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Article

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Intereconomics

Suggested Citation: Tagliapietra, Simone; Veugelers, Reinhilde (2021) : Fostering the Industrial Component of the European Green Deal: Key Principles and Policy Options, Intereconomics, ISSN 1613-964X, Springer, Heidelberg, Vol. 56, Iss. 6, pp. 305-310, <https://doi.org/10.1007/s10272-021-1006-5>

This Version is available at:

<https://hdl.handle.net/10419/247766>

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Simone Tagliapietra and Reinhilde Veugelers

Fostering the Industrial Component of the European Green Deal: Key Principles and Policy Options

In 2019, Ursula von der Leyen adopted the European Green Deal as the flagship initiative of her new European Commission (von der Leyen, 2019). With this initiative, the EU executive arm aims at making Europe the first climate-neutral continent by 2050. To get there, EU member states committed to cut greenhouse gas emissions by 55% by 2030 compared to 1990 levels. With the Fit for 55 package, the European Commission unveiled in July 2021 a set of legislative proposals to achieve its 2030 climate target (Tagliapietra, 2021).

The industrial policy dimension of the European Green Deal

As the European Green Deal seeks to unleash a major transformation in the European socio-economic structure – such as the move from fossil fuels to renewables, or from internal combustion engine cars to electric cars – this challenge is often referred to as a revolution against a deadline. As in any major transformation, there will be winners but also losers, particularly in the short run. A strategy only based on climate targets and instruments, such as raising the price of carbon or banning diesel cars, could miss the target when firms and citizens fail or even simply refuse to adjust. Only a policy creating a broader space for more winners than losers can sensibly face the challenge of such a vast transformation.

The necessity to meet climate and environmental targets, while at the same time ensuring economic and social sustainability, requires a transformation that will generate enough benefits to compensate the losers. This brings industrial policy under the spotlight of the European Green Deal. But what should a green industrial policy look like? In this article, we use insights from recent trends in the academic literature

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Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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on industrial policy to identify the guiding principles for green industrial policy development and test this on the EU's steps towards developing a green industrial policy in the context of the European Green Deal.

Green industrial policy: Where climate policy meets industrial policy

While climate policy finds its main target in fostering decarbonisation and industrial policy finds its main objective in boosting economic competitiveness and jobs, green industrial policy has the aim of reconciling the goal of decarbonising the economy (i.e. like climate policy) with economic and social sustainability (i.e. like industrial policy). We can thus define green industrial policy as an industrial policy where climate change mitigation becomes a binding constraint in the overall social welfare policy objective.

This combination of objectives immediately identifies the challenge of green industrial policy, namely to reconcile both objectives. This may be particularly difficult when they come into conflict as trade-offs will need to be made and costs will have to be attached to missing the climate change objectives. Most countries already have climate and industrial policies in place, each with their own instruments and typically residing in different governmental departments. In this context, an important question is: Would a coordination of already existing instruments from climate change and industrial policy be sufficient for a green industrial policy? Or would green industrial policy need its own dedicated policy instruments? And if so, how should this be coordinated with existing instruments in an optimal policy mix?

Insights from the new industrial policy literature for green industrial policy

Stacked with a lack of robust evidence of successful industrial policy cases and fully aware of the informational and rent-seeking problems constraining the implementation of industrial policies, a new wave of academic debate around forms of industrial policy has arisen, with the seminal work of Rodrik (2014) introducing a new industrial policy perspective. This new perspective seeks to move beyond the traditional ideological division between state-driven intervention versus purely market-based solutions, arguing for a smart combination of both – and shifting the debate away from whether governments should tackle industrial policy at all, to how they can do it well. It acknowledges both theoretical reasons for

intervention, rooted in market failures, and the implementation difficulties, rooted in government failures.

The new industrial policy approach moves the debate away from the classical view of industrial policy as a mere set of tools to allocate resources towards understanding it as a process. Rodrik (2014) argues for new industrial policy to be a “process of institutionalized collaboration and dialog [between the private sector, government and civil society] rather than a top-down approach” where the government picks sectors or firms and transfers money to them. The private sector has to be one of the three fundamental stakeholders of this collaboration where the other two elements are the government and civil society. This new approach also argues for a much broader objective function, moving beyond short-term competitiveness and growth to include more long-term sustainable growth.

The principles used by the new industrial policy approach to design policy interventions rest on the notion that the role of the state in industrial policy design must be that of identifying constraints and opportunities. This will in turn generate solutions that bring together private and public capacities and information, with aligned public and private motives, in a very pragmatic way. At the same time, the new policy design needs to address the issue of rent-seeking and political capture. It should develop a process of iterative collaboration, experimenting and learning, effectively combining sticks and carrots, monitoring and evaluating, building in accountability and transparency (Rodrik, 2014; Altenburg and Rodrik, 2017; Ambroziak, 2017; Pegels, 2017; Andreoni and Chang, 2019; Hausmann et al., 2020). Government agencies have to be embedded with the private sector in order to efficiently reveal their information and leverage it to design policies. This conception requires a high degree of collaboration between the public and private sector, a collaboration that has to be iterative, since the solutions are not assumed as known, but only as discoverable.

A “new” green industrial policy

A green characterisation of industrial policy comes into play once decarbonisation is set as a societal goal, like in the case of Europe with the European Green Deal. As previously mentioned, in addition to market failures at the core of classic industrial policy, green industrial policy also has to address the greenhouse gas externality associated with climate change. As externalities have complex reinforcing interactions, the combination of classic market failure externalities and the greenhouse gas externality represents a significant challenge for green industrial policy. In this section we delve further into the challenges for a green industrial policy and how the principles of new industrial policy are particularly well suited for designing such a green industrial policy.

Compared to what is typically the case of general industrial policy, green industrial policy calls for addressing the problems associated with the transformative change that climate change brings, rather than addressing instantiations of competitiveness of targeted sectors and firms.

Longer-term broad objectives involving the whole of society allow the building of more win-win coalitions compared to the short-term competitiveness objectives of selected sectors and firms. This broader public interest is the foundation for the legitimacy of the policy. The need to address broad societal transformation creates the unique angle for a green industrial policy in the spirit of the new industrial policy perspective. Green industrial policy needs to activate a process of institutionalised collaboration and dialogue between governments, private sector actors (from various sectors and technologies and different parts of the value chain) and civil society. Public-private partnerships will be central in green industrial policy and covering a large set of private sector areas and civil society.

For green industrial policy, the lack of risk-taking can be particularly problematic in the long run, as the possibility of doing too little too late is extremely worrisome. The experimentation and learning principle from the new industrial policy perspective is key for green industrial policy, rather than a cautionary principle of only intervening if there is a certain, clear case for intervention. Green industrial policy should be taking risks, particularly helping to shape the landscape for new, yet-to-be-developed ecosystems and markets where stakeholders still need to be connected for the first time.

Green technologies are often still in the early stage or emerging, with higher levels of risk and uncertainty. In addition, green technologies seem to be more complex than non-green technologies and tend to have larger spillovers and affect a higher variety of other domains (Barbieri et al., 2020). The higher risks and uncertainty and the higher externalities from clean technologies make the case for a more directed approach aimed at supporting investments in clean technologies. Beyond the spillover arguments, an investment push directed at clean technologies is necessary to counter the lock-in of fossil fuel-based technologies and their path dependencies (Aghion et al., 2011, 2016, 2019).

Green industrial policy has to deploy a broad mix of policy instruments, balancing those of a horizontal and vertical nature. Co-financing should cover a balanced set of projects that accelerate and consolidate existing scientific and industrial capacity (e.g. electric cars), together with new projects targeting frontier technologies and markets (e.g. green hydrogen). Instruments have to cover the whole value chain from research, development and diffusion to manufactur-

ing, distribution and sales (i.e. a combination of technology push and market pull; see, for instance, Kemp and Never, 2017).

Climate change is a global commons problem, leaving the risk of overexploiting a common good, e.g. clean air, while free riding when investments need to be made for solutions to the problem. Rodrik (2014) points to competition between countries sparking a race for innovation that solves the market failures linked to price distortion (by lowering prices) and of underinvestment in R&D (by fostering competition from Schumpeterian rents). At the same time, global cooperation in R&D, particularly the pre-commercial phases of R&D can bring cost and risk sharing advantages and higher efficiencies from combining complementary knowledge and exploiting synergies. All this implies the need for multilateral coordination on green industrial policy, which should strike a balance between cooperation and competition to reach global targets (e.g. Lütkenhorst et al., 2014).

Strong operational governance is the key to successful green industrial policy. This is needed to address coordination among the many different types of stakeholders, policy governance areas, instruments and projects, and to coordinate across different geographical layers. It requires a highly competent and empowered governance body, which is sufficiently politically independent – or detached from political pressures – yet accountable for its achievements with a set of clear realistic milestones. And as green industrial policy requires a more directed approach towards clean technologies, it relies on the government's capacity to correctly process incoming information to allocate resources. Another governance challenge has to do with high uncertainty and the need for a long time horizon for green policymaking, conflicting with the incentives of politicians to look for short-term successes. A long-term vision of paths and objectives is important (Lütkenhorst et al., 2014). At the same time, Lütkenhorst et al. (2014) underline the strong need for ensuring flexibility under these different forward-looking settings.¹

Both the market and the state have limits to what they can deliver. Therefore, it is necessary to make them work together efficiently in order to enable successful green industrial policy. The design of public-private partnerships and a strong policy governance will make or break green industrial policy efforts.

¹ One example is the use of 15-20 years guaranteed feed-in tariffs: Long-term prices are guaranteed, but the auctioning mechanism works in batches in order to adapt to technology cost changes.

Lessons from national green industrial policy experiences

We test the principles laid out in the previous section against the evidence on the strengths and weaknesses of four cases of green industrial policy implemented in the Netherlands, Denmark, Germany and the US (Tagliapietra and Veugelers, 2020).

A first lesson from all these green industrial policy cases is the importance of effective collaboration between all elements of society. Policy should be able to involve both industry and society, as new industrial policy advocates. In the Netherlands, transition pathways have long been negotiated across all stakeholder groups allowing for constructive collaboration. In Denmark, cooperative ownership structure and bottom-up political activism have been key in the successful wind industry growth. Public-private partnerships have enjoyed similar success in Germany.

Another lesson is the importance of policy stability and predictability over a longer-term horizon. The growth of the Danish wind industry was strongly supported by stable policy support. Conversely, policy inconsistency in the Netherlands arising from energy market liberalisation programmes reduced the effectiveness of transition management programmes. Yet, in view of the high uncertainties, long-term commitment needs to go hand in hand with flexibility. The German experience of progressively adapted targets for energy efficiency of buildings is a good example.

The lesson of “not putting all of your eggs into one basket” refers to a balanced set of instruments, mixing the demand pull and technology push, general, horizontal instruments, and specific, targeted instruments. With respect to selecting targets, the US experience with solar panels shows that public administrations should refrain from placing any one industry or organisation on a pedestal.

A final observation from the German feed-in-tariffs (FIT) experience is the importance of clearly defining and understanding the relative importance of “green” and “industrial policy”. The German FIT arguably catalysed the global market for solar photovoltaic systems; yet, the market for solar photovoltaic systems is one that German players now hold a relatively low share in, which might appear to be a failure from a purely industrial policy perspective. Yet from a green perspective, the policy was successful; even from an industrial policy perspective, at least when taking a broader objective, the policy was a success in terms of including value added and jobs created in the servicing of solar panels. Notably, the Danish wind deployment programme was successful from both perspectives.

Green industrial policymaking in Europe

Europe remains far from having a full-fledged green industrial policy. It has at best a multitude of green industrial policy initiatives, covering different geographical layers (i.e. regional, national and EU). These initiatives are generally not coordinated – and may even be conflicting. European regions promote their own smart specialisation initiatives with the aim of exploiting their existing competitive edge or building one in certain green technology sectors. Member states often use different policy tools to push their green industrial policies, spanning from public funding for green innovation to subsidies for the deployment of green technologies; from green public procurement to clean energy standards. This represents a major issue because strongly differing green industrial policies across countries fragment the EU single market and could undermine the level playing field across Europe. This calls for a strong EU coordination in the field.

The EU level also holds several policy tools, belonging to different EU policy realms such as competition policy, climate policy, research and innovation policy, EU public investments, EU single market rules and development policy, which it can deploy for green industrial policy.

In March 2020, the European Commission (2020b) presented its “New Industrial Strategy for Europe”, a strategy primarily aimed at managing the green and digital transitions and avoiding external dependencies in a new geopolitical context. Although the “New Industrial Strategy”, being more general, does not have the explicit ambition to be a green industrial strategy, it does contain an explicit green dimension. The document notably presents the following set of green industrial policy goals: securing the supply of clean energy and raw materials; stepping up investment in green research, innovation, deployment and up-to-date infrastructure; and creating lead markets in clean technologies with regulatory policies, public procurement and competition policy.

The need for public-private partnership and the need to coordinate with member states and regions is explicitly recognised in the document, which calls EU institutions, member states, regions, industry and all other relevant players to work together to create lead markets in clean technologies and ensure our industry is a global frontrunner. It also recognises the necessity for the EU to leverage its single market.

Yet, the EU strategy document appears more as a collection of energy, climate, innovation and social policy initiatives than as a truly coherent green industrial policy framework. The strategy does not provide the convincing governance necessary to turn the green transition into an industrial opportunity in the context of the European Green Deal. Certain general elements reflecting the new industrial policy approach, such

as supporting industrial ecosystems encompassing all players operating in a value chain, are going in the right direction, but much stronger action is required to develop a workable effective EU green industrial policy.

Developing an EU green industrial policy to deliver the European Green Deal

In the following, we propose a set of policy recommendations for the EU to develop a green industrial policy for the European Green Deal.

Strong governance

Given the complexities intrinsic to both green industrial policy as a policy realm and to the EU as a wide-ranging policymaking machine, strong governance represents a key prerequisite for an effective EU green industrial policy. This is the key to efficiently addressing coordination among different types of stakeholders, different policy governance areas, different instruments and different projects.

First, the various partners need to be incentivised with a set of balanced, clear, credible and time-consistent commitments. Second, it is necessary to set clear and realistic intermediate milestones throughout the process to allow for more risk-taking. Third, a flexible policy design is required in order to properly address the risks and uncertainties and the associated information problem through a learning process characterised by strong monitoring, evaluation and feedback loops into the policy process. Four, it is necessary to ensure the accountability of these milestones, matching carrots with sticks. In our view, implementing all this requires strong governance that should be based on three principles: competence, ownership and political independence.

Tackle the geographic fragmentation

The current European green industrial policy landscape remains highly fragmented, notably between a vast number of initiatives being undertaken at the EU, national and regional levels with little to no coordination. Green industrial policies strongly differ across countries, and this could undermine the level playing field across Europe – and thereby fragment the EU single market.

To tackle this geographical fragmentation, there are three major ways at the EU level to translate this into the field of green industrial policy: the state aid control instrument, the European Semester and the regional RIS3 smart specialisation programme. A regular evaluation of national and regional programmes by the European Commission could be done in the realm of green industrial policy, as it will create the space for coordination of the various ongoing policy initiatives.

Develop sound public-private partnerships with more and stronger European Alliances

Our recommendations on EU green industrial policy governance include a strong private embeddedness. We recommend expanding the use of the European Alliances format, which has been employed since 2017 on batteries and since 2020 on clean hydrogen. These Alliances represent an important tool of public-private collaboration at the EU level and should become a key tool for EU green industrial policy. Important Projects of Common European Interest (IPCEI) are a core characteristic for these European Alliances. A further broader and deeper application of IPCEI should be considered, to make the best of this tool. This implies opening-up a dialogue with the state aid arm of the EU's competition policy.

Alliances should focus on addressing problems covering the whole value chain for activating all relevant clean markets, rather than instantiations of problems.

To ensure a competitive environment stimulating innovations in the new clean markets created and supported by the EU's green industrial policy, and to avoid rent seeking, the EU should use its competition policy toolbox to assure that the competition policy arm of the Commission has sufficient dedicated expertise on clean technologies and markets.

Unleash EU green investments

EU green investments play an important role in realising the green transition, also by mobilising funds from both member states' national budgets and from the private sector. The EU decision to devote 30% of its long-term 2021-2027 budget to climate action is good news. But this target should be handled carefully. It will be of paramount importance for the EU to develop a solid methodology for monitoring climate spending and its performance on the whole budget, and to report on it regularly (Claeys and Tagliapietra, 2020).

The European Investment Bank (EIB) should be allowed to do more on climate action. The EIB currently benefits from very favourable rates for its borrowing from capital markets and it would be a shame not to use this opportunity to finance worthwhile green industrial policy projects. If EU countries are (unduly) worried about the EIB's rating, a capital increase should be given. This represents an important opportunity to take a step that would contribute to turning the EIB into Europe's true "climate bank". The EIB should also be supported in the further development of its role as intermediary governance body to address network and information imperfections in order to become a true "smart climate bank".

Foster EU green science and innovation

The EU needs to invest in green innovation to better position itself in fast-growing technologies, spanning from electronics to digital sectors that will increasingly underpin clean energy, clean mobility and smart buildings solutions. To truly develop a green industrial policy, the EU must leverage its public resources and toolkit to scale-up national and regional public resources into climate innovation, but especially private climate innovation investment. Fostering green innovation is not only about the total amount of public finance resources available, but also about how to allocate the total amount available to the best areas and projects, i.e. those with the highest socio-economic and climate returns that could not have been reached otherwise. In this respect, particular emphasis should go to high-risk, early-stage technologies with potential for general-purpose breakthroughs.

In the EU, this is the spirit of the European Innovation Council (EIC), and also of the well-established European Research Council (ERC). Although both are applicant-driven programmes for supporting frontier pushing science and ideas, without requiring a specific research focus to researchers in their calls, many ERC and EIC bottom-up proposals address climate change challenges and should thus be seen as an integral part of the toolbox for EU's green industrial policy, even if they are not explicitly directed to green technologies.

Go global

Europe produces less than 10% of global GHG emissions. To really make a difference for climate, the European Green Deal has to go beyond Europe's borders. To this end, it is of paramount importance for Europe to fill the current vacuum in leadership on the global scene, initiate and build "co-op-tive" global partnerships with other countries.

With respect to Europe's role relative to developing countries, we recommend leveraging Europe's external development policy and turning it into a vehicle of global sustainability. The Global Gateway initiative recently announced by the European Commission could become a key tool to export the European Green Deal, and thus become instrumental in EU green industrial policy. Such an approach would represent a triple win for the EU. First, it would help meet the EU's climate finance obligations and thus help to achieve the "conditional" emission reduction commitments assumed by most developing countries under the Paris Agreement. Second, it would enable EU industry to enter into new, rapidly growing markets – a win for EU green industrial policy. And third, it would help economic development in the EU's partner countries, providing an invaluable foreign policy dividend for the EU.

Conclusions

The European Green Deal aims at making Europe the first climate-neutral continent by 2050. This is not going to be an easy ride. To be successful, the European Green Deal will have to foster major shifts in the European industrial structure, such as the ones from fossil fuels to renewables, or from internal combustion engine cars to electric cars.

This will represent a broad, paradigmatic change for the European industry. Shifting economies from brown to green indeed represents one of the major socio-economic transformations in history. Not by coincidence, this challenge is often referred to as an industrial revolution against a deadline.

In this context, green industrial policy emerges as a cornerstone of the European Green Deal. We are convinced that the principles and policy recommendations outlined in this article could benefit the building process of a workable EU green industrial policy that could deliver on the ambitious objectives set by the European Green Deal.

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