

GROWTH, INNOVATION AND TRADE IN ENVIRONMENTAL GOODS

Céline Bak

Key Points

- Environmental goods include the clean technologies that provide foundations for sustainable growth in a carbon-constrained world. There are promising initiatives under way to remove impediments to global trade of environmental goods.
- Global exports in manufactured environmental goods are now four times larger than global aerospace exports and two-thirds the size of global automotive exports, but there is an absence of trade reports on global trade in environmental goods.
- Reporting on global trade in environmental goods would provide a comprehensive lens into diversification that will be needed for the transition to low-carbon economies, help countries benchmark the shorter- and longer-term impact of policies such as regulation and fiscal stimulus targeted at green growth, as well as innovation, and strengthen the G20 leaders' commitment to inclusive and sustainable growth by providing visibility into the pace of investments to address climate change.

Introduction – What Are Environmental Goods?

Environmental goods deliver the foundations for decoupling GDP growth and greenhouse gas (GHG) emissions growth. The following are only some examples of this. Environmental goods for energy efficiency are deployed to make more productive use of energy in both industry and buildings. Environmental goods to monitor emissions by polluters provide the means by which emissions baselines for carbon regulations are established and permissible emissions are later enforced. Environmental goods to deliver renewable energy in all forms produce lower carbon electricity and liquid fuels, and even turn garbage into both electricity and green chemicals. Environmental goods to enable water treatment make water infrastructure resilient to climate change. New classes of environmental goods are enabling the switch to lower carbon fuels with compressed natural gas engines for long-haul transportation, recharging of electric vehicles, energy storage to address fluctuation in electricity generation, carbon capture and use, as well as manufacturing of biochemicals and sustainable substitutes for gasoline. Manufactured environmental goods are the products of clean technology companies. In Canada, innovation-based clean technology firms operate across a variety of sectors to produce environmental goods (see Box 1 for a taxonomy of clean technology firms). However, trade in environmental goods is invisible to both capital managers seeking new classes of assets and global leaders seeking to stimulate sustainable and inclusive growth.



Box 1: Clean Technology Industry Taxonomy

A clean technology firm is defined as a company with *proprietary technology or know-how* that addresses one or more of the sectors listed below.



Source: Bak (2015, 33).

As global economies move to reduce carbon intensity, many initiatives will be centred on solutions that are based on intellectual property. At COP 21 (the twenty-first Conference of the Parties of the United Nations Framework Convention on Climate Change [UNFCCC]), the French Institute for Intellectual Property will host a solutions showcase of 60 small- and medium-sized enterprises from around the world, whose deep intellectual property is at the heart of their contribution to solving climate change.

Some clean technology firms provide software that enables energy and water efficiency. This software keeps track of the physical environmental goods described above needed for climate change mitigation and adaptation. Other clean technology firms have business models that can be characterized as small-scale versions of multinationals. Like multinationals, these clean technology firms operate global supply chains, domestic manufacturing plants, global distribution networks and globally competitive research and development. In many cases, these same firms offer project finance to turnkey customers and many are engaged in global capital raising. The people working in these firms are dedicated to building profitable companies that produce environmental goods that embody intellectual property (Bak 2015).

What Do Cows and Clean Technology Have in Common?

It may come as a surprise that Canada exports more clean technology than it does cows. It is likely not surprising that Canada exported CDN\$11.1 billion in live animals and animal products, because exports of Canadian live animals and animal products have been at the forefront of recent trade negotiations and the importance of these exports to Canada has been reported

in the press. However, it is probably surprising that Canada exported CDN\$12 billion in manufactured environmental goods or clean technology because, unlike minerals, chemicals, automobiles and airplanes, these exports do not appear as a distinct category on Canada's national accounts. These exports are, de facto, invisible to capital markets and the media who report on monthly domestic and international trade.

The time may now have come for environmental goods trade to make its debut in national and international reports to provide a lens through which progress toward decarbonization can be measured. The value of global exports in manufactured environmental goods in 2013 was CDN\$970 billion — four times greater than that of global exports in the aerospace sector components, and already two-thirds that of global automotive exports (Bak 2015). By any measure, trade in environmental goods is economically material, and never more so than now, as global leaders seek sustainable and inclusive economic growth.

Trade in Environmental Goods: Ambition in Geneva?

While not yet a global endeavour, there is an ambitious plurilateral effort under way to remove barriers to trade in environmental goods. Improving trade in environmental goods was included as a priority in the 2012 Leader's Declaration from the Asia-Pacific Economic Cooperation (APEC) meeting in Vladivostok, Russia (APEC 2012). The list of 54 goods agreed to by the APEC leaders became the basis of the World Trade Organization-led plurilateral Environmental Goods Agreement (EGA) initiative. The EGA initiative has made good progress in short order, and interest is growing.

From the original 14, there are now 17 jurisdictions engaged in the EGA negotiations: Australia, Canada, China, Chinese Taipei, Costa Rica, the European Union, Hong Kong, Iceland, Israel, Japan, New Zealand, Norway, Singapore, South Korea, Switzerland, Turkey and the United States. Six of these countries (Australia, Canada, Japan, New Zealand, Singapore and the United States) are party to the Trans-Pacific Partnership (TPP) agreement, which may contain references to environmental safeguards as standard in trade agreements. The EGA work can act a foundation for the TPP, particularly as China and South Korea are participants in the EGA plurilateral process.

The EGA participants are working actively in the negotiation process seeking tariff elimination for environmental goods in the following categories:

- renewable energy and energy storage;
- energy efficiency technology;
- water treatment and waste-water management;
- environmental monitoring and analysis; and
- air pollution control (including CO₂ capture, use and sequestration).

Of the original 660 goods submitted for tariff elimination by the participating jurisdictions, 450 were included in the chair's list of goods to be considered during the September 2015 and subsequent negotiations. The large number of goods suggests that the participants are working to conclude an ambitious agreement.

An ambitious agreement bodes well, as trade in environmental goods is a significant segment of the economy. In an analysis of global trade for only 138 of the 660 goods in the categories listed above, Canadian *manufactured* environmental goods exports in 2013 were of the same order as other areas of nationally significant economic activity. At CDN\$12 billion, Canadian exports in environmental goods (excluding, for example, waste by-products, which are also classified as environmental goods) were of the same size as Canadian exports of four mid-sized classes of exports:

- livestock and animal products;
- wood;
- processed foods; and
- minerals.

In fact, at CDN\$12 billion versus CDN\$11.1 billion, Canada exported more clean technology than livestock and animal products in 2013 as mentioned above. Indeed, global exports of these 138 classes of goods reached CDN\$970 billion in 2013. This global trade does not include electric vehicles, which are considered sensitive by participants of the EGA process, and certainly could be considered a manufactured environmental good.

Trade in Environmental Goods – Foundations for Investment-driven Growth?

For countries implementing policies focused on stimulating investment in sustainable infrastructure, regular reports on global trade in environmental goods would provide insight into the pace at which policies are being translated into investments on the ground. Trade reports could also frame efforts to understand total domestic production.

For example, in response to the global financial crisis, South Korea focused its fiscal stimulus on low-carbon innovation and infrastructure. Did this fiscal policy have the desired impact? Based on a partial analysis of environmental goods trade, South Korea's green fiscal stimulus policy would appear to be correlated with increasing exports in manufactured environmental goods. A deeper analysis of environmental goods trade over time would provide an indication of the lag between changes in environmental goods trade patterns and the implementation of fiscal policies targeting supply-driven growth through investment in sustainable infrastructure. Constructing a timely information bridge between departments of finance and trade would provide empirical evidence of short-term and long-term impacts of fiscal policies.

In 2014, using the same set of 138 environmental goods described above, South Korea's imports of environmental goods were slightly greater than its exports, with the value of imports equal to 110 percent of exports in 2014 (Bak forthcoming). This indicates a maturing sector whose exports of environmental goods are nearly in balance with imports. Analysis over time provides even more striking evidence of progress. South Korea's ranking in global exports of environmental goods rose from tenth to fifth between 2005 and 2013 (Bak 2015). Moreover, total trade, including both imports and exports in environmental goods, between South Korea and the rest of the world reached two percent of South Korea's GDP in 2013 (Bak forthcoming). These results may be solely the result of trade liberalization, but it is also possible that they reflect a combination of factors, including fiscal stimulus, investment in infrastructure and innovation policy.

Similarly striking figures occur from analysis of China's manufactured environmental goods trade. China's climate change focus on renewable energy is evident in trade results. Analysis of its exports in renewable energy-related environmental goods reveals growth from CDN\$20 billion in 2005 to CDN\$120 billion in 2013. This compares well to export growth in the United States from CDN\$25 billion to CDN\$45 billion over the same period (McCarthy 2014).

The global economic slowdown has made boosting growth a key priority for Group of Twenty (G20) finance ministers, with promoting investment a focus to enable sustainable growth.

Broadening trade and national accounts reporting to include environmental goods will support this priority by providing transparent market information to investors considering productive investments in infrastructure. As investments in fossil fuel-related assets are redeployed, asset owners will develop a new investment thesis.¹ Transparency of global trade in environmental goods may enable asset managers to build investment theses for new asset classes.

Trade in Environmental Goods – Benchmarks for Sustainable and Equitable Growth?

Barring a rise in restrictive practices, trade in environmental goods will continue to grow as carbon regulations are brought into force at both the national and subnational levels to meet UNFCCC commitments. A number of drivers support increasing global environmental goods trade in advance of the implementation of regulations to meet national commitments to the UNFCCC.

In some jurisdictions, investments in renewable energy are already being made on the basis of parity with the lowest-cost carbon-based electricity generation. For example, in the Gulf region, solar power generation projects are being contracted at rates that are less than the region's cost of operating coal power plants (Sophia 2015).

In other jurisdictions such as Indonesia, energy efficiency regulation has been implemented to stimulate low-cost industrial productivity improvement. This can be achieved through both process improvement and new technology deployment. Trade reports on energy efficiency environmental goods suggest regulation is resulting in investments. Growth in energy efficiency-related environmental goods imported into Indonesia reached 10 percent compound annual growth rate over the period 2010–2014 (Bak, forthcoming).

In order to meet national commitments, jurisdictions are now implementing increasingly stringent carbon regulations. In addition to renewable energy and energy efficiency, these regulations will drive increasing trade in lesser known classes of environmental goods such as GHG monitoring and carbon capture use and sequestration technology, to both establish emission baselines and to enable the emissions reductions required by new regulations.

Finally, publishing trade figures in environmental goods can provide visibility into inclusiveness of climate finance policies, because environmental goods are the basis of both climate mitigation and climate adaptation for all countries. Publishing global trade in environmental goods could be part of monitoring practical translation and the inclusiveness of climate finance policies over time.

Could Global Trade in Environmental Goods Be the Baltic Dry Index of a Carbon Constrained World?

Global transparency of trade in environmental goods may help unlock seemingly intractable issues. For example, might regular reporting on environmental goods strengthen the impetus for G20 members to reconsider the economic importance of fossil fuel subsidies, as the movement toward a low-carbon economy becomes more tangible with each passing month?

National and global reporting of trade in environmental goods could provide evidence of shifts in global supply and demand of goods needed to both mitigate and adapt to climate change.

Conclusion

Economies are sometimes more diversified than they appear. Reporting on global trade in environmental goods could provide a lens into the diversification that has begun and that is needed for the transition to low-carbon economies. The value of global exports in manufactured environmental goods has already reached two-thirds the value of global automotive exports. There are promising initiatives under way to remove tariffs that pose barriers to global trade of environmental goods. These initiatives can be the basis of formulating regular reports.

The absence of trade reports on trade in environmental goods causes capital market formation to be less efficient than it might otherwise be. There are three potential benefits of reporting trade in environmental goods. It will strengthen the efforts of G20 leaders by providing visibility into the pace of investments to address climate change. National reports on environmental goods trade will help countries benchmark the shorter- and longer-term impact of policies such as carbon regulation and fiscal stimulus targeted at green growth, as well as innovation investments to address climate change. Reporting will provide a yardstick for inclusive and sustainable growth plans. Finally, regular reporting on the economic materiality of environmental goods may provide the impetus for the elimination of inefficient fossil fuel subsidies. Five years hence, global trade data on environmental goods will assist asset managers seeking to deploy capital in a carbon constrained global economy, just as the Baltic Dry Index provides a window into global commodities trade today.

¹ For an example see Crooks and Clark (2014).

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About the Author



Céline Bak is a CIGI senior fellow with CIGI’s Global Economy Program. At CIGI, she is currently investigating economic reporting of environmental goods. Céline is a nationally recognized expert on Canadian clean technology companies and the industry’s ecosystem. Through her role as president of Analytica Advisors, Céline provides strategic vision for clean technology industry leaders.

Céline is the founder of the Canadian Clean Technology Innovation Network and a champion for innovation-based industries. Within Canada’s Department of Foreign Affairs, Trade and Development, she is the chair of the Private Sector Advisory Group and the senior industry advisor — sustainable technologies. As a spokesperson for clean technology innovation, Céline has appeared on four occasions as a witness before Parliament on the Canadian clean technology industry, and is frequently sought out by major Canadian media outlets to discuss clean technology, climate change and sustainability in Canada.

Fixing Climate Governance Series



The Fixing Climate Governance project is designed to generate some fresh ideas. First, a public forum was held in November 2013. High-level workshops then developed a set of policy briefs and short papers written by experts. Several of these publications offer original concrete recommendations for making the UNFCCC more effective. Others make new proposals on such topics as how to reach agreements among smaller sets of countries, how to address the problems of delayed benefits from mitigation and concentrated political opposition, ways that China can exercise leadership in this arena and how world financial institutions can help mobilize climate finance from the private sector. These publications will all be published by CIGI in 2015.

Policy Options Could Increase Ambition in the 2015 Climate Agreement

Fixing Climate Governance Policy Brief No. 1

Henrik Jepsen

Economy-wide targets for emissions reductions will be an indispensable element of a 2015 agreement, but reaching agreement on ambitious targets is notoriously difficult. It needs to include a mechanism that can facilitate and incentivize increased ambition over time, and which focuses on high-potential policy options that contribute to the same general goal: climate change mitigation.

Conducting Global Climate Change Negotiations: Harnessing the Power of Process

Fixing Climate Governance Policy Brief No. 2

Kai Monheim

Process itself — over and above the issues at stake — is a key determinant of negotiation success across all levels of climate change negotiation groups in the United Nations Framework Convention on Climate Change. The author offers six axioms for chairs of negotiation groups that may lead to finding common ground and avoiding deadlocks: brokering compromise while remaining as transparent and inclusive as possible; enhancing influence by acting impartially and recognizing cultural differences; managing the agenda to create momentum while clustering, prioritizing and linking issues; focusing debate using the chair's information advantage; steering individual negotiation sessions in a time-efficient way; and building trust by creating sheltered negotiation spaces that allow for frank and constructive dialogue.

Six Ways to Make Climate Negotiations More Effective

Fixing Climate Governance Policy Brief No. 3

Pamela Chasek, Lynn Wagner and I. William Zartman

This policy brief proposes six changes that could improve the negotiating process and facilitate consensual outcomes. These include using a single negotiating text; discontinuing “on-screen” negotiations; eliminating the norm that “nothing is agreed until everything is agreed” and dividing the climate change problem into pieces that may be more readily acceptable; giving negotiating roles to ministries besides foreign affairs; establishing a group of states to play the “regime-builder” role; and employing the leadership skills necessary to make this all happen.

Focus Less on Collective Action, More on Delayed Benefits and Concentrated Opponents

Fixing Climate Governance Policy Brief No. 4

Edward A. (Ted) Parson

Controlling climate change has significant collective-action aspects, but the importance of these has been exaggerated and efforts misdirected as a result — particularly regarding the feasibility and impact of leading actions to pursue large emission cuts by individual nations or subgroups. Serious climate action must confront other challenges, most importantly, delayed benefits and concentrated opponents. This policy brief sketches several specific approaches to addressing these challenges, which can be pursued nationally or internationally.

Mainstreaming Climate Change into Financial Governance: Rationale and Entry Points

Fixing Climate Governance Policy Brief No. 5

Sáni Zou, Romain Morel, Thomas Spencer, Ian Cochran and Michel Colombier

The financial sector is exposed to the physical risks associated with climate change and the impact of climate policies. Securing global financial and economic stability and scaling up low-carbon, climate-resilient investments are not conflicting, but rather mutually reinforcing, objectives. Policies affecting and instruments matching the demand side and supply side of finance need to be aligned with climate objectives to efficiently shift investments toward a low-carbon, climate-resilient economy.

How China Can Help Lead a Global Transition to Clean Energy

Fixing Climate Governance Policy Brief No. 6

Alvin Lin, Luan Dong and Yang Fuqiang

China's coal consumption fell marginally in 2014, the first such drop this century, in large part as a result of its policies to address its severe air pollution, develop renewable and alternative energy, and transition its economy away from heavy industry. China should take advantage of its current circumstances to adopt an aggressive national coal consumption cap target and policy to peak its coal consumption as soon as possible, no later than its next Five Year Plan (2016–2020), so that it can peak its CO₂ emissions by 2025. It can achieve this target by building upon its existing achievements in developing clean energy such as wind and solar power, and by prioritizing renewable energy development over coal in its western expansion.

Central Banks Can and Should Do Their Part in Funding Sustainability

Fixing Climate Governance Paper No. 1

Andrew Sheng

Central banks, when purchasing financial assets, should consider selecting assets that will promote sustainability, including climate change mitigation and adaptation. Central banks not yet ready to factor social objectives into their decisions should at least incentivize bankers and asset managers to invest in climate mitigation activities and low-emission growth, as well as support a financial transaction tax to fund a new or established global fund for climate mitigation.

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Advancing Policy Ideas and Debate



The Impact of Financial Sector Sustainability Regulations on Banks

CIGI Papers No. 77
Olaf Weber and Olawuwo Ori

This paper analyzes the impact of three financial sector sustainability regulations: the Chinese green credit guidelines, the Nigerian Sustainable Banking Principles and the Bangladesh Environmental Risk Management Guidelines. All three address the connection between financial sector activities and sustainable development, and propose guidelines for sustainable banking policies, strategies, practices, products and services.



The Environmental Goods Agreement: A Piece of the Puzzle

CIGI Papers No. 72
Patricia Goff

Can a trade agreement help achieve environmental goals? The answer to this question has traditionally been mixed, even skeptical. The Environmental Goods Agreement has the potential to produce a more positive outcome. This paper explores this potential, reviewing key aspects of the trade-environment relationship. Prevailing perceptions tend not to count trade agreements as key contributors to the achievement of environmental goals. The paper then looks at the potential contribution of tariff reduction to environmental objectives, and then examines critical challenges to the completion of EGA negotiations. It concludes that the EGA is an important piece of a complex environmental governance puzzle.



Development of Sustainability and Green Banking Regulations

CIGI Papers No. 65
Adeboye Oyegunle and Olaf Weber

Interest in sustainable and green financial regulations has grown in recent years due in part to increasing climate-change risks for the financial sector alongside a need to integrate this sector into the green economy. This paper recalls sustainability's course from fringe issue to central concern, and examines seven countries, all emerging and developing, where regulatory approaches have been implemented successfully.



Global Treaty or Subnational Innovation? Canada's Path Forward on Climate Policy

CIGI Policy Brief No. 66
Sarah Burch

This policy brief describes examples of innovative climate change policy at the subnational level, articulates the roles played by different levels of government, and provides a series of recommendations on pathways to carbon-neutral, resilient communities.



The Environmental Risk Disclosure Regime: Navigating Complexity in Global Financial Markets

CIGI Policy Brief No. 65
Penelope Hawkins and Olaf Weber

One of the most important and topical discussions within the global multilateral arena is the challenge of meeting the world's climate finance needs in order to reduce carbon emissions to sustainable levels and support adaptation strategies. The mobilization of finance is key in supporting the transition away from traditional high-carbon or business-as-usual economic pathways toward low-carbon, climate-resilient economic systems. A conference, Global Sustainability, Climate Change and Finance Policy, organized by the Centre for International Governance Innovation and the South African Institute for International Affairs and held in Johannesburg from July 1 to July 3, considered aspects of the debate.



The Challenges of Counting Climate Change Risks in Financial Markets

CIGI Policy Brief No. 62
Jason Thistlethwaite

Climate change has been identified in recent years as an investment risk, yet existing financial reporting standards do not adequately measure and communicate these risks to investors. A climate change risk disclosure regime has emerged in response, defined by a range of voluntary, regulatory and accounting governance initiatives. In spite of its promise, this nascent regime is highly fragmented and lacks coordination and enforcement. This policy brief describes the background for the climate change risk disclosure regime and the challenges that limit its effectiveness, and presents several policy recommendations to improve its capacity to measure and communicate climate change risks.

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Le CIGI a été fondé en 2001 par Jim Balsillie, qui était alors co-chef de la direction de Research In Motion (BlackBerry). Il collabore avec de nombreux partenaires stratégiques et exprime sa reconnaissance du soutien reçu de ceux-ci, notamment de l'appui reçu du gouvernement du Canada et de celui du gouvernement de l'Ontario.

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