Building a Proactive Decarbonization Strategy: A Comprehensive Guide

As environmental standards tighten, organizations and facilities must innovate to stay ahead. Adopting a forward-thinking decarbonization strategy not only helps improve sustainability but also boosts efficiency and compliance with Provincial mandates. By reducing carbon emissions, organizations can achieve cost savings, enhance operational resilience.

Understanding Decarbonization

Decarbonization is essential for reducing carbon footprints and helping reduce environmental impact across various sectors. This can be achieved through energy efficiency, electrification, low GWP refrigerants, and renewable energy enabled by thermal batteries as well as chemical batteries. As organizations strive to become more sustainable, understanding and implementing a comprehensive decarbonization strategy is crucial.

Decarbonization is not a new concept. Simply put, it involves taking action to reduce emissions. While the terminology continues to evolve—with terms like sustainability, ESG (Environmental Social Governance), and CSR (Corporate Social Responsibility) being used interchangeably—each term plays a critical role in an overall sustainability plan.

Understanding the Vernacular

- Strategy: Achieving environmental sustainability through decarbonization is an overarching strategy that can be used to reduce greenhouse gas (GHG) emissions. This strategy encompasses a broad range of activities and initiatives aimed at reducing the carbon footprint of operations.
- Management Tools: ESG and CSR are management tools that help hold key stakeholders accountable to accomplish the strategy. These tools provide frameworks for measuring and reporting on sustainability efforts, enabling organizations to track their progress and make data-driven decisions.
- Solutions: Energy Efficiency, Renewables, Electrification, and Refrigerant Management are concrete solutions that can be implemented on the path to decarbonization. These solutions represent specific actions that organizations can take to help reduce their carbon emissions and improve their overall sustainability.

Key Initiatives and Pressures

Several initiatives and pressures are pushing organizations and facilities towards decarbonization:

- **Climate Pledge:** Organizations play a crucial role in Canada's efforts to reduce greenhouse gas (GHG) emissions. They are key to achieving Canada's net-zero targets for 2030 and 2050, and the global goal of limiting temperature increases to 1.5°C as per the 2015 Paris Agreement.
- **Economy-wide Strategies:** Canada has implemented economy-wide strategies to reduce emissions, such as procurement of additional zero emission power generation, energy efficiency incentives, clean fuels, and reducing methane emissions. These strategies provide policy certainty to businesses and Canadians, enabling informed decisions as the economy decarbonizes.
- **Buildings Sector:** Transitioning Canada's building stock to net-zero over the long term creates opportunities to promote a low-carbon supply chain, adopt net-zero ready building codes, transform space and water heating, improve affordability through energy efficiency, accelerate private financing, and workforce development to support the sector's transition.
- **Accreditation Agencies:** Various accreditation agencies and partnerships, such as the Global Covenant of Mayors and the Urban Sustainability Directors Network, show global efforts in climate action.
- **Annual Surveys:** Survey data from various organizations reveal that many have implemented climate action plans, adopted GHG emissions targets, and created GHG inventories. Despite progress, gaps remain that must be addressed to meet net-zero goals by 2050.
- **Voluntary Reporting:** Comprehensive datasets for academic research on climate action planning and implementation allow organizations to benchmark against others. Reports summarizing survey data help organizations make informed decisions and understand their current climate action status.

Decarbonization as a Strategy: How to Get Started

While it might seem daunting, getting started is quite simple. Start by assessing what is already being done. Organizations might already be on a decarbonization journey even without a formalized program. Actions to reduce energy consumption, or having a refrigerant management program, can contribute to decarbonization.

As organizations and facilities move into a more formalized decarbonization program, it is important to understand the four primary levers to pull to decarbonize:

- **Energy Efficiency:** Improving overall energy efficiency and reducing emissions can be done in new construction or existing facilities. This involves looking at how buildings currently operate and finding opportunities to make them more efficient, such as reducing heating, cooling, or lighting during slower times or optimizing building automation systems. When choosing new building equipment and fixtures—either in a retrofit or a new build—opt for more energy-efficient options. Implementing energy-efficient lighting, HVAC systems, and building automation systems can significantly reduce energy consumption, and improving the condition of things like insulation and windows can improve efficiency.
- **Electrification of Heating:** Electric heat sources have come a long way in recent years. Moving away from fossil fuel energy sources to electrified equipment in areas that utilize higher volumes of renewable or low-emissions electricity can make a huge impact on fossil fuel emissions. Modern electric heating systems, such as heat pumps, are highly efficient and can reduce greenhouse gas emissions. Additionally, electrification can be paired with on-site renewable energy sources to further reduce the carbon footprint and enhance facility resilience.
- **Refrigerant Choices:** Building Equipment requires refrigerants to keep cool. Ensuring there isn't any leakage and switching to eco-friendlier coolants help reduce emissions. Traditional refrigerants, such as hydrofluorocarbons (HFCs), have high global warming potentials. Transitioning to low-GWP refrigerants, such as hydrofluoroolefins (HFOs), can significantly reduce the environmental impact of cooling systems.
- **Renewable Energy:** Also referred to as "Clean Energy," there are a couple of methods to incorporate renewable energy into building operations, whether it's investing in adding renewables on-site or purchasing renewable energy credits. On-site renewable energy installations, such as solar panels or wind turbines, can provide a direct source of clean energy. Alternatively, organizations can purchase renewable energy credits (RECs) to increase the proportion of clean electricity purchased.

Benefits of a Proactive Decarbonization Strategy

There are significant benefits to making buildings more energy efficient:

- **Cost Savings & Energy Reduction:** Addressing the significant energy losses in Canada—31% in the end-use sector and 36% during conversion and transformation[1]—presents a major opportunity for cost savings and energy reduction. By taking steps to reduce this waste, businesses and facilities will consume less energy and help to reduce utility expenses. Energy-efficient buildings have lower operating costs, which can free up funds for other community initiatives.
- **Energy Resiliency:** Whether it's a planned brownout or being prepared in the event of a natural or man-made disaster, it's increasingly important to have a contingency plan in place should traditional power sources become strained. Energy resiliency measures, such as backup generators and energy storage systems, can ensure that critical services remain operational during power outages.
- **Improved Community Comfort:** The goal of all operational initiatives needs to be centered on providing exceptional community services. Keeping community comfort at the forefront of a decarbonization strategy will help deliver emissions reduction without compromising on performance.

Steps to Transform Infrastructure

No matter how big an organization or facility is, there are steps to transform infrastructure into a stronger asset:

1. **Conduct an Energy Audit:** Begin by performing an energy audit to identify opportunities for energy efficiency improvements. This process involves assessing the current energy consumption of buildings and pinpointing areas where energy is being wasted. By leveraging a building's automation system to collect data on the cloud, building professionals can gain a comprehensive and efficient understanding of the building's current energy state.
2. **Set Clear Goals:** Establish clear and measurable goals for reducing energy consumption and carbon emissions. These goals should be aligned with broader sustainability objectives and should be communicated to all stakeholders.
3. **Develop a Decarbonization Plan:** Create a comprehensive decarbonization plan that outlines the specific actions that will be taken to achieve the established goals. This plan should include timelines, budgets, and responsibilities.
4. **Implement Energy Efficiency Measures:** Begin by implementing low-cost and high-impact energy efficiency measures, such as upgrading lighting systems, optimizing HVAC systems by leveraging Artificial Intelligence (AI), and installing variable speed drives. These measures can provide immediate energy savings and set the stage for more significant investments.
5. **Electrify Systems:** In order to reduce scope 1 emissions from fossil fuels, building systems will need to be electrified. Consider the conditions of your assets, asset replacement cycles, and your decarbonization time horizon to systematically electrify building systems so that they will be prepared for operation on cleaner grids in the future.
6. **Invest in Renewable Energy:** Explore opportunities to invest in renewable energy sources, such as solar, wind, or geothermal. On-site renewable energy installations can provide a direct source of clean energy. As per ASHRAE® Research Paper 1607.2018, Thermal Energy Storage can increase the use of renewables by up to 50%.
7. **Monitor and Report Progress:** Continuously monitor energy consumption and carbon emissions to track progress towards decarbonization goals. Regularly report on progress to stakeholders and adjust the plan as needed.
8. **Engage the Community:** Engage the community in the decarbonization efforts by raising awareness and encouraging participation. Community involvement can help build support for sustainability initiatives and foster a culture of environmental responsibility.

Conclusion

Decarbonization is not just an environmental imperative, but a strategic decision that can lead to significant cost savings, improved energy resiliency, and enhanced community comfort. By taking steps now, organizations can position themselves to meet future regulations and contribute to a more sustainable future. Assessing current infrastructure, developing a proactive plan, and understanding funding options are crucial steps in this journey. With a comprehensive decarbonization strategy, organizations can help reduce their carbon footprints and improve their operations.

1. Canada Energy Regulator. "Canada's Energy Transition: Historical and Future Changes to Energy Systems - Update to the Energy Market Assessment: Energy Systems." Accessed [July 2022]. https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/canadas-energy-transition/canadas-energy-transition-historical-future-changes-energy-systems-update-energy-market-assessment-energy-systems.html#:~:text=For%20Canada%27s%20energy%20demand%20as,transformation%20by%20the%20energy%20industry.