tackle the issue, to external actors. These various reports demonstrate that the motivation behind the proposal is more than just to reach climate objectives. The proposal also aims to break the dependence on non-EU countries for battery production, and the EU to become the leader in the sector.

Figure 2. Timeline 2019



Source: made by author

New President Commissioner raises EU climate ambition

In September 2019, the new Commission President Ursula von der Leyen was appointed by national leaders and elected by the Parliament after she introduced her political guidelines. One of her key ambitions is the European Green Deal. As she presented her team and their portfolios, the Commission president declared "I want the European Green Deal to become Europe's hallmark. At the heart of it is our commitment to becoming the world's first climate-neutral continent'' (European Commission, 2019f). According to the Treaty of the European Union, the Commission President has the power to set the political course of the Commission (EUR-Lex, 2008). This means that the new Commission led by President Ursula von der Leyen will not only strive for a more ambitious climate policy but also make it a priority in

their policy agenda. The goal of the EU Green Deal is to set out a trajectory for the EU to reach climate neutrality by 2050 and to reduce greenhouse gas emissions by 55 percent compared to 1990. This legally binding objective means that the EU will have to swiftly adopt many new environmental measures and regulations to reach that timeline.

In line with the objective of the Green Deal, the Joint Research Centre (2020b) of the Commission, published a report on Responsible and Sustainable Sourcing of Battery Raw Materials. The report includes the document from NGOs on the unethical sourcing of batteries and suggestions on how to improve it. It raises the important issue of child labor, a high-pressure point in this issue, particularly coming from civil society. The JRC study (2020b) points out that under the Commission of von der Leyen, free and fair trade need to include a 'higher standard of climate, environmental and labor protection, with a zero-tolerance policy on child labor. The JRC (2020b) helps address this concern it also draws up ideas on the objective of the Green Deal for the EU to become ''the first climate-neutral continent''. It shows that the extraction of raw material used in the production of batteries can pose substantial social and environmental impacts. Some of the raw materials are partially found in high-risk and conflict-affected regions, the extraction could risk unintentional involvement in armed conflict and resulting violations of human rights, hazardous working conditions, or environmental damage from the release of dangerous compounds into the air, water, or soil. The report states that the abuse of human rights and the environmental impact of mining raw materials for battery production are regularly documented by many civil societies, particularly after the Amnesty International report in 2016 that sent tremors to the industry. The report emphasizes that for some precious materials, over half of the global production is for use in battery applications. For instance, more than half of the worldwide demand for cobalt–64% of which is coming from DRC–is for battery manufacturing and more than half of the global demand for lithium is for electric vehicle production. In order to assure the ethical procurement of raw materials and to level the playing field for business by creating a set of sustainable common rules, it is crucial to establish a legal framework that mandates supply chain due diligence. This will safeguard both the environment and people.

In 2020, the Commission further provided an opportunity for stakeholders to give comments on its inception impact assessment for its initiative on 'Modernizing the EU's batteries legislation'. The Commission pointed out that the consultation activities got a significant response from stakeholders (European Commission, 2020a). In the inception impact

assessment of the Commission (2020a), it is indicated that the new regulation will increase the costs to producers due to new sustainability requirements, higher collection and treatment procedures, and tools required for novel recycling techniques. Although the Commission (2020a) aims to reduce the associated cost by strengthening the economy of the market and future measures that help offset costs and improve efficiency, the industry is still concerned about the negative impacts on their business. The industry is greatly involved in public consultation. The industry and companies alone represent 73% of the total respondents in the consultation (European Commission, 2020a). The stake is high for the industry, and they are not a small stakeholder in the EU. Given that batteries are present in many of the daily devices that the public use, they play a key role in the EU economy.

The Parliament, on the other hand, further urges the Commission to tackle the issue of EU dependency on imports of raw materials for battery manufacturing, in its resolution on the European approach to energy storage (European Parliament, 2020a). It calls for the Commission to address the concerns on the sourcing of batteries and its implication on environmental and labor standards, and local conflict on natural resources (European Parliament, 2020a). In the same resolution, the Parliament also demands the Commission to propose ambitious collection and recycling targets for batteries after conducting an impact assessment. The Parliament also raised concerns about the classification of used batteries and emphasized the concern about the EU's reliance on products sourced outside the EU which has a low level of transparency and sustainability (European Parliament, 2020a).

In response to the call from both the Parliament and the Council, the Commission carried out impact assessments, supported by previous expert studies mentioned above (European Commission, 2020).

Implications of the COVID-19 pandemic

During the EBA conference in November 2020, the Commission Vice-president Maroš Šefčovic proudly announced the achievement of the alliance and the Commission. He pointed out that in 2019, the alliance gained 60 billion euros in investments and 25 billion more so far in 2020 (European Commission, 2020d). That is three times what China attracted in 2019, and twice what it attracted in 2020. He stressed that this was only the beginning and that the Commission would put in place a new framework to reach the objective set by the Green Deal. The Commissioner explained to the stakeholders that in the wake of the COVID-19

pandemic, there would be opportunities for substantial investment to take place in the next few years as part of green recovery (European Commission, 2020d). Various plans such as the NextGenerationEU has a recovery plan of 750 billion euros. The Commission already has tools for stakeholders to seize this opportunity in the battery sector. In addition, the Commissioner assured stakeholders that a significant amount of investment in the Horizon Europe initiative would go into batteries. To seize this opportunity, the Commission needs to speed up the adoption of battery regulations:

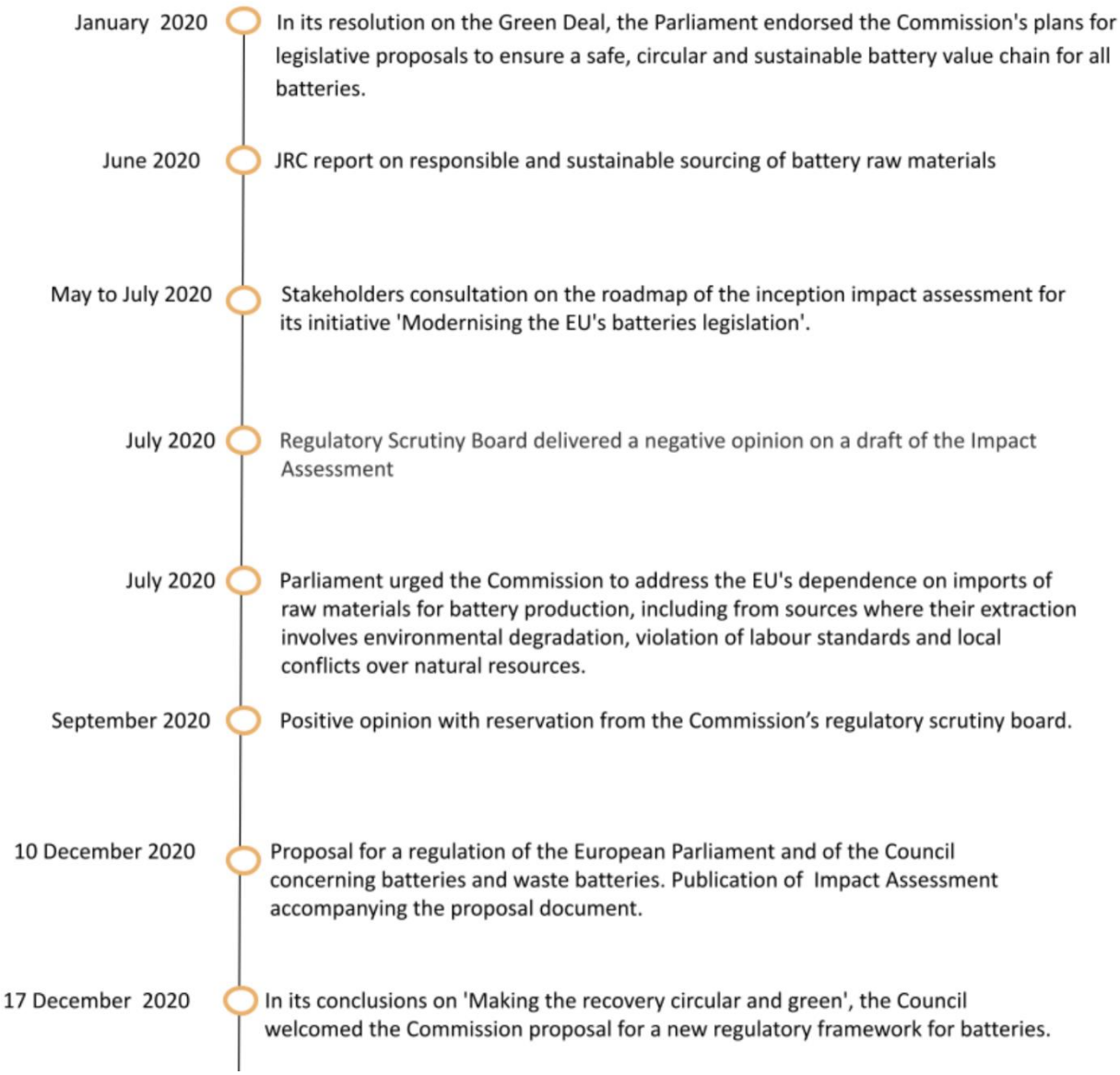
> ‘’With many of these investments cumulating in 2023 or 2024, we need to swiftly adopt a new regulatory framework on batteries.’’ *(European Commission, 2020d)*

A month after the EBA conference, the Commission published the proposal to regulate batteries, accompanied by the impact assessment of the proposal (European Commission, 2020b). Seventeen days after the proposal was published, the Council welcomed the Commission's proposal for a new regulation on batteries in its conclusion on 'Making the recovery circular and green' (European Council, 2020). In an interview with the press, Virginijus Sinkevičius, Commissioner for Environment, Oceans, and Fisheries also confirmed that the battery regulation is key to delivering the objective of the Green Deal.

> ‘’Batteries are essential to gear up the green transition and to deliver the ambition of the European Green Deal. They will be essential on the path to climate neutrality’’ *(Morgan, 2020)*

The battery framework, like the EBA initiative, is a tool for the Commission to reach its broader policy trajectory of the Green Deal. The framework promotes this process by guaranteeing a level playing field and a regulatory climate that is favorable to that innovation, which complements the EBA's goal of fostering innovation and attracting investment.This is another illustration of how the Commission mobilizes its resources and rises to the demand made by other EU institutions. The significant amount of investment that is, and will be, put in place heighten the pressure for the framework to be adopted swiftly, as pointed out by the Commissioner.

Figure 3. Timeline 2020



Source: made by author

Selecting scientific evidence, feasibility over effectiveness

One of the main functions of the Commission is to propose a law to be adopted by the Parliament and the Council. Its proposals are based on consultation with experts and the public to obtain correct technical information. Its functions also include safeguarding the interest of the EU and its citizens on matters that ‘’can’t be dealt with effectively at the national level’’ (European Commission, 2022b). Furthermore, it aims to continuously review policies and legislations ‘’so that they achieve their objectives most efficiently and effectively possible’’ (European Commission, 2022c). However, in the battery regulation proposal, the measures selected by the Commission from the Impact Assessment are not always the most efficient or effective toward the objectives of the Green Deal. This is shown in Measure 7

regarding the performance and durability of rechargeable industrial and electric-vehicle batteries and Measure 4 on collection rates for automotive, EV, and industrial batteries (European Commission, 2022c)..

Information requirement vs Performance requirement

The Impact Assessment indicated in Measure 7 that ‘’Option 3 would be more effective than Option 2 by removing the worst performing batteries from the market in terms of performance and durability’’ (European Commission, 2020b). Option 3 would incur some economic costs for producers, but the administrative cost for the industry would be equal to or slightly higher than that of Option 2, due to the costs associated with calculating minimum characteristics and rigorously checking compliance (European Commission, 2020b). However, for battery users, it should result in financial gains, for instance by gaining better value for money (European Commission, 2020b).

Yet, in the proposal, the Commission chose Option 2 instead of Option 3 (European Commission, 2020c). The Commission explained this choice in the proposal, arguing that information requirements would aid harmonization and thereby allow consumers and businesses to make informed decisions. It would be feasible to implement minimum performance requirements (Option 3) later on after the appropriate information is available, and the standardization process has been finished (European Commission, 2020c). Following this justification, the Commission concluded that ‘’this option is more effective in the long term to help the market switch to better-performing batteries, and so trigger a shift to a lower environmental impact’’ (European Commission, 2020c). This justification is true according to the IA, the standardization could enable the minimum requirement in the medium term and once the appropriate methodology is available. That means it will be feasible for data banks that trigger the fit-for-purpose methodology and correct minimum requirements as mentioned by the Commission in the proposal.

Nevertheless, the IA repeatedly suggests that Option 3 is still more effective as it sets a minimum performance threshold, and it ‘’would have additional environmental benefits over and above Option 2, by reducing the supply of under-performing batteries.’’ (European Commission, 2020c). The IA explains that NGOs prefer setting minimum performance requirements but the industry supports the information requirements over the minimum

performance requirements. The IA indicated further that the performance requirements of Option 3 are rather low and easily achievable by the industry even today. This shows that the Commission chose what can be possibly attained in this timeframe rather than what would be most effective as suggested by experts.

New reporting system vs Collection target for LMT

In Measure 4 on collection rates for automotive, EV, and industrial batteries, the Commission once again chose feasibility over what would be the most effective and bring the most benefits. In the IA document, it states that ''Option 2 is considered to be fully feasible. It is also accepted by producers because they are aware of the advantages of reliable information on the status of industrial batteries.'' (European Commission, 2020c). It would incur the slightly higher administrative costs and once put into place, the report system will result in a ''3% increase in the collection of lithium industrial batteries, which will generate additional revenue and environmental benefits.'' (European Commission, 2020c). The IA explains that, on the other hand, Option 4 ''setting a target for batteries powering means of light transport could result in an increase of nearly 30% in the volume of waste batteries collected (as compared to the baseline) (European Commission, 2020c).. Assuming that these batteries are recycled, this would lead to a reduction in GHG emissions of around 22%.'' (European Commission, 2020c). The reduction of GHG emissions by 22% is a considerable benefit for EU citizens. The IA further explains that to do that, the Commission only needs to develop a methodology for ''available for collection'', an equivalent to an already existing approach that is applied in the WEEE directive for waste electric and electronic (European Commission, 2020c). Nevertheless, the Commission opted for Option 2, the most feasible option preferred by the producer. According to the Commission, Option 3 is to be re-assessed later through a review clause because it needs to develop the methodology first.

The implication of choosing feasibility over effectiveness is the risk of not solving the problem at hand. Following what is only doable according to producers may give the proposal the support that it needs, but the risk remains that the EU will not reach climate neutrality by 2050 if it does only what is easily achieved.

Ambiguity of definition in methodology in the proposal

The primary drawbacks of the 2006 battery regulation are its outdated nature. It lacks definitions for electric cars and light modes of transportation, and it ignores new battery

technology and applications (European Parliament, 2021). The Commission's new proposal (2020c) creates new categories and definitions that are more clear than the previous directive.

However, there is a significant ambiguity in the methodology that accompanies the proposal's set targets. For instance, Article 8 states that 4% of nickel must be recycled by 2030 and 12% by 2035, but there is no clarification on how the recycled content can be calculated and verified (European Commission, 2020c). Another example is in Article 57 concerning recycling efficiencies and material recovery targets, the numerical targets and measures listed in Annex XII are not accompanied by the definition of methodology. Instead, the Commission specifies in Article 73 that it will decide later on how to calculate and verify these goals through delegation acts and implementation acts (European Commission, 2020c). The use of the delegation act helps fasten the adoption of the regulation. That is because once the Commission finishes preparing the delegation act and communicates it to the Parliament and the Council. These acts can only be accepted or rejected by the Council and the Parliament; they cannot be amended as they do with ordinary legislation (European Commission, 2020c). The rules are automatically accepted after a two-month period, which may be extended once if they are not opposed by a majority (European Commission, 2020c).

4.2 Second stage: after the introduction of the proposal

Advocacy from NGOs

In a joint position paper, the European Environmental Bureau, Deutsche Umwelthilfe, ECOS, and Transport & Environment, together with 42 other non-governmental organizations (NGOs) demanded a stronger battery regulation, calling for increased battery collection goals, increased recycling goals for recovering battery material, tests that must be conducted to evaluate whether battery reuse is both technically and financially possible, more due diligence requirements to guarantee environmental protection, and improved protection for vulnerable communities (European Environmental Bureau, 2021). (European Environmental Bureau, 2021). Amnesty International, Human Rights Watch, and 14 other organizations proposed that the battery regulation should cover human rights abuses and environmental impact in bauxite, copper & iron supply chains (Human Right Watch, 2021). The letter includes various reports and evidence that show that in the mining leases in the Brazilian Amazon rainforest, bauxite mining is the main cause of deforestation. It has also resulted in severe loss and damage of

agricultural land and water resources in Guinea, a West African nation with the biggest deposits of bauxite. The letter from Human Right Watch (2021) also points out the significant environmental and human rights risks that accompany copper mining and processing. In Zambia, the mining of copper has led to a widespread land loss for farmers, including forced evictions, as well as air and water pollution. Significant social and environmental dangers are associated with the mining and processing of iron ore. In January 2019, more than 250 people were buried alive in toxic mud and mining waste after a dam in Brumadinho, Brazil that was meant to store waste from iron ore mining, collapsed.

NGOs are expressing deep concerns and urge the European Commission and other EU institutions to strengthen battery regulation and align the strategies on battery and raw materials with the interests of the planet and communities. NGOs are paying close attention to the policy process, and are united to gain a stronger voice to pressure decision-makers. For example, in early 2021, 41 NGOs sent an open letter to all EU Environment Ministers to ask them to ensure that the regulation is adopted and implemented as quickly as possible, warning of the risk of delaying the EU battery rules (European Environmental Bureau, 2021).

High criticism in the Council debate

The EBA held two high-level meetings before the Council debate on the proposal. During the two meetings, Commissioner Maroš Šefčovič laid down the achievements of the initiative. There are almost 70 industrial projects supported by the EBA. With this support, the EU's production of lithium-ion cell batteries is set to be the second largest globally after China (European Commission, 2021). To keep up this pace, the Commissioner stressed that the most pressing priority now is to adopt the battery regulation quickly.

> ''We must accelerate the work on the proposed Batteries Regulation – i.e. adopt the General Approach in the Council under the Portuguese Presidency and strive for the adoption of the proposal by 2022 at the latest, while maintaining the overall level of ambition on sustainability and circularity. This is indispensable, given the expected ramp-up in the production of batteries by 2023.''*(European Commission, 2021)*

In the second meeting, the Commissioner emphasized once again the importance of comprehensive regulation to ensure a level-playing field in the market and promote competitiveness. The proposal is therefore key to making that happen.

> ‘’The adoption of the proposal in 2022 and its entry into force in 2023 will be essential to establish a stable legal framework for the emerging battery ecosystem in Europe.’’ *(European Commission, 2021a)*

However, the Council debate on the proposal did not unfold as the Commissioner expected. The proposal was highly criticized by the Council for its ambitious target and timeline (European Council, 2021). The general approach was not adopted under the Portuguese presidency of the Council. During the European Council debate on 18 March 2021, many member states including the Czech Republic, Latvia, and Bulgaria, pointed out that the proposal can be burdensome for producers and that it is quite ambitious (European Council, 2021). Several EU member states such as France, Greece, and the Netherlands questioned why light means of transport (LMT) were not included in the proposal (European Council, 2021). In response, the Environment Commissioner and the EU informed delegates that the Joint Research Centre will prepare a study to analyze the specific battery collection target for LMT (European Council, 2021).

The JRC later published a technical report on the "’ Available for collection’ study on alternative collection targets for waste portable and light means of transport batteries’’ (Joint Research Centre, 2021). A third external study was also published, this is the final study of the project to assess the ‘’options to improve particular aspects of the EU regulatory framework on battery’’ (European Commission & Directorate-General for Environment (2021). This third external study was requested by the DG ENVI and carried out by Oeko-Institut, Ramboll, and Umweltbundesamt Wien. This third external study is asked to examine possible measures to improve the new legal framework on batteries.

In a press interview, Simona Bonafè, rapporteur in charge of the battery regulation proposal, defended the Commission’s position when she was asked about the Council’s concerns. (Carroll, 2021). She used scientific evidence from the impact assessment result to justify the Commission’s position.

> ‘’The data reported in the Commission’s impact assessment in support of the proposal speak for themselves and support the need to define specific sustainability criteria for batteries. ‘’ *(Carroll, 2021)*

When pressed once again by the concerns of the automotive industry, she defended the Commission’s position by using the scientific result in the impact assessment.

> ‘’The European Commission’s impact assessment states clearly that batteries using recycled materials results in lower environmental impacts, when compared to the use of virgin resources.‘’ ‘’Batteries are a key technology for Europe’s energy transition. *(Carroll, 2021)*

In line with the arguments of the Commission’s vice-president, she confirmed that batteries play a key role in reaching climate neutrality as set out by the Green Deal.

> “They are crucial for sustainable mobility and for storing renewable energy and are an integral part of everyday life in Europe.’’ “For a sustainable transition in line with the objectives of the Green Deal, we need to boost the development of the batteries market.’’ *(Carroll, 2021)*

In a conference in January 2022 on "A stronger industry for a more autonomous Europe", Commissioner for Internal Market, Thierry Breton shared similar concerns on the dependency on raw material for battery production. The Commissioner described a roadmap for internal markets to become autonomous and to avoid being dependent on fossil fuels or other materials that can be used as a geopolitical lever (European Commission, 2022f).

> ‘’I am also thinking of our dependences on raw materials that are critical for the transition of our industry, such as lithium or synthetic graphite, which are so important for the production of electric batteries. The question is: how will Europe take its destiny in its own hands?’’ *(European Commission, 2022f)*
> ‘’Europe must be a leader in the markets of the future, not a subcontractor for whoever, a factory Europe that gives itself the means to cater for its own needs but also to conquer world markets and export; a Europe not withdrawn into its shell and wanting to produce everything itself, but rather a Europe that shelters all its supplies from the hazards of what I call the geopolitics of value chains.’’ *(European Commission, 2022f)*

The Directorate-General for Internal Market, Industry, Entrepreneurship, and SMEs (DG GROW) plays a key role in this legislation alongside DG ENVI. The risk of being dependent on fossil fuels and other resources is not merely economic but also geopolitics as stated by Commissioner Thierry Breton. This has become ever so apparent in February 2022 when Russia invaded Ukraine, having significant implications for the EU.

Ukraine war and the need to quickly end dependency on fossil fuel

Since the second half of 2021, there has been a significant increase in energy prices around the globe. The price of fuels has further increased as a consequence of Russia's invasion of Ukraine (European Council, 2022). The decision from Russia to suspend gas deliveries to several EU member states has impacted the security of the energy supply in the EU. In March 2022, EU leaders decided with the Versailles Declaration to completely phase out the EU's dependence on Russian fossil fuels, as quickly as possible (European Council, 2022).

In March 2022, a Parliament debate regarding sustainable battery regulation took place. Both Virginijus Sinkevičius and Simona Bonafè were representing the Commission. Virginijus Sinkevičius stressed the importance of breaking the dependency on fossil fuels, especially in the wake of the Ukraine war.

> ''Setting up the new legal framework for batteries in Europe is a top priority for us and even more so in the current context after Russia's attack on Ukraine. We must overcome our dependency on fossil fuels, and batteries are a key part of the solution. '' *(European Parliament, 2022c)*

The Parliament has expressed its aspiration to move faster and with higher ambition, the Commissioner agreed that the Commission shares a similar aspiration and emphasized the need to take precautions.

> ''Regarding the calendar for the adoption of the secondary legislation, I understand that you would prefer a faster calendar, and so would I. However, the Commission needs to develop quality secondary legislation. Advancing deadlines could result in legal uncertainty, with a risk of litigation and damage claims, and this would be the opposite of what we all want to achieve.'' *(European Parliament, 2022c)*

Simona Bonafè stressed the importance of keeping up with global competitors. She also mentioned that the regulation must have two objectives, one is to protect the environment and human well-being, and the second is to ensure a harmonized standard of battery production in the EU. She asked the members of the Parliament to reflect on the mistake made previously with solar panels which engendered a tense trade dispute between China and the EU.

> ''In fact, we will have to avoid the mistake made in the past for solar panels, for which the incentive to commercialize is not matched by the creation of a new European industrial sector.'' *(European Parliament, 2022c)*

The rapporteur explains how imperative autonomy in the battery sector is, and she encouraged the Parliament to reflect on how the Ukraine war has made this regulation become even more strategic.

> ''We have all said it: this regulation was already important before, for the reasons that have been well explained, but the war in Ukraine made this dossier even more strategic'' *(European Parliament, 2022c)*

After the debate, the Parliament's planetary adopted the report and raised the ambition of the Commission (European Parliament, 2022a). The MEPs wanted a higher target and also wanted to include LMT such as e-bikes and electric scooters in the legislation (European Parliament, 2022a). Seven days later, the Council adopted a general approach to the proposal under its French presidency. France bid for quick progress in battery regulation and made it one of the priorities of its EU council presidency. In an interview with the press, the French MEP and chair of the European Parliament's ENVI committee, Pascal Canfin, said that they aim to adopt the proposal six months earlier than first intended (Moussu, 2022).

Intrainstitution negotiation and advocacy from industry

From April to December 2022, three trialogues were held to negotiate the deal. It is challenging to analyze the situation in this period as it was held behind closed doors. Nevertheless, the position paper and letters from different stakeholders offer a glimpse of what was happening. The Parliament insisted on raising the level of the target, scope, and general ambition of the proposal. This evoked fear throughout the industry. In a joint position paper by the industry, they raised many concerns, for instance, on the risk of over-regulating a highly innovative and fast-paced sector (Eurobat, 2022). They also warned that the amount of delegated and implementing acts in the proposal is quite high. They also included many suggestions on how to improve the proposal, such as avoiding setting recycling targets at such an early stage (Eurobat, 2022). The industry hugely benefits from the support of the Commission and the EIB to tap into the battery market share of €250 billion a year in the EU (European Commission, 2020). However, the clean and just transition would require the

industry to change its business as usual, and create a significant change to ensure its production and supply chain is sustainable and ethical.

On December 9th, 2022, the Parliament and the Council finally struck a provisional deal on battery regulation. In the press release of the Commission, Commissioner Maroš Šefčovič credited the achievement to the EBA initiative and pointed out that this regulation was a priority under this initiative.

> ‘’Setting a top notch, future-proof regulatory framework for batteries has been among the key priorities under the Alliance – and today, we are delivering.’’ *(European Commission, 2022c)*

In the same press release, Commissioner Virginijus Sinkevičius emphasized that the battery market is growing quickly and that with the new EU battery regulations, the EU economy will be better prepared for the enormous changes that lie ahead, as a result of the green and digital revolutions. To support the secure supply of manufacturing materials in a more circular economy, the EU will need to expand the procurement of valuable raw materials from waste batteries, such as lithium and cobalt (European Commission, 2022c). He also added this is the key sector to make the EU less dependent on fossil fuels.

> ‘’These rules will make us less dependent on imported oil and reduce the carbon footprint of our economy. This is very important in the context of Russia’s brutal war on Ukraine and the economic and geopolitical instability that it causes.’’ (European Commission, 2022c)

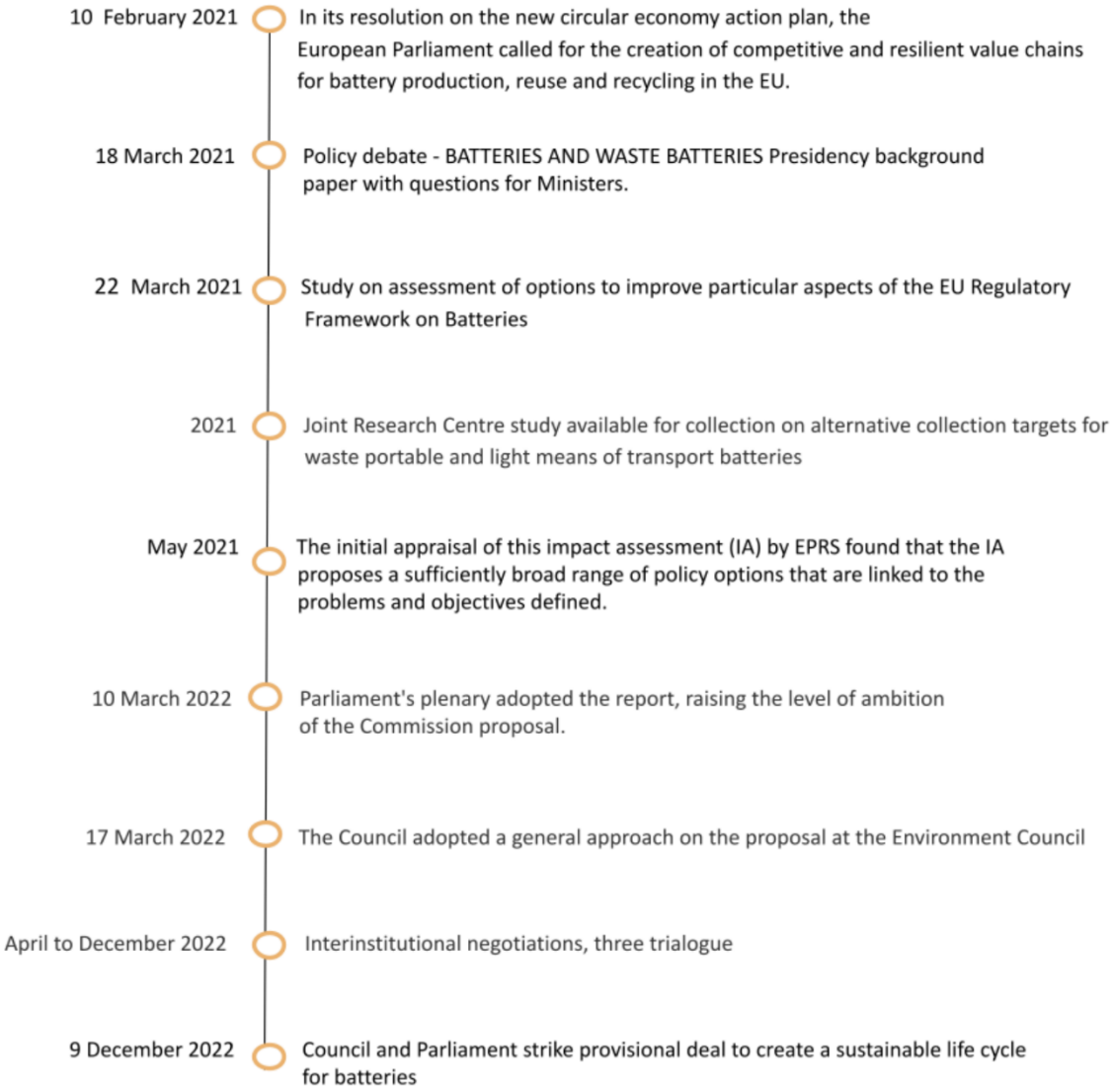
Alongside other Commissioners, Commissioner Thierry Breton issued a statement stating there is strong global competition and the EU must lead the green transition. Once again, he warned that the EU must not be a subcontractor for other countries.

> ‘’Electric mobility is a new and coveted market. Global competition is fierce and demand for batteries has increased sharply. We want to ensure that we are not a mere subcontractor depending on others, and that clean mobility leads to jobs in Europe.’’ *(European Commission, 2022c)*

The new Regulation, according to the Commissioner, will ensure that batteries sold on the EU market are sustainable and secure throughout their entire life cycle, even if they were produced in a third country (European Commission, 2022c). In the battery value chain, the Commission will mobilize large public and private investments.

> ''Because batteries are at the heart of Europe's competitiveness and resilience.''
> *(European Commission, 2022c)*

Figure 4. Timeline 2021 to 2022



Source: made by author

4.3 Discussion

What does this case tell us about the utilization of scientific knowledge in the Commission? How do factors such as the degree of internal capacity and the degree of high external pressure shape how the Commission uses scientific knowledge? In this section, the thesis puts forward possible explanations based on the findings.

Problem solving

The evidence shows that the Commission selects expert knowledge that is feasible to fit in the timeframe of broader policy trajectory, instead of what is most effective as recommended by the expert. In the preparation for the proposal, the Commission proved to have a high internal capacity to produce sound and scientific knowledge. The Council asked the Commission to present a long-term vision for the EU's industrial future and implement it by the end of 2019. In response, the Commission published several studies and a strategic plan on batteries. The studies received positive endorsement from both the Council and the Parliament. Although the Council and the Parliament welcome the Commission's plan to propose a new regulation for batteries, they also call for more actions related to it. The high level of pressure can be observed through numerous calls, particularly from the Parliament. It urged the Commission to address the issue related to sustainable and ethical sourcing batteries in early 2020. Later in 2020, it called for the Commission to quickly tackle the dependency on raw materials and raise the level of battery collection. The Commission rose to the challenge and published the proposal in December 2020. The intense pressure from Parliament showed clearly during the parliament debate, where many MEPs asked the Commissioner to fasten the calendar.

In the analysis of the IA and the proposal, the thesis finds evidence that the Commission did not choose what is most effective and brings the most benefits as suggested by the expert. Instead, the Commission chose the measures that are feasible in order for the proposal to be adopted by the end of 2022. In terms of the definition of methodology, which is imperative to solve the problem and act as guidelines for the industry to follow, the Commission left it out to delegation acts. In doing so, the matter will be decided by the experts later. Pushing technical issues to be determined by the experts later allows the proposal to pass more quicker. This strategy has been used intensively in the past few years by the Commission. Policy observers explain that it enables the Commission to take a fast lane for policies under the Green Deal.

According to the theoretical expectation developed by Rimkuté (2014), if an organization has a high capacity for producing scientific knowledge output, it can focus its efforts on problem-solving by putting its available scientific expertise to use. This is because there is little interference from outside actors in the organization's activities. However, this is not the case in the EU sustainable battery regulation. The Commission evidently has a high capacity to produce expert knowledge, but the high interference from external actors puts pressure on the Commission to accelerate the timeline. The evidence points out that the Commission did not choose what experts suggested as the most effective solution to solve the problem, but what is implementable to fit the timeframe of the Green Deal.

Strategic political

The evidence does not show any sign of strategic political use of expert knowledge. During the Council debate and the Parliament debate, the Commissioners and rapporteur did not use scientific knowledge to defend their position or use it as ammunition against co-legislators. When several member states raised concerns during the debate about the absence of studies related to LMT, the Commissioner ensured that the JRC will publish a report on it. In the Parliament debate, both the Commissioner and the rapporteur used the Ukraine war as a pressure point to convince MEPs about the urgency of breaking dependency on fossil fuels. The only time that the study found the use of scientific knowledge in defense of the Commission's proposal was not in the political arena. Instead, it was in a press interview with the rapporteur Simona Bonafè. She used the IA's findings to justify the Commission's position when the press asked about the concerns of the Council and the industry. That is the extent of it.

The literature shows that organizations are likely to hide their inability to produce scientific evidence to avoid losing status, reputation, and power. Instead of acknowledging that a task is beyond their capacity, organizations can use epistemic authority to strengthen their legitimacy, boost their resources, and increase their chances of survival. In order to do this, information is applied strategically and politically (Rimkuté, 2014).This is not the case with the EU battery regulation. The Commission did not use epistemic authority strategically to hide its inability to produce knowledge. The Commission proved to have a high internal capacity for scientific output. The Commission did not use expert knowledge in the political arena. The studies that the Commission mandated did incorporate into the final proposal.

Symbolic

There is no evidence that shows the use of scientific knowledge for symbolic purposes. According to the literature, when an organization is under intense external pressure and must respond, but lacks the scientific expertise to do so, it tends to follow similar organizational structures and responds to pressure by merely accepting what key actors have already done (Schrefler, 2010; Radaelli, 2009). For instance, the IA is used to boost legitimacy rather than improve policy (Radaelli, 2010). This is, however, not the case with the EU battery regulation. The Commission conducted new scientific studies in preparation for the proposal, it did not merely imitate what relevant organizations have done.

Scientific knowledge was not used for a symbolic purpose, as the studies did translate into the final proposal of battery regulation. There is evidently high pressure from other EU institutions. Nevertheless, the Commission has a high capacity to mobilize resources to produce scientific output in response to pressure. Consequently, the Commission did not have to imitate studies from other actors to boost its legitimacy.

Strategic substantiating

The evidence points out that scientific knowledge is used for strategic substantiating purposes. According to the literature, if an organization is under intense external pressure and has high capacity, it is more likely that it will adopt the use of substantiating evidence because it will be able to actively respond to the demands and pressure by generating reliable scientific outputs in line with a wider policy trajectory (DiMaggio & Powell, 1983; Radaelli, 2009; Rimkuté, 2014). This is the case with the EU battery regulation.

The case unfolds as the theory expected. Given that the Commission has a high capacity to produce scientific knowledge, it was able to respond actively to the high demand from other EU institutions. The Commission published the proposal by the end of 2022 as expected. This is a step forward in reducing greenhouse gas emissions in the transport sector by 90%, a necessary objective if the EU is to reach climate neutrality by 2050. Reaching this objective is only possible if the battery that is used for transportation is sustainable. The Commission selected scientific knowledge that is implementable by the timeline of the Green Deal and not what is most effective as recommended by the expert. Both the IA and proposal indicate the need for battery regulation to pass swiftly to reach the objective of the Green Deal. The Commissioners equally pointed out how imperative it is for the battery regulation to be

adopted as soon as possible to reach the Green Deal objective. A swift adoption of the regulation will ensure that the sector can benefit from the significant investments already in place for batteries. In addition, it will ensure a level-playing playing that is needed to boost innovation and competitiveness. It is evident that the Commission has a pre-determined preference and the regulation is used as a tool to reach that preference. A preference that is supported by all EU institutions and is in line with the broader policy trajectory, the Green Deal.

5. Conclusion

The theoretical expectation in this study argues that if there is a high external pressure in the battery regulation and the Commission has a high internal capacity to produce knowledge, then one should expect the Commission to use strategic substantiating of knowledge in response to the pressure. This is done by producing outputs that are in line with preferences that are considered legitimate by the wider institution and in line with the broader policy trajectory.

The empirical analysis shows that there is high external pressure from both political and non-political actors. The analysis also reveals that the Commission has a high capacity to respond to pressure from external actors. The interaction between high external pressure and high internal capacity to respond to the pressure leads to the substantiation use of expert knowledge. However, one's assessment that this interaction leads to one type of knowledge depends in part on one's assessment that it does not lead to alternative types of knowledge. One cannot observe the problem-solving logic because the battery regulation proposal does not have a clear definition of methodology, and it does not choose the policy measure that experts find most effective in the impact assessment to solve the problem. Symbolic uses were also absent, as the Commission did not merely replicate scientific conclusions reached by other organizations to increase their legitimacy. The Commission has proved to have mobilized its internal capacity to produce the scientific output it needs. Strategic political

practices were also absent. The Commissioners do not use the scientific outputs in the political arena to confront other co-legislator, the Commissions do use the studies that they mandated in the proposal.

Many sources of evidence suggest that the Commission adopted a strategic substantiating expert use of knowledge to introduce battery regulation. There is a smoking gun proof the Commission chose measures that are easily attainable instead of measures that are estimated to be most effective by experts in order to meet the broader policy timeline goal of the EU Green Deal. Further analysis into the motivation and perception of the Commissioners reveals that the EU needs to adopt this battery regulation as soon as possible, as they fear dependency on non-EU countries such as China for such an imperative sector. This fear heightened in wake of the energy crisis during the Ukraine war, urging the EU to end its dependency on fossil fuels by moving to electric. The combination of the comprehensive storyline, smoking gun evidence and the confession of the actors proves that the theoretical expectation mechanism holds, and it unfolded as expected. In the case of battery regulation, where there is high external pressure and high internal capacity to produce scientific evidence, the Commission adopted a strategic substantiating use of knowledge to support the broader policy goal, the EU Green Deal.

The strength of the finding is in the methodology. Process tracing and single case study enable the study to observe causality systematically and therefore generate insights on sequences and causal mechanisms (George & Bennett, 2005). In addition, the systematic approach allows for a more comprehensive picture of the case. The thesis contributes to empirical analysis that is lacking the literature of knowledge utilization. The finding of the thesis supports Rimkuté and Haverland (2015) result that expert knowledge do translate into the Commission proposal.

The alternative explanation of the finding is that the Commission used scientific knowledge partly for problem-solving purposes. While significant evidence points to the Commission prioritizing knowledge that fits the time frame of broader policy trajectory, it must be taken into account that this proposal does tackle many issues related to batteries. Given the complexity of reality, the implication lies in the difficulty to make an absolute conclusion of the finding of the type of knowledge utilization.

The limitation of the study is, first, the restrictions of the short time frame to conduct the research. A longer time frame would allow the researcher to collect more evidence. Secondly, the inability to access Commissioners for an interview regarding this policy makes it challenging to find new source evidence, as interviews could shed light on different aspects of the case.

This study develops many starting points for future research. Future research will need to test whether this theoretical expectation holds in other cases and whether other factors influence the use of expert knowledge. Additional source of evidence such as interview with experts and Commissioners would add to a more comprehensive understanding of knowledge utilization.

Appendix

Appendix 1: EU document on battery regulation from 2017-2022 analyzed

Dates	Organization	Document	Source
October 2017	The Commission	Statement by Vice-President for Energy Union Maroš Šefčovic following the high-level meeting on battery development and production in Europe	https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_17_3861
17 May 2018	The Commission	Strategic action plan on batteries by the Commission	https://eur-lex.europa.eu/resource.html?uri=cellar:0e8b694e-59b5-11e8-ab41-01aa75ed71a1.0003.02/DOC_3&format=PDF
27 May 2019	The Council	An EU Industrial Policy Strategy: a Vision for 2030 - Council conclusions	https://www.consilium.europa.eu/media/39507/st09706-en19.pdf
9 April 2019	The Commission	Report on the Implementation of the strategic action plan on batteries by the Commission to the Parliament, the Council, the EESC, The Committee of the regions	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:176:FIN

		and the EIB	
9 April 2019	The Commission	Commission Report on the implementation of the Batteries Directive and its impact on the environment and on the internal market to the Parliament, the Council, the EESC, The Committee of the regions	https://ec.europa.eu/environment/pdf/waste/batteries/report_implementation_batteries_directive.pdf
9 April 2019	The Commission	Working staff document - on the evaluation of the Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC	https://ec.europa.eu/environment/pdf/waste/batteries/evaluation_report_batteries_directive.pdf
17 July 2019	The European Economic and Social Committee	Strategic Action Plan on Batteries (report) - opinion	https://www.eesc.europa.eu/en/our-work/opinions-information-reports/opinions/strategic-action-plan-batteries-report
4 October 2019	The Council	More circularity - Transition to a sustainable society - Council conclusions	https://www.consilium.europa.eu/media/40928/st12791-en19.pdf
15 January 2020	The Parliament	European Parliament resolution on European Green Deal	https://www.europarl.europa.eu/doceo/document/TA-9-2020-0005_EN.html
10 July 2020	The Parliament	European Parliament resolution on a comprehensive	https://www.europarl.europa.eu/doceo/do

		European approach to energy storage	cument/TA-9-2020-0198_EN.html
18 September 2020	European Commission Regulatory Scrutiny Board	Regulatory scrutiny board opinion - Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=PI_COM:SEC(2020)420&from=EN
October 2020	European Parliamentary Research Service (EPRS)	Briefing on Batteries Directive, Implementation Appraisal	https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/654184/EPRS_BRI(2020)654184_EN.pdf
10 December 2020	The Commission	Proposal for a regulation of the European Parliament and of the Council concerning batteries and waste batteries	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020PC0798
17 December 2020	The Council	Making the Recovery Circular and Green - Council conclusions	https://data.consilium.europa.eu/doc/document/ST-14167-2020-INIT/en/pdf
10 February 2021	The Parliament	European Parliament resolution of 10 February 2021 on the New Circular Economy Action Plan	https://www.europarl.europa.eu/doceo/document/TA-9-2021-0040_EN.html

24 March 2021	European Economic and Social Committee	Opinion of the European Economic and Social Committee on 'Sustainability requirements for batteries in the EU' (COM(2020) 798 final — 2020/353 (COD))	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021AE0122
May 2021	European Parliamentary Research Service	Initial Appraisal of a European Commission Impact Assessment - Updating the EU regulatory framework for batteries	https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/662628/EPRS_BRI(2021)662628_EN.pdf
7 June 2021	The Council	Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries - Progress report from the Council	https://data.consilium.europa.eu/doc/document/ST-9052-2021-REV-1/en/pdf
7 December 2021	The Council	Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries - Progress report from the Council	https://data.consilium.europa.eu/doc/document/ST-14568-2021-INIT/en/pdf
13 December	The Parliament	OPINION of the Committee on the Internal Market and Consumer Protection for the Committee on the Environment, Public Health and Food Safety on the proposal for a regulation of the European Parliament and of the Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) No 2019/1020 (COM(2020)0798 – C9-0400/2020 – 2020/0353	https://www.europarl.europa.eu/doceo/document/IMCO-AD-695236_EN.pdf

		(COD)) - Rapporteur for opinion: Antonius Manders (	
On 10 February 2022,	The Parliament	The ENVI committee adopted its report on the proposal, with 74 votes in favour, to 8 against, with 5 abstentions. The report introduces the following main changes to the Commission's proposed text.	https://www.europarl.europa.eu/doceo/document/A-9-2022-0031_EN.html
On 10 March 2022	The Parliament	New rules on batteries: MEPs want more environmental and social ambition	https://www.europarl.europa.eu/news/en/press-room/20220304IPR24805/new-rules-on-batteries-meps-want-more-environmental-and-social-ambition
14 March 2022	The Council	Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries - General approach by the Council	https://data.consilium.europa.eu/doc/document/ST-7103-2022-REV-1/en/pdf
March 2022	The Parliament	Briefing from Parliament on New EU regulatory framework for batteries: Setting sustainability requirements	https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689337/EPRS_BRI(2021)689337_EN.pdf
9 December 2022	The Council	Council and Parliament strike provisional deal to create a sustainable life cycle for batteries	https://www.consilium.europa.eu/nl/press/press-releases/2022/12/09/council-and-parliament-strike-provisional-deal-to-create-a-sustainable-life-cycle-for-batteries/

Appendix 2 : Scientific outputs mandated by the Commission analyzed

Dates	Organizations that produce the document	Name of Document	Source
May 2018	Trinomics and Öku-institute	Study in support of the preparation of the Implementation report on Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators	https://ec.europa.eu/environment/pdf/waste/Published%20Study%20Implementation.pdf
9 October 2018	Trinomics and Öku-institute	Study in support of evaluation of the Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators	https://ec.europa.eu/environment/pdf/waste/Published%20Supporting%20Study%20Evaluation.pdf
9 April 2019	The Commission	Report from Commission to the Parliament, the Council, the EESC, The Committee of the regions on the implementation of the Batteries Directive and its impact on the environment and on the internal market of Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC	https://ec.europa.eu/environment/pdf/waste/batteries/report_implementation_batteries_directive.pdf

9 April 2019	The Commission	Working staff document - on the evaluation of the Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC	https://ec.europa.eu/environment/pdf/waste/batteries/evaluation_report_batteries_directive.pdf
22 February 2020	Umweltbundesamt and Öku-institute	Assessment of options to improve particular aspects of the EU regulatory framework on batteries - Final report	https://op.europa.eu/en/publication-detail/-/publication/78f09953-8c53-11eb-b85c-01aa75ed71a1/language-en/format-PDF/source-209077070
10 December 2020	The Commission	Commission staff working document Impact Assessment report - Accompanying the document Proposal for a Regulation of the European Parliament and of the Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) 2019/1020	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD%3A2020%3A335%3AFIN
2021	The JRC	"Available for Collection" study on alternative collection targets for waste portable and light means of transport batteries	https://publications.jrc.ec.europa.eu/repository/handle/JRC125615

Appendix 3 : Position papers and stakeholder consultation recommendations made by EU stakeholders analyzed.

Dates	Category	Organization	Title of the document	Source
July 2020	Car industry and battery manufacturers	Recharge	Modernizing EU Battery Legislation: Proposal for a Regulation Public Consultation	https://rechargebatteries.org/wp-content/uploads/2020/06/Modernization-of-EUs-Battery-Legislation-Public-Consultation.pdf
11 December 2020	Recycling firms	Fead	FEAD welcomes the new European Commission's proposal for Regulation concerning batteries and waste batteries	https://fead.be/position/fead-welcomes-the-new-european-commissions-proposal-for-regulation-concerning-batteries-and-waste-batteries/
29 January 2021	Car industry and battery manufacturers	Eucobat	Proposal for a Regulation on Batteries and Waste Batteries - Eucobat Position	https://www.eucobat.eu/news/proposal-regulation-batteries-and-waste-batteries-eucobat-position
5 May 2021	NGOs	Joint NGOs	Enhancing the sustainability of batteries: a joint NGO position paper on the EU battery regulation proposal	https://eeb.org/wp-content/uploads/2021/03/Enhancing-the-sustainability-of-batteries_5.5.2021.pdf
09	Car industry and	Eurobat	The Batteries Regulation: state of play	https://www.eurobat.org/resource/the-

September 2021	battery manufacturers		and what to consider during institutional negotiations	batteries-regulation-state-of-play-and-what-to-consider-during-institutional-%e2%80%8enegotiations/
23 September 2021	Car industry and battery manufacturers	Eucobat	Batteries Regulation Producer definition for batteries incorporated in vehicles or appliances: clarity needed!	https://www.eurobat.org/resource/batteries-regulation-%e2%80%8e-producer-definition-for-batteries-incorporated-in-vehicles-or-%e2%80%8eappliances-clarity-needed%e2%80%8e-2/
6 October 2021	Car industry and battery manufacturers	ACEA	Position paper – EU Batteries Regulation: main automotive priorities	https://www.acea.auto/publication/position-paper-eu-batteries-regulation/
03 November 2021	Recycling firms	Euric	EuRIC Reaction to the Proposed Batteries and Waste Batteries Regulation (Batteries – modernizing EU rules)	https://www.euric-aisbl.eu/position-papers/item/508-euric-reaction-to-the-proposed-batteries-and-waste-batteries-regulation-batteries-modernizing-eu-rules
21 JANUARY 2022	Car industry and battery manufacturers	Join industry	Joint industry position paper on the Batteries Regulation	https://www.eurobat.org/resource/joint-industry-position-paper-on-the-batteries-regulation/
7 December 2022	Car industry and battery manufacturers	Eurobat	Achieving the Green Deal sustainably	https://www.eurobat.org/resource/achieving-the-green-deal-sustainably/

Appendix 4: Speeches, press releases, briefing, debates, minutes from meetings and interviews by key actors analyzed

Dates	Category	Actor(s)	Title	Source
2017	Speech	Maroš Šefčovič, Vice-President for Energy Union	Statement by Vice-President for Energy Union Maroš Šefčovic following the high-level meeting on battery development and production in Europe	https://ec.europa.eu/commission/presscorner/detail/de/STATEMENT_17_3861
23 February 2018	Speech	Maroš Šefčovič, Vice-President for Energy Union	Speech by Vice-President for Energy Union Maroš Šefčovič at the Industry Days Forum on the Industry-led initiative on batteries / the EU Battery Alliance	https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_18_1168
10 September 2019	Press release	Commission President Ursula von der Leyen	The von der Leyen Commission: for a Union that strives for more	https://ec.europa.eu/commission/presscorner/detail/en/IP_19_5542

26 September 2019	Speech	Maroš Šefčovič, Vice-President for Energy Union	Statements by Vice-President Sefcovic and participants to the 4th high level meeting of the European Battery Alliance	https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_19_5896
19 May 2020	Speech	Vice-President Šefčovič, EIB Vice-President McDowell, members of the European Battery Alliance	Statement by Vice-President Maroš Šefčovič following the meeting with high-level industrial actors under the European Battery Alliance	https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_20_914
24 November 2020	Speech	Maroš Šefčovič, Vice-President for Energy Union	Speech by Vice-President Šefčovič at the European Conference on Batteries	https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_20_2202
2 Dec 2020	Press interview	Virginijus Sinkevičius, current European Commissioner for Environment, Oceans and Fisheries.	Sinkevicius: Batteries are essential to Green Deal ambitions	https://www.euractiv.com/section/batteries/interview/sinkevicius-batteries-are-essential-to-green-deal-ambitions/
3 March 2021	Speech	Maroš Šefčovič, Vice-President for Energy Union	Main takeaways by Vice-President Maroš Šefčovič following the meeting with high-level industrial actors	https://ec.europa.eu/commission/commissioners/2019-2024/sefcovic/announcements/main-takeaways-vice-president-maros-sefcovic-following-meeting-high-level-industrial-

			under the European Battery Alliance	actors-under_en
12 March 2021	Speech	Maroš Šefčovič, Vice-President for Energy Union	Speech by Vice-President Šefčovič at the press conference following the 5th high-level meeting of the European Battery Alliance	https://ec.europa.eu/commission/presscorner/detail/en/speech_21_1142
18 March 2021	Video conference debate	The Council ministers,	Informal video conference of environment ministers Public session	https://video.consilium.europa.eu/event/en/24442
26 Oct 2021	Press interview	Simona Bonafè is an Italian MEP sitting with the Socialists & Democrats (S&D) group in the European Parliament. She is rapporteur for the EU's proposed battery regulation in the Parliament's environment committee.	Simona Bonafè MEP: Recovery of raw materials is cornerstone of EU battery law	https://www.euractiv.com/section/batteries/interview/simona-bonafe-mep-recovery-of-raw-materials-is-cornerstone-of-eu-battery-law/
7 February	Press interview	Pascal Canfin, MEP of the Renew Europe	Canfin: Battery Regulation to enter into force 'six	https://www.euractiv.com/section/batteries/interview/nelly-canfin-battery-regulation-to-

2022		group, is the chairman of the European Parliament's Committee on the Environment, Public Health and Food Safety.	months' early	enter-into-force-six-months-early/
9 March 2022	Parliament Plenary Debate	Members of the Parliament	Plenary Session - Batteries and waste batteries (debate)	https://www.europarl.europa.eu/doceo/document/CRE-9-2022-03-09-ITM-010_EN.html

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