REGULATING EV BATTERIES' CARBON FOOTPRINT: EU CLIMATE AMBITION OR GREEN PROTECTIONISM?

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SUMMARY

The European Union's (EU's) recent proposal for a new regulation on EV batteries is a groundbreaking effort, the first to focus on the entire value chain to improve product sustainability and safety throughout the life cycle. Battery producers inside and outside of the EU will have to meet a series of requirements, starting from carbon footprint declaration and related labeling to complying with life-cycle carbon footprint thresholds, for having their products placed in the EU market. While addressing climate change is the key objective, the EU is also seeking to boost its competitiveness, strengthen domestic battery manufacturing capacity, and develop a local value chain. The Battery Regulation's consistency with obligations under the World Trade Organization (WTO) regime thus becomes questionable. This Article explores key concepts of WTO law and examines the compatibility of the EU measures with the Agreement on Technical Barriers to Trade. Notwithstanding that unilateral measures can be permissible, the EU must ensure that design and implementation of its Battery Regulation can contribute to its climate ambition instead of simply being "green protectionism."

As a critical component in electric vehicles (EVs), the battery is key to achieving ambitious climate change mitigation targets, particularly decarbonization of the transportation sector and accelerating the net-zero transition. The past few years have witnessed exponential growth in EV battery production and deployment, indicating the vast potential for further growth.[1] Developing the EV battery industry can also enhance economic competitiveness and create employment opportunities. Currently, China accounts for approximately 77% of global EV battery production capacity, although some forecasts predict greater geographical diversification as more countries, especially in Europe, become producers.[2] Nevertheless, the emissions arising from upstream supply chains in obtaining and processing all materials needed to manufacture EV batteries have become an increasingly discussed environmental concern.[3]

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1. The global EV battery market is expected to reach around $155 billion by 2028. *See* Press Release, Fortune Business Insights, Electric Vehicle Battery Market Size to Hit USD 154.90 Billion by 2028—Exhibit a CAGR of 28.1% (Apr. 6, 2022), https://www.globenewswire.com/news-release/2022/04/06/2417479/0/en/Electric-Vehicle-Battery-Market-Size-to-Hit-USD-154-90-Billion-by-2028-Exhibit-a-CAGR-of-28-1.html.

2. Five European countries—Germany, France, Slovakia, the Czech Republic, and Sweden—are estimated to experience considerable production increases after an influx of battery capacity investment. *See* Alice Yu & Mitzi Sumangil, *Top Electric Vehicle Markets Dominate Lithium-Ion Battery Capacity Growth*, S&P Glob. Mkt. Intel. (Feb. 16, 2021), https://www.spglobal.com/marketintelligence/en/news-insights/blog/top-electric-vehicle-markets-dominate-lithium-ion-battery-capacity-growth. Nevertheless, only approximately 1% of EV batteries was supplied by European companies in 2018. *See* James Eddy et al., McKinsey & Company, Recharging Economies: The EV-Battery Manufacturing Outlook for Europe 2 (2019), https://www.mckinsey.com/~/media/McKinsey/Industries/Oil%20and%20Gas/Our%20Insights/Recharging%20economies%20The%20EV%20battery%20manufacturing%20outlook%20for%20Europe/Recharging-economies-The-EV-battery-manufacturing-outlook-for-Europe-vF.pdf.

3. Mark Mills, *The Tough Calculus of Emissions and the Future of EVs*, TechCrunch (Aug. 22, 2021), https://techcrunch.com/2021/08/22/the-tough-calculus-of-emissions-and-the-future-of-evs/. The World Economic Forum and Global Battery Alliance findings identify the most greenhouse gas (GHG) emission-intensive steps in the battery value chain as the manufacturing of active materials and other components, and the manufacturing of cells.

As one of the world's largest markets for EV batteries,[4] the European Union (EU) proposed a new regulation to govern batteries' entire product life cycle, covering design, production, and disposal stages, as part of its Green Deal and Circular Economy Action Plan in 2020.[5] Building upon and replacing the 2006 EU Battery Directive that covered portable, automotive, and industrial batteries, the proposed Battery Regulation creates a new category—EV batteries.[6] All segments of EV batteries throughout their life cycle will be subject to sustainability-oriented requirements, such as increasing transparency and traceability,[7] reducing climate impacts,[8] promoting the circularity of critical materials,[9] and enhancing longevity and performance.[10] The Regulation has three interrelated objectives: (1) strengthening the functioning of the internal market (including products, processes, waste batteries, and recyclates) by ensuring a level playing field through a common set of rules; (2) promoting a circular economy; and (3) reducing environmental and social impacts throughout all stages of the battery life cycle.

The EU Battery Regulation's aim to govern EV batteries' carbon footprint to promote production of low-carbon batteries and minimize climate impacts marks a notable policy development that was overlooked in the previous Battery Directive.[11] The regulation of a product carbon footprint has less to do with the end product than with the production process, which does not leave any physical trace in the end product itself. For instance, EV batteries remain the same in terms of functioning, performance, or safety irrespective of whether their life-cycle carbon emissions are high or low.

In World Trade Organization (WTO) parlance, regulatory distinctions that are invisible in the finished product are known as non-product-related processes and production methods (NPR-PPMs). Although NPR-PPMs are not per se prohibited under WTO law, they remain highly controversial and contested,[12] which can entail significant compliance costs for exporters.[13] Such costs arise from the gathering of information on regulatory requirements, adjusting production specifications to comply with requirements, or undertaking various conformity assessments to prove compliance.[14] The absence of internationally agreed mechanisms or standards to report and verify carbon accounting for EV batteries would add to the complexity in terms of implementing and enforcing the EU Battery Regulation.

Given Europe's large share of global battery imports and the increasingly integrated global value chain in the EV battery sector, the EU has huge potential to influence the global battery trade and to set product standards through its domestic legislation. With an extensive territorial scope, the EU Battery Regulation sets forth conditions on how processes should be carried out not only within, but also outside EU borders. Besides aiming to protect environmental and social interests, the Regulation seeks a global competitive advantage for EU battery manufacturing firms.[15]

Some commentators argue that the EU can use its regulatory clout to tilt the playing field in favor of domestic industries and help them remain or become competitive.[16] There is a risk that design and implementation of the rules of the Regulation might serve green protectionism interests, by "adding non-environmental objectives that are discriminatory, or overly trade-restrictive in intent and/or effect to environmental policy."[17] Traditional green industrial policies blatantly favor domestic producers over foreign ones,[18] while the use of regulatory standards appears

4. It is anticipated that about 70% of all vehicles sold in Europe across different segments by 2040 will be electric. The demand for EV batteries from Europe is estimated to reach a total of 1,200 gigawatt hours per year. *See* Eddy et al., *supra* note 2, at 3.
5. *See 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) 798 final (Dec. 10, 2020) [hereinafter *EU Battery Regulation Proposal*]. On December 9, 2022, the European Commission, Parliament, and Council reached a provisional political agreement on the final text of the new EU Battery Regulation, scheduled to be published later in 2023. The EU Green Deal aims to make the EU the first "climate-neutral continent" by 2050. *See Communication From the Commission: The European Green Deal*, COM (2019) 640 final (Dec. 11, 2019). On June 14, 2023, the members of the EU Parliament approved the new rules, with 587 votes in favor, 9 against, and 20 abstentions. The Regulation will come into force once the European Council has formally endorsed the text. *See* Press Release, EU Parliament, Making Batteries More Sustainable, More Durable and Better-Performing, (June 14, 2023), https://www.europarl.europa.eu/news/en/press-room/20230609IPR96210/making-batteries-more-sustainable-more-durable-and-better-performing.
6. The 2006 EU Battery Directive covered only three categories of batteries—portable, automotive, and industrial.
7. *EU Battery Regulation Proposal*, *supra* note 5, arts. 10, 47, and 65.
8. *Id*. art. 7.
9. *Id*. arts. 47, 55, and 57.
10. *Id*. arts. 51, 59, and 65.
11. The EU Battery Directive was introduced in 2006, and has been interpreted and implemented in different ways by the Member States.
12. *See* Steve Charnovitz, *The Law of Environmental "PPMs" in the WTO: Debunking the Myth of Illegality*, 27 Yale J. Int'l L. 59 (2002); Jason Potts, International Institute for Sustainable Development, The Legality of PPMs Under the GATT (2008), https://www.iisd.org/system/files/publications/ppms_gatt.pdf; Robert Howse & Donald Regan, *The Product/Process Distinction—An Illusory Basis for Disciplining "Unilateralism" in Trade Policy*, 11 Eur. J. Int'l L. 249 (2000); Douglas Kysar, *Preferences for Processes: The Process/Product Distinction and the Regulation of Consumer Choice*, 118 Harv. L. Rev. 526 (2004).
13. Christophe Bellmann & Colette van der Ven, *Greening Regional Trade Agreements on Non-Tariff Measures Through Technical Barriers to Trade and Regulatory Co-operation* 7 (Organisation for Economic Co-operation and Development, Working Paper No. 2020/04, 2020).
14. *Id*.
15. *See* Hans Eric Melin et al., *Global Implications of the EU Battery Regulation*, 373 Science 384, 385 (2021); Marek Bielewski et al., European Commission, JRC Technical Report: Analysis of Sustainability Criteria for Lithium-Ion Batteries Including Related Standards and Regulations 5 (2021). EU Minister for Ecological Transition Barbara Pompili also stated that "the new rules will promote the competitiveness of European industry and production chains." *See* Press Release, Council of the EU, Sustainable Batteries: Member States Ready to Start Negotiations With Parliament (Mar. 17, 2022), https://www.consilium.europa.eu/en/press/press-releases/2022/03/17/sustainable-batteries-member-states-ready-to-start-negotiations-with-parliament/.
16. Victor Crochet & Elyse Kneller, *Tilting the Playing Field*, EJIL: Talk! (Jan. 11, 2023), https://www.ejiltalk.org/tilting-the-playing-field/.
17. Fredrik Erixon, *Green Protectionism in the European Union: How Europe's Biofuels Policy and the Renewable Energy Directive Violate WTO Commitments* (European Centre for International Political Economy (ECIPE), Occasional Paper No. 1/2009, 2009).
18. An example of green industrial policy in the battery sector is China's "White List," which was introduced in 2015 and removed in 2019. The condition for getting Chinese government EV subsidies was to use batteries designated in the "White List," which included only Chinese EV battery manufacturers and their products. This is a classic example of green industrial policy that

neutral, yet still gives domestic producers advantages by imposing requirements that their foreign counterparts find more challenging to comply with.

After the EU notified the WTO of the Battery Regulation, specific trade concerns (STCs) were quickly raised by several WTO Members, as discussed below in Part II. The ability to withstand challenges in the WTO is crucial for EU lawmakers to prevent the EU's emission-reduction efforts in the battery sector from falling into risk. It is pertinent to ask several questions in this context: Will the EU Battery Regulation distort fair competition and disadvantage foreign EV battery manufacturers? Will it unnecessarily restrict international trade and breach WTO law? What can the EU do to ensure the Regulation's effectiveness in achieving the underlying objectives while also remaining consistent with its international trade obligations?

To address the above questions, this Article analyzes the legal implications of the carbon footprint requirements dictated in the EU Battery Regulation in relation to the EU's right to regulate and in the context of the WTO disciplines, namely the rules as administered by the Technical Barriers to Trade (TBT) Agreement. Although both the General Agreement on Tariffs and Trade (GATT) and TBT Agreement include key regulatory conditions that apply to EU carbon footprint requirements, the Article focuses on the TBT Agreement but not GATT, because the former imposes more rigorous obligations on WTO Members that are additional to those imposed by the latter. The GATT obligations are essentially duplicated in the TBT Agreement, although there are some differences in the burden of proof.[19]

In other words, the TBT Agreement prevails over GATT given its *lex specialis* nature.[20] Therefore, surviving TBT scrutiny matters significantly to the EU Battery Regulation. Although the specific carbon footprint targets as well as the calculation and verification methodologies will only be available in future EU secondary legislation, it is vital to identify design and administrative issues that warrant policymakers' attention to reduce the likelihood of violating WTO law.

The analysis commences in Part I, where product carbon footprints are explained and the EU Battery Regulation's carbon footprint requirements are outlined. Part II develops an in-depth analysis of how the EU Regulation would be scrutinized by WTO law, focusing on the obligations under Articles 2.1 and 2.2 of the TBT Agreement and highlighting potential contraventions. Part III concludes with three recommendations for the EU on how to enhance the synergy between standard-setting in the battery sector and the WTO regime, while also contributing to the EU's climate goals.

I. Regulating the Product Carbon Footprint and the New EU Battery Regulation

A. *Regulating the Product Carbon Footprint: A Brief Introduction*

Going beyond physical product-specific characteristics to address production processes, even when the use of a certain process is not physically ascertainable in the final product, is nevertheless critical for sustainable development.[21] So-called life-cycle assessment (LCA) refers to a measurement of all the external costs and benefits of a product, from manufacturing to disposal.[22] Concern over climate change has stimulated interest in calculating and controlling the total amount of carbon emissions generated during the different stages throughout the life cycle of goods and services, irrespective of their location.[23]

Measuring only the amount of carbon emitted by companies in their own operations is insufficient; emissions from upstream and downstream processes should also be quantified. Some "emissions-free" final products can still jeopardize environmental integrity when their manufacturing processes are not clean.[24] Although both international environmental law and the United Nations climate change regime have adopted a territory-based system boundary that divides responsibility for reduction of carbon emissions based on the production location, this approach appears insufficient in preventing the rise of global temperature above the critical threshold of 2 degrees Celsius.[25]

takes the form of domestic content subsidies. For a discussion of this policy measure, see Mandy Meng Fang & Weihuan Zhou, *Greening the Road: China's Low-Carbon Energy Transition and International Trade Regulation*, 35 Leiden J. Int'l L. 357, 363 (2022). The use of green industrial policies by developed and developing countries to support green technologies which are key to decarbonization shows no sign of diminishing.

For a discussion of green industrial policies in general, see Larry Karp & Megan Stevenson, *Green Industrial Policy: Trade and Theory* (World Bank, Policy Research Working Paper No. 6238, 2012), https://openknowledge.worldbank.org/server/api/core/bitstreams/5c58ad2e-3eb8-5b90-a7d7-d5b-9c6eac586/content; Dani Rodrik, *Green Industrial Policy*, 30 Oxford Rev. Econ. Pol'y 469 (2014); Mandy Meng Fang, *Old Wind in a New Bottle? Green Industrial Policy and the Use of Safeguards in the Solar Sector*, 55 J. World Trade 573 (2021); Joanna I. Lewis, *Green Industrial Policy After Paris: Renewable Energy Policy Measures and Climate Goals*, 21 Glob. Env't Pol. 42 (2021); Mandy Meng Fang, *Local Content Measures and the WTO Regime: Addressing Contentions and Trade Offs*, *in* Local Content, Sustainable Development and Treaty Implementation in Global Energy Markets 41 (Damilola S. Olawuyi ed., Cambridge Univ. Press 2020).

19. Jan McDonald, *Domestic Regulation, International Standards, and Technical Barriers to Trade*, 4 World Trade Rev. 249, 252 (2005).
20. Timo Gerres et al., *To Ban or Not to Ban Carbon-Intensive Materials: A Legal and Administrative Assessment of Product Carbon Requirements*, 30 Rev. Eur. Compar. & Int'l Env't L. 249, 255 (2021).
21. *See* U.N. Conference on Environment and Development, *Rio Declaration on Environment and Development*, U.N. Doc. A/CONF.151/26/Rev. 1(Vol.I), annex I, princ. 8 (Aug. 12, 1992).
22. Michael Z. Hauschild & Mark A.J. Huijbregts, *Introducing Life Cycle Assessment*, *in* Life Cycle Impact Assessment 1, 2-4 (Michael Z. Hauschild & Mark A.J. Huijbregts eds., Springer 2015).
23. The life-cycle process generally includes production, processing, transportation, sale, use, and disposal. *See* Simon Bolwig & Peter Gibbon, Counting Carbon in the Marketplace: Part 1—Overview Paper, Presentation at the Global Forum on Trade and Climate Change (June 2009).
24. *See* Troy Hawkins et al., *Comparative Environmental Life Cycle Assessment of Conventional and Electric Vehicles*, 17 J. Indus. Ecology 53 (2013).
25. Natalie L. Dobson, *The EU's Conditioning of the "Extraterritorial" Carbon Footprint: A Call for an Integrated Approach in Trade Law Discourse*, 27 Rev.

Establishing a regulatory framework to govern the life-cycle carbon emissions of traded products has received increasing attention from different stakeholders, such as international organizations, national governments, consultancy companies, and large retailers.[26] Such a framework can incentivize or even oblige producers to invest in a more environmentally friendly production process to reduce carbon emissions at the levels of the corporation and throughout the supply chain.[27] Meanwhile, this can affect consumer choice by increasing the attributes a consumer must consider and potentially changing the weight the consumer assigns to each attribute.[28] In other words, market competitiveness will be steered toward attributes, such as product sustainability, traceability, and circularity, and away from traditional factors, such as price.

Currently, the calculation of a product carbon footprint is largely dictated by private standards, and certification schemes are primarily operated by small consultancy companies, or in some cases large retailers and manufacturers, while government-set standards are rather limited.[29] It was not until 2008 that the first methodology for determining a product's life-cycle carbon footprint was introduced by the British Standards Institution, covering a wide range of products.[30] In the same year, the International Organization for Standardization (ISO) announced its decision to add the "carbon footprint of products" to its ISO 14000 series of environmental management standards, in particular the ISO 14067:2018, which provides guidelines on the quantification and reporting of a product carbon footprint.[31] Later, the European Commission also released a technical report on product environmental footprint, setting a multi-criteria of the environmental performance of goods or services throughout their life cycle, including but not limited to carbon emissions.[32]

Although these standards could be considered helpful frameworks to measure the carbon footprint of EV batteries, it should be noted that carbon footprint calculation methodologies that work for one sector might turn out to be difficult to implement for other sectors.[33] Therefore, simply adopting an existing methodology applicable to a different sector to calculate EV battery carbon footprint might be infeasible or even counterproductive. A preferable option would be to establish an internationally agreed calculation system specifically tailored to EV batteries to ensure credibility and accuracy. Otherwise, using different standards to quantify carbon footprint risks imposing uncertainty and unpredictability on producers.

Any State wishing to regulate product carbon footprint may have an enduring concern that foreign counterparts with lax or no regulation would gain a competitive advantage while domestic producers would lose market share or relocate abroad to avoid additional costs. The rapidly expanding global market for EV batteries will only exacerbate this concern. This will likely push regulating States to ensure regulatory compliance within foreign jurisdictions to level the playing field.[34]

A unilateral extension of regulatory reach by leveraging market access to regulate conduct or circumstances abroad takes place as a result, which nevertheless has coercive potential and raises issues of extraterritoriality.[35] Even when both domestic and foreign producers are subject to an identical regulatory standard, the latter may still find it more difficult to comply.[36] In consequence, even if not in intent, regulatory measures can lead to the discrimination of imports, thus protecting import-competing domestic producers.

Over the past decades, the EU has sought to fulfill its role in ensuring a climate-friendly production process for products and services beyond its own borders.[37] Whether the unilateral market access-based measure can effectively entice or coerce other countries to comply depends on several factors, including the market power of the implementing State, trade dependence of the specific industry in the compliance State, and the appropriateness and feasibility of the requirements imposed.[38] The EU's ability to take unilateral measures to regulate global markets by setting regulatory standards can be primarily attributed

Eur. Compar. & Int'l Env't L. 75, 77 (2018).

26. *See* Kateryna Holzer & Aik Hoe Lim, *Trade and Carbon Standards: Why Greater Regulatory Cooperation Is Needed*, *in* Cool Heads in a Warming World: How Trade Policy Can Help Fight Climate Change 7-8 (Daniel C. Esty & Susan Biniaz eds., Yale Center for Environmental Law and Policy 2022).
27. Jasper Stein, *The Legal Status of Eco-Labels and Product and Process Methods in the World Trade Organization*, 1 Am. J. Econ. & Bus. Admin. 285 (2009).
28. Elisa Baroncini & Claire Brunel, *A WTO Safe Harbour for the Dolphins: The Second Compliance Proceedings in the* US—Tuna II (Mexico) *Case*, 19 World Trade Rev. 196, 207 (2020).
29. Bolwig & Gibbon, *supra* note 23, at 3.
30. *See* British Standards Institute, PAS 2050:2008—Specification for the Assessment of the Life Cycle Greenhouse Gas Emissions of Goods and Services (2008), http://www.carbonconstruct.com/pdf/pas_2050.pdf.
31. This has two parts—ISO 14067-1 quantifies the carbon footprint of a product as well as tracks its progress in GHG mitigation and ISO 14067-2 harmonizes methodologies for carbon footprinting. ISO, *ISO 14067:2018*, https://www.iso.org/standard/71206.html (last visited May 29, 2023).
32. Simone Manfredi et al., European Commission, Product Environmental Footprint (PEF) Guide (2012), https://ec.europa.eu/environment/eussd/pdf/footprint/PEF%20methodology%20final%20draft.pdf.
33. American Chamber of Commerce to the European Union, Our Position: Batteries Regulation: A Key Stop on the Road to Net-Zero 3 (2022), https://www.amchameu.eu/system/files/position_papers/batteries_paper_amcham_eu_reviewed_feb2022_final_0.pdf.
34. The use of PPM-based requirements as a condition for trade to avoid losing competitiveness has a long history. *See* Virginia Leary, *Workers Rights and International Trade: The Social Clause*, *in* Fair Trade and Harmonization: Prerequisites for Free Trade? 185 (Jagdish Bhagwati & Robert E. Hudec eds., MIT Press 1996).
35. *See* Barbara Cooreman, *Addressing Environmental Concerns Through Trade: A Case for Extraterritoriality*, 65 Int'l & Compar. L.Q. 229 (2016).
36. Peter Swann et al., *Standards and Trade Performance: The UK Experience*, 106 Econ. J. 1297, 1298 (1996).
37. Key examples include the Fuel Quality Directive and Renewable Energy Directive. For a discussion of the EU's climate-related regulations, see Joanne Scott & Lavanya Rajamani, *EU Climate Change Unilateralism*, 23 Eur. J. Int'l L. 469 (2012); Joanne Scott, *Extraterritoriality and Territorial Extension in EU Law*, 62 Am. J. Compar. L. 87 (2014); Gerres et al., *supra* note 20; Ioanna Hadjiyianni, The EU as a Global Regulator for Environmental Protection (2019).
38. Organisation for Economic Co-operation and Development, Processes and Production Methods (PPMs): Conceptual Framework and Considerations on Use of PPM-Based Trade Measures 30 (1997).

to its vast market size.[39] As Prof. Daniel Drezner posits, "[T]he larger the economy, the stronger the pull for producers to secure and exploit market access. As demand increases, firms will have greater incentives to mirror that market's preferences."[40]

Empirical research demonstrates that trade incentivizes exporting countries to adopt the standards that their major export markets have already complied with.[41] The attractiveness of securing access to the European market for a significant number of producers enables the extension of regulatory requirements unilaterally decided by the EU to foreign jurisdictions as a condition for market access. An illustrative example: the world's largest EV battery manufacturer in China has recently proposed to establish a carbon footprint calculation methodology and system shortly after the EU released the proposed Battery Regulation.[42]

B. *EV Battery Carbon Footprints*

As one of the most carbon-intensive components of EVs, batteries make EV manufacturing more carbon-intensive than manufacturing traditional internal combustion engine (ICE) vehicles, even though EVs generally have much lower life-cycle greenhouse gas (GHG) emissions than ICE vehicles.[43] Despite enormous technological progress, EV battery production remains energy-intensive from upstream (involving raw material extraction and processing), through midstream (where various components are manufactured and assembled), to downstream (involving the assembly of components and distribution to end-users).[44] Regulating emissions arising from battery production is integral to minimizing the negative environmental impacts of EVs. Nevertheless, accurate quantification of the embodied emissions of EV batteries as a prerequisite for regulating battery carbon footprint remains notoriously complicated for three reasons.

First, the exact amount of carbon emitted in the process of making an EV battery is highly variable, depending on the energy mixes and energy requirements.[45] A range of factors can affect a carbon footprint, such as the location of production and the means of transportation. The carbon footprint of EV batteries, even when produced using an identical process, can be different if the electricity used for one production process comes from fossil fuels and the other comes from renewable energy sources. In the particular segment of EV battery production, the cell manufacturing processes have hardly been agreed upon between studies in terms of energy usage and carbon emissions.[46]

Second, the absence of an internationally agreed-upon methodology for calculating and verifying EV battery carbon footprint adds to the difficulty of obtaining reliable data, as different calculation methods can lead to varying results. For instance, comparing two relatively established methods to calculate EV battery carbon emissions—the "bottom-up" approach and the "top-down" approach—using the latter can result in the estimation of a higher amount of emissions.[47] It is essential to quantify the amount of carbon emissions as precisely as possible given the commercial benefits or harms that might result from a low- or high-carbon footprint.[48]

Third, the increasingly expansive EV battery supply chain separates production into stages, and these stages can be completed in different locations, some of which are in the least developed countries with limited availability of battery industry data.[49] Drawing boundaries for the different activities and their respective emissions would be onerous.[50] It is challenging to obtain reliable data to assess embodied carbon footprints, particularly when a battery contains components from various production sites and suppliers.[51] In the absence of precise or certain data sets, some exporters, particularly those in developing countries, may have to use the most conservative or "worst-case scenario" data sets.[52]

39. *See* Anu Bradford, The Brussels Effect: How the European Union Rules the World (2020).
40. Daniel W. Drezner, *Globalisation, Harmonization, and Competition: The Different Pathways to Policy Convergence*, 12 J. Eur. Pub. Pol'y 841, 843 (2005).
41. *See* Aseem Prakash & Matthew Potoski, *Racing to the Bottom? Trade, Environmental Governance, and ISO 14001*, 50 Am. J. Pol. Sci. 350 (2006).
42. The chief executive officer of Contemporary Amperex Technology (CATL) recently made one proposal, "The Proposal to Accelerate Carbon Footprint Research and Establish the Mechanism of Mutual Recognition Between the EU and China," to the National People's Congress and the Chinese People's Political Consultative Conference in March 2022. The proposal highlighted the importance of establishing a management system for carbon emissions, engaging in global standard-setting, and promoting the mutual recognition between the EU and China in battery carbon footprinting. *See* Zeng Yuqun, Proposal to Facilitate the Research on Battery Carbon Footprints, Presentation at Fujian Provincial Committee of the Chinese People's Political Consultative Conference (Mar. 3, 2022), https://fj.china.com.cn/news/202203/17128.html.
43. Dale Hall & Nic Lutsey, International Council on Clean Transportation, Effects of Battery Manufacturing on Electric Vehicle Life-Cycle Greenhouse Gas Emissions 3 (2018), https://theicct.org/sites/default/files/publications/EV-life-cycle-GHG_ICCT-Briefing_09022018_vF.pdf.
44. *See* Erik Emilsson & Lisbeth Dahllöf, IVL Swedish Environmental Research Institute, Lithium-Ion Vehicle Battery Production: Status 2019 on Energy Use, CO_2 Emissions, Use of Metals, Products Environmental Footprint, and Recycling (2019).
45. Linda Ager-Wick Ellingsen et al., *Life Cycle Assessment of a Lithium-Ion Battery Vehicle Pack*, 18 J. Indus. Ecology 113, 117 (2013).
46. Simon Davidsson Kurland, *Energy Use for GWh-Scale Lithium-Ion Battery Production*, 2 Env't Rsch. Commc'ns 012001, at 2 (2020).
47. A bottom-up approach incorporates the activity data for each stage of each component of a battery and aggregates these different components. In contrast, a top-down analysis first determines the total emissions from a plant and attributes these emissions to different processes. Top-down inventories tend to include more auxiliary energy uses, but they may double-count certain processes and emissions and, therefore, find higher emissions. *See* Hall & Lutsey, *supra* note 43, at 2.
48. Katrin Plassmann et al., *Methodological Complexities of Product Carbon Footprinting: A Sensitivity Analysis of Key Variables in a Developing Country Context*, 13 Env't Sci. & Pol'y 393, 402 (2021).
49. For instance, some least developed countries and developing countries are mineral-rich and responsible for a sizeable share of raw materials extraction for EV batteries. *See* Franco Ciulla et al., *Charged-Up Demand Brings Challenges to the Battery Value Chain*, LEK Insights (Oct. 19, 2021), https://www.lek.com/insights/ei/charged-demand-brings-challenges-battery-value-chain.
50. *Calculating the Carbon Footprint of Li-Ion EV Batteries*, Auto. Cells Co. (June 2, 2022), https://www.acc-emotion.com/stories/calculating-carbon-footprint-li-ion-ev-batteries.
51. Hans Eric Melin, Circular Energy Storage Research and Consulting, Analysis of the Climate Impact of Lithium-Ion Batteries and How to Measure It 10 (2019).
52. Plassmann et al., *supra* note 48.

Besides quantifying and reporting EV battery carbon emissions, the task of verifying the data also can be cumbersome for either exporters or implementing States. If exporters are required to submit the data to third parties for certification and verification, the resulting cost will add to the burden of complying with the Battery Regulation. If implementing States bear the burden of verification, their market surveillance authorities will need to build a credible system to certify and verify the data provided, given that compliance cannot simply be verified by inspection of the battery itself.

At the current stage, the production of EV batteries in the EU will likely have a lower carbon footprint because the average energy mix in Europe is less carbon-intensive, given its higher share of hydro and nuclear energy in the power mix.[53] The EU's regulatory efforts to reduce EV battery emissions might be perceived by its trading partners as a disguised agenda to afford unfair advantages to European manufacturers. Economies that lack the capacity to follow low-emission production methods will inevitably be disadvantaged by the EU Regulation.

In addition, while ISO can provide some guidance for the calculation of battery carbon footprint, no available international standards can be relied on to classify products based on their carbon intensity or to set a maximum level of acceptable product carbon footprint. Therefore, the EU will need to formulate completely new regulatory standards that all of its importers will have to accept as a condition to the EU market. Whether the EU can fill the regulatory gap by being a responsible standard-setter in the EV battery sector remains an open question.

C. *The EU Battery Regulation and Its Carbon Footprint Requirements*

The EU Battery Regulation sets forth a three-stage approach with progressive requirements to promote the production of low-carbon EV batteries, and failure to meet it would deny effective access to the EU market.[54]

- Stage One: the mandatory declaration of the carbon footprint of batteries put into the EU market (applicable as of July 1, 2024).
- Stage Two: the creation of carbon footprint performance classes as labeling criteria (applicable as of January 1, 2026).
- Stage Three: the setting of maximum life-cycle carbon footprint thresholds for batteries (applicable as of July 1, 2027).

The level of stringency of measures designed as enforcement instruments in the three stages increases progressively—from the declaration and labeling to maximum carbon footprint requirements. In every stage, the Regulation will circumvent the territorial system boundary to regulate carbon emissions generated abroad, at a time when the product concerned is not present in the EU internal market. Manufacturers that produce EV batteries in an emission-intensive manner will be penalized upon exportation into the EU, especially at Stage Three during which a numeric limit on carbon emissions will be imposed.

The integration of different policy objectives by the EU for regulating battery carbon footprints would play an important role in shaping the specific design and implementation of the Regulation. There is a concern that policymakers may exploit environmental concerns to pursue non-environmental objectives, such as enhancing self-sufficiency and boosting export. As a result of pursuing multiple policy objectives, EU lawmakers may set standards intentionally or unintentionally involving discriminatory elements that favor domestic producers over their foreign counterparts to the detriment of fair competition.[55]

The rules can also be set arbitrarily or unjustifiably stringent to restrict foreign exporters' access to the EU market and lead to de facto discrimination. While European battery manufacturers have actively participated in policymaking, limited opportunities have been available for stakeholders from foreign countries to negotiate market access issues over the course of policy development and implementation. As a result, the compliance costs incurred by foreign competitors may be higher compared with the EU's domestic producers. The consistency of the Regulation with the EU's trade obligations under the WTO regime becomes questionable.

II. Application of WTO Rules—The TBT Agreement

Seeking compliance with the rules dictated in multilateral trade agreements is important to avoid the EU Battery Regulation becoming the target of trade complaints and to ensure its long-term viability. In the past, the use of carbon footprint requirements triggered several STCs from

53. Nevertheless, the regional differences should be properly considered—for instance, the carbon intensity of a battery produced in South China is found to be much smaller than some EU States, such as Poland, while behind some others, for instance Sweden. *See* Melin, *supra* note 51, at 8.

54. Given that the proposed regulation is still under discussion, some of the requirements might change. Several of the proposed requirements will be further specified via EU "secondary legislation." These acts will be drafted and adopted by the European Commission in the years to come and—depending on the regulatory procedure—this will involve, to a various degree, the other EU institutions (European Parliament and EU Council). The carbon footprint targets as well as the methodologies to calculate the specific material recovery and recycled content targets are just three examples of key aspects that will be defined in more than 30 pieces of EU secondary legislation.

55. Carbon accounting can be potentially unfair to exporters in developing countries. *See* Alexander Kasterine & David Vanzetti, *The Effectiveness, Efficiency, and Equity of Market-Based and Voluntary Measures to Mitigate Greenhouse Gas Emissions From the Agri-Food Sector*, *in* Trade and Environment Review 2009/2010, at 87, 111 (United Nations Conference on Trade and Development 2010).

Members of the TBT Committee.[56] This time around, after the EU had notified the TBT Committee of its proposed Battery Regulation, countries such as Russia, China, and India swiftly raised STCs on several grounds.[57]

For instance, a shared concern stemmed from the requirement for complying with the maximum level of carbon footprint over the life cycle of batteries, given the lack of a comprehensive methodology to calculate this parameter. It was transcribed in the TBT Committee records of November 2021 that "there is no unified international calculation criteria or basis for the carbon footprint of such products, therefore the equitable and scientific assessment is hard to carry out," and that "the draft does not specify the ways for the stakeholders from outside the EU to submit their data and calculations made under internationally recognized protocols, which are likely to be different from the EU standards."[58]

Against this background, this section provides an in-depth analysis of how the EU carbon footprint requirements would fare with respect to the TBT Agreement, and identifies potential conflicts. Before specific carbon footprint targets, as well as the calculation and verification methodologies, are rolled out in future EU secondary legislation, it is crucial to identify the Regulation's potential conflicts with the WTO law.

A. *Application of the TBT Agreement*

The TBT Agreement establishes a specialized legal regime that moves beyond the negative integration legal instruments, such as national treatment, and incorporates positive integration instruments, such as harmonization, mutual recognition, and equivalence.[59] The TBT Agreement applies to technical regulations, standards, and conformity assessment procedures.[60] Technical regulations receive the most stringent multilateral legal disciplines because compliance with them is mandatory.

Whether the EU Battery Regulation's carbon footprint requirements for EV batteries fall under the scope of the TBT Agreement is a threshold issue as regards the application of the Agreement. A measure will not be subject to scrutiny based on the TBT Agreement in the first place if it falls outside the sphere of the Agreement.

1. Are the EU Carbon Footprint Requirements Technical Regulation?

Annex 1.1 defines a "technical regulation" as a "document which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method."

For the first time, the Appellate Body in *European Communities—Asbestos* clarified the scope of technical regulation: (1) the measure must apply to identifiable products; (2) the measure must lay down products' characteristics or their related processes and production methods, including applicable administrative provisions (or else it must be about labeling and identification); and (3) compliance with the measure must be mandatory.[61] What remains controversial in *European Communities—Asbestos* is how "product characteristics" must be understood. The Appellate Body interpreted the term as including any objectively definable features or qualities intrinsic to the product, such as its composition, size, shape, color, texture, hardness, tensile strength, flammability, conductivity, density, or viscosity.[62]

In support of this conclusion, the Appellate Body referred to TBT Agreement Annex 1.1, which provides examples of product characteristics, such as "terminology, symbols, packing, marking or labeling requirements." Therefore, "product characteristics" include not only features and qualities intrinsic to the product itself, but also related characteristics, such as the means of identification, the presentation, and the appearance of the product.[63] The decision that the "characteristics" subject to the TBT Agreement are not limited to those intrinsic to the product itself was reaffirmed in *European Communities—Sardines*, which suggests that the term "characteristics" carries a potentially broad scope.[64]

Given the established WTO jurisprudence as regards the meaning and scope of a "technical regulation," it is relevant to examine whether the carbon footprint of EV batteries can be objectively defined and viewed as a means of identification that qualifies as a "characteristic" as defined in the TBT Agreement. Since the amount of carbon emissions emitted during the EV battery manufacturing process can be measurable, the carbon footprint can be "objectively" established and thus deemed a "characteristic" of EV batteries.[65]

56. WTO Members raising concerns were primarily concerned with the methodology chosen for the calculation of life-cycle carbon emissions of products, trade restrictiveness of regulations, and the periods provided or the implementation of regulations. *See* Holzer & Lim, *supra* note 26, at 14.
57. *See EU Battery Regulation Proposal*, *supra* note 5; Committee on TBT, *Notification*, WTO Doc. G/TBT/N/EU/775 (Jan. 26, 2021).
58. *See* Committee on TBT, *Minutes of the Meeting of 10-12 November 2021*, WTO Doc. G/TBT/M/85 (Feb. 2, 2022).
59. Ming Du, *What Is a "Technical Regulation" in the TBT Agreement?*, 6 Eur. J. Risk Regul. 396, 397 (2015).
60. *See* Agreement on Technical Barriers to Trade art. 1 and annex 1, Apr. 15, 1994, 1868 U.N.T.S. 120.
61. Appellate Body Report, *European Communities—Measures Affecting Asbestos and Products Containing Asbestos*, ¶ 66, WTO Doc. WT/DS135/AB/R (adopted Apr. 5, 2001) [hereinafter Appellate Body Report, *EC—Asbestos*].
62. *Id.* ¶ 67.
63. *Id.*
64. Appellate Body Report, *European Communities—Trade Description of Sardines*, ¶ 6, WTO Doc. WT/DS231/AB/R (adopted Oct. 23, 2002) [hereinafter *EC—Sardines*].
65. Charles Owen Verrill also argues that carbon intensity limitations are definable as "characteristics" since the carbon intensity of products can be "objectively" established. Charles Owen Verrill, *Maximum Carbon Intensity*

Meanwhile, the Regulation would provide that EV batteries would have to comply with its carbon footprint requirements in order to be sold in the EU market. This clearly meets the mandatory requirement according to Annex 1.1 of the TBT Agreement. Therefore, the EU Battery Regulation's carbon footprint requirements for EV batteries fall into the scope of technical regulation under the TBT Agreement.

2. Are the EU Carbon Footprint Requirements Consistent With the TBT Rules?

Applying the TBT Agreement to assess the compatibility of the carbon footprint requirements according to the EU Battery Regulation starts with an understanding of the applicable rules and obligations. From a list of obligations under the TBT Agreement, this Article focuses on the most relevant Articles 2.1 and 2.2 of the Agreement.[66]

☐ *Are the EU carbon footprint requirements consistent with Article 2.1 of the TBT Agreement?* TBT Agreement Article 2.1 states as follows: "Members shall ensure that in respect of technical regulations, products imported from the territory of any Member shall be accorded treatment no less favourable than that accorded to like products of national origin and to like products originating in any other country."

This article comprises two substantive requirements with two central concepts—"like products" and "less favourable treatment." A degree of indeterminacy is deeply rooted in the determination of product likeness within the meaning of the TBT Agreement.[67]

As seriously contested in *United States—Clove Cigarettes*, the definition of "like products" was key to the identification of protectionist measures in the dispute. The panel assessed the likeness by focusing on the objectives and purposes of the technical regulation, while the Appellate Body chose to follow a competition-based approach.[68] The regulatory concerns underlying a measure may be relevant to an analysis of the "likeness" criteria under GATT Article III:4 and TBT Agreement Article 2.1 to the extent that they have an impact on the competitive relationship between and among the products concerned.[69] A determination of the nature and extent of a competitive relationship between and among products fundamentally determines the existence of "likeness" adopted in the TBT disputes.[70]

The interpretation of "less favourable treatment" can be tricky in the TBT Agreement, given the absence of a "general exceptions" clause similar to Article XX of GATT 1994.[71] The jurisprudence after *United States—Clove Cigarettes* has confirmed that identifying "less favourable treatment" under Article 2.1 of the TBT Agreement requires a two-step analysis. The first step is to find whether the measure at issue modifies the conditions of competition in the relevant market to the detriment of the group of imported products compared with the group of domestic like products.

The second step is to investigate whether the detrimental impact on imports exclusively stems from a legitimate regulatory distinction. In other words, the mere existence of a detrimental effect on imported like products does not suffice to establish "less favourable treatment" within the meaning of TBT Article 2.1. A detrimental impact on imports amounts to "less favourable treatment" only if it cannot be justified as the outcome of pursuing a legitimate objective. The focus on assessing whether a detrimental impact stems exclusively from a regulatory distinction concerns primarily the legitimacy of the regulatory distinction.[72] A measure differentiating products should pursue a reasonable and justifiable objective fairly and justifiably.[73]

Despite being criticized as "incomplete and unexplained," the reading-in of the legitimate regulatory distinction has been consistently adopted by the Appellate Body in the following TBT disputes.[74] As further elaborated in *United States—Certain Country of Origin Labelling (COOL) Requirements*, a regulatory distinction is not deemed "legitimate" if it is not designed and applied in an evenhanded manner.[75] The design, architecture, revealing structure, operation, and application of the measure at issue determine whether the requirement of evenhandedness is satisfied.[76] The requirement of "evenhandedness" is met only if a measure aligns credibly with the regulatory objective and the measure is

Limitations and the Agreement on Technical Barriers to Trade, 2 Carbon & Climate L. Rev. 43, 46-47 (2008).

66. The primary obligations under the TBT Agreement in relation to technical regulation are contained in Articles 2.1, 2.2, and 2.4. Because of the lack of an international standard regulating EV battery carbon footprint, there is no need to go through Article 2.4.
67. *See* Tomer Broude & Philip I. Levy, *Do You Mind if I Don't Smoke? Products, Purpose, and Indeterminacy in* US—Measures Affecting the Production and Sale of Clove Cigarettes, 13 World Trade Rev. 357 (2014).
68. Appellate Body Report, *United States—Measures Affecting the Production and Sale of Clove Cigarettes*, ¶ 107, WTO Doc. WT/DS406/AB/R (adopted Apr. 24, 2012) [hereinafter Appellate Body Report, *U.S.—Clove Cigarettes*].
69. *Id.* ¶ 199.
70. The interpretation was affirmed by the Appellate Body in *EC—Asbestos*. *See* Appellate Body Report, *EC—Asbestos*, *supra* note 61, ¶ 99. The Panel in the TBT dispute *United States—Tuna II (Mexico)* found the pertinence of the Appellate Body's likeness interpretation in Article 2.1 of the TBT Agreement. *See* Panel Report, *United States—Measures Concerning the Importation, Marketing, and Sale of Tuna and Tuna Products*, ¶¶ 110-111, WTO Doc. WT/DS381/R (adopted June 13, 2012).
71. If the interpretation of "less favourable treatment" followed the same way as that of Article III:4, any technical regulation having a detrimental impact on the group of imported products vis-à-vis the group of domestic like products would breach Article 2.1 of the TBT Agreement. *See* Ming Du, *Taking Stock: What Do We Know, and Do Not Know, About the National Treatment Obligation in the GATT/WTO Legal System?*, 1 Chinese J. Glob. Governance 67, 80-81 (2015).
72. Appellate Body Report, *United States—Certain Country of Origin Labelling (COOL) Requirements*, ¶ 271, WTO Doc. WT/DS384/AB/R (adopted July 23, 2012) [hereinafter Appellate Body Report, *U.S.—COOL*].
73. *See* Jason Houston-McMillan, *The Legitimate Regulatory Distinction Test: Incomplete and Inadequate for the Particular Purpose of the TBT Agreement*, 15 World Trade Rev. 543, 554 (2016).
74. *See id.*
75. Appellate Body Report, *U.S.—COOL*, *supra* note 72, ¶ 271.
76. Appellate Body Report, *U.S.—Clove Cigarettes*, *supra* note 68, ¶ 182.

"calibrated" accordingly.[77] The concept of "evenhandedness," like discrimination, refers to whether two similar factual situations are treated differently.

What became particularly notable was the Appellate Body's emphasis on the "disproportionate" burdens imposed under the measure at issue. This analytical approach reflects the suggestions put forward during the Tokyo Round GATT talks regarding the proportionality of a measure with its objectives.[78] When the challenged measure is origin-neutral yet detrimental to imported goods, it can be difficult to identify whether costs are imposed on imported goods simply because they are foreign.

Analysis of the compatibility of the EU's Battery Regulation with TBT Agreement Article 2.1 starts with an examination of whether domestic and imported EV batteries are like products. The difference in the treatment of the EU's domestic and imported EV batteries is made on the basis of embedded carbon emissions in batteries. The case law and existing scholarship imply that production processes do not assume a decisive role in the assessment of product likeness.[79] Instead, a variety of factors that can influence how markets operate must be considered in assessing likeness. Therefore, characterizing products that bear identical or largely similar physical characteristics but vary in carbon emissions as "unlike" seems to be unconvincing, unless consumers' preferences suggest otherwise.

Although there is evidence that some consumers are willing to pay premiums for less carbon-intensive goods, this is not widely representative of consumers in the EU market as a whole.[80] Otherwise, EU lawmakers would not need to impose regulatory distinctions on batteries made with different carbon footprints. In this vein, EV batteries produced in both carbon-intensive and carbon-efficient ways are directed at the same consumers and are thus competitive. Therefore, based on the competition-based approach, EV batteries that are high and low in carbon emissions will be considered like products.

The next step is to examine whether the EU Battery Regulation treats foreign-made EV batteries less favorably. A regulation applying indistinctively to both domestically manufactured and imported batteries, regardless of the origin, can still constitute a form of de facto discrimination if it leads to less favorable competition conditions for foreign manufacturers. Therefore, it is necessary to examine whether the EU Battery Regulation modifies the conditions of competition in the relevant market to the detriment of the group of imported products compared with the group of domestic like products. As discussed above, the EU has competitive advantages in the carbon-efficient production of EV batteries due to its higher share of clean electricity in the power mix. Assuming that EU-produced EV batteries have lower-carbon footprints than foreign-produced ones, the enactment of the Battery Regulation will lead to an increasingly unfavorable treatment of foreign-like products.

Nevertheless, the mere existence of a detrimental impact on imports is not dispositive of "less favourable treatment" under TBT Agreement Article 2.1, given the additional requirement to demonstrate that such a detrimental impact does not stem exclusively from a legitimate regulatory distinction. In other words, there is a need to consider whether the detrimental impact caused by a regulation can be reconciled with or is rationally related to the policy objective sought by the regulation. This requires designing and applying the regulatory distinction in an evenhanded manner. Therefore, the burden placed on the EU is to ensure that the regulatory distinction the technical regulation draws between EV batteries based on their carbon footprints is legitimate.

In general, making a regulatory distinction on the basis of the production process as regards embedded carbon emissions is oriented toward tackling climate change and is thus legitimate. Even if foreign-produced EV batteries were to be subject to less favorable treatment because of the EU Battery Regulation, this does not breach the TBT rules as long as the distinction is based on the regulatory aim to abate carbon emissions and facilitate the transition to a low-carbon economy. Given the WTO adjudicators' long-standing defense of Members' policy goals for the protection of the environment and human health, it is hard to imagine that the EU's climate ambition would be struck down as illegitimate.

Although the EU Battery Regulation has a good chance to pass scrutiny in relation to TBT Agreement Article 2.1, provided it strictly follows the objective to minimize the carbon footprint of EV batteries, several policy design and implementation issues can still be potentially problematic, particularly in relation to the "evenhandedness" requirement. First, flow batteries are currently excluded from the carbon footprint requirements of the Battery Regulation. Although the application of flow batteries in the EV sector is limited, the trajectory appears promising.[81]

Given that around 41% of all flow battery companies are located within Europe,[82] excluding flow battery technologies from the Regulation would give an unfair advantage to European producers, once flow batteries can be applied in EVs. Flow batteries and other forms of EV batteries that are subject to the Regulation, such as lithium-ion batteries, are clearly "like products," and the less favorable treatment of the latter has little to do with a legitimate regulatory distinction. Therefore, in light of technological progress in the

77. Appellate Body Report, *United States—Measures Concerning the Importation, Marketing, and Sale of Tuna and Tuna Products*, ¶ 297, WTO Doc. WT/DS381/AB/R (adopted July 13, 2012) [hereinafter Appellate Body Report, *U.S.—Tuna II (Mexico)*].

78. Simon Lester, *Finding the Boundaries of International Economic Law*, 17 J. Int'l Econ. L. 3, 9 (2014).

79. *See* Reinhard Quick & Christian Lau, *Environmentally Motivated Tax Distinctions and WTO Law*, 6 J. Int'l Econ. L. 419 (2003).

80. Dobson, *supra* note 25, at 80.

81. Cameron Murray, *Flow Batteries Europe Urges Inclusion in EU Battery Passport Regulation*, Energy Storage News (Mar. 3, 2022), https://www.energy-storage.news/flow-batteries-europe-urges-inclusion-in-eu-battery-passport-regulation/.

82. Peter Fischer, FLORES Network of Flow Battery Research Initiatives, Flow Battery Systems and Their Future in Stationary Energy Storage 2 (2021).

EV battery sector, the scope of the Battery Regulation calls for an adjustment to accommodate the changing circumstances to avoid favoring certain technologies over others.

Second, although detailed implementation rules are not formulated, it is important to caution that similar factual situations should not be treated differently. Given the expansive EV battery value chain and the large number of countries that will likely be subject to the Battery Regulation, it presents a challenge for the EU to treat affected countries evenhandedly. The past experience of countries crafting and enacting trade-related environmental measures testifies to the hurdle of satisfying the "evenhandedness" requirement.[83] There is a risk that a regulating State might adopt different procedural and/or substantial requirements for different countries and fail to meet the requirement of being evenhanded. If EV-producing countries exporting to the EU are subject to differential requirements in terms of carbon emission calculation, reporting, and verification with no strong justification, the EU Battery Regulation would be deemed as not stemming from a legitimate regulatory distinction and breaching TBT Agreement Article 2.1.

☐ *Are the EU carbon footprint requirements consistent with Article 2.2 of the TBT Agreement?* TBT Agreement Article 2.2 further provides the following:

> Members shall ensure that technical regulations are not prepared, adopted or applied with a view to or with the effect of creating unnecessary obstacles to international trade. For this purpose, technical regulations shall not be more trade-restrictive than necessary to fulfil a legitimate objective, taking account of the risks non-fulfilment would create. Such legitimate objectives are, inter alia: national security requirements; the prevention of deceptive practices; protection of human health or safety, animal or plant life or health, or the environment. In assessing such risks, relevant elements of consideration are, inter alia: available scientific and technical information, related processing technology or intended end-uses of products.

The article requires technical regulations to be not more trade-restrictive than necessary to fulfill a legitimate objective to avoid creating unnecessary obstacles to trade. A regulatory measure that neither explicitly restricts nor allegedly discriminates against imports can still violate Article 2.2 of the TBT Agreement if it unreasonably burdens international trade for the attainment of a legitimate policy objective.[84] A regulation is deemed an unnecessary obstacle to trade when it is more restrictive than necessary to achieve a given policy objective or when it does not fulfill a legitimate objective.

Nevertheless, Members still retain policy space to impose stricter regulations than other Members if the regulating Member can demonstrate that stricter regulation is necessary to avoid risks posed by less strict regulation. Unlike the necessity test under GATT Article XX, which is to exempt a measure from being deemed WTO-inconsistent, Article 2.2 sets out a positive obligation to prevent Members from instituting a TBT measure that unreasonably burdens international trade for the attainment of a legitimate policy objective.[85]

In determining whether a measure is more trade-restrictive than necessary to fulfill a legitimate objective under Article 2.2 of the TBT Agreement, the Appellate Body has adopted a test similar to the necessity test under GATT Article XX. The evaluation of "necessity" involves "a relational analysis" of three factors: trade restrictiveness of the technical regulation, the degree of the contribution that it makes toward a legitimate objective, and the risks nonfulfillment would create.[86]

In case of a provisional conclusion that the measure is "necessary," an additional step would be to consider whether any less trade-restrictive alternatives that would make an equivalent contribution to the objective are reasonably available to the responding party, accounting for the risks of non-fulfillment of the relevant objective.[87] The concerns that Article 2.2 might be interpreted to severely constrain WTO Members' right to regulate have not materialized, as evidenced by the fact that in all the TBT Agreement decisions, the Appellate Body did not find any defending party's violation of Article 2.2.[88]

Compared with assessing the EU Battery Regulation's consistency with TBT Agreement Article 2.1, analyzing the Regulation's compatibility with TBT Agreement Article 2.2 can be even more complex and fact-intensive. Given the specific rules of the EU Battery Regulation as regards its degree of trade restrictiveness have not been released yet, the discussion in the following part will have to be partially speculative. Besides offering critical legal and policy analysis, this part engages with the scientific literature concerning regulating EV battery carbon emissions in general and the EU's proposed carbon footprint requirements in particular to examine the consistency with Article 2.1. In doing so, this part addresses four interrelated questions one-by-one as follows.

83. For instance, in *U.S.—Shrimp*, the defending Member (United States) failed to treat affected countries in an evenhanded manner and thus could not meet the chapeau requirements of GATT Article XX. *See* Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WTO Doc. WT/DS58/AB/R (adopted Nov. 6, 1998). In *U.S.—Gasoline*, the defending Member (United States) also favored some affected countries over others in the policy implementation and failed to satisfy the chapeau requirements of GATT Article XX. *See* Appellate Body Report, *United States—Standards for Reformulated and Conventional Gasoline*, WTO Doc. WT/DS2/AB/R (adopted May 20, 1996).

84. Jan Neumann & Elisabeth Türk, *Necessity Revisited: Proportionality in World Trade Organization Law After* Korea—Beef, EC—Asbestos, *and* EC—Sardines, 37 J. World Trade 199, 217 (2003); Robert Howse & Philip I. Levy, *The TBT Panels:* US—Cloves, US—Tuna, US—COOL, 12 World Trade Rev. 327, 350 (2013).

85. Neumann & Türk, *supra* note 84, at 217.

86. Appellate Body Report, *U.S.—Tuna II (Mexico)*, *supra* note 77, ¶ 318; Appellate Body Report, *U.S.—COOL*, *supra* note 72, ¶ 374.

87. Appellate Body Report, *U.S.—Tuna II (Mexico)*, *supra* note 77, ¶ 320; Appellate Body Report, *U.S.—COOL*, *supra* note 72, ¶ 376.

88. Ming Du, *The Necessity Test in World Trade Law: What Now?*, 15 Chinese J. Int'l L. 817, 841-42 (2016).

1. What are the legitimate objectives of the Battery Regulation and what risks would their non-fulfillment create? This first step is to determine the EU Battery Regulation's objectives, which requires an independent and objective evaluation of the facts, considering the structure and operation of measures at issue and whether they are legitimate.[89] Since the TBT Agreement provides a non-exhaustive list of legitimate policy objectives, the scope of objectives deemed legitimate under the Agreement can be potentially broad.[90] WTO adjudicating bodies have adopted a deferential standard of review when dealing with the legitimacy of objectives to avoid unduly restricting Members' discretion in pursuing certain policy objectives.[91] In the case when a measure pursues multiple objectives,[92] it is crucial to identify legitimate ones that are "lawful, justifiable, or proper."[93]

According to an EU official report, the goal of the carbon footprint requirements as mandated by the EU Battery Regulation is to "reach climate neutrality by 2050 and fight against climate change, as stated in the new Circular Economy Action Plan, for a cleaner and more competitive Europe."[94] Apparently, the EU's policy objectives are largely twofold—environmental and economic/industrial. The environmental rationale (e.g., to reduce carbon emissions in battery production) would be easily deemed legitimate, since Article 2.2 explicitly recognizes the legitimacy of the objective of "protection of human health or safety, animal or plant life or health, or the environment."

However, the agenda to make Europe "more competitive" in the battery sector might face a large obstacle to being acknowledged as legitimate.[95] Although it is not uncommon for regulators to pursue a complex mix of policy objectives because of overlapping societal goals and the need to strike a balance between competing objectives in politico-legislative processes,[96] certain objectives can easily come into conflict with WTO law. A measure introduced to "level the playing field" in terms of comparative cost and market competitiveness might become more trade-restrictive than permissible by the WTO. Prof. Frederic Kirgis has contended that an economic motivation for regulating the production process of imports should not be tolerated by the multilateral trading system.[97]

The potential of the EU Battery Regulation to offer European battery companies a first-mover advantage and to serve as a non-tariff barrier to cheaper imported products should not be dismissed. Although accommodating competitiveness concerns does not necessarily undermine the Regulation's objective to address climate change, it is critical to ensure industrial goals are not unduly favored. When considerations of industrial competitiveness are prioritized in the regulatory process, it will not only distort fair competition by contravening WTO law, but also undermine the underlying environmental goals. Therefore, it is essential to investigate whether the climate-related goal is put at the forefront of the EU Regulation and to what extent the playing field would be tilted in favor of EU battery manufacturers.

The following step is to examine the nature of the risks and the gravity of the consequences of non-fulfillment of the objective pursued by the EU's proposed carbon footprint requirements. A vast body of research has increasingly confirmed the urgency to tackle climate change and achieve carbon neutrality in the EU and even the world as a whole. As the continent has experienced the fastest rise in temperature over the past three decades,[98] Europe has lost approximately 145 billion euros in 10 years due to climate change.[99] Without successful efforts to reduce carbon emissions, Europe will suffer even more adverse impacts induced by extreme weather and climate-related hazards, such as heat waves, floods, and droughts on its ecosystems, economic sectors, and human health and well-being.[100] Therefore, the risks and consequences of not fulfilling the target to achieve carbon neutrality and address climate change are grave for the EU.

2. What degree of contribution can the EU Battery Regulation make to achieve a legitimate objective? This part focuses on the contribution of the EU Battery Regulation-dictated carbon footprint requirements to the objective of achieving carbon neutrality and addressing climate change. Regulatory measures targeting carbon emissions from EV battery manufacturing undoubtedly have the potential to push production processes toward a more environmen-

89. Appellate Body Report, *U.S.—COOL*, *supra* note 72, ¶¶ 370-371.
90. Joshua Meltzer & Amelia Porges, *Beyond Discrimination? The WTO Parses the TBT Agreement in* US—Clove Cigarettes*,* US—Tuna II (Mexico)*, and* US—COOL, 14 Melbourne J. Int'l L. 699, 719 (2013).
91. Petros C. Mavroidis & Kamal Saggi, *What Is Not So Cool About* US—COOL *Regulations? A Critical Analysis of the Appellate Body's Ruling on* US—COOL, 13 World Trade Rev. 299, 307 (2014).
92. It is possible for a single technical regulation to pursue more than one objective. *See* Appellate Body Report, *U.S.—Clove Cigarettes*, *supra* note 68, ¶ 136.
93. Appellate Body Report, *U.S.—Tuna II (Mexico)*, *supra* note 77, ¶ 313.
94. *A New Circular Economy Action Plan for a Cleaner and More Competitive Europe*, COM (2020) 98 final (Mar. 11, 2020), https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF.
95. This idea was expressed by Roderick Abbott in the preface to the ECIPE Occasional Paper No. 1/2009. *See* Erixon, *supra* note 17, at 5-6.
96. Ingo Venzke & Geraldo Vidigal, *Are Trade Measures to Tackle the Climate Crisis the End of Differentiated Responsibilities? The Case of the EU Carbon Border Adjustment Mechanism (CBAM)* 24 (Amsterdam Law School, Legal Studies Research Paper No. 2022-02, 2022). Prof. Nicolas Lamp also posits that trade policy is now expected to pursue a substantially broader range of objectives than even a few years ago. *See* Nicolas Lamp, *Toward Multipurpose Trade Policy? How Competing Narratives About Globalization Are Reshaping International Trade Cooperation*, Int'l Inst. Sustainable Dev. (Jan. 15, 2023), https://www.iisd.org/articles/policy-analysis/multipurpose-trade-policy.
97. Frederic Kirgis, *Effective Pollution Control in Industrialized Countries: International Economic Disincentives, Policy Responses, and the GATT*, 70 Mich. L. Rev. 859, 901-02 (1972).
98. Press Release, World Meteorological Organization, Temperatures in Europe Increase More Than Twice Global Average (Nov. 2, 2022), https://public.wmo.int/en/media/press-release/temperatures-europe-increase-more-twice-global-average.
99. Stefan Ellerbeck, *Climate Change Has Cost the EU €145 Billion in a Decade*, World Econ. F. (Dec. 2, 2022), https://www.weforum.org/agenda/2022/12/climate-europe-gdp-emissions/.
100. *See* European Environment Agency, Europe's Changing Climate Hazards—An Index-Based Interactive EEA Report (2023), https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1.

tally friendly model and thus reduce the amount of carbon emitted into the atmosphere. EV battery manufacturers inside and outside of the EU will be incentivized to invest in upgrading production technologies and facilities to meet the EU-set requirements.

As reported, some Chinese EV battery manufacturers are planning major future expansions to locations having access to hydropower, instead of somewhere else that relies on coal- or gas-fired power for electricity.[101] In addition, the rigorous process of complying with more stringent regulatory requirements can facilitate product innovations and drive harmonization of global regulation.[102]

However, whether adopting a less carbon-intensive EV battery production process as a result of complying with strict carbon emissions standards would necessarily accelerate climate change mitigation and contribute toward carbon neutrality remains questionable for three reasons. First, given that EV battery and application design are still in rapid development, excessively stringent criteria would cause high compliance costs that hinder innovation or even safety-relevant design improvements.[103] As research shows, a certain level of technological maturity concerning low-carbon production processes or substitute materials constitutes a prerequisite to the implementation of product carbon requirements, which is not likely to happen before the 2030s.[104]

As cautioned by several industry stakeholders, a rigorous analysis of cost-benefit and carbon emissions-saving potential is needed before regulating the carbon footprint of EV batteries.[105] For instance, developing appropriate functional units of EV batteries for carbon footprint calculation and verification may be highly challenging given the short timeline mandated by the EU Regulation.[106] Excessively strict carbon footprint requirements will harm the industrial competitiveness of the battery sector and slow down the adoption of EVs to the detriment of climate change mitigation.[107]

Second, if battery product carbon footprint regulation spreads across the distribution, end-of-life, and recycling phases, it will be extremely onerous to measure and verify the emissions during these phases. Particularly for the recycling process, which will likely take place 10 or 15 years after the battery's production, the difficulty of accurately accounting for the possible technical progress in the carbon calculation is daunting.[108] Unless the carbon footprint requirements are exempted for the post-EV battery production stages, the burden for industry stakeholders to comply with the Regulation will be heavy.

Third, research shows that at the current stage, even accounting for the emissions associated with the manufacturing of batteries, EVs still cause much fewer carbon emissions than traditional vehicles powered by gasoline, known as ICE vehicles.[109] Hans Eric Melin posits that the climate impact from EV batteries is not as large as many studies have indicated, since the rapid scaling up of battery production is expected to boost the efficiency of the most energy-intensive production processes and thus reduce carbon emissions per battery cell.[110] When the goal is to decarbonize the transportation sector via electrification and mitigate climate change, the priority is to increase the penetration of EVs as replacements to ICEs, regardless of the carbon emissions embedded in battery manufacturing. Strictly regulating battery carbon emissions may slow down the penetration of EVs at the speed and scale much needed and thus undermine the effectiveness of the Regulation in achieving its climate-related objectives.

3. Is the EU Battery Regulation trade-restrictive and, if so, to what degree? Trade restrictiveness is a matter of degree, unlike binary calculation.[111] A measure that is trade-restrictive to some degree does not mean that it breaches the TBT Agreement because Article 2.2 allows for some trade restrictiveness.[112] Given that Article 2.1 addressing discrimination and Article 2.2 concerning trade restrictiveness operate as separate and independent obligations, the existence of discrimination is not sufficient to establish a measure's trade restrictiveness.[113]

In fact, in the absence of discrimination, a measure can still be deemed trade-restrictive, such as a direct market access barrier.[114] The determination of trade restrictiveness should be based on a challenged measure's detrimental impact on the competitive opportunities of imported products, in comparison with domestic products or imported products from other sources.[115] Simply examining the trade effects or impacts of a challenged measure will not help conclusively define a measure's trade restrictiveness.

Carbon footprint requirements under the EU Battery Regulation, from declaration and labeling to maximum carbon emission levels, could be implemented in a non-discriminatory manner; however, the compliance costs caused by such requirements would still be of a magni-

101. *EU Draft on Battery Rules a Shock for Asia*, Asia Bus. L.J. (Apr. 28, 2022), https://law.asia/eu-battery-rules/.
102. Yoojin Cha & Mingyo Koo, *Who Embraces Technical Barriers to Trade? The Case of European REACH Regulations*, 20 World Trade Rev. 25, 39 (2021).
103. *See* European Automobile Manufacturers' Association et al., Joint Industry Position Paper on the Batteries Regulation (2022), https://www.acea.auto/files/Joint_industry_position_paper-EU_Batteries_Regulation.pdf.
104. *See* Chris Bataille et al., *A Review of Technology and Policy Deep Decarbonization Pathway Options for Making Energy-Intensive Industry Production Consistent With the Paris Agreement*, 187 J. Cleaner Prod. 960 (2018).
105. *See* European Automobile Manufacturers' Association et al., *supra* note 103, at 5.
106. *Id.*
107. Melin et al., *supra* note 15, at 384.
108. European Automobile Manufacturers' Association et al., *supra* note 103, at 6.
109. Iris Crawford, *How Much CO_2 Is Emitted by Manufacturing Batteries?*, MIT Climate Portal (July 15, 2022), https://climate.mit.edu/ask-mit/how-much-co2-emitted-manufacturing-batteries.
110. Melin, *supra* note 51, at 11.
111. Tania Voon, *Exploring the Meaning of Trade-Restrictiveness in the WTO*, 14 World Trade Rev. 451, 467 (2015).
112. Appellate Body Report, *U.S.—COOL*, *supra* note 72, ¶ 375.
113. Voon, *supra* note 111, at 476.
114. *Id.*
115. Panel Report, *US—COOL Requirements: Recourse to Article 21.5 of the DSU*, ¶ 7.63, WTO Doc. WT/DS384/R/W (adopted May 29, 2015).

tude or nature that limits the competitive opportunities available to imported products and hence create a limiting effect on trade.[116] The degree of trade restrictiveness would escalate from Stage One to Stage Three, along with the toughening of carbon footprint requirements. When the maximum carbon emission level is set as a condition, battery manufacturers that fail to meet the requirement will be denied access to the EU market, unless the Regulation provides exceptions.

The trade restrictiveness of a market access prohibition can be extremely high. Meanwhile, the burden of complying with the carbon footprint requirements is poised to differ among different countries. Given that the largest share of carbon emissions in battery manufacturing comes from the use of electricity in production processes,[117] countries with less carbon-intensive grids, such as in the EU, will find it easier to meet the carbon footprint requirements than countries with electricity systems powered by coal or other forms of fossil fuels. The value chain of EV batteries has been increasingly globalized, covering countries in the least developed world with limited capacity to decarbonize production processes as well as to measure, report, and verify the carbon intensity of batteries exported to the EU.[118]

A particular cause for concern is the Regulation's requirements in relation to the granularity of data to be provided, as well as the consequent administrative burden.[119] Currently, the proposed Regulation mandates reporting data on the carbon footprint "for each battery model and batch per manufacturing plant."[120] However, research findings suggest that differences in carbon footprints between batches of the same model of batteries produced in the same plant are negligible; hence, including such a level of detail would unnecessarily complicate the reporting and verification process for both industry and national authorities.[121]

Stakeholders in the European industry pointed out that impact assessment endorsing the calculation of the carbon footprint based on the "battery type," not on "battery model and batch," underestimated the administrative costs associated with complying with such requirements.[122] The absence of an accurate impact assessment will likely lead to the formulation of rules and policies with a higher-than-necessary degree of trade restrictiveness.

The EU Battery Regulation would decrease the competitive opportunities of imported EV batteries that are relatively higher in carbon emissions, and thus limit international trade in this sector. The degree of trade restrictiveness resulting from the EU Regulation would depend on the specific design and implementation of the carbon footprint requirements. The more stringent the rules are set, the more trade-restrictive the Regulation, and thus the more demanding it will be to satisfy the conditions of a legitimate technical measure under the TBT Agreement.

A more stringent requirement may call for additional justification in relation to the legitimate objective and alternative measures. Given that in the past the setting of carbon footprint standards in some previous EU regulations was contested as neither "scientifically justified" nor "based on a recognized international norm of standard,"[123] it is crucial to ensure that the EU Battery Regulation would not be unnecessarily restrictive.

4. Are there possible alternative measures? A valid alternative measure should not only be less trade-restrictive than the challenged measures, but also make at least an equivalent contribution to the objective pursued through the challenged measures and be reasonably available to the regulating Member.[124] As discussed above, the EU Battery Regulation can be trade-restrictive, particularly when the implementation reaches Stage Three. Meanwhile, the degree of trade restrictiveness of the Regulation will likely be felt differently by different countries across the EV battery value chain. The burden of complying with the carbon footprint requirements will therefore differ among different countries. Although regulating the embodied carbon content of energy-intensive commodities will inevitably lead to an increase in compliance costs for producers and exporters, at least in the short to medium term, it does not justify some aspects of trade restrictiveness.

For instance, the requirement to submit carbon emission data for each battery model and batch per manufacturing plant under the EU Battery Regulation would be burdensome and unnecessarily restrictive. Several other undecided matters also are highly relevant in relation to the trade restrictiveness of the EU Regulation and the availability of less trade-restrictive alternative measures. These matters include whether the carbon footprint requirements extend beyond the EV battery production phase to cover

116. Nevertheless, the existence of any level of costs associated with compliance with the requirements will not be sufficient, in and of itself, to demonstrate that such requirements are trade-restrictive. *See* Panel Report, *Australia—Certain Measures Concerning Trademarks, Geographical Indications, and Other Plain Packaging Requirements Applicable to Tobacco Products and Packaging*, ¶ 7.1235, WTO Doc. WT/DS467/R (adopted Aug. 27, 2018) [hereinafter Panel Report, *Australia—Tobacco Plain Packaging*].

117. Electricity used in the battery manufacturing process accounts for roughly half of emissions related to battery production. *See* Hall & Lutsey, *supra* note 43, at 2.

118. For instance, countries in Africa and Latin America have rich reserves of raw materials that constitute key inputs to EV batteries and, thus, become engaged in the upstream extraction and even processing of such materials. *See* Rafiq Raji, *Electric Vehicles: Africa's Battery Minerals and GVC Opportunities*, Nanyang Tech. U.—Sing. (Aug. 13, 2021), https://www.ntu.edu.sg/cas/news-events/news/details/electric-vehicles-africa-s-battery-minerals-and-gvc-opportunities.

119. Association of European Automotive and Industrial Batteries Manufacturers, Position Paper on Carbon Footprint Provisions in the New Batteries Regulation 5 (2021).

120. *Id.*

121. *Id.*

122. For instance, the impact assessment only foresees five declarations per EV battery plant per year, while the real number is two to three orders of magnitude higher. *Id.*

123. Argentina contested the EU setting 35% GHG emissions savings as the threshold for sustainable biofuels in 2013 as scientifically ungrounded. *See* EU and Certain Member States—Certain Measures on the Importation and Marketing of Biodiesel and Measures Supporting the Biodiesel Industry, *Request for Consultations by Argentina*, WTO Doc. WT/DS459/1 (May 23, 2013).

124. Panel Report, *Australia—Tobacco Plain Packaging*, *supra* note 116, ¶ 7.1364.

the distribution, end-of-life, and recycling phases; how to classify the performance of EV batteries into different categories when there is no internationally agreed method; and how high the maximum amount of carbon footprint should be set. Therefore, in light of the existing and potential trade-restrictive aspects of the EU Regulation's carbon footprint requirements, this Article argues that identifying less trade-restrictive alternatives would not be difficult.

The following question to raise is whether a less trade-restrictive alternative to the EU-proposed carbon footprint requirements can at least equivalently contribute to the objectives of combating climate change and achieving carbon neutrality while remaining reasonably available to the EU. Depending on the specific requirements of the EU Regulation, a less trade-restrictive alternative can take various forms. For instance, a less trade-restrictive option could be to impose the reporting and verification obligation of the embedded carbon footprint on each EV battery type while still effectively regulating the carbon emissions of EV batteries as per the EU Battery Regulation. The shift from imposing carbon footprint-related requirements on a narrowly defined battery category ("model and batch") to a larger one ("type") bears a lower degree of trade restrictiveness and at the same time offers an equivalent, if not higher, level of contribution to climate-related objectives.[125]

Further, it is impossible to see why such a measure with modifications to the proposed Battery Regulation would not be reasonably available to the EU. Similarly, if the EU adopts highly stringent requirements in terms of the declaration, labeling, and maximum carbon footprint requirements, the likelihood of its trading patterns identifying less trade-restrictive alternatives with equivalent effectiveness in achieving the objectives is bound to rise. At least until EV battery technology develops to become sufficiently mature, strictly regulating embedded carbon emissions would risk hindering the development of the sector to the detriment of climate change mitigation. When scientific findings point to the higher carbon-saving potential for an EV with its battery's carbon content unregulated compared with an ICE, stringently regulating the carbon footprint of EV batteries appears unnecessarily restrictive.

Although in many cases protecting a non-trade value such as environmental protection requires a trade-restrictive measure, it is wrong to assume that the higher the degree of trade restrictiveness of a measure, the larger its contribution toward the realization of the underlying objectives. Quite the contrary and as demonstrated in several WTO disputes, a less trade-restrictive measure can still be equally effective, if not more, in achieving non-trade objectives, particularly when unnecessarily restrictive aspects are motivated to serve protectionism interests. WTO scrutiny, in reality, can help ensure the efficiency and effectiveness of climate policies that have a trade dimension.[126]

III. Conclusion

With its long-standing environmental ambition to play a leadership role in the global fight against climate change, the EU has proposed a series of regulations to curb emissions embodied in the production and importation of carbon-intensive commodities. As an illustrative example, the EU Battery Regulation, once passed, will shape the regulatory regime of batteries inside and outside of the EU.

Despite the potential of the EU's regulatory efforts to incentivize global action to tackle climate change, the use of unilateral measures poses questions regarding compatibility with the multilateral trading system. A delicate equilibrium should be sought between two fundamentally important policy objectives: the EU's right to regulate the value chain of EV batteries and the need to hold the EU accountable for the external effects of its unilateral policy on other trading partners. When regulatory standard-setting is associated with competitiveness considerations, it is crucial to prevent standards from becoming entry barriers for market participants.[127]

This Article has considered the EU Battery Regulation's legality under international trade obligations as embodied in the WTO TBT Agreement, and highlights how, in the proposed format, it runs the risk of violating TBT rules. While the scrutiny posed by Article 2.1 of the TBT Agreement is not particularly challenging, EU lawmakers must ensure that the Regulation will be implemented in an "evenhanded" manner so that detrimental impacts on foreign producers can still be deemed as stemming from a legitimate regulatory distinction.

Complying with Article 2.2 can be challenging, as several existing and potential aspects of the Regulation in relation to carbon footprint requirements are more trade-restrictive than necessary. Even the declaration obligation, imposed in Stage One, can be unnecessarily restrictive if the proposed requirement to submit carbon footprint information based on a narrowly defined category remains unchanged. The trade restrictiveness of the Regulation might further be exacerbated in the ensuing stages, depending on the formulation of specific targets and obligations.

While tackling emissions arising from EV batteries is well-intended, an unnecessarily restrictive regulation would overly burden producers and slow down innovation in the sector. Thus, a seemingly neutral technical regulation can still disproportionately disadvantage foreign producers, as they might find compliance too costly or even impossible. The potential of a climate-oriented regulation being hijacked by domestic industries to serve the agenda of green protectionism looms large in an era fraught with rising nationalism and deglobalization.

125. The proposed alternative could make a potentially larger contribution to climate-related objectives because it is less trade-restrictive and less costly in terms of seeking compliance, which can lessen the burden on producers and leave them with more space and resources to innovate.

126. WTO, World Trade Report 2022: Climate Change and International Trade 134 (2022).

127. Steve Charnovitz, *International Standards and the WTO* 13 (George Washington Univ. Law School, Legal Studies Research Paper No. 133, 2005).

At the forefront of shaping international regulatory standards in the EV battery sector, the EU should diligently examine the interface of its Battery Regulation with the WTO to avoid a potential and undesirable clash with the trade law regime. Acknowledging that the WTO's proofing of the EU Battery Regulation would strengthen the synergy between climate-related goals and industrial ones, this Article makes three recommendations. First, the EU should carefully set and periodically adjust the regulatory scope to account for the technological changes in the EV battery sector. While over-inclusiveness can have chilling effects on industry development, under-inclusiveness, as discussed above, can potentially give rise to de facto discrimination that goes against TBT Agreement Article 2.1.

Second, the EU should accurately and thoroughly assess the trade restrictiveness of the Regulation to ensure its consistency with TBT Agreement Article 2.2. Seeking input from industry and other relevant stakeholders, both within and outside the EU, would assist EU regulators in developing appropriate regulatory requirements that are not unnecessarily restrictive or disguised as protectionism.

Third, the EU should use the TBT Committee as a multilateral platform to engage in constructive dialogue, foster cooperation among WTO Members, and settle trade concerns in a preemptive manner. For developed countries with large export markets, like the EU, the role of WTO law as a mechanism of external accountability should be respected. If the EU can prioritize the imperative to reduce carbon emissions and resist succumbing to green protectionism, it is well-positioned to become a responsible global standard-setter in green technologies that are key to a net-zero transition.