

FOR A LOW CARBON ECONOMY



Domestic Content Requirements for Renewable Energy Manufacturing¹

Sustainable Prosperity is a national research and policy network, based at the University of Ottawa. SP focuses on market-based approaches to build a stronger, greener, more competitive economy. It brings together business, policy and academic leaders to help innovative ideas inform policy development.

Key messages

- Domestic content requirements (DCRs) compel renewable energy developers to source a specified share of equipment from local suppliers. A principal goal of a domestic content policy is to ensure that the government's renewable energy policy produces tangible local economic benefits. This *Brief* is focused on the short-run economic impacts of the DCR and its effectiveness in increasing employment.
- By forcing developers of renewable energy to source from domestic suppliers, the DCR is expected to raise the cost of generating renewable electricity, at least in the short-run.² That is because sourcing from domestic equipment manufacturers reduces access to technology providers from outside the jurisdictions that might be lower cost than the domestic options. The higher equipment costs are likely to reduce the amount of renewable electricity generated. In this way, DCRs can actually work against one of the main goals of the renewable energy support policy. Additionally, if renewable energy equipment costs are increased by a significant enough margin as a result of the DCR, the imposition of the DCR may even reduce employment associated with manufacturing renewable energy equipment and renewable energy generation in the short-run.
- Two Canadian jurisdictions, namely Ontario and Quebec, have tied government support for renewably generated electricity to DCRs.

Sustainable Prosperity
 c/o University of Ottawa
 555 King Edward Avenue
 Ottawa, ON K1N 6N5
 613-562-5800 x3342
www.sustainableprosperity.ca

1 This *Policy Brief* is partly based on a draft working paper authored by Dr. Nicholas Rivers of the University of Ottawa and Dr. Randy Wigle of Wilfrid Laurier University on the same topic. Sustainable Prosperity would like to thank Dr. Jen Baggs of the University of Victoria and Aaron Cosbey, Associate and Senior Climate Change and Trade Advisor at the International Institute for Sustainable Development (IISD) for their thoughtful comments and contributions to this *Brief*. Responsibility for the final product and its conclusions is Sustainable Prosperity's alone, and should not be assigned to any reviewer or other external party.

2 This *Brief* uses the standard economic definition of the short-run, where the current equipment stock is fixed, so costs rise as production is increased.

The Issue

Certain jurisdictions that have implemented policies that promote the development of local renewable power generation have added domestic content requirements for equipment sourcing to achieve economic objectives, such as job creation. But, at least in the short-run, domestic content requirements are likely to increase the cost of renewable energy generating equipment, and therefore also the developer's cost of generating renewable energy. Depending on the type of renewable energy support policy with which the domestic content requirement is linked, this may have the effect of increasing consumers' electricity prices, or reducing the number of renewable energy facilities built. In the last case, it is possible that the reduced renewable energy output leads to overall reductions in employment in renewable energy generation and manufacturing.

The Knowledge Base

Domestic content requirements for renewable energy production serve several government economic objectives. The economic objectives include job creation (especially in the manufacturing sector), fostering an infant industry to a mature globally competitive sector, and energy security. This *Policy Brief* will limit itself to the question of whether domestic content requirements are effective at increasing 'green' employment.³

The effects of the DCR differ depending on whether a government is using a price- or a quantity-based mechanism to increase the deployment of renewable energy. Under a price-based policy, such as a Feed-in-Tariff (FiT), a fixed price is offered for renewable energy. The total amount of renewable energy capacity that will be built under a price-based policy is unknown by government prior to policy implementation, since government does not have perfect information about the cost and behaviour of renewable energy suppliers. In contrast, under a quantity-based program, government sets a target for a certain amount of renewable energy, and requires that generators achieve that target (using a renewable portfolio standard, for example), or else issues a procurement call to achieve that target (i.e., an auction). Unlike a price-based policy, government knows prior to policy implementation the eventual capacity of renewable energy that will be built under a quantity-based policy, but does not know the cost, or the exact amount of renewable energy that will be generated. In practice, quantity-based and price-based renewable energy support policies as described above are theoretical ideals, and policies actually implemented by government generally fall somewhere between the two bookends.⁴

³ This *Brief* is focused on the impact on employment in the renewable energy sector only.

⁴ For example, government might adjust prices under a price-based policy after observing response by renewable energy suppliers. Alternatively, government might adjust quantities under a quantity-based policy after observing market response.

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As with any significant policy measure, there are also likely to be a host of complementary policies at play. These will lead to policy interaction effects that will influence the cost and effectiveness of the DCR. These interaction effects, however, are not considered in this *Policy Brief*.

Instead, the focus of this *Brief* is examining the short-run effects of a DCR coupled with a price-based renewable energy support policy. In this context, a DCR is likely to increase the cost of renewable energy equipment, and therefore also the cost of renewable energy itself. As a result, it is likely that a DCR will reduce the amount of installed renewable electricity generation capacity.

The International Knowledge Base

Domestic content requirements have been implemented alongside renewable energy policies in Brazil, China and Spain. In certain countries, these policies have been in place for many years, providing models and results that Canadian policy-makers can learn from, although few studies that examine their effectiveness in achieving their stated objectives have been made publicly available. Other countries, such as Denmark, Germany and India have used other policy tools to support their domestic renewable energy manufacturing sectors, which are also discussed briefly below.

Since 2005, Brazil has required that at least 60 percent of the total cost of wind energy projects is sourced from Brazil; this local content requirement increased to 90 percent in 2007.^{5,6}

Wind projects approved by China's National Development and Reform Commission from 1996 to 2000 were required to source at least 40 per cent of their content from local manufacturers, which was increased to 50 per cent in 2003, and then to 70 per cent in 2004.⁷ The domestic content requirement was discontinued in 2009, as it was no longer needed as most turbines exceeded the DCRs.⁸ However, Chinese wind turbine manufacturers receive other forms of government support, including cheap land, low-interest government loans and preferential contracts from government-owned power generation companies.⁹

In Spain, domestic content requirements have been used since at least 1995. Several Spanish regional governments continue to require domestic content prior to granting development

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5 Lewis, J., Wiser, R., 2007. Fostering a renewable energy technology industry: An international comparison of wind industry policy support mechanisms. *Energy Policy* 35 (3), 1844-1857.

6 Cavallero, C., Da Silva, E., 2005. Electricity generation: regulatory mechanisms to incentive renewable alternative energy sources in Brazil. *Energy Policy* 33 (13), 1745-1752.

7 Lewis, J., 2007. *A review of the potential international trade implications of key wind power industry policies in China*. Energy Foundation China Sustainable Energy Program.

8 Bradsher, Keith, December 14, 2010. *To Conquer Wind Power, China Writes the Rules*. New York Times, <http://www.nytimes.com/2010/12/15/business/global/15chinawind.html?pagewanted=all>.

9 Ibid.

concessions for wind power.¹⁰ Spain's domestic content requirements are considered to have been instrumental to the creation and success of Gamesa, a Spanish company that is currently one of the top ten world's wind turbine manufacturing companies.¹¹ Conversely, in the Spanish solar industry, which had no domestic content requirement, most equipment was imported from China or Germany.¹²

Other countries with strong renewable energy policies have used other policy instruments to support their domestic renewable energy manufacturing sector. For example, in Denmark and Germany, "soft" (below market rate) loans were provided by government to support projects with significant domestic content, alongside customs duties that favoured the import of components over fully assembled turbines (to support a local assembly industry). In both of these countries, the focus has been on developing an export market, by providing export credit assistance and development aid loans to less developed countries that are purchasing wind technology.¹³ In India, the government has altered customs and excise duties in order to make imports of wind turbine components and domestic assembly more attractive than imports of assembled turbines.¹⁴

The Knowledge Base in Canada

In Canada, both Quebec and Ontario have implemented DCRs alongside policies to augment the amount of renewable energy produced in each province. Quebec has a quantity-based policy, where the government has a target to install 4,000 MW of wind capacity by 2015 using a series of calls for power.¹⁵ Ontario uses a price-based program, the Feed-in-Tariff (FiT), to attract renewable energy companies to the province by providing guaranteed pricing for certain forms of renewable energy projects. Ontario aims to have 10, 700 MW of installed capacity in renewable energy (wind, solar and bioenergy) by 2030.¹⁶

Quebec

In Quebec, two large tenders for wind power (1,000 and 2,000 MW) required that bidders attain 60 percent domestic content to qualify as bidders, and scored bids higher if domestic

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10 Lewis, J., Wisler, R., 2007. Fostering a renewable energy technology industry: An international comparison of wind industry policy support mechanisms. *Energy Policy* 35 (3), 1844-1857.

11 Bayar, Tildy, August 4, 2011. *World Wind Market: Record Installations, But Growth Rates Still Falling*. Renewable Energy World, <http://www.renewableenergyworld.com/rea/news/article/2011/08/world-wind-market-record-installations-but-growth-rates-still-falling?cmpid=rss>.

12 Sills, Ben, October 18, 2010. *Spain's Solar Deals on Edge of Bankruptcy as Subsidies Founder*, <http://www.bloomberg.com/news/2010-10-18/spanish-solar-projects-on-brink-of-bankruptcy-as-subsidy-policies-founder.html>.

13 Held, A., Ragwitz, M., Huber, C., Resch, G., Faber, T., and Vertin, K., 2007. *Feed-in systems in Germany, Spain, and Slovenia: a comparison*. Fraunhofer Institute Working Paper.

14 Lewis, J., 2007. *A comparison of wind power industry development strategies in Spain, India and China*. Working paper, Center for Resource Solutions.

15 Quebec Ministry of Natural Resources and Wildlife, 2011. *Highlights on Energy: Wind Energy*, <http://www.mrnfgouv.qc.ca/english/energy/wind/index.jsp>.

16 Government of Ontario, 2010. *Ontario's Long-Term Energy Plan*.

content was above 60 percent.¹⁷ Quebec's domestic content requirement likely helped spur the creation of a General Electric manufacturing plant with around 450 employees in an economically-depressed area of the province.¹⁸

Ontario

Ontario's domestic content requirements under the Feed-In-Tariff (FiT) program (part of the *Green Energy and Green Economy Act* (GEEA) of 2009) vary by renewable energy technology type, as shown in Table 1 below. Though the FiT encourages the development of various renewable technologies, including biogas, biomass, and landfill gas, the domestic content requirements apply only to wind and solar projects.¹⁹

Table 1: Ontario's Domestic Content Requirements

TECHNOLOGY TYPE	Project Size	Domestic Content Requirement ¹⁹
Windpower	10 kW or less	None
Windpower	Over 10 kW	25%; increased to 50% on January 1, 2012
Micro solar PV	10 kW or less	40%; increased to 60% on January 1, 2011
Solar PV	Over 10 kW	50%; increased to 60% on January 1, 2011

Source: Ontario Power Authority²¹

Each project developer must present the Ontario Power Authority (OPA) with a domestic content plan, which shows how it intends to meet the above requirements. When certain components are made in Ontario, it will receive a qualifying percentage.

The intention of the domestic content requirement is to ensure that the government achieves tangible benefits, in terms of local investment and jobs, in return for the rates offered to renewable energy producers. In Ontario, the domestic content requirement, along with \$110 million in economic development financing for establishing four manufacturing plants, attracted a \$7 billion wind turbine manufacturing investment from South Korea's Samsung.²² According to the Ontario government, the *Green Energy and Economy Act* has created 20,000 jobs.²³

Ontario's domestic requirements have been blamed for raising renewable energy project costs, due to the time and energy it takes to find local suppliers and fill out the lengthy

17 Lewis, J., Wisser, R., 2006. *Supporting localization of wind technology manufacturing through large utility tenders in Quebec: lessons for China*. Energy Foundation China Sustainable Energy Program.

18 Hydro Quebec, 2008. *Wind Power: Ensuring Québec's electricity supply*, http://www.hydroquebec.com/publications/en/others/pdf/depliant_eolienne_distribution.pdf.

19 Ontario Power Authority, 2010. *Feed-In-Tariff Program: Program Overview*, http://www.fit.powerauthority.on.ca/Storage/102/11160_FIT_Program_Overview_August_new_price_version_1.3.1_final_for_posting-oct_27.pdf.

20 The percentage requirements are assessed based on total project cost.

21 Ontario Power Authority, 2010. *Domestic Content*, <http://www.fit.powerauthority.on.ca/Page.asp?PageID=834&ContentID=10544&SiteNodeID=11126>.

22 Aegent Energy Advisors, August 2011. *Samsung Renewable Energy Deal: An Update*, <http://www.aegent.ca/newsletters/SamsungRenewableUpdate.html>.

23 D'Aliesio, Renata, August 10, 2011. *In Ontario, gloomy skies for solar power*, <http://www.theglobeandmail.com/news/national/ontario/in-ontario-gloomy-skies-for-solar-power/article2125904/page2/>.

paperwork.²⁴ Also, there are not enough domestically-produced components being delivered in a timely way, resulting in project delays.²⁵ It is also not clear that manufacturing capacity can be built up fast enough to meet the more stringent 2012 domestic content requirements for wind. In addition to the time lag in building new capacity, manufacturers need reasonable certainty that the FiT program will be in place long enough to pay for the investment.²⁶

Another factor to consider in Ontario is that transmission constraints have imposed a practical maximum on the number of renewable megawatts that have been integrated into the grid. While this may blunt some of the cost inflation related to rapid development of the sector, it is a separate consideration than DCRs and their role in increasing project costs.

Domestic Content Requirements and International Trade Law

Domestic content requirements were used extensively during the 20th century by many countries to shield domestic manufacturers from international competition, most notably in the automobile manufacturing sector. The passage in 1995 of the Uruguay Round Agreement on Trade-Related Investment Measures (TRIMs Agreement) made it clear that a host of so-called “performance requirements”, including DCRs, were illegal under the General Agreement on Tariffs and Trade (GATT).²⁷ Some middle- and lower-income countries do however continue to require domestic content in their manufacturing industries; Brazil, for instance, requires automobile manufacturers to source 50 to 60 percent of auto parts locally.

Other countries claim that DCRs run counter to the spirit and letter of several international trade agreements. Table 2 highlights the relevant texts from several trade agreements.

The DCR forces local renewable energy developers to substitute domestic for foreign suppliers, which can lead to higher prices for the domestically produced equipment. In the short-run, the quantity of plants that produce renewable electricity generating equipment is fixed, so there are fewer options than if the equipment could be sourced globally.

²⁴ Cameron, Lea, 2011. *Feed-in tariffs: Accelerating renewable energy project development in Ontario*. MARS Market Insights, http://www.marsdd.com/dmsassets/reports/MaRS_FIT_Cleantech_Report_2010.pdf.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Performance requirements are requirements (such as for domestic content) that an investor must comply with to obtain some sort of advantage. Typically they are a condition of investment. See the illustrative list of prohibited performance requirements in the Annex of the TRIMs Agreement.

Table 2: International Trade Agreements Relevant to DCRs

TRADE AGREEMENT	Article	Relevant Text
General Agreement on Tariffs and Trade (GATT) ²⁷	Article III.4	The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favourable than that accorded to like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use. The provisions of this paragraph shall not prevent the application of differential internal transportation charges which are based exclusively on the economic operation of the means of transport and not on the nationality of the product.
	Article III.5	No contracting party shall establish or maintain any internal quantitative regulation relating to the mixture, processing or use of products in specified amounts or proportions which requires, directly or indirectly, that any specified amount or proportion of any product which is the subject of the regulation must be supplied from domestic sources. Moreover, no contracting party shall otherwise apply internal quantitative regulations in a manner contrary to the principles set forth in paragraph 1.
	Article III.8a	The provisions of this Article shall not apply to laws, regulations or requirements governing the procurement by governmental agencies of products purchased for governmental purposes and not with a view to commercial resale or with a view to use in the production of goods for commercial sale.
Agreement on Government Procurement ²⁸	Annex 4	The inclusion of "Services" for sub-central enterprises under Annex 3 are to be specified initially on or before 15 April 1994 with the final list to be provided within eighteen months after the conclusion of the new Government Procurement Agreement... The Canadian offer does not include the following: ...public utilities.
Agreement on Subsidies and Countervailing Measures ²⁹	Article 3.1b	Except as provided in the Agreement on Agriculture, the following subsidies, within the meaning of Article 1, shall be prohibited: subsidies contingent, whether solely or as one of several other conditions, upon the use of domestic over imported goods.
Agreement on Trade-Related Investment Measures ³⁰	Article 2.1	Without prejudice to other rights and obligations under GATT 1994, no Member shall apply any TRIM that is inconsistent with the provisions of Article III or Article XI of GATT 1994.
The North American Free Trade Agreement (NAFTA) ³¹	Chapter 11 (Investment), Article 1106	No Party may impose or enforce any of the following requirements, or enforce any commitment or undertaking, in connection with the establishment, acquisition, expansion, management, conduct or operation of an investment of an investor of a Party or of a non-Party in its territory: ... to achieve a given level or percentage of domestic content.

Source: Various, see footnotes

Foreign countries and firms have challenged Ontario's DCRs, saying that they run contrary to international trade law. In 2010, Japan challenged Ontario's *Green Energy and Economy Act* at the World Trade Organization (WTO), with thirteen countries including the European Union and the United States seeking third-party status in the dispute.³³ Japan claims that the domestic content requirements are inconsistent with Canada's obligations under Article III of the General Agreement on Tariffs and Trade (GATT), Article 2.1 of the Agreement on Trade Related Investment Measures (TRIMs), and Article 3.1(b) of the Subsidies and Countervailing Measures (SCM) Agreement.³⁴

In addition, a Texas-based power company, Mesa, has filed a Notice of Intent to Submit a Claim to Arbitration under the North American Free Trade Agreement (NAFTA), stating that the domestic content requirements violate Article 1106.³⁵

28 World Trade Organization. *The General Agreement on Tariffs and Trade (GATT 1947)*, http://www.wto.org/english/docs_e/legal_e/gatt47_01_e.htm.

29 World Trade Organization. *Annex 4 to the Agreement on Government Procurement (Canada)*, http://www.wto.org/english/tratop_e/gproc_e/can4e.doc.

30 World Trade Organization. *Agreement on Subsidies and Countervailing Measures*, http://www.wto.org/english/docs_e/legal_e/24-scm_01_e.htm.

31 World Trade Organization. *Agreement on Trade-Related Investment Measures*, http://www.wto.org/english/docs_e/legal_e/18-trims_e.htm.

32 Foreign Affairs and International Trade Canada. *The North American Free Trade Agreement (NAFTA)*, <http://www.international.gc.ca/trade-agreements-accords-commerciaux/agr-acc/nafta-alena/texte/chap11.aspx?lang=en&view=d>.

33 Dispute 412 under the World Trade Organization Dispute Settlement System – Canada – Certain measures affecting the renewable energy generation sector. See: http://www.wto.org/english/tratop_e/dispu_e/cases_e/ds412_e.htm.

34 While these are the major legal areas of contention, the complaint also cites GATT Article XXIII:1, and SCM Articles 3.2 and 1.1.

35 Mesa power Group LLC, July 6, 2011. *Notice of Intent to Submit a Claim to Arbitration under Section B of Chapter 11 of the North American Free Trade Agreement*, http://www.international.gc.ca/trade-agreements-accords-commerciaux/assets/pdfs/Mesa_Power_Group_NOI.pdf

This is an emerging area of international trade law, and the current cases against Ontario may help to establish important legal precedents.

Economic Effects of a Domestic Content Requirement

It is hard to find evidence of the overall impact of a domestic content requirement for renewable electricity equipment, either on employment or other economic variables. In particular, since DCRs are often introduced concurrently with renewable energy support policies (such as the FiT) or as part of procurement, it is not clear exactly what role is played by the domestic content requirements in promoting employment in the renewable electricity industry, or in affecting other economic variables.

The DCR forces local renewable energy developers to substitute domestic for foreign suppliers, which can lead to higher prices for the domestically produced equipment. In the short-run, the quantity of plants that produce renewable electricity generating equipment is fixed, so there are fewer options than if the equipment could be sourced globally. Given that in the short-run there is a fixed number of domestic renewable energy equipment companies, this limited supply, coupled with increasing demand, would tend to lead to higher prices for domestically produced equipment.³⁶

A domestic content requirement is expected to raise the price of equipment, at least in the short-term, which creates two dynamics with potentially opposing effects. The effects are also different whether considering employment in renewable energy equipment manufacturing or renewable energy generation. In both sectors, it can dampen output of renewable energy by raising the cost of generation, leading to a reduction in employment in the sector; this is known as the output effect. In the renewable energy equipment manufacturing sector, employment increases because generators are required to use more domestic content. However, in the generation sector it could also raise the demand for labour, thus raising employment, to the extent that renewable energy producers can substitute labour for more expensive equipment; this is known as the substitution effect. This dynamic is shown in figure 1 below.

The higher price of domestically produced equipment (1 in the figure) produces a ripple effect. Under the output effect, the increased cost of production reduces the amount of renewable electricity generated (2), which reduces demand, and therefore production of

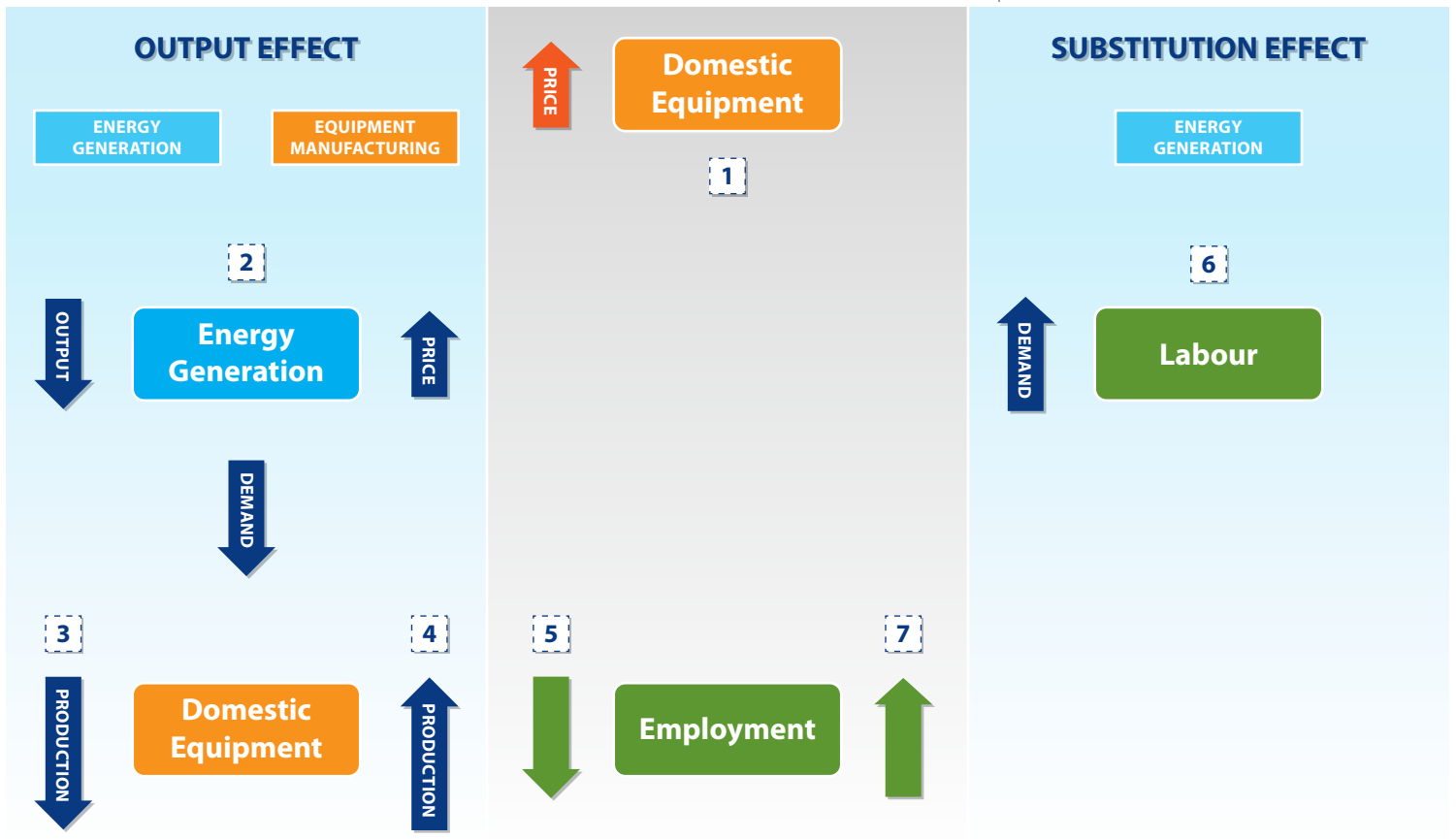
It is hard to find evidence of the overall impact of a domestic content requirement for renewable electricity equipment, either on employment or other economic variables.

³⁶ Grossman, G., November 1981. The theory of domestic content protection and content preference. *The Quarterly Journal of Economics*, 583-603.

renewable energy equipment (3), thus reducing employment (5). However, production of renewable energy equipment also increases because of the DCR (4), which would increase employment (7). With the substitution effect, the higher cost of equipment causes generators to substitute labour for equipment to the extent possible (6), which raises demand for employment (7).

The net outcome of these effects is theoretically ambiguous. However, if the domestic content requirement is strong enough that it pushes equipment prices up significantly, it is more likely to cause a net reduction in green employment than otherwise. Governments that choose to use DCRs in conjunction with renewable energy policies should therefore carefully design them such that they do not cause equipment prices to increase unduly.

Figure 1: The Output and Substitution Effects of the Domestic Content Requirement



Source: Sustainable Prosperity

Most studies find that domestic content requirements are economically inefficient, worsening welfare for all countries.³⁷ In the Ontario case, a study, commissioned by foreign renewable energy manufacturers seeking entry into the Ontario market, led by Mitsubishi Electric of Japan, found that the domestic content rules for solar will lead to increased costs, 9,000 fewer jobs and \$2-billion less in investment than would occur without the content rules.³⁸ The effects of such policies can depend substantially on the degree of competition and size of the protected market.

Longer-Term Effects

It is important to keep in mind that the negative effects of a domestic content policy as described in this *Policy Brief* occur in the short-term. In the longer term, it is likely that the cost premium for locally sourced equipment would fall, which would reduce the impact on employment.

There are other factors that could influence the effectiveness of domestic procurement policies in the longer-term in achieving the economic objective of creating a globally competitive sector. Several of these, including non-cost advantages and non-tariff trade barriers, are briefly explored below.

There are many countries seeking to establish a leading position in the manufacture of renewable energy equipment, including China, Germany, Korea and the United States. Domestic content requirements may lead to the establishment of renewable energy equipment companies where they would not necessarily choose to locate without government support. Whether or not Canadian firms can compete internationally and become exporters in the longer-term is unclear. Canada has entered the game relatively late. China has established a leading position as a low-cost producer, especially in the solar sector.³⁹ Canadian renewable energy equipment companies are unlikely to be able to compete internationally based on cost, due to high labour and other costs, but could become leaders based on non-cost advantages, especially if a local cluster develops.⁴⁰ Non-cost advantages include a relatively well-educated work force, and publicly provided health care.⁴¹

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37 See, for example: Mussa, M., 1984. *The economics of content protection*. Working paper, National Bureau of Economic Research, Grossman, G., November 1981. The theory of domestic content protection and content preference. *The Quarterly Journal of Economics*, 583-603 and Hollander, A., 1987. Content protection and transnational monopoly. *Journal of International Economics* 23 (3-4), 283-297.

38 McCarthy, Shawn, Oct. 20, 2010. *Solar rules will hurt Ontario, group warns*, <http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/solar-rules-will-hurt-ontario-group-warns/article1766007/>.

39 Bryant, Chris, January 2, 2012. *Chinese solar company to buy Germany's Sunways*. Financial Times, <http://www.ft.com/cms/s/0/02ab3978-354c-11e1-84b9-00144feabdc0.html#axzz1jBHtQR00>.

40 Michael Porter defines a cluster as "... geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate." See: Porter, M.E., February 2000. Location, Competition, and Economic Development: Local Clusters in a Global Economy. *Economic Development Quarterly* 14 (1), 15-34.

41 Shiell, Leslie and Stuart, Justin, November 2008. *The Economics of Subsidies in Ontario's Automotive Industry*. University of Ottawa Working Paper, <http://www.socialsciences.uottawa.ca/eco/fra/documents/0812E.pdf>.

Economies of scale or of learning in equipment manufacturing, which drive costs down, can enable the local manufacturing sector to become an exporter of renewable electricity equipment. The possibility to take advantage of economies of scale is enhanced if there is a large home market characterized by sizable, stable annual demand, although even in such a market, demand is likely to shrink over time as the local market becomes saturated.⁴²

In addition, there may be trade barriers which would impede international trade in renewable energy components. For example, if transport costs were very high, then renewable energy developers would source renewable energy components from local companies. Also, other countries could have their own, similar, domestic content requirements, which would block Canadian companies from accessing these markets.

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Implications for Policy-Makers

This *Brief* is meant as an overview of the theory and experience on a domestic content requirement for renewable energy equipment, and its impact on employment in the renewable energy sector. Based on the overview, Sustainable Prosperity believes that the following conclusions are of direct relevance to policy-makers engaged in the development of renewable energy policies in Canada:

1. The aim of a domestic content requirement is to grow the domestic renewable energy equipment manufacturing industry. However, such policies can impose costs in the short-term as well, in the form of reduced renewable electricity generation, or higher required government transfers to renewable electricity generators.
2. Domestic content requirements can have both beneficial as well as harmful effects on the number of 'green' jobs. While such policies may increase the number of such jobs by increasing the fraction of equipment manufacturing that takes place domestically, they may also eliminate such jobs by increasing the cost of renewable energy equipment and so reducing the quantity of renewable electricity supply overall.
3. The potential negative impacts of a domestic content requirement can be mitigated by gradually increasing the stringency of the policy over a longer period of time, to allow the local industry time to grow. In addition, short-term direct support to the renewable energy equipment industry could be coupled with the DCR to help the industry meet demand and build capacity. The government can provide assistance by matching developers to equipment suppliers, and helping companies navigate the domestic requirement paperwork.

⁴² Ibid

4. In the longer term, a renewable domestic content requirement may have a better chance of achieving its goal to increase employment in the renewable energy sector, though there are many factors at play that will have an impact on the actual outcome, which Canadian policy-makers need to be aware of and for which they need to adjust policies accordingly.
5. Although these are not directly addressed in this *Policy Brief*, it is clear that domestic content requirements raise a number of challenges from the perspective of international trade law. Canadian policy-makers, both at the provincial and federal level, need to consider these with great care.