A Green Steel Deal: Toward Pro-Jobs, Pro-Climate Transatlantic Cooperation on Carbon Border Measures

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June 2021

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Acknowledgments

We thank Bracken Hendricks, Suzanne Kahn, and Mark Paul for helpful comments on an earlier version of this working paper. We also thank Kristina Karlsson, Matt Hughes, and Tayra Lucero for editorial and production assistance.

EXECUTIVE SUMMARY

The climate crisis is the most important long-term challenge facing policymakers around the world. Addressing it will require deep economic transformations within and across national borders, and a mix of ambition and pragmatism about what nations' individual political and legal constraints will permit. So far, existing approaches have failed to produce the necessary levels of emissions reduction. President Biden's election, however, offers a chance for a new beginning.

This working paper reviews the intersection of climate and trade policy, and in particular the divergent paths that conversations on decarbonization are taking in the US and European Union (EU). While the EU has made carbon pricing central to its decarbonization policy, the Biden administration has promised a new approach that deploys regulatory tools (standards) and industrial policy (investments). Both the US and the EU recognize the need to support their domestic decarbonization policies with a trade policy that prevents carbon leakage and reduces the embedded carbon consumed domestically via international trade. But the divergence in domestic approaches could put the two trading partners on an unnecessary collision course where trade is concerned.

We argue that the US, the EU, and like-minded countries should harvest an early win in the fight against the climate crisis by imposing a common external tariff on carbon-intensive steel imports, while—as the Paris Agreement contemplates—allowing each other flexibility to pursue a range of decarbonization strategies domestically. Over time, this sectoral strategy—common external trade barriers on carbon-intensive imports combined with flexibility to choose among a range of domestic decarbonization measures—can and should be expanded to other industries.

The steel industry is the ideal sector in which to begin transatlantic cooperation on trade and climate. It is one of the largest emitters of carbon in the manufacturing sector, is on track to consume 50 percent of available carbon budgets by 2050, is highly exposed to trade, and is already subject to extensive policy controls over which the US and EU are in negotiations. These elements make it an

excellent candidate for an early demonstration both of how climate cooperation could be achieved later in other tradable industries and how trade policy can advance climate objectives.

Our primary point of entry into this conversation is through governance and trade law questions, including at the World Trade Organization (WTO). Our analysis foregrounds legal and political constraints. In so doing, our hope is to offer a structure that sets activists, policymakers, economists, engineers, and others up for demonstrable success. And by converting a climate-blocking industry into a climate-supporting industry, the proposal alters climate politics and makes future climate-supporting action more likely.

INTRODUCTION

Integrating trade and climate strategy is vitally important. An estimated 27 percent of carbon emissions are embedded in trade flows (Yamano and Guilhoto 2020). While US production and exports are (relatively) carbon-efficient, this obscures Americans' total carbon footprint, since the US consumes extremely carbon-intensive imports from places like China. This merely shifts the location where pollution is occurring, rather than reducing it overall. Indeed, a recent meta-analysis of academic research found that while only 23 percent of global economic output is traded, the portion that is traded accounts for up to 70 percent of the total environmental or social impact (Wiedmann and Lenzen 2018).[1] Thus, making progress on global decarbonization requires a global effort, and international trading rules and arrangements can play a powerful role in facilitating this.

The Biden administration came into office pledging renewed climate ambition and an improvement in transatlantic relations, after four years in which both suffered under the go-it-alone approach of the Trump administration. Domestically, President Biden promised to put climate at the center of his administration's policies. Internationally, in May 2020 candidate Joe Biden pledged to impose some

[1] This number varies by industry or activity. While a range of 10 to 30 percent of the emissions in global surface and rainwater use is embodied in international trade, the comparable estimate for global metal ore extraction is a range of 62 to 64 percent, and a high of 70 percent for global coal exploitation.

sort of carbon border adjustment,[2] and the Biden administration's Office of the US Trade Representative (USTR) floated the same idea in the administration's early days (USTR 2021). The EU, for its part, has long been a climate leader. Its Emissions Trading Scheme (ETS) was one of the early large-scale efforts to push industry to decarbonize. Its Green Deal seeks to expand those decarbonization efforts through a mix of new policies that address issues like clean energy, sustainable production standards, and biodiversity. Part of the Green Deal envisions a carbon border adjustment mechanism (CBAM), which would levy a charge of some kind (yet to be determined) on carbon-intensive imports. Despite these common policy objectives, however, the reset with Europe got off to a rocky start earlier this year when US climate envoy John Kerry frostily greeted an EU proposal for a new joint transatlantic initiative. At a summit in Brussels, the EU pressed the United States to adopt carbon pricing and related climate standards similar or "identical" to those the EU is developing, and to accept the EU's CBAM. In response, Kerry suggested that the United States was likely to go its own direction on a range of climate policies (Hook 2021).

The EU also insists that any CBAM comply with WTO rules (European Parliament 2020), with many Europeans arguing that only their approach will do so (French General Directorate of the Treasury 2021). This insistence poses an obstacle to international cooperation on carbon border measures. As we explain below, strict WTO compliance would likely require countries harmonizing their carbon border measures to also adopt a greater degree of convergence in domestic climate policies. Given

[2] In pledges to the United Steelworkers, Biden wrote: "I will rejoin the Paris Agreement, but simply rejoining is not enough. I will use every tool of American foreign policy to push the rest of the world to raise their ambitions alongside the United States. I will make sure their commitments are transparent and enforceable, and stop countries from cheating by using America's economic leverage and power of example. I will fully integrate climate change into our foreign policy and national security strategies. And I will not allow other nations, including China, to game the system by becoming destination economies for polluters, undermining our climate efforts and exploiting American workers and businesses. As the US takes steps to make domestic polluters bear the full cost of their carbon pollution, **the Biden administration will impose carbon adjustment fees or quotas on carbon-intensive goods from countries that are failing to meet their climate and environmental obligations**. I will work with other countries in the Americas to set new common standards for the greening of manufacturing, mining, and tourism. I will also condition future trade agreements on partners' commitments to meet their enhanced Paris climate targets. All of this together will ensure that American workers and their employers are not at a competitive disadvantage and simultaneously encourage other nations to raise their climate ambition. And, on day one of my administration, I will require public companies disclose climate risks and the greenhouse gas emissions in their operations and supply chains" (emphasis added) (Biden 2020).

bipartisan skepticism about the WTO in the US and a bipartisan preference to craft nationally appropriate solutions, this approach risks being counterproductive.

But while transatlantic collaboration on trade and climate is necessary, a strategy that aims for convergence on domestic decarbonization policies is neither politically nor legally feasible. Rather, as we argue in this working paper, the path forward is a gradual one that allows countries flexibility in how they pursue ambitious climate policies domestically, while adopting a common approach to trade in carbon-intensive products. Specifically, our proposal begins with industry-specific sectoral deals among the US, EU, and like-minded countries that impose tariffs on and eventually ban carbon-intensive production and trade; foster agreement, industry by industry, on how to measure carbon intensity; share best practices and new technologies (as these develop); plow tariff revenue into demonstration projects; and use carrots and sticks to get third countries to adopt similar measures.[3] In the sections that follow, we explore the divergent approaches taken by the US and EU to address climate change and how those paths influence their respective climate and trade strategies.

Throughout, we explain why the EU's CBAM approach is technically and politically unworkable as the basis for transatlantic cooperation; why a steel-focused tariff and strategy is a superior starting place; and what legal, political, and economic considerations should inform the design of what we call the Green Steel Deal.

[3] In fact, the latest EU statements suggest some openness to a sectoral strategy (though paired with a continued insistence on domestic carbon pricing) (Hollinger et al. 2021).

DIVERGENT DOMESTIC CLIMATE APPROACHES IN THE EU AND US

To understand why the American and European approaches to decarbonization are at odds, it's important to understand the origin story of each. We aim to be somewhat provocative in our assessment of the EU's strategy—both at home and as it relates to trade. This is not because we think the strategy misguided as a matter of principle. Rather, we take this critical approach because the EU's discourse reflects dominant and well-represented perspectives that—as a matter of practical implementation—are not responsive to the political and legal realities facing the Biden administration, and are thus unlikely to form the basis for transatlantic cooperation.

Established in 2005, the EU's ETS represents a market-oriented approach to climate change. The logic for the scheme is the following: Private firms know better than government the most efficient technologies for reducing carbon emissions in their factories. Thus, if government caps the total amount of carbon emissions, and gives those firms a fixed number of emissions permits, then the firms can trade those permits amongst themselves and figure out the profit-maximizing way to go green. Voila: The market sets a price on carbon.

An ETS is similar in some ways to a carbon tax—which has been the preferred policy tool of many economists from the 1970s to the present (Markusen 1975; Hook 2019). Both carbon taxes and emission trading schemes are forms of carbon pricing. The difference is that government sets the price directly with a tax (although for political reasons such schemes are sometimes not referred to as "taxes"), and the market then chooses the quantity of emissions; with an ETS, the government sets the quantity of emissions, and the market then establishes the price. Many environmental economists prefer emissions cap-based pricing, since that targets the ultimate variable of most importance to addressing the climate crisis.

In theory, carbon pricing schemes could be effective ways to decarbonize an economy. At a minimum, they raise revenue for other climate policies. At their best, they could establish an ambitious

economy-wide price of carbon that forces industry to internalize the costs of pollution. Indeed, some scholars have proposed exciting versions of carbon pricing and revenue sharing with citizens that even appear to poll well among voters (Boyce and Paul 2021).

The practice is very different. Carbon pricing schemes are not made in a lab. They are the product of political contestation within domestic legal systems that impose constraints on the range of feasible policy choices. Indeed, the choice between different carbon pricing mechanisms—and decarbonization policies more generally—is influenced by a country's individual legal and political constraints. The main reason that the EU did not impose a domestic carbon tax directly in the early 2000s is that under the bloc's rules, such a measure would require every EU member to assent. The ETS, on the other hand, is "merely" an environmental regulation and only requires majority support. Similarly, the Supreme Court of Canada recently upheld that nation's federal law establishing a baseline price of carbon. The court reasoned that the measure is a "regulatory charge," related to broader environmental regulations that fall within federal jurisdiction, as opposed to a carbon tax, which would not have been within the federal government's power.

As a result of these real-world constraints, carbon pricing schemes in practice are weakened such that that they have not worked to meaningfully reduce emissions. In a meta-analysis of the 37 studies that examined the impact of carbon pricing schemes on emissions, political scientist Jessica Green found that studies of carbon pricing only show a reduction of between 0 and 2 percent per year. The EU ETS in particular reduced emissions by less than 1.5 percent per year, even though the Intergovernmental Panel on Climate Change (IPCC) warns that we need to reduce emissions by 45 percent below 2010 levels in the next decade in order to limit warming to the 1.5 degrees Celsius (2.7 degrees Fahrenheit) set as a goal by the Paris Agreement (Green 2021). Regulatory instruments that did not use price as the main incentive to decarbonize performed substantially better, by contrast.[4]

[4] See also Egenhofer et al. 2011; Wara 2014; Martin and Saikawa 2017; Cullenward and Victor 2020; Mildenberger 2020.

Although carbon pricing, ideally designed, could reduce carbon emissions, political economy obstacles—and the fact that it is not voters themselves making or vetoing legislation—make ineffective versions of carbon pricing more likely. A growing body of social science and reporting indicates some of the reasons why. Carbon-free or low-carbon production methods are often in their early stages of development, have not been commercialized, and/or are very expensive—all obstacles to industry adoption. Where ETSs are concerned, politically connected firms lobby for free allowances or ineffective and hard-to-monitor carbon offset projects in faraway locales, undercutting climate efforts. ETS-derived carbon prices in the EU and at the US state level have been too low (a global average of $2 per ton of CO^2) and too volatile to make much of a difference, while prices that could make a difference ($100 to $400 per ton of CO^2) would be so high as to be politically unfeasible. Where prices have gone up, populations damaged by decades of rising inequality resist price increases, as shown by the 2018 French "yellow vest" protests and Australia's 2014 repeal—following an election in which the victorious candidate for prime minister campaigned on a promise to "ax the tax"—of a carbon pricing scheme introduced only three years earlier (Baird 2014). This means that in practice, meaningful carbon prices only emerge in sectors where consumers won't notice and where industry buys into the scheme. The last US federal attempt to launch an ETS-like scheme died in 2010 when the Senate refused to bring the Waxman-Markey bill up for a vote, even after lawmakers had watered down the scheme at industry's behest (Cullenward and Victor 2020; Jenkins, Stokes, and Wagner 2020; Aronoff 2021; Mildenberger 2020).

Enter Joe Biden. His Build Back Better agenda does not use taxes or an ETS but instead contemplates industry-specific maximum emissions standards, industry-specific industrial policies[5] to promote adoption of best-in-class decarbonization technology, and (potentially) support for "demonstration projects" that can show these technologies are viable. This emerging US "non-market" approach can be attributed to scholars and policymakers studying the shortcoming of the EU's lived experience on carbon pricing, as well as studying Europe's successes elsewhere in the field of industrial policy in the

[5] We define industrial policies as any policy that is not industry-neutral, and which thus influences the allocation of labor and capital *among* the over 1,000 industries in the economy—encouraging some activities and discouraging others (Tucker 2019).

wake of the financial crisis and subsequent (partial) moderating of neoliberalism,[6] the paradigm from which the EU's more market-based approach to fighting the climate crisis emerged.[7]
It also reflects a different political, legal, and historical context. A nationwide carbon pricing scheme in the United States—either an ETS or a carbon tax—would require action by a closely divided Congress. With significantly larger majorities in his first two years in office than President Biden enjoys, President Obama was still not able to pass the Markey-Waxman bill, which would have created a cap-and-trade system. Aggressive climate measures in the United States are thus likely to have to rest, at least in part, on preexisting delegations of authority from Congress to the president. President Obama recognized this in relying on the Clean Air Act to implement the US's Paris Agreement commitments, rather than seeking new legislation from Congress. Thus, while legislation from Congress remains the best route to more durable emissions reductions regimes, an approach that draws heavily on imposing regulatory standards under existing legal authorities is consistent with the political and legal constraints the Biden administration faces in aggressively confronting the climate crisis.

There are also sound practical reasons for this non-tax/ETS approach, in addition to the theoretical ones presented above. First, the US has extensive experience with product standards, including for cars, appliances, toys, and more. Arguably the most significant of these are the Corporate Average Fuel Economy (or CAFE) standards, which impose minimum fuel efficiency requirements on vehicle manufacturers. While the Biden administration has not, thus far, proposed emissions standards for the manufacturing sector generally or steel specifically, it does plan to do so for the electricity sector, which is a principal input to manufacturing and so will reduce overall embedded emissions. The EPA has long tracked carbon emissions from large emitters, so it has expertise it can bring to bear in administration of emissions standards (King et al. 2020).

[6] On the moderating of neoliberalism, see Wong (2020).
[7] For instance, European public development banks have a combined balance sheet of over 2 trillion euros in 2017; the four largest banks (France, Italy, Germany, Netherlands) have assets equivalent of anywhere from 15 to 25 percent of GDP, with assets growing by an average of 60 percent over the 2007–2017 period. This has given European governments an edge in spurring the development of green technology relative to the more hands-off US approach—a fact that increasingly irritates US policymakers and industry (Mertens, Thiemann, and Volberding 2021; Hart 2021).

Second, subsidies—the key tool of industrial policy—don't raise costs for firms; they lower costs by lowering the price of the technologies and inputs firms need to make their products. This makes decarbonization more politically palatable by removing an objection firms would make to regulations that increase their operating costs. Policymakers have a longer track record for—and economists and engineers are better able to estimate optimal values for—subsidizing activities that have positive externalities, rather than pricing in the novel negative externalities of climate change.[8] Such direct subsidies are more likely to produce decarbonization on the timeline required, relative to the more indirect mechanism of carbon pricing (Jenkins, Stokes, and Wagner 2020; Li et al. 2020). (Note that standards are likely to raise the internalized costs faced in the price to the consumer, while industrial policy subsidies lower them, so the net effect needs to be evaluated on a case-by-case basis.) Relatedly, government procurement can be used to provide financial support for greening the economy. For instance, government-funded infrastructure is a major user of steel, so green procurement standards could generate a ready market that would signal to the steel industry that there will be final demand for its product if it makes the leap toward retrofitting existing facilities or building new ones.

Finally, when technologies are untested and market demand uncertain, demonstration projects (either public or public-private) help establish the baseline operating costs and showcase market demand. Over time, public and private financial entities can more accurately price risk and loans (Peterson 1978; Hart 2021).

These tools of industrial policy show that carbon pricing is not the only option domestically. As Build Back Better exemplifies, governments have a full range of carrots and sticks to get firms within their borders to decarbonize—some that raise costs to firms (like performance standards), and others (like green infrastructure and subsidies) that lower them. The EU's Green Deal also reflects an effort to diversify the tools Europe uses to combat climate change domestically by imposing new regulations,

[8] Positive externalities refer to activities in which firms have difficultly capturing all the social gains from said activity, whereas negative externalities refer to instances in which firms do not pay all the social costs. Thus, the former would tend to be undersupplied by the market (say R&D spending), whereas the latter would be oversupplied (say pollution).

such as tough green performance standards. The mix of policy instruments a government turns to will depend on its own legal and political constraints, just as the European, Canadian, and Australian experiences with carbon pricing have been shaped by the neoliberal era's politics and each country's allocation of powers across different levels of government.

THE INTERNATIONAL TRADE PROBLEM

This divergence in domestic approaches has important implications for how countries approach the nexus of trade and climate. For reasons we explain, in order to be effective and politically viable, strong domestic climate measures require a supportive trade policy. Coordinating that trade policy among countries with ambitious climate standards has significant benefits. First, it allows those countries to reduce or eliminate trade barriers between them. Trade liberalization of this kind both boosts trade in green products, a win for the climate, and builds political support among consumers (including downstream industries) for strong climate measures by linking trade liberalization and climate policy.[9] Second, it imposes barriers on high-carbon products. These barriers create an incentive for countries and ultimately producers to adopt greener production standards, while also offering domestic producers a reason to support aggressive domestic climate measures that may raise their own production costs. The catch, though, is that coordinating trade measures without coordinating domestic climate measures likely runs afoul of WTO rules. Because effective action on climate change requires, as a practical matter, accepting a diversity of national approaches, WTO considerations should be secondary in the design of a green trade policy.

The international trade problem is this: Regardless of their form, domestic decarbonization measures that raise costs for producers create the possibility of so-called "carbon leakage." Government

[9] In this paper, we do not advocate for passage of the WTO's Environmental Goods Agreement (EGA). This mid-2010s proposal to zero out tariffs suffers from two weaknesses. First, the EGA negotiations include China. Chinese trade practices, most notably the massive level of state support for industry, make further reductions in trade barriers with China unwise and politically infeasible at this time. Further tariff reductions could lead to unmanageable import floods into the US, hindering our ability to develop green infant industries. Second, the carbon border measures we propose in this working paper address a separate issue from the EGA. Carbon border measures aim to ensure that products *produced* in a carbon-intensive manner do not benefit from low trade barriers. The EGA aims to lower trade barriers in products *the use of which* advances environmental objectives. The EGA thus does little to incentivize clean production standards globally.

measures that increase the cost of carbon for private firms may spur those firms to shift their production operations to countries that do not have meaningful climate regulations. Because developed countries like the US and the EU have reduced their tariffs since the end of World War II to historically low levels, firms can then cheaply import their production back into the US and the EU. The costs of shipping have also steadily fallen with containerization, making offshoring a more viable strategy (Levinson 2016). The result is twofold. First, the impact of aggressive climate measures is blunted because firms are able to evade those standards through offshoring. Second, countries that adopt strict climate measures pay an economic price in terms of competitiveness, lost jobs, and tax revenue due, again, to offshoring.

A CBAM solves this problem by reimposing trade barriers for products that do not meet domestic climate standards or the equivalent. As noted above, both the EU and candidate Joe Biden have proposed carbon border measures as essential to protecting the effectiveness of their domestic climate measures and the integrity of their domestic industrial composition. The European Commission is due to make its initial proposal for a CBAM in June 2021, and the EU Parliament has preemptively endorsed the measure (European Parliament 2020). Presently, in the absence of a CBAM, European regulators have dealt with competitiveness concerns by issuing free emissions allowances to domestic producers. These allow trade-exposed firms to keep emitting carbon without having to pay a price for doing so, so that their foreign competitors are not given as much of a cost advantage. Unfortunately, these allowances also undermine decarbonization efforts and, in the US's view, represent countervailable subsidies (Maeder 2020).

In discussing its plans, the EU has insisted that its CBAM must be and will be consistent with WTO rules. What this means in practice is unclear. The most straightforward way to attempt to achieve WTO compatibility is a nondiscriminatory carbon tax applicable to both imports and domestic products (Hillman 2013). As we have explained, however, such a mechanism is unlikely to achieve the necessary unanimous support among EU members. More likely is that the EU will opt for a carbon tariff that purports to reflect the price of carbon created by the EU ETS. Yet a third option would be to extend the ETS to imports, either directly or through a separate international mechanism (Marcu, Mehling, and

Cosbey 2020).[10] Whatever option it chooses, the EU is leaning toward initially applying its CBAM only to energy-intensive imports such as steel, aluminum, cement, and chemicals (European Parliament 2021). Some reports have indicated that the measure would apply initially only to the EU's neighbors in Eastern Europe, Turkey, and North Africa (Hodgson 2021).

No matter how it's designed, a CBAM is almost sure to be the target of a WTO complaint by countries subject to the measure. We explore these legal issues in depth in a separate paper (Meyer and Tucker 2021), but briefly review these matters here. In particular, a CBAM that applies only to some countries' products will surely be challenged as discriminatory in violation of WTO rules. Although the EU could devise an ostensibly neutral methodology in order to claim that a limited application does not violate WTO rules on nondiscrimination,[11] such a methodology may not shield the EU from an adverse judgment. Indeed, because no country has ever introduced a CBAM, the compatibility of such a measure with WTO rules will be a question of first impression, and the WTO panel's view cannot be presumed.

A common CBAM among countries potentially makes these problems worse. WTO rules should permit a carbon tariff that is equivalent to the domestic price of carbon (Hillman 2013). But if countries have divergent domestic approaches to decarbonization, they are not likely to have a single domestic price of carbon. A common tariff will therefore not reflect the domestic price of carbon in at least one of those countries. To this basic problem, we can add the more difficult problem of calculating and comparing domestic carbon prices in the first place, especially when some countries have foregone explicit pricing mechanisms.

In theory, exceptions to WTO rules offer a way out of this conundrum. The drafters of WTO rules envisioned that countries would in certain instances have reasons to discriminate in the pursuit of legitimate public policy objectives. The conservation of exhaustible natural resources and the

[10] The EU tried a version of this last option when it first covered aviation emissions through the EU ETS. Ultimately, the EU backed down when faced with an overwhelmingly negative reaction from countries around the world, applying the ETS only to flights within Europe.
[11] The EU has done something similar in order to exclude palm oil–based biodiesel from Indonesia and Malaysia from its domestic market (Fischer and Meyer 2020).

preservation of human, animal, and plant life and health are among those legitimate objectives listed in the relevant WTO exceptions. Unfortunately, interpretations of those exceptions have created a thicket of hurdles that have made them difficult to rely on in practice. As US Trade Representative Katherine Tai has said:

> While countries can avail themselves of what amounts to an affirmative defense, that defense has proven difficult to invoke successfully. This is part of the reason why, today, the WTO is considered by many as an institution that not only has no solutions to offer on environmental concerns, but is part of the problem.[12]

The overall result is that making WTO consistency a primary consideration significantly limits the possibility for aggressive climate measures, as well as cooperation among like-minded countries. In designing a CBAM or other carbon border measures, any country, let alone a group of countries, will face tradeoffs between international diplomatic and legal concerns, domestic political and legal constraints, administrability, and effectiveness as a climate mitigation measure. In making these trade-offs, prioritizing WTO compliance considerations in advance of a dispute even being brought has the tail wagging the dog. Prioritizing WTO consistency means delaying aggressive climate action until countries are able to converge on domestic climate measures. But such convergence is unlikely for the political and domestic legal reasons we have discussed above.

The climate crisis is an existential one. The "bottom-up" approach that nations adopted in the Paris Agreement recognized that successful cooperation on climate requires greater freedom for countries to adopt climate policies appropriate to their circumstances. To limit that freedom in order to reduce the odds of a WTO violation risks undoing the diplomatic work of building Paris from the collapse of Kyoto.

[12] See https://ustr.gov/about-us/policy-offices/press-office/press-releases/2021/april/remarks-ambassador-katherine-tai-trade-policy-environment-and-climate-change.

A BETTER AND MORE FEASIBLE PATH FOR THE CLIMATE: THE GREEN STEEL DEAL

The treatment of carbon-intensive products in international trade offers both opportunities and risks for the decarbonization agenda: opportunities, because having a collaborative transatlantic strategy could speed the greening of the economy; and risks, because failure to incorporate difficult but necessary political economy considerations into the governance design of that collaboration risks the domestic viability of climate policy and diminishes its effectiveness.

In particular, because of the US Senate's long record of blocking climate change policy, it is vital that any strategy include at least the credible possibility of unilateral executive branch action in the United States.[13] Unilateral executive action will, however, be circumscribed by political and legal constraints that an overall strategy must take into account. Moreover, because any attempts at (say) economy-wide decarbonization will encounter resistance from carbon-intensive industries (which will argue it hurts their international competitiveness), it is important to consider which industries (and their associated labor unions, where applicable) are most likely to be cooperative, and/or to convert industries from climate skeptics to climate hawks, when deciding where to take action first (Mildenberger 2020).

These political economy considerations, along with the opportunity to reduce emissions in a highly traded and carbon-intensive sector, lead us to recommend that transatlantic climate and trade cooperation begin with an industry that has already accommodated itself to extensive regulation (domestically) by the US executive branch and (internationally) by trading partners: the steel industry. In 2018, the Trump administration imposed 25 percent tariffs on steel imports—a move that it justified on national security grounds to address global steel overcapacity caused by considerable Chinese subsidies to the steel sector (the Biden administration has kept these tariffs in place). In

[13] It is unlikely that 10 Senate Republican votes could be secured to overcome the filibuster for such bold climate action. Indeed, it should not be assumed that there would be 50 Senate Democratic votes under a scenario where climate action is allowed to pass via reconciliation. However, the possibility of unilateral executive action through the mechanism we describe in this paper could incentivize senators of both parties to negotiate with the administration.

response to this move, the EU and other trading partners imposed their own 25 percent tariffs on US steel products, in addition to other products that are politically sensitive to the US, such as bourbon (a prominent export of Kentucky, the home state of then—Senate Majority Leader Mitch McConnell [R-KY]).[14] Notably, it was the central executive authority in both the US (pursuant to Section 232 of the Trade Expansion Act of 1962) and EU that was empowered to take these actions, with little to no input by potential veto actors in other branches or levels of government.

If the goal is to decarbonize all of industry globally, paradoxically, it may be more effective to show early success in just one industry. Much as technical demonstration projects solve for anxiety among firms and in the marketplace, international demonstration projects can solve for political anxieties among nations. A successful pilot in steel could increase trust that it will be possible to decarbonize across all other industries. Since no group of countries has yet tried to do something like this, we're starting from a low base and level of confidence.

In the subsections that follow, we first explain why the economics of the steel sector make it a good candidate for early action; what elements our Green Steel Deal would consist of; and, finally, the legal and political rationales for the various elements.

The Economics of the Steel Sector Make It a Logical Candidate for Early Action

The manufacturing sector's carbon emissions have outpaced the power sector and are on track to outpace the transportation sector this decade. Within manufacturing, a small set of industries accounts for the majority of emissions: chemicals, cement, paper, aluminum, glass, and steel. The steel industry in particular is on track to consume 50 percent of humanity's carbon budget by 2050 unless deep decarbonization is implemented. And compared with other industries like automobiles, steel is more difficult for carbon abatement. Every kilogram produced requires lots of energy, which

[14] See https://www.trade.gov/feature-article/foreign-retaliations-timeline.

accounts for a high share of the cost to producers and emissions from the sector. The more you produce, the more you pollute.[15]

Currently, there are two primary methods of producing steel, both of which require extremely high levels of heat in order to make the material malleable. The first, accounting for nearly 75 percent of global crude steel production, is through iron ore being reduced in a blast furnace (BF). The second, accounting for the remaining 25 percent, is through melting scrap steel or another feedstock in an electric arc furnace (EAF).

These methods have important differences. First, the BF methods are currently more carbon-intensive, and difficult to decarbonize in the future, while the EAF method can be mostly decarbonized if recycled steel is used as the feedstock and if the electricity that feeds into the furnace is itself decarbonized. Second, there are differences in the domestic US industrial organization of facilities using each method. The BF facilities are highly concentrated in terms of corporate ownership and location, with only three companies producing at nine facilities in only a handful of congressional districts. In contrast, there are 51 companies operating EAF facilities at 99 sites across the country.[16] Third, there are important cross-national differences. While around 65 percent of US steel production utilizes the EAF method, only 6 percent of Chinese production does. (EU countries are closer to the US EAF percentage, ranging from 30 percent in Germany to 75 percent in Italy.) This matters hugely for the overall global emissions of the industry, as around 50 percent of global steel production is in China.

These differences are reflected in total carbon emissions intensity of the countries as a whole. Using the BF method, Italy, Spain, and the US emit less than 1,000 kilograms of carbon per ton of crude steel produced, while China and India (another increasingly important producer) emit more than twice that. (Germany is in the middle, along with other European producers.) Using the EAF method, there is

[15] The sources for this subsection include: Blank 2019; Breakthrough 2020; Hasanbeigi and Springer 2019; King et al. 2020; Li and Friedmann 2021; Victor et al. 2019; and World Steel Association 2020.
[16] For a map of these facilities from 2018, see https://www.steel.org/wp-content/uploads/2020/07/AMM-Steel-Producers-Map-2018.pdf.

important variation depending on what feedstock is used and the energy intensity of electricity generation. In the US and many European economies, scrap iron is used as a feedstock, and the electricity sector is energy-efficient. In India and China, directly reduced iron and pig iron are used as feedstocks, respectively; the electricity sector is also far less efficient. Thus, US EAF production emits 600 kilograms of carbon per ton of steel production, while comparable numbers for China and India are over 1,400 and 1,600, respectively.

There are a number of pathways to decarbonize steel production. According to Victor et al. (2019), improved energy efficiency could reduce 15 to 20 percent of emissions, while increasing the ratio of scrap steel that is recycled through EAF methods from the current 85 percent to 100 percent could make a further 20 percent reduction. The majority of further reductions would then need to come from changes to the BF process, such as the use of natural gas, carbon capture and storage (CCS), direct electrolysis (DE) of iron ore, or hydrogen reduction. There are important trade-offs between the four technologies. Natural gas is already widely in use but is not carbon-neutral. The CCS method is known but not commercialized, while DE is less ready technologically, though steel company Arcelor Mittal is investing heavily in it. Hydrogen can come from fossil sources that are then captured and stored (deemed "blue") or electrolysis of water using solar or wind power (deemed "green"). Either method will likely require or at least benefit from networks of pipelines to transport the hydrogen. This could have positive implications, such as job creation in the pipeline sector or efficient repurposing of existing fossil fuel infrastructure. But it could also have negative consequences if these pipelines are sited without due regard to environmental justice concerns.

The asymmetric production patterns offer opportunities to use trade rules and practices as leverage for decarbonization. The US, Germany, and Italy are the three top importers of steel, while China is by far the biggest exporter. Similar patterns emerge for so-called "indirect steel," meaning steel embodied in other products, with the UK displacing Italy as the third-biggest importer, and France becoming the fourth biggest. Thus, the US and Europe acting in concert could not only decarbonize their own (already relatively less carbon-intensive) steel industries but use their market power to offer carrots and sticks to get major exporters like China and India to follow suit.

Elements of a Green Steel Deal

The Green Steel Deal would consist of several elements.

First, like-minded countries would create a steel-focused international climate club, where the condition of membership is to convert, as soon as is feasible, all domestic steel production to green methods. Member states would have the freedom to choose the methods they would employ to green the steel sector, but there would be agreement on the menu of acceptable production methods. In addition, club countries would also develop common understandings on measuring emissions reductions—and agreed-upon targets that would be subject to verification—in the steel sector.

Second, member states would agree to apply a common carbon tariff on the imports of steel from nonmember countries. The tariff would not apply to member countries that are in compliance with obligations to green the steel sector.[17] These tariffs could build on the existing tariff regime applicable to steel discussed above. Within 10 years, all members would replace the tariff with a ban on the sale of dirty steel (regardless of source) in their domestic markets. Tariffs would, in other words, give way to generally applicable product standards that would ban both imported and domestic "dirty" steel.[18] In a happy accident surely uncontemplated by the Trump administration, a 25 percent rate appears to be a rough estimate of the lower bound for the "green premium" for the steel industry for certain green methods—meaning the incremental cost increase for those firms that adopt green processes

[17] One possible objection to removing Trump's Section 232 tariffs on steel traded between club countries is that it ignores the reason they were imposed in the first place: global excess capacity, which is caused by China subsidizing its own steel sector. Overcapacity depresses prices on world markets as Chinese steel moves into third countries and exacerbates the climate problem by making market conditions for green steel considerably tougher. As in other areas of the economy, China poses a complicated mix of environmental and economic problems for which there is no one silver bullet. Rather, nations must continue to work aggressively to address both the environmental and unfair competition issues created by China's state-led economy. The Green Steel Deal would be additional to, and not in place of, aggressive efforts to combat global overcapacity. Having said that, the Green Steel Deal could pose a challenge for efforts to address overcapacity if it created an opportunity for Chinese steel to evade current tariffs. The US is unlikely to agree to any removal of 25 percent tariffs for steel products being transshipped via the EU and other markets but originating from China. China, of course, is unlikely to comply with the terms of membership in the club. Because Chinese producers will not face the regulatory costs paid by producers within club members, they will face the club's common tariff. Club members should also agree to invest in additional anti-circumvention measures to ensure that Chinese steel does not enter club members' markets posing as steel from a member country.

[18] This is similar to a proposal made by economist William Nordhaus (2020), though his suggested tariff was only 3 percent, which he estimated was equal to abatement costs under a domestic carbon price. Instead of correcting an (economic) market failure, our proposal should be thought of as an unmistakable political signal to producers and laggard governments that the green transition is imperative. (Moreover, it should be noted that Nordhaus's modeling assumptions have come under fire, including the idea that humanity could withstand a 4-degree Celsius increase by the 2100s [Kaufman et al. 2020].)

relative to those that do not. The upper bound for this premium is 50 percent, but could be higher (Victor, Geels, and Sharpe 2019). Given the immediacy of the climate crisis, club members could start by applying a 25 percent tariff on steel to nonmembers (which the United States already does, effectively), while removing the 25 percent tariffs on club members.

Critically, though, a review process would be established to raise or lower the rate to reflect the increased costs of using green production methods that firms located within club countries would face.[19] Given the diversity of approaches members are likely to take toward decarbonization, the resulting tariff rate will be an estimate or average across member countries of the costs firms face due to the decarbonization measures adopted by their governments. Within the United States, the International Trade Commission—an independent agency with expertise in assessing sectoral impacts of trade measures—could be tasked with developing a recommendation as to what those costs, and the resulting tariff, are. Other countries would, of course, want their own expert agencies to develop estimates as well, which would then provide the basis for setting the joint rate. Finally, this review process should also facilitate differential treatment by grade of steel and consideration of whether tariffs should also be imposed on downstream steel-containing products, as importers may shift their purchasing patterns along these lines in an attempt to circumvent the restrictions.

Third, the club countries agree to technology transfer and information-sharing on feasibility and cost associated with different methods, both with one another and with the least-developed countries, as the EU Parliament has proposed (European Parliament 2021).

Fourth, member countries pledge to plow the tariff revenue back into green steel R&D and demonstration projects. Trump's steel tariffs have generated at least $6.4 billion (York 2019), which would be sufficient to operate two green steel demonstration projects (Blain 2021).

[19] Raising or lowering the rate over the initial 10-year "adjustment decade" is also reasonable given the economics of the industry. For the next decade, steel companies and policymakers are going to be experimenting and developing new methods. Until these are shown to work at scale, price signals will matter less than feasibility. Over time, as technologies become commercialized and diffused, a price premium may emerge, and the rate can be reset with more precision. We are indebted to Rebecca Dell for this point.

Finally, climate club countries will announce a joint commitment to modernize trade rules at the WTO, in preferential trade agreements, and elsewhere. The goal of this effort is to update trade rules to reflect and enable best practices in regard to climate-supporting trade policies, with the expectation that carbon tariffs will expand into other industries beyond steel. In this way, the Green Steel Deal becomes an opportunity for nations to consider what works and what does not, from the point of view of effective climate mitigation, and then to translate those lessons into trade rules via negotiated outcomes, rather than via dispute resolution at the WTO. Club members would also agree to a "peace period," during which they would not challenge each other's climate policies related to the steel sector at the WTO or through any preferential trade agreements. Any disputes between club members on matters subject to the Green Steel Deal would be worked out exclusively via the club. In sum, the strategy of the Green Steel Deal chooses slow but predictable progress through collaboration within the club, rather than a policy built on adversarial contesting. While the ideal would be all sectors decarbonizing rapidly, we feel our proposal is more likely to be politically feasible and thus more likely to generate significant progress on reducing emissions in the near future.[20]

Why This Deal Makes Sense

The policy reasons for such a Green Steel Deal are numerous. First, as noted above, manufacturing generally and steel specifically are huge emitters of carbon, so the decarbonization payoff for targeting the steel industry is high.

Second, steel is the iconic example of what climate experts term an "energy-intensive, trade-exposed" (EITE) sector. As the designation implies, this means that energy costs make up a large share of total production costs, so any increase in the cost of energy forces producers to increase the price they charge to consumers. Moreover, because a large portion of steel consumption is imported, and the price is set in a global marketplace, any increase in the price of domestic steel leads to a direct loss of competitiveness and market share for domestic producers. When the EPA did a study in preparations for congressional consideration of Waxman-Markey, it found that 44 out of 500 US industries could be

[20] We are indebted to Bracken Hendricks for this observation.

considered EITE: Steel was near the top of list, alongside aluminum, cement, glass, chemicals, and paper.[21] Accordingly, EITE industries should be considered a proxy for the industries where demands for trade protection are most likely to be heard, so getting out ahead of industry demands will be politically useful.

Third, the producing industry is likely to support this proposal. The American Iron and Steel Institute, the US trade association for teel producers, calls a "strong and effective" carbon border measure a key principle for how "to maximize the steel industry's role in reducing global greenhouse gas."[22] Similarly, the European Steel Association (the EU counterpart) has said that a "carbon border measure is of critical importance for the transition of industry toward climate neutrality."[23] The US and Europe are already relatively carbon-efficient compared to competitors in China, and under the Green Steel Deal they will necessarily transition to being fully green. Domestic steel producers within club members will gain a competitive advantage relative to China in the markets of all other club members. Moreover, the industry is fairly well-organized in trade associations—a fact that can help with obtaining and maintaining consensus on design and implementation questions. Indeed, there is a relatively high degree of expert agreement (compared to other industries) on the metrics for emissions in the sector. Nonetheless, as with any sector, there will be substantial scope for disagreements over technical matters. But because these disagreements will arise amid a relatively high base level of agreement and organization, they are more likely to be readily solvable than in other sectors that are less well-organized. The most carbon-intensive facilities in the US are also geographically concentrated, meaning that political brokering from only a few members of Congress can go a long way. All of this points to the political value for the overall decarbonization project: Steel will go from a possibly climate-blocking industry to a climate-supporting industry, which contributes to changing the balance of power and thus aids climate politics.

[21] https://www.epa.gov/sites/production/files/2016-07/documents/interagencyreport_competitiveness-emissionleakage.pdf.
[22] https://www.steel.org/public-policy/energy-and-climate-change/.
[23] https://www.eurofer.eu/press-releases/european-parliament-carbon-border-vote-proves-majority-support-for-stronger-carbon-leakage-protection-to-match-greater-climate-ambition/.

Fourth, there will be less near-term disruption to market patterns than with other products. Importers and steel-using industries have all priced in the 25 percent rate that the Trump administration assessed in 2018 and that the Biden administration extended. And, by eliminating the steel tariffs that currently apply between the US and the EU, the Green Steel Deal would lead to some trade liberalization, which steel-using industries would celebrate and the EU in particular would welcome. Indeed, the EU just recently backed off a threat to increase its retaliatory tariffs on US products in response to the US steel tariffs. In exchange, the US agreed to enter into negotiations with the EU on how to address overcapacity, as a precondition to revisiting the national security tariffs. By providing a basis for removing the steel tariffs between the US, the EU, and other nations that join the Green Steel Deal, while leaving the tariffs in place on dirty steel producers, our proposal fits neatly within this effort to both address overcapacity and restore liberalized trade in steel products across the Atlantic.

Fifth, the move to a ban after year 10 of the scheme has several attractive features from an administrative and legal perspective. Administratively, it eliminates the burdensome requirement of translating carbon emissions from various production methods into a carbon tariff. Instead, products—domestic and imported alike—that meet green standards will be allowed on the market; products that don't won't. A general ban on dirty steel is also easier to administer at the border than a tariff.[24] Politically and legally, a nondiscriminatory ban is also more likely to pass muster with our allies and under trade law. Nations may, of course, still try to argue that treating steel products differently based on the carbon emitted during production is discriminatory on the grounds that dirty steel and green steel are "like" products that compete in the market. But a product standard that applies regardless of national origin is both less offensive to other countries diplomatically and easier to justify under the spirit (if not always the letter) of WTO rules.

[24] Administering this ban will require a verification system to ensure that dirty steel does not pose as green steel. But this kind of problem is not new to trade or to climate measures. In the context of trade in goods, customs authorities have developed systems to verify the national origin of products. In the environmental goods context, governments have used labeling schemes backed by monitoring and verification to distinguish products based on their production methods. For instance, the United States uses the Tuna Tracking and Verification Program to ensure compliance with its dolphin-safe tuna labels. A similar labeling scheme, backed by monitoring and verification systems, could be used to distinguish green from dirty steel (see generally Taufique et al.).

Sixth, our proposal delinks the calculation of the carbon tariff from a strict calculation of the domestic carbon price across club members. In this respect, our proposal differs from the likely form that the EU's CBAM will take, given the EU's position on trying to maximize WTO compatibility in advance of a dispute. Our proposal has administrative appeal, as finding exactly equivalent charges would be challenging, especially if—as we propose and is most feasible—club members adopt different mixes of domestic decarbonization policies. Rather, our proposal recognizes that making common cause with our allies, and working differences out through negotiations based on lessons regarding how the new system works, is a more viable way to address the climate crisis while also respecting our own and our allies' domestic economic objectives. This approach also reflects the manner in which trade negotiations have worked in recent years. Because the WTO has struggled to operate as a negotiating forum, states have increasingly moved negotiations into smaller, preferential trade agreements. Trade-related climate rules would thus be following a pattern established for a whole host of 21st century trade problems, ranging from digital trade to state-owned enterprises.

Relatedly, our proposal recognizes that the perfect cannot be the enemy of the good. Climate change is not going to give us the time to develop a single decarbonization program that works and can be legally implemented by all the world's major economies. Political and legal constraints, which differ between the US, the EU, and other like-minded countries, make such a Herculean task virtually impossible. Dealing with climate change is hard enough as it is. Our approach would thus allow countries to lean on their existing authorities to implement the Green Steel Deal. In the United States, for instance, Congress may well legislate on some aspects of the Biden administration's climate agenda. Such legislation would be welcome, as it would put the administration's climate measures on a firmer legal and political footing. But Congress may also not legislate, or not do so comprehensively. In that case, our proposal would allow the United States to lean on existing authorities to achieve the Green Steel Deal's goals. In that event, the United States could impose the common tariff pursuant to Section 232 of the Trade Expansion Act and lean on existing grants of regulatory authority to impose domestic production standards. The EU could work within the ETS system that it has painstakingly

invested in over the last two decades. Japan and Canada, were they to join, could rely on their carbon tax schemes.

Such an approach, we acknowledge, very likely discriminates against non-club members within the meaning of WTO rules. But the Green Steel Deal's internationalist approach might be more likely to be seen as WTO-consistent, for the simple fact that WTO members are less likely to challenge widely adopted measures, and WTO adjudicators look more favorably on deviations from trade rules contained in multilateral agreements. Indeed, the Montreal Protocol on ozone-depleting substances—perhaps the most successful environmental treaty of all time—provides for trade sanctions against nonmembers. These provisions may well violate General Agreement on Tariffs and Trade (GATT) and WTO nondiscrimination rules, but have nevertheless been viewed as essential to the treaty's success (Brack 1996).

In a similar vein, the Green Steel Deal offers countries serious about tackling climate change a vehicle to restore the balance at the WTO between trade liberalization and the pursuit of core public policy objectives. As noted above, we explore these trade law questions at length in a separate working paper (Meyer and Tucker 2021).

Finally, by agreeing to a peace clause and removing the Trump-era national security tariffs on steel among members, the Green Steel Deal lowers the temperature and contributes to good will and legal stability. It provides a foundation for greater cooperation on climate matters, but also on a broader range of global challenges in which the United States, the EU, and its allies have shared interests.

CONCLUSION

The Green Steel Deal takes decarbonization out of a market-centric approach that has not worked to meaningfully reduce emissions, and emphasizes the central role of the state in providing global public goods. As such, it recalls the efforts of the Roosevelt and Churchill administrations during World War II, when the governments pooled and allocated resources internationally in order to more effectively mobilize their entire economies (Bottelier 2020). It also recalls the commodity-specific arrangements of the later Bretton Woods era, when developing countries protected themselves against fluctuations in prices by managing trade for the benefit of their development (Musselli 2017). By starting with a sector that is ready to move on border measures, governments can show feasibility and proof of concept early, while taking a broad range of steps across numerous sectors domestically to develop and drive down the cost of green technologies.[25] Moreover, our proposal changes climate politics by converting an industry that would be skeptical to domestic decarbonization measures into one that has a stake in the green economy at home and abroad.

Finally, while the EU and other observers have centered the question of WTO compatibility in trade and decarbonization efforts, we should take a step back and consider first principles. The primary goal is to decarbonize, not to follow 1947 trade rules made in a time when energy and pollution were taken for granted. Nations should not assume that the goal of maintaining smooth international relations is best served by trying to anticipate WTO-based objections to climate rules. In particular, given bipartisan US skepticism about the WTO's Appellate Body, the US is more likely to respond favorably to an EU posture that allows countries to achieve decarbonization ends by the means that make the most political, economic, and technological sense for the time and place. When a critical mass of countries shows that joint action on an existential threat is possible, trade rules and rule-makers should follow, not block.[26]

[25] In future work, the Roosevelt Institute will discuss domestic and international strategies for decarbonizing other industries.
[26] This paper has not touched on other concerns that the US should consider as conditions for supporting the steel sector, such as guarantees that industry will support union rights and racial equity in the disproportionately white sector. Future research should consider these and other domestic implications of industry-by-industry action.

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