



**UNIVERSITY OF
CALGARY**

ENEL 674 Industrial and Commercial Power Systems

Group 7

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Project Milestone 2

Incorporation of zero carbon initiatives

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Incorporation of zero carbon initiatives, such as electric vehicle chargers:

Zero carbon initiatives refer to measures and actions taken to reduce or eliminate carbon emissions from various sources, with the aim of mitigating climate change and its negative impacts. Some examples of zero carbon initiatives include:

1. Renewable energy sources:

This includes solar, wind, geothermal, and hydropower. These sources of energy do not emit any greenhouse gases during generation and can help reduce carbon emissions. By producing building's own electricity and lowering its dependency on fossil fuels and the grid, buildings can become more energy independent by incorporating renewable energy resources. This could increase the structure's durability and lower the likelihood of power interruptions. Given the rising demand for sustainable and energy-efficient structures, adding renewable energy sources to a building may raise its property value. Buildings such as multi-use community gathering space, educational hub, and local art gallery using renewable energy resources can assist advance sustainable energy practises and increase understanding of the significance of lowering carbon emissions.

2. Electric vehicle Chargers:

By using electric vehicles instead of gasoline or diesel-powered vehicles, it is possible to significantly reduce greenhouse gas emissions from the transportation sector. Commercial buildings may support the usage of electric vehicles by offering EV chargers, which generate substantially less greenhouse gases than conventional gas-powered automobiles. This may lessen carbon emissions and slow down climate change. Offering EV charging facilities in the workplace can help improve employee satisfaction and retention by providing an additional benefit that promotes a sustainable and eco-friendly lifestyle As they can charge their vehicles when they are working in the office during day time. There are several types of EV chargers available, including Level 1, Level 2, and Level 3 (also known as DC fast charging). Level 1 and Level 2 chargers typically require a 240-volt circuit, while Level 3 chargers require a 480-volt circuit. Building designers and electrical engineers may need to consider the specific needs of the building occupants and the surrounding community when determining the number and type of EV chargers to install.

3. Energy-efficient buildings:

Buildings that use less energy for heating, cooling, and lighting are more energy-efficient. This lessens the need for fossil fuels and energy, which account for a sizable amount of carbon emissions. Energy-efficient structures can aid in lowering commercial buildings' carbon footprints by consuming less energy. Energy-efficient structures frequently have better ventilation and air filtration systems, which can assist lower indoor air pollution and enhance occupant health and well-being. Higher output, decreased absenteeism, and fewer healthcare expenditures may result from this.

4. Carbon capture and storage (CCS):

To promote CCS projects in other sectors or regions, commercial buildings may use carbon offset programmes. In doing so, the building would be able to compensate for its carbon emissions by aiding in the removal or reduction of carbon dioxide emissions in other places. Commercial structures can contribute to spreading knowledge about the necessity of lowering carbon emissions and the possibility for CCS technology to promote zero-carbon projects, even though they are not directly tied to CCS technology. Commercial structures can encourage greater adoption of CCS and other carbon-reduction-supporting technology by promoting sustainable practises and practises.

5. Implement a demand response system:

By lowering electricity consumption during peak hours, when the grid is under strain and frequently uses high-emitting power plants to satisfy demand, the implementation of a demand response (DR) system can assist in achieving zero carbon projects. Demand management strategies that support the integration of renewable energy sources, such wind and solar electricity, can be implemented using DR systems. DR systems can lessen the need for fossil fuel-based generation by adjusting demand to match available renewable energy supply and facilitate the switch to a low-carbon energy system. By encouraging users to use less electricity during peak hours, DR systems can help consumers pay less for their electricity. This could promote more environmentally friendly consumption habits and support the shift to a society that is low in carbon emissions.

6. Implement intelligent building controls:

Intelligent building controls such as occupancy sensors, daylight harvesting, and automated shading can help reduce energy consumption by automatically adjusting lighting and heating systems based on occupancy and lighting levels. Intelligent building controls have the ability to deliver real-time data on energy use, occupancy, and other factors. The location of areas where energy use can be minimised can be determined using this data, which can also be used to track advancement towards sustainability goals. By encouraging people to turn off lights and electronics when not in use, intelligent building controls can encourage people to adopt sustainable behaviours. This may facilitate the development of a sustainable culture and the shift to a low-carbon society.

7. Monitoring and measurement:

Identifying trends in energy use, such as peak demand times and areas of high energy consumption, can be done with the aid of monitoring and measuring. Using this information will help you utilise energy more efficiently and waste less. The success of energy-saving initiatives, including the installation of energy-efficient lighting or HVAC systems, can be evaluated through monitoring and measurement. With this data, energy-saving strategies can be adjusted to make sure they are working as intended. Monitoring and measuring can support a sustainable culture in a commercial facility. The significance of energy efficiency can be highlighted, and residents can be inspired to adopt sustainable behaviours, by measuring and sharing energy usage statistics with stakeholders and occupiers.