DECARBONIZATION: A ROADMAP FOR MANUFACTURERS

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The manufacturing sector accounts for a significant proportion of global CO_2 emissions. In fact, manufacturing poses a carbon conundrum. On the one hand, industrial processes and products are over reliant on fossil fuels and natural resources. On the other, carbon intensity across the value chain increases operational risks for industrial manufacturers. Climate science has conclusively proven that greenhouse gas emissions (GHG) emissions are detrimental to the environment and living species. It has put the carbon issue front and center of the business agenda for CXOs.

Decarbonization programs should transcend compliance and become more accountable to constituents. As a first step, manufacturers should monitor emissions demarcated in the GHG Protocol: Scope 1 (direct emissions from facilities via combustion equipment, vehicles, boilers), Scope 2 (indirect emissions due to electricity from fossil fuel-based 'brown' sources for lighting, heating and cooling) and Scope 3 (indirect emissions associated with business travel, procurement, shipping, and waste disposal).

Visibility into CO_2 emissions from direct and indirect sources enables enterprises to commit to a sustainable business framework, and devise policies to reduce the carbon footprint.

Infosys – a lab to incubate decarbonization solutions

Infosys implemented a holistic strategy to achieve carbon neutrality by 2050. The global digital services and consulting company sought to reduce power consumption in 191 offices and data centers across 46 countries as well as emissions from business travel and the daily commute of 250,000+ employees. The Green Initiatives team of Infosys benchmarked emissions and reduction targets against the corporate accounting and reporting standard of the GHG Protocol and the Publicly Available Standard 2060 (PAS 2060).

Infosys undertook energy conservation programs to minimize Scope 1 and 2 emissions, and carbon offsetting programs to reduce Scope 3 emissions. This approach reduced per capita emissions by over 70% and achieved carbon neutrality 30 years ahead of the timeline set by the Paris Agreement at the United Nations Climate Change Conference (COP 21) in 2015. Green policies reduced Scope 1 and 2 emissions by ~ 40,000 tCO2e (metric tons of carbon dioxide equivalent).

The carbon neutral journey of Infosys provides insights for manufacturers to reimagine operations. A combination of energy-efficient systems, renewable energy sources, and community-based carbon offset projects can drive sustainable manufacturing.

Carbon-free energy

Infosys installed 46.1 MW captive onsite and offsite solar power plants to reduce dependence on fossil fuel-based power grids by ~ 44%. The renewable energy program addresses requirements of office buildings and data centers.

Manufacturers can reduce emissions by replacing fossil fuels used in operational assets and processes with viable alternatives. Enterprises should evaluate clean energy sources for transitioning to a low-carbon economy. Industrial enterprises can generate renewable energy in-house with the expertise of third-party operators. Alternatively, power can be procured from 'green' grids with wind, solar and hydropower systems.

However, renewable sources of energy are not always reliable. Global manufacturers can drive stability of green grids by promoting natural gas plants that use carbon capture and sequestration technology. Enterprises may opt for green tariff plans and purchase electricity from clean energy projects of utilities. When manufacturers pivot to clean energy, they must also ensure that their suppliers pledge to a low carbon business model.

Low carbon infrastructure

Infosys reduced per capita power consumption by over 55% through energy efficiency programs. The company's campuses are among the most energy-efficient in the world, according to the Lawrence Berkeley National Laboratory, USA.

Improvement in energy efficiency of heating and lighting, materials handling, process machinery, and semi-automated systems help manufacturing enterprises reduce emissions. Existing buildings, equipment, and Heating, Ventilation and Air Conditioning (HVAC) systems can be upgraded or retrofitted to minimize power consumption and steadily eliminate Scope 1 / 2 emissions.

Industrial manufacturers also need to reduce carbon intensity across the supply chain to achieve GHG reduction goals. Informed procurement decisions related to raw materials, parts and components minimize the carbon footprint. In addition, products can be redesigned to rationalize energy consumption and eliminate substances that cause emissions during disposal.

Community-based carbon offset

Infosys launched carbon offsetting programs that cumulatively reduce emissions by over one million tCO_2e. More than 100,000 families benefit from biogas plants and organic farming projects in rural areas.

The operations of a majority of manufacturing units do not allow elimination of emissions. Partnerships with non-governmental organizations (NGOs), local agencies and communities compensate for GHG emissions. Such projects may include reforestation, wildlife conservation, rural development, and landfill methane capture.

Carbon pricing systems allow critical evaluation of decarbonization projects, enabling targeted reduction in emissions through community programs. A carbon footprint assessment in monetary terms helps enterprises deepen stakeholder engagement and sensitize franchisees, contractors, suppliers, logistics partners, and employees to a low carbon ecosystem while shining a light on sustainable manufacturing.

Conclusion

Digital technology enables industrial manufacturers to develop a cost-effective decarbonization blueprint. Emissions monitoring systems provide an audit trail of GHG reduction, and serve as a catalyst to meet long-term, strategic goals. Manufacturers should capitalize on AI, digital twins and virtual reality to reconfigure products, reorient production, replace carbon-emitting infrastructure, and test industrial-scale pilot projects to minimize their carbon footprint.

About the Author

Jasmeet Singh, *EVP and Global Head of Manufacturing, Infosys*

Jasmeet is Executive Vice President and Global Head of Manufacturing at Infosys, a global leader in next-generation digital services and consulting. Infosys holds a strong ESG vision around climate change, technology for good, diversity and inclusion, energizing local communities, ethics and transparency, data privacy and information management and became carbon neutral in 2020, 30 years before the Paris Agreement. At Infosys, Jasmeet is responsible for overseeing and growing client relationships in the Automotive, Aerospace, Defense and Industrial Manufacturing sectors. Under his leadership, the sector has grown double digit for the past 2 years while improving the margin profile of his business. Jasmeet is also on the Board of Fluido, a Finland based digital transformation leader and Salesforce platinum consulting partner that became part of the Infosys family in October 2018. He is also on the board of Panaya, an Israel based company that Infosys acquired in early 2015. Panaya is a leader in change acceleration, impact analysis and testing across SAP, Oracle and Salesforce based ecosystems.

With over two decades of experience in IT and technology-driven business transformation, Jasmeet brings a deep appreciation of business processes and the usage of technology as a strategic differentiator for clients. He has a keen interest in the business value the manufacturing industry can derive from the intersection of technologies like IIoT, Automation and Machine Learning.

A graduate in electrical engineering from IIT (BHU) Varanasi, Jasmeet also holds an MBA from Faculty of Management Studies, Delhi.

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