

# 8 A more globally minded European green industrial policy

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*“I want Europe to be the first climate neutral continent in the world by 2050,”* proclaimed Ursula von der Leyen, President of the European Commission, in the context of discussions about the European Green Deal in December 2019. The goal at the time sounded bold and inspiring. To back it up, the European Commission announced ambitious targets for 2030: a 55 percent emissions reduction from 1990 levels, which corresponds to a 40 percent reduction from 2019 levels. To achieve this, Europe is adopting a set of directives and policies, including an expansion of its carbon trading mechanism to include air and shipping transport, and the adoption of the Carbon Border Adjustment Mechanism (CBAM). In addition, in the context of the recovery from COVID-19, it is putting on the table €750 billion (€360 billion in loans and €390 billion in grants) in NextGenerationEU funds to support decarbonisation and digitalisation processes.

If the plans are successful and all goals are achieved, the EU will have reduced global emissions by 2050 by a paltry 9 percent. Obviously, this is too little to do much to change the course of global warming.

Moreover, decarbonisation is only one half of Europe’s green industrial policy equation. The other half, to *“make sure that the future of industry is made in Europe,”* featured prominently in Ursula von der Leyen’s State of the Union speech in 2022 (Von der Leyen, 2022). In Europe’s post-COVID-19 economy, wracked by supply-chain disruption, strategic competition over critical minerals, and an uncomfortable

dependence on Russian oil and gas and Chinese solar panels, it is easy to see where von der Leyen is coming from. Europe's policy prescriptions though – to mine its own minerals and make its own green hydrogen and solar panels – are harder to understand.

Both of Europe's goals suffer from the wrong framing, because they neglect the global dimensions of global warming and the future of industry. On decarbonisation, Europe's goal must obviously be to reduce global emissions. Reducing Europe's emissions to zero does very little, unless Europe can bring the other 91 percent of emissions along with it. On the future of industry, Europe's goal should be first to maximise the global value of the clean economy, and then to claim as much as it can.

To be fair, many of the current European policies and policy proposals are sensitive to the international dimension. Europe's CBAM attempts to create a level playing field that applies the same price to carbon emissions embodied in industrial production, whether they take place domestically or abroad<sup>46</sup>. Similarly, the proposed Critical Raw Materials Club appears to aim in part at developing critical mineral supply chains and deposits around the world, and the Green Deal Industrial Plan affirms a commitment to open trade in principle (European Commission, 2023).

But 'Europe First' policy goals – decarbonising the European continent and making what Europe needs domestically – mean that Europe might not consider valuable approaches and instruments because of a lack of a framework to justify them. Here, we reframe the goals of Europe to include these global dimensions, and draw out some of the implications.

46 See European Commission press release of 14 July 2021, 'Carbon Border Adjustment Mechanism: Questions and Answers', [https://ec.europa.eu/commission/presscorner/detail/en/qanda\\_21\\_3661](https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3661).

## **The silent prologue to 'Europe First' goals**

'Europe First' goals (to be the first net-zero continent and to make the future of industry in Europe) suppose a set of unspoken assumptions on how the whole will respond to its parts. We should bring these assumptions into the light to see how realistic they are.

Europe aims to be the first net-zero continent. One implicit assumption is that by promoting the technological innovations needed to reduce emissions, it will bring the costs of clean technologies down for everyone and hence accelerate global decarbonisation. Maybe, but maybe not. Europe trying to decarbonise faster than the rest of the world could increase the relative price of scarce resources including lithium, copper and cobalt, and hence slow everyone else's decarbonisation efforts. It might also cause Europe to try to do things in Europe that can be more efficiently done elsewhere, such as capturing solar and wind energy, and hence become uncompetitive and decline economically, with uncertain effects on global emissions. Europe could also end up protecting its domestic market in ways that may reduce the incentives others have to decarbonise in order to meet Europe's emission standards.

By making the future of industry in Europe, Europe hopes to supply the world with what it needs to make its own energy transition, and thereby profit from the rest of the world as it attempts to decarbonise. But it is equally likely that Europe's industrial policy could be zero sum: by attempting to localise supply chains domestically, Europe could disrupt efficient allocation of capital, undermine economies of scale and needlessly transfer wealth to shareholders of companies by engaging in subsidy races with other industrial nations.

For a guide on how to make industrial policy zero sum, Europe just needs to look across the Atlantic. In late 2017, Amazon announced it would create a second headquarters somewhere on the North American continent. Over 200 municipal economic development agencies across the US lined up to lavish tax breaks, subsidies and funding on one of the world's largest companies in the hopes of attracting its 50,000 workers.

More than a year later, Amazon selected Washington DC and New York (its presumptive frontrunners from the start), having extracted offers of over a billion dollars in state funds for its shareholders. Getting drawn too far into a subsidy race with Europe's strategic competitors to localise clean industries could have the same effect.

All of this is to say that the general equilibrium effects of a 'Europe First' industrial policy are opaque. Green industrial policy in Europe takes place under conditions of fundamental uncertainty: not only are there obvious uncertainties over which technologies are likely to win in the search for a cleaner future, but there are also many degrees of freedom on how the world might respond to Europe First efforts, making it hard to know whether they will really benefit Europe. Better to start with the right goals: to reduce global emissions, and to maximise the global clean economy (while claiming as much of it as Europe can).

### **What is industrial policy?**

Part of Europe's challenge is that it is not always clear what industrial policy means. Economists have long questioned whether industrial policy should exist at all. As the traditional argument goes, governments should not pick winners: they should let the market allocate resources across industries to reflect consumer preferences and technological possibilities. Governments rarely have superior information to justify interfering in the market, and even when they do, they shouldn't make matters worse by adding government failures (such as rent seeking) onto market failures.

But before there can be market regulation, there must be a market. A cardinal function of government is to co-create markets alongside changing technology and social relations. Industrial policy is about creating the ingredients needed for an industry to thrive in the first place: the focus is on the rich web of (often vertical-specific) public goods that modern industries need. Cars require roads, traffic lights, rules and cops. Air travel requires airports, air traffic controllers, safety regulations, overflight rights and visas. Electricity systems require

standardised voltage and frequency. In other words, every technology presumes a set of public goods that are relatively specific and that need to be provided for an industry to thrive. This may involve creating product standards for market players to adhere to, inspecting product safety and quality so customers have the confidence to buy, adapting infrastructure to product needs, training the workers industries will require, and coordinating research ecosystems, companies and investors around particular technology or industry roadmaps. Governments need to engage deeply with industry to supply the public goods needed for industries to take off.

Industrial policy can also involve internalising learning externalities, solving coordination problems and de-risking private investment. Without intervention, market outcomes in these cases may be inefficient because the incentives faced by certain activities are weak relative to the benefits that society may obtain from them. This is the general case in favour of subsidies. R&D subsidies may compensate for learning externalities. Advance market commitments may solve coordination problems. Grants de-risk investment. But over-emphasising subsidies may shift the focus away from the public goods that industries need in order to thrive.

Industrial policy's cardinal rule is never to stray too far from an industry's inherent economics, or a region's underlying comparative advantage, while helping to accumulate the capabilities needed to evolve that comparative advantage in purposeful directions. Put differently, industrial policy can do many things, from promoting good jobs, to reviving the Rust Belt, to bringing production home, so long as it does not try to step beyond what is economically possible given the state of technology, or a region's production costs relative to those of its competitors. States that do so at scale risk grave public waste and self-defeating policies.

China knows this only too well. Chinese industrial policy is currently the envy of the western world, which admires, loathes, fears and attempts to emulate it all at the same time. But three generations ago, in

an attempt to wean itself off imported steel and develop its hinterlands, China planned a 'Great Leap Forward' consisting of small-scale backyard steel furnaces that waged misguided war against the technology and economics of large-scale modern steel production. This is not, of course, to compare Europe's highly considered green industrial policy with China's tragic decision. But efforts by many developed countries with high labour costs to recreate relatively small-scale domestic solar manufacturing industries may not, ultimately, be any more successful.

### **A framework for green growth**

A rigorous framework for green growth in Europe starts with the observation that Europe can best pursue its dual economic and environmental goals not by focusing only on decarbonising its own economy, but on helping the world decarbonise. This involves helping the world produce the goods and services it needs to decarbonise, wherever they can most efficiently be produced.

A seismic shift in comparative advantage will take place as local energy resources start to matter in the production of energy-intensive industrial commodities again. Throughout the history of human civilisation, industry has been located close to sources of energy. This changed in the twentieth century, as cheap-to-transport fossil fuels made it possible for energy-intensive industrial production to take place pretty much anywhere.

But decarbonisation implies a move from cheap-to-transport fossil fuels to green sources of energy – sun, wind, hydro and geothermal – that are unevenly distributed and very hard to move. A megawatt of solar energy costs a small fraction of what it takes to transform it into green hydrogen or ammonia and ship it to Europe. Better use it where it hits. The local availability of renewable energy will increasingly drive an economy's comparative advantage. Places rich in hard-to-transport renewable power have a generational opportunity to produce the energy-intensive building blocks of the world's economy, including fertilisers, steel, aluminum, chemicals and fuels.

Europe's green industrial policy should recognise and work with this economic reality, rather than attempt to fight it. Europe is a large net importer of energy: it lacks the renewable resources to engage in zero-carbon energy-intensive industrial production. Producing basic industrial commodities such as green hydrogen, steel or ammonia with German sunshine and wind will be less efficient than doing it with German knowhow and Namibian sun and wind.

None of this means that Germany needs to deindustrialise the Mittelstand. Fortunately for Europe, energy costs matter less for more complex forms of production that are further downstream from many of the energy-intensive inputs. Energy costs make up a greater proportion of the cost of raw aluminum than they do of the aluminum-encased laptops on which we are writing this chapter. And increasing the size of the global green economy will increase overall demand for the green products and services in which Europe does have a comparative advantage, such as carbon accounting services, engineering, procurement, construction and complex electrical equipment.

Europe is already seeing these dynamics play out in the way that surging natural gas prices have rendered sectors of European heavy industry uncompetitive, from ammonia to steel to basic chemical production. Natural gas is substantially more transportable than hydrogen or renewable electricity, but much less so than oil. As a consequence, the spot price of natural gas in the European market (TTF) is, at the time of writing, some 20 times the price at Henry Hub, coming down from much higher multiples. Definitely, the law of one price does not apply to natural gas and it will apply much less to green hydrogen. Trying to keep energy-intensive nodes of the value chain in Europe is unlikely to succeed. Instead, these nodes should relocate to places that are potentially more efficient in capturing green energy. Part of the mechanism through which Europe will achieve net zero is by relocating – outside of Europe – production steps that can be more effectively decarbonised elsewhere. European green industrial policy shouldn't try to fight this reality: it should instead plan an orderly transition

into the green industries of the future in which it is likely to retain or enhance its comparative advantage.

This dynamic applies in the same way for manufacturing of clean-energy technologies. Industry dynamics and Europe's economic structure give Europe an advantage in producing some clean-energy technologies, but make it less well equipped to produce other technologies. Manufacturing of wind turbines and lithium batteries appears to be easier to localise in high-wage industrial economies.

Other technologies such as solar panels exhibit extraordinary economies of scale and labour forms a relatively high share of total production costs, meaning that it will always be most efficient to produce the world's solar panels in only a few places with low labour costs. The US Department of Energy's Solar Office has accordingly concluded that:

*“to reestablish domestic solar manufacturing in the U.S., companies that produce and sell solar components will require financial support to offset the 30 – 40% higher cost of domestic solar production... These tax credits should be enacted for at least a decade... Renewal for some time thereafter... could be required to maintain US competitiveness”* (US Department of Energy, 2022).

Europe, it seems, should not follow the US's lead and create large subsidies for domestic production of solar panels. Doing so would fight comparative advantage, rather than work with it.

### **Coordinate international value chains to maximise shared value**

A globally-minded European green industrial policy would therefore put production where it makes sense to put it, and only engage in strategic competition over the parts of the value chain in which Europe realistically has a comparative advantage.

How should Europe determine in which parts of the value chain it could have a comparative advantage? Bottom-up technoeconomic cost modelling is one approach widely used in firms and industrial



strategy offices. Another approach (that is less familiar to industrial strategy offices) is to apply economic complexity analysis to emerging clean supply chains (Hausmann *et al*, 2014). This enables researchers to predict which industries might thrive in certain places based on whether the industries are similar to existing activities that already succeed in that place.

Where parts of clean value chains should be located abroad, European industrial policy should coordinate with partner countries to help build out these value chains. Europe's ultimate aim, after all, is to help the world decarbonise, not to bring its own emissions to zero the fastest. To do so, it must create the infrastructure to scale the building blocks of the clean economy wherever it makes sense to scale them, whether these building blocks are critical minerals, green steel or manufacturing supply chains.

Of course, this doesn't mean that Europe should bankroll the green transition for everyone else. European industrial policy should aim to maximise the size of the clean economy, and take a fair share of it for Europe. Crucially, Europe's return depends on the total size of the pie, not just on its share of the pie. Attempting to take too much of a green value chain can be counterproductive. To understand this point, just look at Bolivia's lithium industry. Bolivia has the world's largest lithium reserves by some margin, but it produces no lithium: Bolivia's mining rules attempt to reserve such a high share of the industry profits for Bolivians that they scare away foreign investors that have the capital and knowhow to develop Bolivia's lithium industry. Europe's attempt to make all possible things at home might replicate a similar inefficiency, but on the manufacturing front.

In addition, it may prevent others from decarbonising. The global discussions in the context of the Paris Agreement and subsequent Conference of the Parties meetings have focused on what will be done to help finance the energy transition in developing countries, in order to reduce their carbon footprints. These talks include, *inter alia*, setting up the Global Environment Facility and the Clean Energy Finance

Facility. But many developing countries are already severely over-indebted, both fiscally and externally, and adding more debt to their books, even under soft terms, will crowd out other investment priorities. Ultimately, foreign financing only postpones payment. In the end, imports are paid with exports and if developing countries are not going to have a role as exporters in the new green economy, they will not be able to pay for the imports their economies will require. Helping these countries leverage their advantages so they can become efficient nodes in global green value chains is crucial to make sure that supply is elastic to the growing global demand for decarbonisation. However, all of the discussion of green development finance has been focused on funding the decarbonisation of developing countries themselves, not on helping them become important suppliers of the world's decarbonisation needs.

Helping Europe's partners to develop will also maximise Europe's economic returns, as it gives Europe's trading partners the resources they need to buy Europe's green technologies. Merely providing credit through development finance is not enough: it postpones the issue until the bill has to be paid. Europe's trading partners need revenues, not debt: they can get these revenues if Europe helps localise appropriate parts of green production there.

Just as vested interests and industry's political economy affects Europe, it also affects Europe's trading partners. In many developing economies, such as South Africa and India, powerful political interests sit behind the coal-based electricity system, and these forces resist the transition to green energy and decarbonised production. A globally minded industrial policy would develop economic constituencies and political economic forces behind green industries in Europe's trading partners (to counterbalance fossil-fuel interests that resist change). Seeding industries in these places around critical minerals, solar and wind, green hydrogen, green steel and other green technologies with European industrial policy would serve Europe's goal of helping the world decarbonise.

How should Europe earn a return from its industrial policy investments abroad? The answer to this lies in the recognition that every business has three constituents: workers, shareholders and customers. European workers can benefit if these industrial policy investments abroad lead to demand for products and services produced in Europe, for example through the design of projects, the sale of machinery and the provision of technical assistance. European shareholders can benefit when they earn a return on foreign direct investments through debt or equity. And European customers can benefit when they secure the lowest-cost sources of supply.

Flexibly and agnostically seeking to benefit the different constituents of the European economy – workers, customers and shareholders – can help inform how European industrial policy should address its thorniest industries. These are industries for which domestic production is uneconomical, where Europe is reliant on strategic adversaries for supply and where industry dynamics lead to extreme concentration. These include industries such as solar and also the energy-intensive segments of many value chains.

Recognising that industrial policy can promote these three different constituent groups can expand the parameter space for European industrial policy, and thereby enable it to create better strategies. Europe seems to be stuck: it shouldn't localise production domestically when doing so is uneconomic. At the same time, European energy security demands that it can't rely on China for its supply of solar panels, or try to protect its industry from more efficient producers of hard-to-move green energy. The solution is for Europe to channel its purchasing power into developing a supply chain outside of China in regions with lower labour or energy costs, and ideally with European participation in the technology and shareholding of the new supply chain. European industrial policy would thereby benefit European customers and shareholders, while recognising that European workers are better employed in tasks other than low-skilled labour or energy-intensive manufacturing.

## Conclusion

Europe is in the process of aligning its considerable ingenuity, resources and ambition behind a green industrial policy that pursues the wrong goals: to become the first continent to decarbonise, and to build the future of industry in Europe. The right goals for European green industrial policy – to help the world decarbonise, and to maximise the value of the clean economy, while claiming Europe’s share in it – are not far off. But the differences are significant, not just nit-picking: a green industrial policy framework that is more globally minded will be more adaptive, nuanced and accommodating of the real tradeoffs that Europe must confront.

Many proposals under the European green industrial policy umbrella are sensitive to these global dimensions. But in its actual implementation, European green industrial policy may end up splitting the difference. Its Carbon Border Adjustment Mechanism, for example, is seen both as a protectionist measure to defend European heavy industry, and an attempt to make global markets fairly price in carbon. Europe’s REPowerEU plan aims to produce half of the EU’s hydrogen domestically and import half of it from abroad, which seems like a compromise struck by policymakers keen to localise at least some production<sup>47</sup>.

Promising all things to all people with industrial policy may be smart politics, but it is not smart economic strategy. Superior strategy involves confronting real inconvenient tradeoffs, choosing between dearly held goals, and letting go of good opportunities to pursue great ones. Baking the binding restrictions of green industrial policy in a global setting into European goals will make European green industrial policy stronger, not weaker, and more likely to benefit Europe’s economy and the planet overall.

47 See European Commission press release of 13 February 2023, ‘Commission sets out rules for renewable hydrogen’, [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_23\\_594](https://ec.europa.eu/commission/presscorner/detail/en/IP_23_594).

## References

- European Commission (2023) 'A Green Deal Industrial Plan for the Net-Zero Age', COM(2023) 62 final, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52023DC0062>
- Hausmann, R., C.A. Hidalgo, S. Bustos, M. Coscia, A. Simoes and M.A. Yildirim (2014) *The Atlas of Economic Complexity: Mapping Paths to Prosperity*, The MIT Press, available at <https://doi.org/10.7551/mitpress/9647.001.0001>
- US Department of Energy (2022) *Solar Photovoltaics Supply Chain Deep Dive Assessment*, US Department of Energy Response to Executive Order 14017, 'America's Supply Chains', available at <https://www.energy.gov/sites/default/files/2022-02/Solar%20Energy%20Supply%20Chain%20Report%20-%20Final.pdf>
- Von der Leyen, U. (2022) '2022 State of the Union Address by President von der Leyen', speech to the European Parliament, 14 September, available at [https://ec.europa.eu/commission/presscorner/detail/en/speech\\_22\\_5493](https://ec.europa.eu/commission/presscorner/detail/en/speech_22_5493)