



Foresight

Smart Policy Series

INCENTIVIZING LOW CARBON PATHWAYS FOR MANUFACTURING





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Manufacturing is the foundation of many economies and Canada is no exception, representing 10% of the country's total GDP. In value, that is \$174 billion dollars and 1.7 million jobs.¹ Manufacturing is typically referred to as the production of products for use or sale using labour and machines, tools, chemical and biological processing, or formulation. In this article, we've identified two pathways where clean technology is contributing to industrial transformation.

The first is the scaling up of clean technology product manufacturing itself. Against the backdrop of countries and companies taking action on climate change, a new wave of industrial activity is growing to meet demand for products and services. Canada is placed to become a leader, because of its vast forests, access to ocean and rich mineral deposits combined with a wide focus on research and innovation, there are already number of clean technology companies located across the country with local manufacturing sites and value chains.

Secondly, clean technology has a role to play in the actual process of manufacturing of goods and commodities. This is called

sustainable manufacturing - **minimizing of negative environmental impacts, conserving energy and natural resources in the manufacturing process**.² For example, large manufacturers of generic goods may be interested in improving their environmental performance indicators at various manufacturing sites to meet publicly known targets. Clean technology providers are best placed to help them achieve their mission.

WHAT TRENDS ARE DRIVING THIS NEW INDUSTRIAL REVOLUTION?

Companies across the world face increased costs in materials, energy, and compliance coupled with higher expectations of customers, investors and local communities.

Consumers

Consumer purchasing behaviour is changing. Demand for environmentally conscious, low carbon, transparent and responsible products is increasing. As a result, we see companies adhering to national and international standards or committing to voluntary climate change targets to help promote their efforts to their audience. This has the added benefit of a knock-on effect, creating further demand in the upstream supply chain for products that meet or contribute to environmental standards, all the way back to raw materials.

Costs

Raw materials and energy input costs typically represent over 50% of the total cost of a product, see Figure.1. Adopting environmental management practices and technology could reduce this cost by a significant amount.



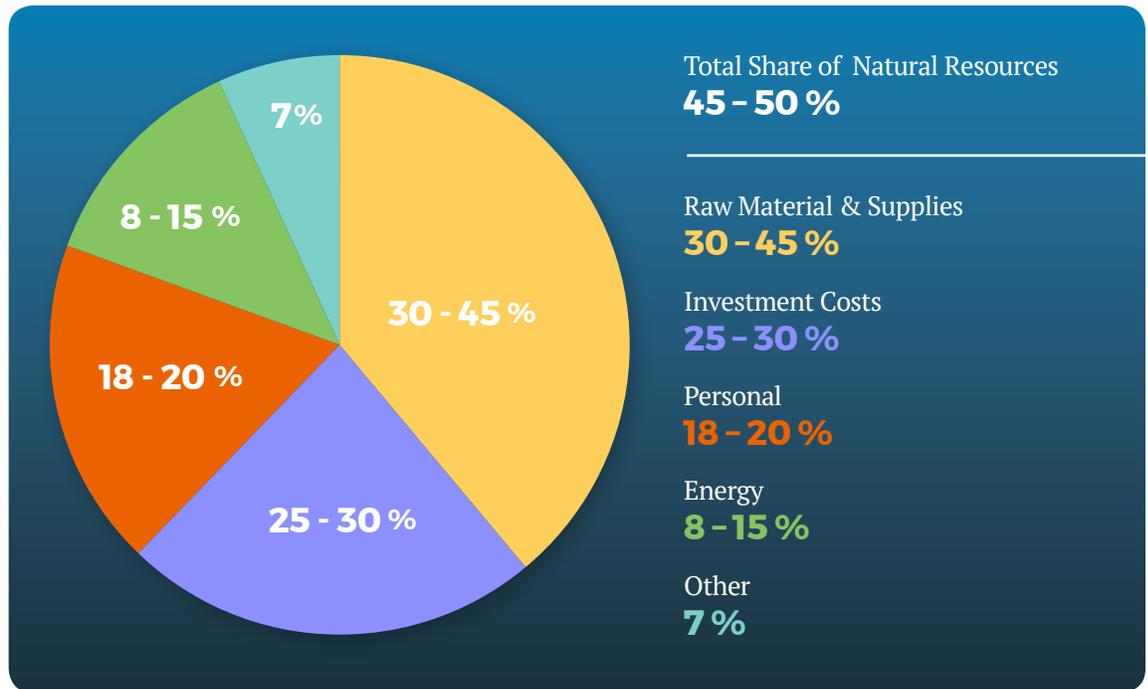


Figure 1. Environmental costs of manufacturing (INNOVA Europe 2012) ³

Risk

In a recent supply chain risk report researched by CDP, ⁴ 115 purchasing organizations and more than 11,500 global suppliers disclosed how they identify and manage **climate change, deforestation and water-related risks**. ⁵ 43% of the purchasers confirmed they would currently deselect existing suppliers based on their environmental performance. What's more, CDP discovered that suppliers are improving their efforts to procure responsibly, with 35% of suppliers saying they're engaging with their own suppliers on climate change.

HOW ARE STANDARDS AND FRAMEWORKS SUPPORTING SUSTAINABLE MANUFACTURING?

International standards such as ISO 14001/14004 provide a focussed framework for **environmental impact and evaluation**. ⁶ It encompasses a common method of reporting which is based on Lifecycle Assessment Analysis (LCA). Conducting LCA on products puts a spotlight on where GHGs including carbon emissions can be reduced in a product's

lifecycle. Other important standards to note are the PAS 2050 and the **GHG Protocol Product Standard**. ⁷ PAS 2050 was introduced in 2008 (revised in 2011) with the aim of providing a consistent internationally applicable method for quantifying product carbon footprints. The GHG Protocol Product Standard was released in 2011 and in addition to providing requirements to quantify the GHG inventories of products, also includes **requirements for public reporting**. ⁸



CASE STUDY: HOW GLOBAL CORPORATION UNILEVER IS DEMONSTRATING LEADERSHIP IN SUSTAINABLE MANUFACTURING

Major consumer good company Unilever set a carbon positive strategy in 2015. One of their targets was to source 100% of their energy across all operations from renewable sources by 2030. To date, they have made significant progress, by the end of 2018, 111 of their manufacturing sites across 36 countries were [using 100% renewable grid electricity](#).⁹ They follow CDP and RE100 climate reporting frameworks and use Green Building Council LEED certification rating process for buildings.

They also redesigned their production processes to reduce their environmental footprint including reducing water abstraction in their factories, reducing total amount of waste generated (by 97% per tonne compared to their 2008 baseline!) and energy consumption. What's the impact? While maintaining the growth of their business, they have avoided costs of €105 million through improving water efficiency, €601 million through improving energy efficiency and €234 million by [using less material and producing less waste](#).¹⁰

These savings are now invested into an internal fund to continue to invest in carbon positive and environmental performance improvements and technology. This is a great example of environmental leadership in manufacturing and supply chains.

SCALING SECTOR TRANSFORMATION AND CLEAN TECHNOLOGY INNOVATION IN CANADA

Often, countries regulate manufacturing activity with labour and environmental laws and are subject to regulations and pollution taxes to offset the environmental costs of manufacturing activities. However, this is not taking into account green growth policy that drives industry transformation. In the Smart Policy Series, we highlight various industries that will be impacted by policy, regulations, costs and customer demand, in their effort to align with green growth economic strategies, therefore driving the market for new clean technology and services. Here we've highlighted a couple of important industries to watch out for over the coming months, where significant change is set to happen.

Construction

Building codes are evolving in Canada. The federal government is looking to upgrade the 2020 National Building Code (NBC) to permit tall wood buildings and establish performance-based buildings codes for the [2025 edition of the NBC and beyond](#).¹¹ These codes carry significant weight to influence the materials used for construction of new materials, including wood. Wood-based materials use less energy, use less GHGs and pollutants over their life cycle compared to traditional materials. This provides a mandate for construction companies to source sustainable wood and forest products locally.



Local innovation is poised to support industry. Companies such as BC BioCarbon, a bio-refining technology company, has a pilot scale bio-refinery to process biomass or biomass derived materials into high grade biocoal, biochar, biogas and other **biogenic carbon products**.¹² Reforus has developed a technology to protect wood's structural integrity and **extend its value**.¹³ Their manufacturing process uses pulp and agriculture waste streams to naturally extend wood's performance. Manufacturers and builders improve their efficiencies because wood composites made with the technology helps cut labour costs, eliminate processes and reduce materials needed.

Transport

The government of British Columbia has introduced legislation for Spring 2019 to phase in **targets for the sale of Zero Emission Vehicles**.¹⁴ This legislation will set targets of 10% ZEV sales by 2025, 30% by 2030, and 100% by 2040, while government will take additional steps to make ZEVs more affordable. This policy direction gives a large number of innovators a boost, especially those in EV or hydrogen vehicle manufacturing, grid balancing specialists, battery and advanced material scientists.

Local company Hydrogen in Motion is part of this wave of innovation. They develop and manufacture mobile uncompressed hydrogen storage tanks and delivers **off-board refueling solutions to owners of hydrogen fuel cell vehicles**.¹⁵ The company has two business lines, a manufacturing line and a service delivery line, both designed to address the key barriers to adoption for the hydrogen fuel cell vehicle which are: fuel storage, range and re-fueling.

Learn more about our Smart Policy Series and clean tech companies driving industry transformation online by visiting our website: foresightcac.com/category/smart-policy-series/



Endnotes

- ¹ ic.gc.ca/eic/site/mfg-fab.nsf/eng/home
- ² oecd.org/innovation/green/toolkit/aboutsustainablemanufacturingandthetoolkit.htm
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