

# Opportunities for Technology Companies in the Fight Against Climate Change



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**T**he focus on the role of corporations in the fight against climate change has never been sharper, and rightfully so. While policymakers are responsible for setting emissions standards, developing environmental regulations, and shaping other macro-level forces that influence the environmental impact of economies, these processes are complex and move at their own pace. These efforts are critically important, but corporations have both the power and the opportunity to push forward in the fight against climate change in parallel with these political processes.

Technology companies, in particular, are well positioned to seize the opportunity to help in this fight. While some of the obstacles to decarbonization are of course economic and political, some of them are pragmatic. Insufficient insight into business operations, an opaque supply chain, an inability to leverage more efficient technologies, and a lack of cost-effective lower-carbon alternatives all hinder the ability of even the best-intentioned companies to reduce their emissions. These challenges generally boil down to three critical needs that technology companies have the unique ability to meet: better data, better operations, and better technology.

How effectively and rapidly large portions of the economy can decarbonize will hinge on whether companies recognize this opportunity and rise to the challenge. By doing so and working alongside policymakers and other stakeholders, technology companies can help make enormous progress in the fight against climate change while strengthening the economy.



## Better Data

You can't manage what you can't measure, which is why better data about the environmental impact of every aspect of the economy is invaluable for companies and policymakers alike. Disclosure of corporate greenhouse gas (GHG) emissions can be an invaluable tool for ensuring stakeholders have the necessary data to understand where and how GHG emissions enter the atmosphere and how to best prioritize mitigation efforts. However, this is a massive data and integration undertaking, requiring the collection and management of huge volumes of diverse data points across a company's business activities.

Here, technology companies can provide powerful reporting and analytics platforms to help companies of all sizes rise to this challenge. When done properly, these platforms can help deliver transparent, verifiable, high-quality data for use by regulators, investors, and researchers focused on reducing GHG emissions, while also delivering insights about that can improve the efficiency of business operations.

Widespread usage of these platforms, paired with smart, targeted emissions disclosure requirements, would have the added benefit of enabling governments to develop an economy-wide view of emissions. With every firm reporting their emissions transparently and accountably in a standardized format, governments could link this data to "map" the emissions of entire countries. The same platforms that help individual companies gather and report this data could help governments accomplish this task.

Canadian electronics manufacturing services company **Celestica** operates in over 50 sites across 15 countries. Measuring and managing sustainability efforts across such a widely dispersed business is a major challenge and relying on manual reporting and calculations is tedious and error prone. [By transitioning to IBM's Envizi ESG Suite, Celestica is now able to easily compile and transform data from around the world while reducing errors.](#) Relying on data management software enables Celestica to tackle more ambitious internal emissions reductions and reporting efforts while more easily complying with requirements of external reporting frameworks. This increase in efficiency and accuracy has empowered Celestica to pursue aspirational sustainability goals, including reducing Scope 1 and 2 GHG emissions by 30% by 2025 from a 2018 baseline.

Envizi can automate the collection and consolidation of more than 500 data types and supports internationally recognized ESG reporting frameworks, to consistently deliver transparent, verifiable information and report out on progress. Companies will be able to transform this ESG data into predictive insights. These insights can be used to assess progress towards sustainability benchmarks and help reduce the environmental impact of daily business operations.

Envizi's Decarbonization solution integrates a suite of software modules that support the ongoing monitoring, analysis, management, and reporting of energy demand, consumption, and associated emissions across large and complex organizations.



## Better Operations

Better data alone will not make a difference in the fight against climate change if companies can't meaningfully use it to improve their operations. While many companies recognize the efficiency and operational benefits of becoming a data-driven organization, various factors such as a lack of skills and inflexible legacy infrastructure create significant obstacles that slow this transition. By enabling the use of analytics and automation, technology companies can help industry make smarter decisions, greatly improve the efficiency of their operations, and cut costs.

Danish infrastructure firm **Sund&Bælt** has historically relied on manual processes to inspect over 300,000 square meters of concrete that make up critical infrastructure such as the 11-mile Great Belt Fixed Link Bridge and tunnel in Denmark. These inspections, which must be repeated every six years, are expensive, can take many man hours, and are only as reliable as the human's conducting them.

[Sund & Bælt partnered with IBM to deploy the Maximo Application Suite to support its digital transformation and significantly improve its operations.](#) The Maximo Application Suite can consolidate data from disparate sources such as maintenance records, design documents, drone photography, and 3D modeling to rapidly identify cracks, corrosion, and other signs of infrastructure integrity. This allows Sund & Bælt to make more informed decisions faster and better prepare for emergencies.

Sund & Bælt estimates that within 5 to 10 years, this technology will have increased productivity by 15 to 25 percent with an over a 30 percent reduction in the time it takes to repair an incident after it's identified. More significantly, Sund & Bælt believes this technology will expand the lifespan of the Great Belt Bridge by 100 years, resulting in a savings of 750,000 tons of CO2 emissions.



The environmental benefits of more efficient operations through the better use of data are not limited to large companies. The recently launched **IBM Sustainability Accelerator** is devoted to leveraging data technologies such as hybrid cloud and artificial intelligence to enhance and scale projects [focused on populations vulnerable to environmental threats such as climate change, extreme weather, and pollution](#). IBM will provide \$30 million in technology services by 2023 to the Sustainability Accelerator's first cohort, which is focused on clean energy. These projects include:

- Working with the NGO **Sustainable Energy for All** to build an intelligent model to project energy needs based on current and future human activity. This will leverage machine learning and cloud technology and generate insights with temporal and special data to help address development challenges and support energy infrastructure planning.
- Helping the **Miyakojima City Government** in Japan to develop a renewable energy strategy to make the community more resilient to extreme weather events that threaten power infrastructure. The City Government will leverage IBM Cloud and weather analytics to model electricity demand and inform infrastructure development.

## Better technology

Any feasible transition to a carbon-free economy will require the maturation and adoption of nascent and yet-unforeseen technologies with the potential to reduce the amount of GHG being emitted and even remove GHG from the atmosphere. Technology companies have access to unparalleled scientific and technological talent and resources, and they can put them to good use by pursuing ambitious climate-focused R&D agendas.

### Quantum computing

Many obstacles to developing technologies that can improve efficiency and support decarbonization are computational in nature—researchers simply cannot feasibly perform the calculations they need to conduct experiments with existing computers. In late 2022, IBM announced **Osprey, a quantum processor a qubit count of 433, making it the most powerful quantum processor to date**. Osprey's qubit count is three times that of IBM's Eagle processor unveiled in 2021, highlighting the potential for technology companies to rapidly mature powerful new computing technologies. Quantum computers have the potential to perform complex calculations far more efficiently than traditional computing. For reference, the number of classical bits that would be necessary to represent a state on the IBM Osprey processor far exceeds the total number of atoms in the known universe.

Advancements in quantum computing are critical for solving enormously complex computing challenges that could unlock significant progress in the fight against climate change. IBM's **Quantum Network**, an international network of over 210 Fortune 500 companies, universities, laboratories, and startups is already tackling many of these challenges.

- Automaker **Mercedes-Benz** is [using quantum computing to pursue more energy-dense battery technologies for electric vehicles](#). Developing new battery technology requires enormous amounts of time, money, and engineering expertise. Quantum computing makes it feasible to simulate the properties and behaviors of molecules that could lead to breakthroughs that make powerful new batteries, such as lithium sulfur (Li-S) batteries, commercially viable.

### Carbon capture

Improving efficiency is critical to reducing the amount of greenhouse gasses businesses generate, but technologies that could remove carbon from the atmosphere will be an essential cornerstone of net zero strategies. IBM Research is building a cloud-based knowledge base of materials and processes for carbon capture by using natural language processing to mine information from millions of research papers and patents, [which can help researchers pursue carbon capture R&D more strategically](#).



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## Conclusion

Conventional wisdom about how to solve climate change might suggest that it is simply a matter of policymakers gradually minimizing the amount of greenhouse gasses the private sector can emit through regulation. This view posits industry as an antagonist in the fight against climate change. While this has often been the case, it can not be in the future if society hopes to make meaningful progress in protecting the environment. Policymakers will not be able to bring about a zero-carbon economy through regulation alone, and corporations will not be able to simply innovate their way out of climate change in a vacuum.

Instead, industry—the technology industry in particular—can embrace the opportunity that working to fight climate change presents. By better leveraging data and technology, companies can make being a good environmental steward more economically feasible and beneficial to reduce emissions. Similarly, policymakers can prioritize policies that harness powerful market forces to steer industry to a strong and competitive carbon-free economy.



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