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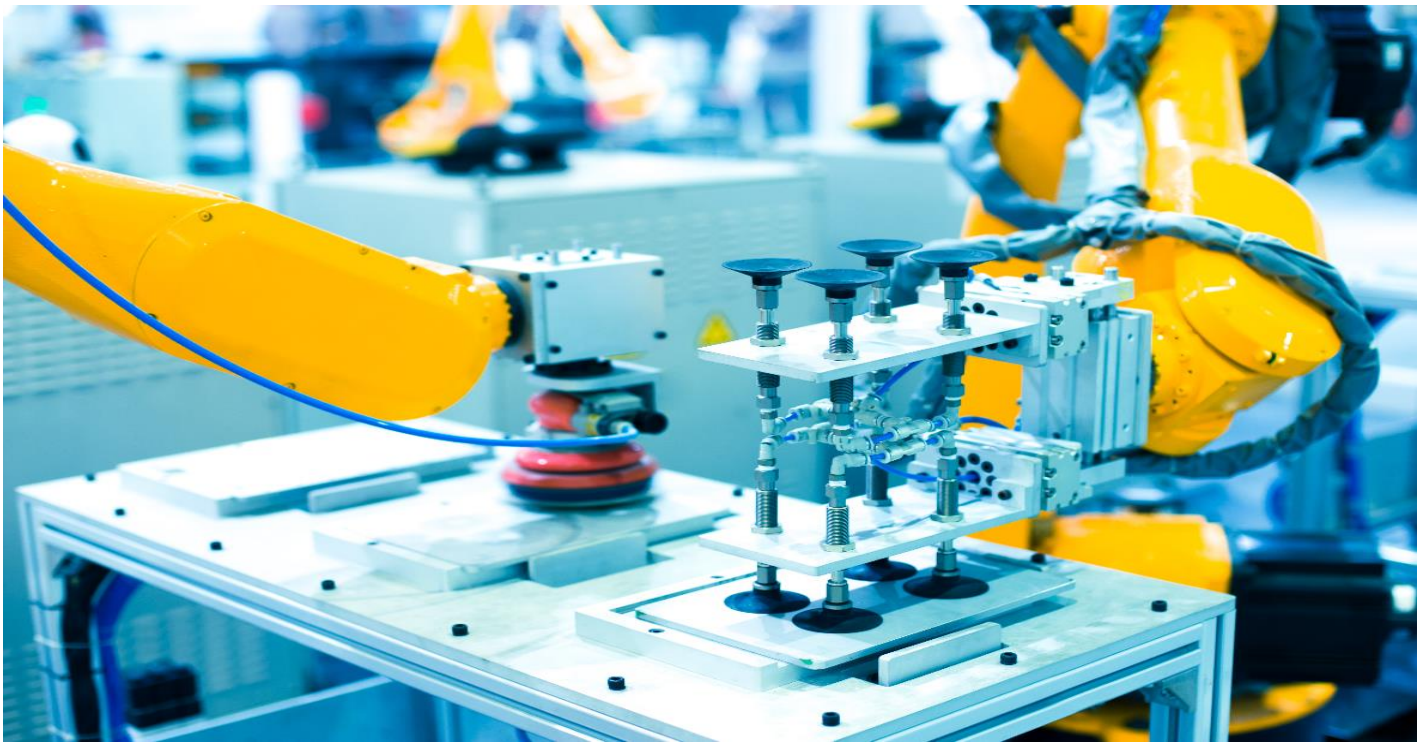
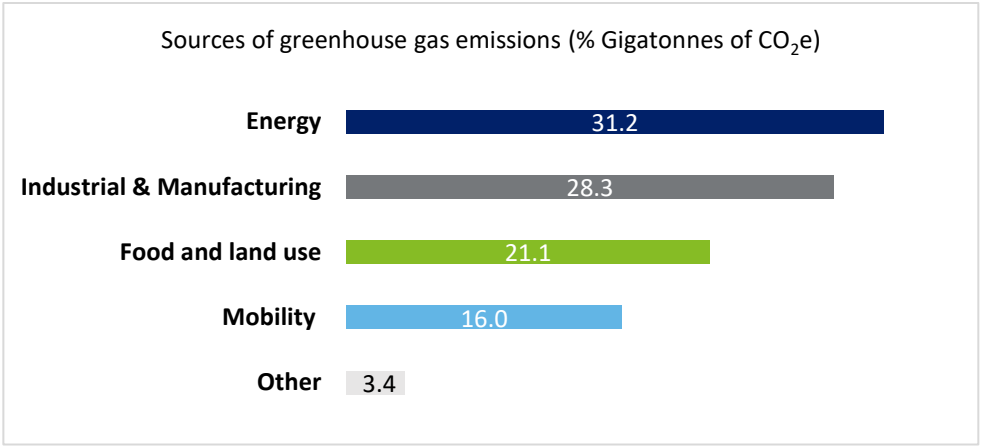


Policy considerations for a low-carbon industrial and manufacturing system

Introduction

Industry and manufacturing accounts for ~28% (~14 gigatons CO2e) of global GHG emissions[i] and reaching a net-zero future or staying close to a 1.5-degree pathway will require significant decarbonization of these often hard-to-abate industries. Major innovations are needed to transform industry and manufacturing into a low-carbon system. The emissions intensive nature of industrial and manufacturing processes requires rapid decarbonization of primary energy sources, faster adoption of circular approaches, and more support from the negative emissions system. Governments need to implement policies that promote and accelerate the transition to a low-carbon industrial and manufacturing system.



The transition to a low-carbon economy will require transforming a series of complex, interconnected, emissions free systems; and that catalytic change can happen by working at the intersections of those systems. Government, businesses, consumers as well as finance, and technology all have key roles to play in accelerating the emergence of low-carbon systems.

The transition will require major process and infrastructure changes with the consequent dislocation in jobs. Changes, such as green manufacturing and an increased reliance on recycling through a circular economy, will offer new career opportunities. Policymakers should include investments and plans that provide reskilling and job matching programs so that vulnerable workforces can make quick and efficient career transitions into the low-carbon economy.

Policies and policy levers–five considerations to be addressed

Policy makers are faced with a vast and varied array of choices about how to move their countries to a low-carbon industrial and manufacturing system. While most agree that this is the future and have committed to the Paris Agreement, how best to get there is a matter of continuing debate.

1. Policies are needed to help remove cost and technology barriers to accelerate the transition to low-emission processes.
Most emissions in the industrial and manufacturing system are the result of energy required for production. Many industries rely on carbon-intensive processes that currently lack sufficient viable alternatives. High costs and unproven technology related to low emission alternatives remain significant barriers to adopting cleaner processes.

Supporting tech incubators and directly investing in technologies that have the potential to replace emissions intensive infrastructure is one option to accelerate the transition to low-emission processes. For example, the Swedish company Hybrit, which is partly owned by the state-owned utility Vattenfall, is developing steel that is made without the use of coal. Instead, the company uses renewable electricity and hydrogen[ii].Technology for green steel production is far less carbon intensive but requires vast amounts of capital to reach commercial scale and economic viability, something governments could help support through the transition phase.

2. Policymakers can incentivize the commercialization and scaling-up of alternative energy sources.
Switching to alternative energy sources are often costly projects and may involve technology that has yet to be proven on a commercialized scale. Reducing costs of electrification retrofits and lowering risks to first movers could be achieved by incentivizing the switch through tax credits, subsidies, or investments. Governments can also support the scaling and commercialization of alternative fuels, such as hydrogen. The Government of Canada recently launched a Hydrogen Strategy call-to-action and roadmap for Canada to maximize the potential of hydrogen as a fuel to help the country reach net-zero by 2050, which includes 32 policy recommendations.[iii]

To further address emission levels, governments can support the development and investment into carbon capture, utilization, and storage (CCUS) infrastructure that can be deployed at emissions intensive sites. Policies are needed that allow for more capital to flow into the research and development of CCUS, and to reduce the costs associated with integrating CCUS into industrial processes, particularly for first movers.

3. Governments must work with industry to set common standards and implement policies that reduce the production of net-new products and grow circular economies.
A net-zero future will be easier to achieve with extensive adoption of holistic circular manufacturing approaches. Manufacturers can share part of this responsibility through design changes that improve the durability, repairability, energy intensity, and recyclability of their products. Governments can accelerate these changes through policies such as regulating producer responsibilities for end products, creating common standards that foster widespread circularity, and providing incentives to consumers to choose lower carbon intensive products and services. For example, the EU's Circular Economy Action Plan used legislative measures to create standards that enable a shared understanding as to what makes a supply-chain circular across the EU[iv]. National governments are then able to enact their own regulation supporting these standards.

4. National recycling networks and industrial frameworks are needed to support a robust circular economy.
Within the efforts to create a circular economy, governments need to develop more robust national recycling networks that contribute to lowering demand for net-new products and the energy required to make them. Governments must ask whether their national recycling networks can support a robust circular economy, or if new infrastructure is needed. China's Development Plan for the Circular Economy aims to increase resource efficiency and meet climate commitments, part of which involves new recycling initiatives to improve the lifecycle of products. The plan includes integrating recycling infrastructure into

land planning and standardizing construction of the recycling network. China has also set various targets, such as utilizing 60 million tons of wastepaper and 320 million tons of scrap steel by 2025, to further reduce its reliance on net-new products.[v]

5. Policymakers should minimize the social consequences of the transition and support workforce development. Whatever policies are chosen to accelerate the transition to low-carbon industrial and manufacturing system, they should consider the impact on people whose jobs are affected. Workers will need support to develop the right skills and be matched to new jobs in the low-carbon system. The industrial and manufacturing transition will need a workforce to build and retrofit infrastructure, maintain the new systems, and to support the circular economy network. Governments should consider what new opportunities will be created and determine how to effectively reskill vulnerable workforces.

Find out more

- Deloitte's system of systems approach
- Deloitte's Climate Exchange

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[i] Hannah Ritchie, "Sector by sector: Where do global greenhouse gas emissions come from? " September 18, 2020.
[ii] [ii] Asa Backlin, "The world's first fossil-free steel ready for delivery", August 18, 2021.
[iii] Government of Canada, "Hydrogen Strategy for Canada," December 2020.
[iv] European Commission, "Circular economy action plan," accessed October 20, 2021.
[v] Alexander C. Koty, "China's Circular Economy: Understanding the New Five Year Plan," July 16, 2021.

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