Issue Brief
ENTWINED 2013/10/30 | 17

Green Industrial Policy and the World Trading System

By *Aaron Cosbey*

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ABOUT THE AUTHOR

Aaron Cosbey is a development economist specializing in the areas of trade, investment, sustainable development, and climate change. He is Associate and Senior Advisor with the Trade and Investment Program, and Associate with the Climate Change and Energy Program, at the International Institute for Sustainable Development, Canada, where he directs the Institute's suite of work on trade and climate change. He has published widely for over 20 years in the area of trade and sustainable development, and for more than 12 years in the area of climate change and energy, and has consulted to governments, research institutes, academia, UN agencies, NGOs and IGOs. His work with ENTWINED includes research on green industrial policy and on border carbon adjustment.

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THIS BRIEF TARGETS

- Environmental policymakers considering support for domestic "green" infant industries, for example in the renewable energy or low-carbon auto sector.
- Trade policymakers considering calls for revised trade rules to allow for green industrial policy.
- Policy analysts hoping to better understand how to craft effective green industrial policy.

KEY MESSAGES

- There are a number of sound rationales for employing industrial policies to support emerging green sectors, including benefits that go beyond the national level to global goods such as mitigating climate change.
- The details matter; we have many more negative examples of industrial policy than we do positive, and the tools must fit both the specific market failure being addressed, and the realities of the implementing economy.
- Industrial policy is inherently difficult for governments because, among other things, it demands a great deal of technical and sector-specific knowledge, and it is subject to intense rent-seeking by the supported firms.
- Subsidies may be an appropriate tool for green industrial policy in certain cases. But it is difficult to see how trade rules might accommodate their sensible use without also allowing their misuse.
- There may be a case for special trade rules that allow for industrial policy that achieves generally agreed global goods such as mitigating climate change and fostering development in least-developed countries.

PURPOSE OF THE ISSUE BRIEF: Drawing on country case studies of renewable energy support conducted for ENTWINED, and on the extensive industrial policy literature, this brief aims to highlight some of the key lessons for policy makers considering adopting green industrial policies. It also aims to contribute to the debates over whether WTO law needs to be reformed to accommodate industrial policy measures that address climate change and other global public goods.

What is green industrial policy?

Industrial policy, broadly cast, can be defined as, "a set of policies that selectively favours the development of certain industries over others" (Schwarzer, 2013). The definition used in this brief is broad, spanning from policies directly supporting certain sectors — such as tax breaks to certain firms — to policies that create a more conducive investment climate for innovative ventures across a range of sectors — such as science and innovation policies. Green industrial policy, more specifically, is any such policy that supports the development of industries that produce "green" goods, or goods that:

- Have better environmental performance in operation than their competitors (e.g., electric vehicles, renewable electricity-generating equipment, biofuels)
- Directly address environmental problems (e.g., environmental remediation technologies)
- Are produced in a way that is environmentally preferable to their competitors (e.g., organic agriculture).

The majority of green industrial policy in the last five years targets the development of new low-carbon energy technologies, such as solar PV and wind turbines.

Green industrial policy is at the heart of many of the most vexing current trade and environment frictions. Starting from zero disputes five years ago, such policies are now the subject of

scores of national trade remedies (including the largest domestic trade-remedy case in history, brought by the EU against Chinese solar PV imports), as well as three separate WTO disputes. This is understandable, on several scores. First, industrial policy is explicitly aimed at distorting the international flow of trade and investment, looking to grow so-called infant industries that will take market share from foreign competitors. Second, the value of the coming green economy is huge and growing, with the potential value of investment estimated at between US$ 1 to US$ 2.5 trillion per year (UNEP, 2012:23). Governments understandably want to direct their national economic growth toward these important markets of the future.

Rationales for green industrial policy

The first major movement toward green industrial policy came in the wake of the 2008 financial crisis, as part of national efforts to stimulate economic activity. Hundreds of billions of dollars were injected by governments into the economies of the EU, US, China and Korea, to name the biggest spenders.

It is reasonable to ask why governments should spend such money at all. Until recently, the accepted wisdom of most economists was that governments were terrible at picking winners and losers, and were doomed to waste money if they tried. The counsel of this particular aspect of the Washington Consensus was that government resources would be better directed at ensuring sound fiscal policies and macroeconomic stability, in order to attract investors that could function and thrive without need of government support.

This section will survey some of the rationales for using green industrial policy, almost all of which involve some sort of market failure. That is, without government intervention the free market solution turns out to be sub-optimal. Later in this brief we will look more critically at the use of such intervention.

Most of the justifications for government intervention are premised on the idea of latent comparative advantage: with a little help, a true comparative advantage could be fostered in some sectors. What varies from justification to justification is the reason why help might be needed.

• Knowledge or information externalities/spillovers/lack of appropriability: There are a number of reasons why individual firms may not be fully compensated for the social benefits created by their investments in innovation, and therefore would underinvest. They may be concerned that at least some of the fruits of their investment will be exploited by their competitors, for example through imitation of their ideas (Bardhan, 1971), or concerned that the costly process of discovering that a sector is profitable is only borne by the first actor to undertake it (Hausmann and Rodrik, 2003). In addition, there may be benefits of firms' innovation that extend to non-competitors in different sectors (Succar, 1987; Young, 1991). Finally, firms' investments in training workers for innovative production may be wasted, as the trained workers may take jobs with competitors or start their own businesses. In all cases where such rationales hamper investment, the result is investment in innovation that is less than the socially-optimal level. The role of government would be to increase incentives to invest in innovation, to subsidize R&D activities, or to subsidize worker training.

• The special case of environmental externalities: Environmental externalities are a special case of lack of appropriability — special because of the scale involved. There are massive environmental benefits to investment in green technologies — climate change mitigation and adaptation being the most significant category — that are not captured by investors' returns. Subsidies can internalize these external benefits.

• Capital market imperfections: For various reasons, firms may find it difficult to finance their operations as they try to move along the cycle of innovation from R&D to final deployment. Lenders may be unfamiliar with new technologies, assigning them overly high risk factors. Access to equity finance may be limited by the immaturity of the domestic market. Lenders may be hesitant to lend to smaller firms with short track records, irrespective of their fundamental creditworthiness. The role of government would be to facilitate finance by various means, including loan guarantees, educating financiers on new technologies and direct financial support.

• Learning by doing: It may be that firms in a particular country have a latent comparative advantage in a sector that can only be captured if they learn by doing (Krugman 1987). Established firms may exist that are currently more competitive, but against which domestic firms could compete if only they could achieve a certain level of production, learning as they go. Where such a dynamic exists (and it is, of course, difficult to say ex ante that it does), there would be an argument for government support to help kick-start and scale up the process of production or deployment through, for example, government procurement, support for demonstration projects, or demand-side incentives to deployment such as discriminatory feed-in tariffs.

• Increasing returns to scale: There are some sectors where the larger a producer gets, the more competitive it becomes, because the incremental cost of production is continually falling (or at least falling over the whole range of possible production for which there is demand). Where such a dynamic exists (and where limited private-sector financing makes it impossible for the firm to use private capital for expansion) there may be some justification for government helping firms reach a size at which they can be competitive on the global market. Grossman (1990) warns that the benefits of such actions diminish if several countries engage in the same sort of support.

• Agglomeration economies: There may also be potential for latent comparative advantage to be exploited where a number of synergistic firms are located in the same area. Silicon Valley is typically cited as an example of this sort of agglomeration effect, where the synergistic presence of others increases competitiveness of the group as a whole. In such cases there is an argument for governments to support the establishment of groups of synergistic firms through locational subsidies.

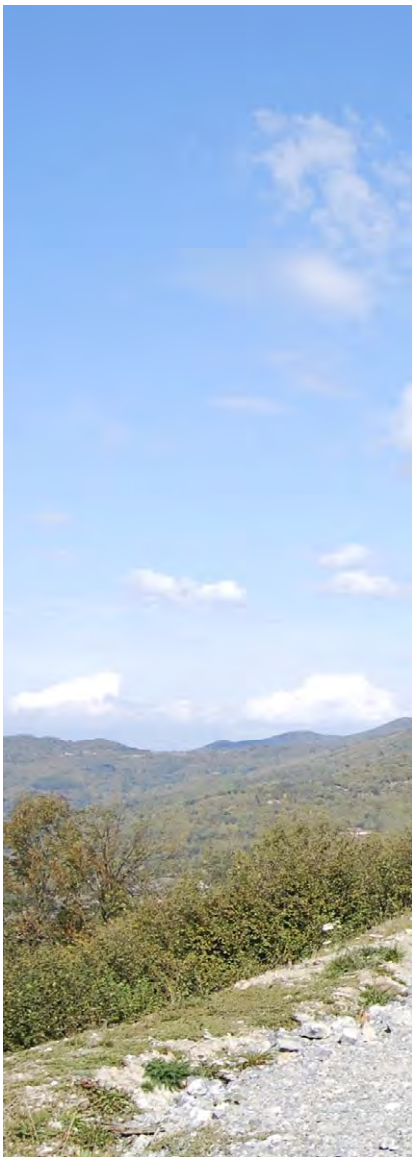
• Inherent bias toward existing technology: Presented with existing technology and potential substitute technology that is not yet mature or perhaps even developed, investors will choose to invest in incremental improvements to existing technology. This is true even where radical new technology would eventually be more profitable — to "build on the shoulders of giants." Such cases may justify government interventions aimed at lowering the cost of risk-taking innovation.

• Coordination or sequencing failures: Some technologies may need to be accompanied by other innovations, or specific infrastructure, in order to be viably deployed (Pack and Westphal 1986; Okuno-Fujiwara 1988). For example, there is no market for electric vehicles until there are charging stations, but there will not be charging stations until there is demand for them from electric vehicles. Similarly, large-scale wind energy is much less viable absent smarter grids than are found in most places. In such cases there may be a role for government in supporting investments in the prerequisite infrastructure or innovation.

• Imperfect competition in goods markets: If competing goods are subsidized then there may be an argument for subsidizing new technologies to compensate. Of course, removing the existing subsidy is the best policy, and second-best policies can have unintended perverse effects.

• Inability to pool risks of innovation: As a large pool, innovators in a specific sector (e.g., storage media for energy) may represent an acceptable rate of risk for investors. But there is no way to actually pool them, meaning investments in individual innovators are less than socially-optimal. There is a role for governments here in lowering the risk of failure across the board, for example through full or partial loan guarantees.

Green industrial policy is not fundamentally different than traditional industrial policy, so all of the rationales above (and the caveats below) apply to them equally. However, there are a small number of unique arguments supporting green industrial policy. The most important one by far is that of environmental externalities. Under normal market conditions the seller of green goods is not paid a price that captures the true social benefits of selling that particular good. For example, geothermal energy avoids the emissions of greenhouse gases associated with most conventional energy-generation technologies. But a straight purchase of geothermal-produced electricity at market rates does not compensate the producer for having delivered that global benefit. Thus, the incentives to producing such energy may be too low to result in the socially-optimal amount of production. Where the global benefits include the avoidance of climate change — arguably our greatest environmental challenge, with wide-ranging global costs if left unaddressed — these external benefits will be



substantial. Government interventions such as subsidies, feed-in tariffs and renewable purchase obligations are designed to address this sort of market failure.

Issues to give pause

The rationales for green industrial policy may seem compelling. However, there are a number of issues that should give policy makers pause as they consider whether to employ it, and as they decide on the design of policies.

First, several of the rationales discussed above involve the government knowing that there is some latent comparative advantage in a particular sector. That is, governments must somehow realize that a particular sector is characterized by increasing returns to scale, or has potential for significant learning by doing, or has agglomeration economies. Or it must somehow know that once barriers like financing or sequencing are addressed, domestic firms will have the potential to become globally competitive. This sort of information is not typically known either by governments or by the firms themselves (Rodrik 2004; Pack and Saggi 2006), so there is risk that governments will use scarce resources in failed efforts to create viable new global competitors (Klimenko, 2004). As such, the process of trying to discover that information is critically important. Indeed, Rodrik (2004) argues that industrial policy should be a strategic collaboration between governments and the private sector to discover where latent comparative advantage exists.

Second, the choice of policy-support measures is key. First and foremost, it should be directed to remedy the particular market failure that is in play, and, ideally, should be tailored to address only that problem. For example, if the problem is knowledge spillovers from the investment in discovering where there may be profitability, then a subsidy to the entire sector is wasteful; the subsidy should be directed to new entrants only. As part of the necessary tailoring, the choice of policy measures needs to be informed by the unique circumstances of each country involved: existing technical capacity, available business services and legal infrastructure, natural-resource endowment and geography, market demand and so on. And it needs to be informed by the unique dynamics of the sector involved: level of technological development, innovation on the horizon, structure

of the global markets and characteristics of competitors, etc. In addition, any policy support needs to contain tools that help ensure that when failures become evident (because there will inevitably be failures) support is withdrawn in a timely manner.

This is an exacting set of requirements for getting it right. Some argue that it is beyond the capacity of governments to do so. Even those that ardently support industrial policy argue that we need to expect many failures for every success (Amsden, 2001). Harrison and Rodriguez-Clare (2010), in an extensive survey of the literature, conclude that policies that improve the investment climate broadly are more effective than policies that target specific sectors and activities. Such a broad approach is often called "soft" industrial policy. Examples include:

- Creating special economic zones with lower infrastructure costs
- Investing in transportation-related infrastructure designed to increase trade
- Providing credit and insurance specifically for exporters, and
- Promoting export clusters (without sectoral discrimination).

"Hard" industrial policy, by contrast, consists of policies that target particular sectors, such as:

- Protective import tariffs on final goods
- Lower tariffs on specific inputs
- Subsidies to specific sectors: outright grants, land grants, low-interest loans, R&D support, tax holidays, etc., and
- Domestic-content requirements. [1]

The distinction could more accurately be described as a spectrum of policies from the very sector-specific to the very general. Because green industrial policy targets particular types of firms and specific sectors, it will always tend to lie toward the "hard" end of the spectrum.

There are two standard tests that green industrial policy, like traditional industrial policy, must meet if it is to be justified: the Mill text and the Bastable test (Kemp, 1960). The Mill test (as interpreted by Kemp) demands that the supported sector can eventually survive unsupported to compete globally. The Bastable

test (again as interpreted by Kemp) demands that the total cost of support be outweighed by the present discounted value of the benefits involved. Costs in this case would depend on the policy tools used: higher consumer prices if tariff protection is used; opportunity costs if subsidies are used, etc. In the case of green technologies there is an environmental cost in the present as well, since protecting infant industries results in higher prices for environmental goods, meaning less environmental protection for a given outlay, and more environmental damage. Benefits would include lower consumer prices in the future, when the infant industry grows up and becomes a competitive global innovator and producer. Significant benefits for green technologies include the environmental damage avoided in the future as a result of the new entrant(s) in green goods markets.

Another dimension of concerns can be classed as governance failure. Some of these were touched on above, when asking whether governments have perfect information about latent comparative advantage, or the capacity to adequately understand market failures more generally and choose the right tools to address them. There is another class of governance failure that is salient when discussing industrial policy. Many of the policies advocated for addressing market failures involve tools that create rents and vested interests. Subsidies are one of the best examples of this; they create concentrated interests that will lobby hard to maintain them even when they are no longer necessary (or worse yet, when they produce perverse results), while those with an interest in abolishing them — the general taxpaying public — are dispersed and less motivated. The concern, then, is that governments that are given a mandate to employ instruments for green industrial policy may be subject to influence by rent-seeking special interests. The result can be a waste of scare public resources, and likely less environmental protection than would otherwise have been possible.

Subsidies and the international dimension

While it is impossible to draw accurate generalities about the propriety of any particular policy instrument (because the context matters), trade barriers tend to be one of the least desirable instruments, while subsidies may be appropriate in some cases (Corden, 1957).

Trade barriers in the form of tariffs tend to be rather blunt instruments relative to the very specific problems identified as potential rationales for green industrial policy. In only two cases — learning by doing and increasing returns to scale — does it seem to make sense to opt for broad sectoral protection of the type afforded by tariffs. Even in such cases, protectionist tariffs may do more harm than good. Harrison and Rodríguez-Clare (2010), who are generally sympathetic to the need for some types of infant industry protection, find that trade protection is not the best option in any of the many models they survey. In general, tariff barriers work against the kind of exposure to international competition that must eventually take place for industrial policy to pass the basic Bastable test.

Subsidies, on the other hand, are a more versatile tool, though they come with their own problems. As noted above, they create vested interests keen on seeing their perpetuation. However, they can be more easily tailored to suit the needs at hand. If the

governance failure problems can be overcome, there are several reasons why subsidies might be justified as an industrial policy tool. Harrison and Rodríguez-Clare (2010:4071) argue that export subsidies in particular might have several advantages over tariffs:

"(1) that by promoting exports, a country makes sure that firms are subject to the 'discipline of the international market,' which forces firms to become more productive;

(2) that by subsidizing only exporting firms, a country effectively limits the subsidy to firms with high productivity; and

(3) that domestic markets may be too small to allow the protected industry to reap the full benefits of Marshallian externalities [such as learning by doing]."

There is, however, no easy recipe for the successful use of any industrial policy tool. Further, in a case study of Bangalore's success as an agglomeration of IT service firms, and in a brief survey of other industrial policy interventions, Pack and Saggi (2006) find no compelling empirical evidence that hard industrial policy has been successful. Altenburg (2011), in a survey of industrial policy in seven developing country studies, finds some successes but more failures. Similarly, forthcoming case studies of support for solar PV and wind in Germany and India, conducted for the ENTWINED network and The Global Subsidies Initiative, find decidedly mixed success.

From a WTO legal perspective, there may be an economically effective role for subsidies as tools of industrial policy, even if the literature indicates that they are difficult tools to get right. The more interesting question might be, what types of impacts do they have on trading partners, assuming that they can be used effectively? WTO rules, after all, are multilateral agreements on appropriate behaviour based on a mutual forswearing of mercantilism. Even if it could be shown that subsidies might result in benefits at the national level, the question remains whether the results are globally desirable.

In this respect green industrial policy has an important advantage over traditional industrial policy, at least where it addresses environmental problems that are global, or that are faced by many countries. Recall that one of the key rationales for green industrial policy is to internalize positive environmental externalities. Where these are significant, as for example in the case of climate change, it may be that the benefits outside the country of implementation actually outweigh the domestic benefits. That is, whereas traditional industrial policy has a somewhat mercantilist bent, successful green industrial policy produces benefits that accrue to the entire global community. These go beyond narrow environmental benefits: the costs of uncontrolled climate change are decidedly economic, and will fall most heavily on the poor and marginalized in developing countries.

But benefits only materialize if industrial policy efforts are successful. As noted above, if the underlying policies are unsuccessful or only moderately successful (such that they fail the Bastable test), then they are wasteful both environmentally and economically. If effectiveness were easily predicted, then the ideal trade and investment law with respect to green industrial policy could be just as easily crafted; it would ban the use of those instruments that have no chance of success, and allow governments the policy space to use those that in the end produce more benefits than costs, even if some of those costs are visited upon countries other than the implementing country. However, as noted above, effectiveness is not easily predicted; the same instrument used in different countries with different endowments and different flanking policies would have very different results. How is it possible for trade and investment law to take this into account?

Part of the answer might lie in prescriptive restrictions on policy that take into account the lessons of industrial policy. There might, for example, be policy space for the use of subsidies, but only if they have explicit sunset provisions after a set number of years, reflecting the fact that successful industrial policy must eventually be phased out to allow sheltered infants to either stand on their own or fall. But such prescriptions can only go so far. It would be difficult, for example, to dictate that local content requirements only be used in those countries whose upstream producers have adequate capacity to make the leap that propels them into the realm of international competitiveness, or to dictate that adequate science, education and innovation policies should be used in concert with attempts to foster infant industries.

The critical question then remains: should trade and investment law restrict policy space for tools that are only sometimes effective? On the one hand, such a restriction would prevent harm from being inflicted on trading partners by diverting flows of traded goods and investment – flows that are not compensated for by environmental or other benefits. On the other hand, it would also eliminate any opportunity for countries to get it right — to foster new infant industries that have beneficial global spillover impacts that outweigh their economic costs. Where such bans are motivated by a desire for countries to avoid harming themselves economically, they are easily dismissed as paternalistic; countries have the sovereign right to scare off investment and implement ineffective policies should they so choose. But ultimately the issue is the impacts on trading partners; damage caused by poor industrial policy is commonly not confined to the implementing country.

It may be that we find some environmental challenges so critically important that we are willing to allow for the use of green industrial policies that are only sometimes effective (accompanied, of course, by as many prescriptive restrictions as are practically possible). Climate change, for example, is a strong candidate, especially given that the impacts of unchecked climate change are weighted toward economic disaster for precisely those countries that are most in need of the economic development that can be brought by trade and investment opportunities. Many commentators have suggested special rules for climate-related industrial policy measures (Houser et al., 2008; Hufbauer, Charnovitz and Kim, 2009; Bacchus, 2012).

We may similarly find the need for economic development in poor countries so compelling that it justifies similar exemptions for those countries to use otherwise illegal policies – exemptions that cannot be used by their more-developed trading partners. The principle of special and differential treatment is embedded firmly in the multilateral trading system; so this would not be out of

line with existing practice. Altenburg (2011:83) warns, however, that it is precisely in developing countries that we typically find predictors of failed industrial policy: "where market failure is particularly common, and government action is required to form even the most basic market institutions, such as creating a national entrepreneurial class and encouraging the formation of business associations, … the effectiveness of the state is typically low, and the risks of political capture are considerable as the political systems often build on favouritism and lack political checks and balances." However, he also finds cases where industrial policy can be successful even in such countries.

In the end, any special exemptions from existing trade and investment law must be informed by a better understanding of what policies can be effective, and what circumstances can help them to be so. Some of this understanding can come from the lessons of decades of industrial policy efforts. But there is still too little research on the effectiveness of the suite of policy tools (such as feed-in tariffs and renewable purchase obligations) that can be used to foster successful domestic players in, for example, the clean energy and transport sectors. If we are to find a way forward that successfully allows trade and environment objectives to peacefully co-exist in the green industrial policy space, there is a need for more research as a foundation on which to lay that route. ■

Footnotes and references

[1] These lists are drawn from Harrison (2011), cited in Newfarmer (2011).

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