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G7 STEEL POLICY SCORECARD

SHIFTING THE PATHWAY FOR STEEL

KATINKA LUND WAAGSAETHER, DOMIEN VANGENECHTEN AND MIHNEA CĂTUȚI

Steel is one of modern society's most central yet dirtiest building blocks. G7 countries have both the ability and the collective responsibility to initiate a shift towards steel decarbonisation. Yet, they are generally far from doing so.

This briefing introduces E3G's G7 Steel Policy Scorecard. This is a first step in developing a methodology to evaluate government action on steel decarbonisation. Over time, we will be able to track and compare progress. The methodology brings together seven key policy levers that governments can apply to reduce emissions from steel, which are used to benchmark government action toward steel transition.

The need for government policy is evident. Corporate emission reduction targets across G7 countries are currently taking us to a global average temperature increase of 2.7 °C.[1]

In this first analysis, we find that the large machineries of the G7 countries are starting to make movements in the right direction. Germany and France are amongst the most ambitious early movers. However, much more needs to happen.

[1] CDP & Oliver Wyman, 2022, **Missing the mark: 2022 analysis of global CDP temperature ratings**

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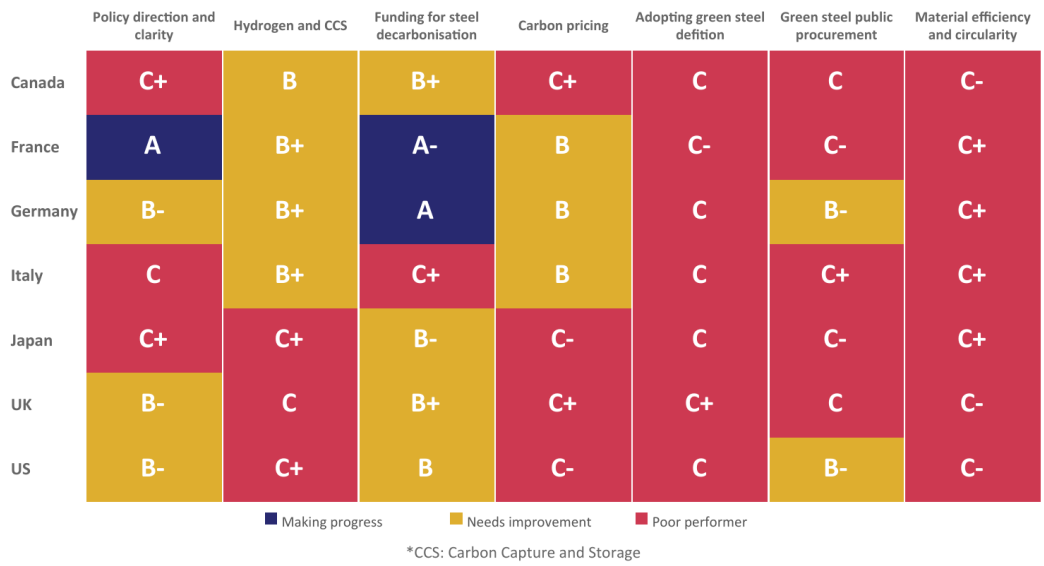
The G7 Steel Policy Scorecard

In the below scorecard (Figure 1) we see how the G7 governments are faring across seven steel policy levers that have been identified as key enablers for steel decarbonisation. None of the countries are showing concerted government action on all levers. The greatest headway can be observed on policy direction and clarity, the rollout of hydrogen and carbon capture and storage (CCS),[2] and on government funding for steel decarbonisation.

While several G7 countries are exploring the adoption of a green steel[3] definition and green steel public procurement targets, intention needs to be turned into action. Movements on material efficiency and circularity remain largely absent.

Figure 1. The G7 Steel Policy Scorecard



Here we have focused on inward facing policy action, levers that shift the domestic pathways for steel, as we recognise this as an essential first step towards coherent global action. However, outward facing action in the form of knowledge sharing, technology transfer and finance, must now follow.

[2] Noting that while we here focus on CCS, Carbon Capture and Usage (CCU) solutions can also contribute to reducing emissions of steel production.

[3] For consistency we use the term "green steel" as the all-encompassing definition for low-emission/near-zero emission steel making.

Key recommendations

G7 governments should all ensure that they have clear and binding emission reduction targets for industry. They must set steel-specific goals and phase-out commitments – such as no new unabated coal-based steel plants after a certain year. They need to steer hydrogen policy towards green hydrogen for steel, while maintaining a steady flow of funding to complement commitments made by the industry itself.

It is increasingly evident that the US will not take the carbon pricing route, which means it needs to be more ambitious on other policy levers. We urge Canada and Japan to look at strengthening their respective mechanisms and closing industrial loopholes. The EU countries – France, Italy and Germany – must now play a progressive role in ongoing negotiations on EU climate policy, ensuring that clear and ambitious phase-out dates for free allowances are legislated in the context of its Emissions Trading System (ETS). The UK should duly follow such a lead, within its own ETS.

G7 countries need to turn intention into action and formally adopt an internationally aligned green steel definition, with an agreed emissions intensity threshold and a measurement standard. Dovetailing this, the US, UK, Canada and Germany should move swiftly on their stated intentions for green steel public procurement targets and requirements, with the other G7 countries swiftly picking up the baton and following suit.

Finally, there is a need to reduce the demand for steel and increase steel reuse and recycling. All G7 countries need to move beyond mentioning the importance of circularity and efficient use of steel, to setting clear and coherent targets and actions. These will then need to be mainstreamed into the various policy and regulatory spaces affected – from building codes to product design requirements and regulation on reuse and recycling.

More detailed findings are set out in the separate annex document to this briefing: Annex A: Delving deeper in the findings – policy lever by policy lever.

Greening steel production

With growing global attention on industrial emissions steel has sailed into the limelight. The industry is responsible for 11% of CO_2 and 7% of all greenhouse gas (GHG) emissions globally.[4] This is largely due to the use of integrated blast furnace-basic oxygen furnaces. Coal is the main source of fuel in these furnaces, while also providing the chemical properties required (for reducing iron ore to pig iron).

Globally, the share of steel produced using coal-based blast furnace-basic oxygen furnaces (BF-BOF) is higher than that produced through electric arc furnaces (EAF). Steel production can be partly decarbonised by increasing steel recycling with EAFs, provided that the electricity used is renewable. However, primary steel production based on iron ore cannot be done via this technological route.

Given the expected growth in demand for steel and the limited availability of scrap, one of the most important challenges for decarbonising the steel sector is being able to reduce iron ore with low or no GHG emissions.

There is now increasing clarity in terms of the different technological routes able to achieve this. The most viable alternative pathways for primary steel production are

> shifting to direct reduced iron (DRI), ideally using renewable hydrogen, or

> retrofitting existing (ideally newer) blast furnaces with carbon capture and storage (CCS).

The former option is preferable given its higher emissions abatement potential.

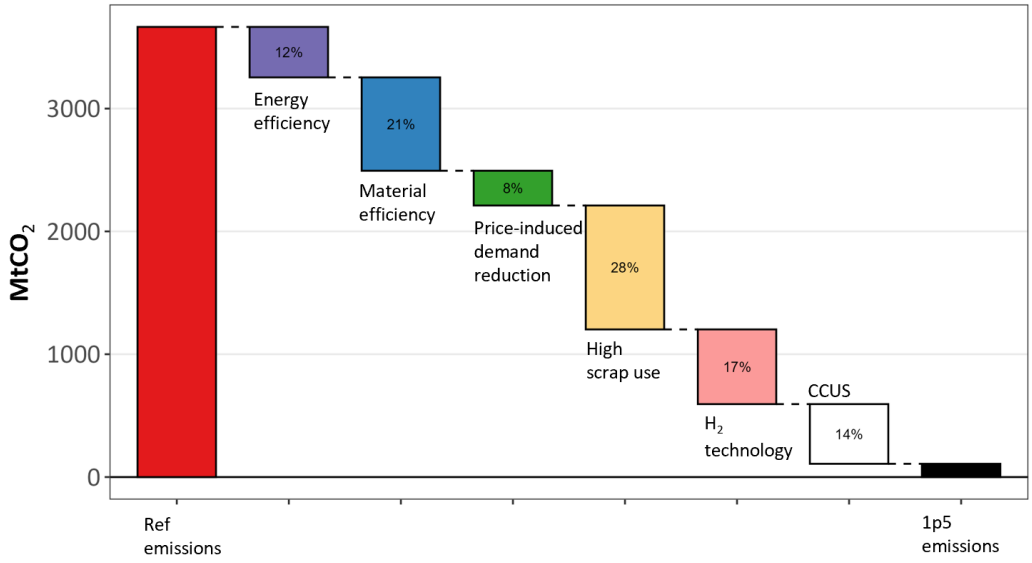
Other innovative solutions, such as iron ore electrolysis, are still at a low technology readiness level, so the main technological levers for decarbonising primary steel production over the next decade will likely be the availability of either renewable hydrogen or CCS infrastructure.

Together with energy efficiency, material efficiency and demand reduction, these technology shifts are required to put us on the necessary emission reductions pathway, as illustrated in Figure 2 below.[5]

[4] UNEP, 2020, **Emissions Gap Report 2020**

[5] E3G & PNNL, 2021, **1.5°C Steel: Decarbonizing the Steel Sector in Paris Compatible Pathways.**

Figure 2. Contribution of different mitigation strategies to global steel emissions reductions by 2050, in a 1.5 °C-compatible scenario



Source: E3G & PNNL, 2021, ***1.5°C Steel: Decarbonizing the Steel Sector in Paris Compatible Pathways, p20***

On the back of these technological advances, there have been a growing number of clean steel pilot projects and investment announcements.[6] Encouraged by this recent optimism and fuelled by a growing sense of urgency, governments are increasingly recognising the need for concerted efforts to support the acceleration of the transition. Across the world, governments are starting to roll out climate policies and support mechanisms.

The International Energy Agency (IEA) made clear in a recent report that "ambitious, stable and well-designed policy frameworks are needed to create the conditions for industry to make a rapid transition".[7] And while governments have started making policy moves, large gaps remain.

There is increasing consensus among academics, stakeholders and policy makers about the necessary components of an enabling policy framework. Most studies and reports call for a mix of "push" and "pull" policies. These include, but are not limited to: carbon pricing, regulations, direct support for early-stage commercialisation of technologies, taxonomies and definitions to provide investment clarity, contracts for difference, and public procurement.[8]

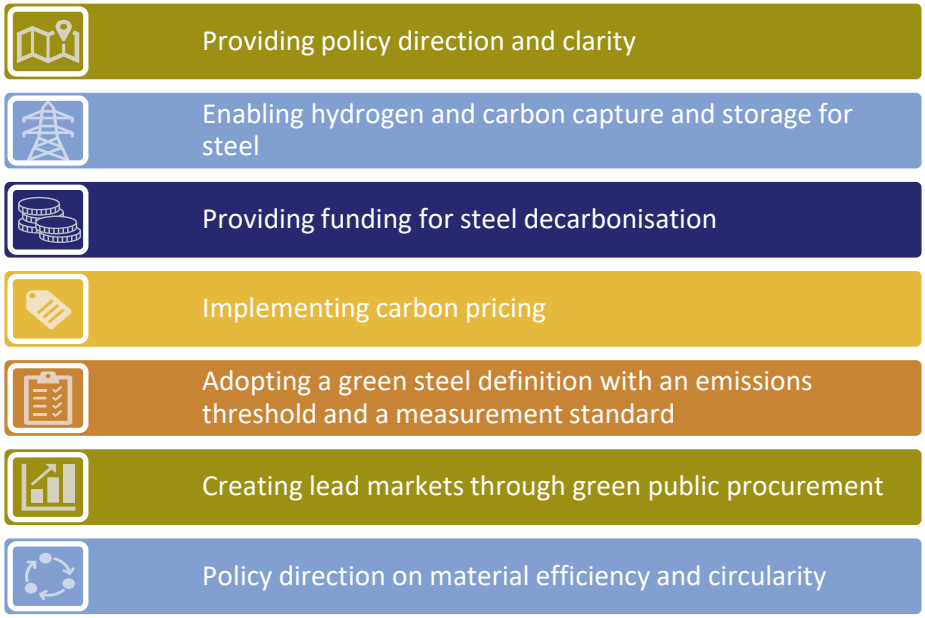
[6] **Agora Global Steel Transformation Tracker**

[7] IEA, 2022, **Achieving Net Zero Heavy Industry Sectors in G7 Members**

[8] See for example: E3G, 2020, **A Policy Vision for the EU Industrial Strategy**; DOE, 2022, **Industrial Decarbonization Roadmap**; Material Economics, 2019, **Industrial Transformation 2050**; IEA, 2022, **Achieving Net Zero Heavy Industry Sectors in G7 Members**; I3, 2021, **Decarbonizing Industry by 2050**

Building on these reports and studies, our scorecard assesses seven key policy levers governments can apply to reduce emissions from steel, which are used to benchmark government action toward steel transition (Figure 3).

Figure 3. The seven policy levers of the Steel Policy Scorecard



Individually all seven policy measures are important but insufficient tools towards shifting steel production from dirty to clean. There are no silver bullets. Together, however, they would go a long way towards creating the necessary enabling conditions to fully decarbonise the steel sector.

The exact composition of a steel policy framework will vary across countries in accordance with different political preferences, prioritisation and realities.

Of course, there are other policies that are not captured in this scorecard but are important in any decarbonisation strategy. For example, policies to address the socio-economic implications of the transition, public consultation and civic participation.[9] Policies to counter carbon leakage – avoiding emissions for carbon-intensive steel production being displaced to other countries – are also important, though their importance is highly dependent on domestic policy choices. The G7 countries have recently started to explore addressing carbon leakage at the international level, in the context of the "climate club".[10]

[9] Nilsson et al., 2021, **An industrial policy framework for transforming energy and emissions intensive industries towards zero emissions**

[10] G7, June 2022, **G7 Statement on Climate Club**

More information about the methodology behind the Steel Policy Scorecard and scoring for each G7 country is detailed in the separate annex document: Annex B: Methodology

Why the G7

The G7 countries first came together in the early 1970s, as the then leading industrialised countries, to exchange ideas and coordinate policy in the face of the first oil crisis.[11] The group of countries has since played a role in steering the global agenda.

Together, G7 countries account for 40% of the world's economy and 30% of its energy demand – and produce 17% of the world's steel.[12] As illustrated in **Error! Reference source not found.** below (y-axis) a large portion of G7 countries' steel production facilities are up for re-investment by 2030, ranging from 60% of production capacity in Germany to 100% in the UK.[13] The global average lifetime of assets such as blast furnaces is around 40 years (requiring major refurbishment after 20–25 years of production).[14] The investment decisions made in the coming five to eight years will therefore be essential – both in order to meet short- to long-term emission reduction targets, and to avoid the risk of stranded assets.

In the G7 countries, similar to the situation globally, the share of steel produced using coal-based blast furnace-basic oxygen furnaces is generally higher than that produced through electric arc furnaces. The US and Italy are the exceptions.

G7 countries have taken it upon themselves to take a leading role in the decarbonisation of industrial sectors. In June 2021, G7 countries launched their Industrial Decarbonisation Agenda (IDA),[15] aimed at fostering and accelerating the emergence of markets for near-zero industrial products, including steel. More recently, G7 members have committed to establish a "Climate Club",

[11] **History of the G7 | G7 Germany 2022**

[12] IEA, 2022, **Achieving Net Zero Heavy Industry Sectors in G7 Members**

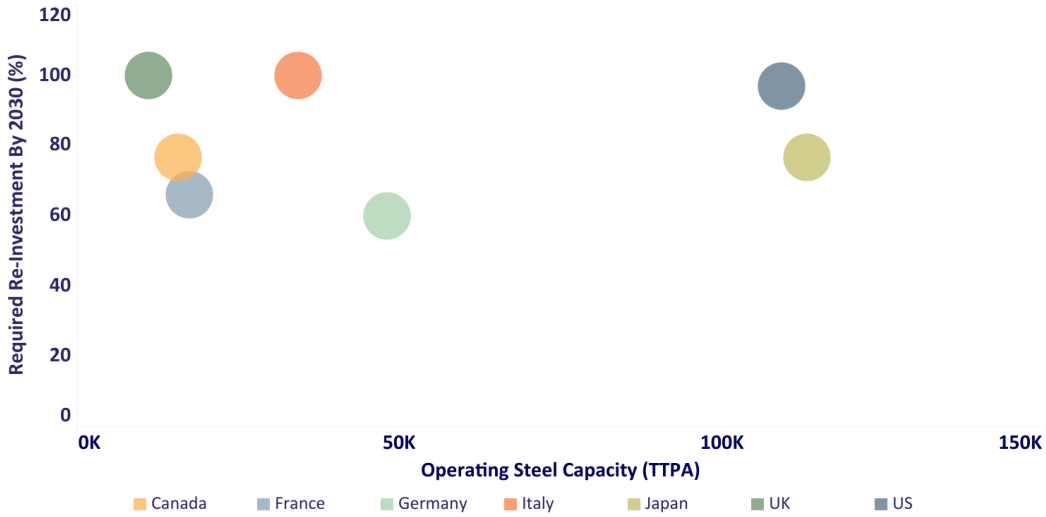
[13] **Agora Global Steel Transformation Tracker**

[14] IEA, 2022, **Achieving Net Zero Heavy Industry Sectors in G7 Members**

[15] 2021 UK G7 Presidency, 2021, **G7 Industrial Decarbonisation Agenda (IDA)**

aimed at jointly accelerating industrial decarbonisation and countering carbon leakage at the international level.[16]

Figure 4: G7 steel production – reinvestment requirements and overall capacity



Source: E3G based on Agora Global Steel Transformation Tracker (reinvestments), and the Global Energy Monitor (operating steel capacity)

Being rich, industrialised countries and large historical emitters G7 countries are indeed well placed to show leadership in the decarbonisation of the steel sector. This will lead to opportunities for G7 countries, including the potential to capture a growing share of future markets for green steel. But it will also help facilitate the transition elsewhere through the diffusion of technologies while bringing down costs.

Moreover, G7 countries have historical, moral and economic responsibility to lead global action on steel decarbonisation. They are key beneficiaries of the industrial revolution, and societies where steel infrastructure and building blocks are already well integrated. Collectively they hold not just the responsibility but also the ability to initiate a shift in the global pathway for steel.

G7 governments have recognised that the adoption of a "comprehensive set of different policies addressing key areas" is needed to accelerate industry decarbonisation, including steel.[17] The policy toolbox identified in the context of the IDA includes many, if not all, of the seven key policy levers outlined above.[18]

[16] G7, June 2022, **G7 Statement on Climate Club**

[17] G7, 2022, **G7 Climate, Energy and Environment Ministers' Communique**

[18] G7, 2022, **Conclusions regarding the Industrial Decarbonisation Agenda**

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As they have started rolling out domestic policies, our scorecard aims to track how G7 countries have started to meet the challenge of decarbonising the steel sector – while highlighting that there is still a long way to go across the board.

Key country messages

> While funding at scale is materialising, and hydrogen and CCS are clearly on the agenda, **Canada** falls short of setting clear targets for industrial decarbonisation and steel. The Canadian ETS (output-based carbon price system) is a move in the right direction. However, free allowances and thresholds based on historical average emission intensity only send a weak signal to industries.

> **France** is leading the way when it comes to policy direction and clarity, with a clear steel emission reduction target of 31% by 2030 (relative to 2005). It is showing positive signs across a number of policy levers, including large-scale industrial decarbonisation funding and earmarking for steel and hydrogen, ongoing projects on hydrogen for steel, and the various EU policy pulls and pushes: funding, the EU ETS and the Circular Economy Action Plan. It is however showing next to no movement when it comes to the adoption of a green steel definition and green steel public procurement.

> Steel decarbonisation momentum is building in **Germany**, with clear industrial emission reduction targets and industrial decarbonisation funding earmarked for steel. It is on track to leverage public procurement, with minimum requirements for steel set to be instituted in 2023. With a hydrogen strategy emphasising steel decarbonisation and multiple hydrogen-DRI installations announced or already under development, some of the most advanced steel decarbonisation projects right now can be found in Germany. Coupled with several EU policy pulls and pushes – funding, the EU ETS and the Circular Economy Action Plan – Germany is showing positive signs across a number of the policy levers.

> **Italy's** movements on steel decarbonisation are largely driven by EU policy pulls and pushes. Large-scale funding announcements for industrial decarbonisation are lacking, and national decarbonisation funding infrastructure only in its infancy, with the Green Deal Fund only opening for initial questions in November 2022. Hydrogen for steel is on the agenda, with projects under way and funding earmarked through EU NRRP.

> In **Japan**, the largest steel producer among the G7 countries, clear targets for industrial decarbonisation and steel are lacking. However, a hydrogen

strategy with explicit focus on steel, and a large green innovation fund (2 trillion yen – €14 billion) with focus on industrial decarbonisation and hydrogen, are set to have some positive "pull" effect. The Japanese carbon tax, which could have provided a strong "push" effect, is currently inconsequential given exemptions and low price levels.

> In **the UK** the ongoing exploration of a 2035 target for near-zero emission steelmaking, and a small steel decarbonisation fund (£250 million) – announced but not launched – hold highly precarious promises. In the broader realm of industrial decarbonisation however, the UK has announced large-scale funding of £12 billion (€14 billion), to implement its ten-point plan for a green industrial revolution. Various relevant national funds are operational. The UK has also been a driving force in international initiatives, including in the G7 Industrial Decarbonisation Agenda (IDA) and the Breakthrough Agenda. It is the only G7 country with both a hydrogen and a CCS strategy, though with no actual projects fully materialising yet. It has set up its own ETS upon leaving the EU, but is trailing behind the EU ETS in that a phase-out date for free allowances is not yet on the table.

> **The US**, the second largest steel producer among the G7 countries, is one of the steel policy laggers. It lacks any form of national carbon pricing, and while the very recent release of an industrial decarbonisation roadmap is showing some policy direction, it is staying well clear of setting a steel emission reduction **target**. The US shows relative strength in the policy "pushes" – investments are on the cards through acts and laws, most notably through the Inflation Reduction Act (IRA). The US's work on green public procurement, and related intentions for steel, are further set to motivate domestic producers whose production pathways are already cleaner than many other places given the large portion of production through electric arc furnaces with scrap. However, the US lacks any concrete hydrogen or CCS projects for steel decarbonisation.

About E3G

E3G is an independent climate change think tank with a global outlook. We work on the frontier of the climate landscape, tackling the barriers and advancing the solutions to a safe climate. Our goal is to translate climate politics, economics and policies into action.

E3G builds broad-based coalitions to deliver a safe climate, working closely with like-minded partners in government, politics, civil society, science, the media, public interest foundations and elsewhere to leverage change.

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