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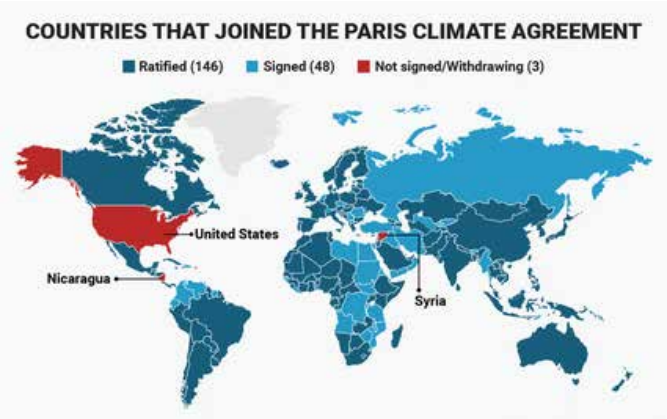
Energy Efficiency in Commercial Buildings

There is a shift in the modern world towards adopting environmentally sustainable best practices in order to reduce our carbon footprint. Environmental sustainability is all about living and acting in a way that ensures future generations have the natural resources available to live an equal, if not better, way of life than the current generation.
To achieve this end, sustainable strategies are used in commercial buildings, ranging from energy-saving to a more holistic approach addressing wider environmental issues such as water use, selecting sustainable materials, and carefully managing energy consumption.
In this whitepaper, we will delve deeper into where sustainability is today in commercial buildings, and what can be done to make commercial buildings more sustainable and eco-conscious.

Sustainability: Where We Are Now

The Paris Agreement was adopted in 2016 by 196 countries to substantially reduce global greenhouse gas emissions and to limit the global temperature increase in this century to 2 degrees Celsius while pursuing means to limit the increase even further to 1.5 degrees.



Source: Business Insider

The UN's Global Status Report 2017 found that buildings and construction now account for 39% of energy-related CO2 emissions, with 28% coming from energy use in buildings. The emissions from older buildings rose by nearly 1% per year between 2010 and 2016.

These older buildings, known as "Brownfield Buildings", consist of old buildings constructed up until the last decade with old deteriorating infrastructure in need of constant repair.
These buildings are the most common type of polluters, as they are inefficient in their use of energy, they do not incorporate smart energy management systems.

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One method of enforcing sustainability in Brownfield Buildings is via Clean Technology. Clean Technology (or CleanTech) is a wide selection of products, procedures, and services that harness sources of renewable energy to reduce or eliminate wastes and emissions and significantly minimize the utilization of natural resources. Whether through energy efficiency techniques, energy distribution and storage, this category consists of technologies that help in the supply of electricity and provide, domestic, commercial, and industrial consumers with more control over how and when their power is supplied and used.

Sustainability in Commercial Buildings

There is a vast number of avenues in implementing sustainability in a building, whether it be via the construction of the building using green materials such as hempcrete, relying on alternative energy resources, or reducing energy consumption by applying techniques for boosting or managing the efficiency of energy transmission.

Global sales of air conditioners rose to 141 million units last year, valuing the market at US$103 bn, according to the most recent figures from BSRIA.

Economic and population growth, urbanization and rising temperatures in countries such as Bangladesh, Brazil, Ghana, India, Indonesia, Kenya and Vietnam are said to be the main drivers for increasing demand for cooling. Due to this, energy management remains an unsolved problem.

Developed countries are constantly trying to fulfill the energy needs of their communities, as renewable energy resources remain inefficient. Carbon dioxide emissions that cause pollution, which in turn leads to climate change, call for the procurement of even more air conditioning units...increasing peak hour demand of electricity even more - creating a vicious cycle that never seems to end.

Green buildings are 14% less costly to operate than traditional buildings – with newer buildings saving significantly more in terms of energy costs. Additionally, on average, green buildings are worth 7% more than traditional buildings – with market demand for green buildings doubling every three years.

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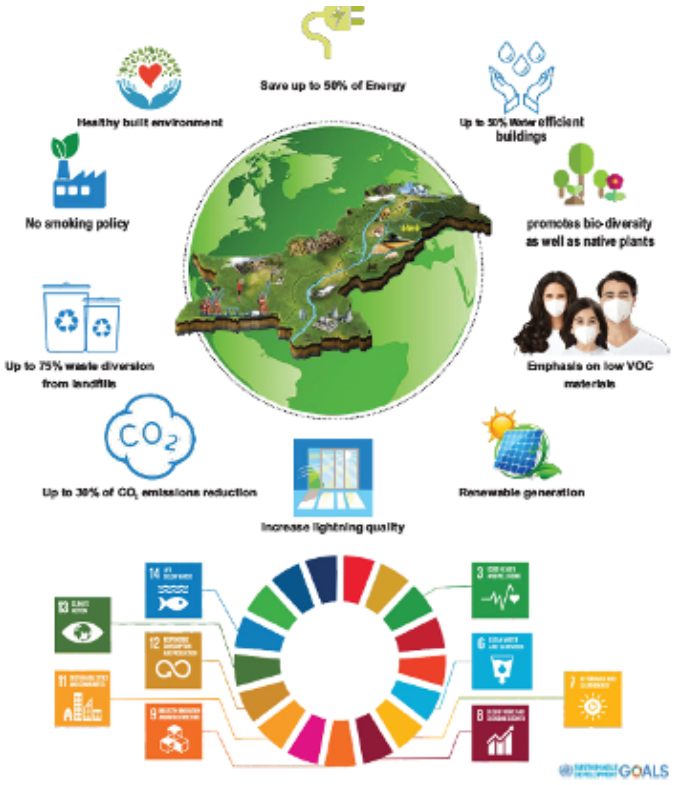
UN Sustainable Development Goals

The World Green Building Council is delighted to support the UN's Sustainable Development Goals (SDGs). so we can achieve these below UN sustainable development goals by implementing best Green or Sustainable practices.



Source: World Green Building Council

LEED (Leadership in Energy and Environmental Design) is the world's leading green building rating system for all buildings, community and home project types. LEED certification is a globally recognized symbol of sustainability achievements. It has delivered a comprehensive framework for green building design, construction, operations and performance:

- The rigorous focus on material selection, human comfort, air quality and human health features of a building rightly prioritizes the most important asset of the building: human beings.
- The specific focus on social equity ensures that buildings are not considered in isolation of their communities but prioritize access and inclusiveness for all.
- To ensure a building is resilient from natural and unnatural disturbances a comprehensive set of design and construction strategies has been established in LEED.

Incorporation of Sustainability into CleanTech

Any building can be made sustainable by using a variety of techniques that help save energy and improve efficiency. Here are a few:

1. Reduce the number of structural materials by optimizing a structural grid
A large amount of construction materials are used to build the core and structure of the building itself. Oftentimes, these materials, such as steel and concrete, have a large environmental footprint.

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2. Reduce construction materials by floor height selection

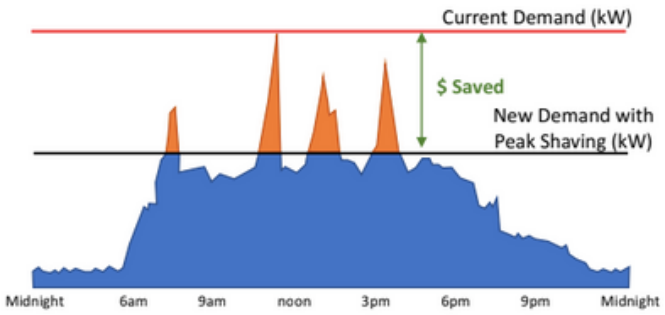
Floor slab height ultimately determines a building's overall height and the material quantity required for exterior cladding, structure and interior partition walls. Interiors with exposed ceilings easily adapt to residents' needs, and in most cases it is possible to add higher clearance at workstations without increasing structural height.

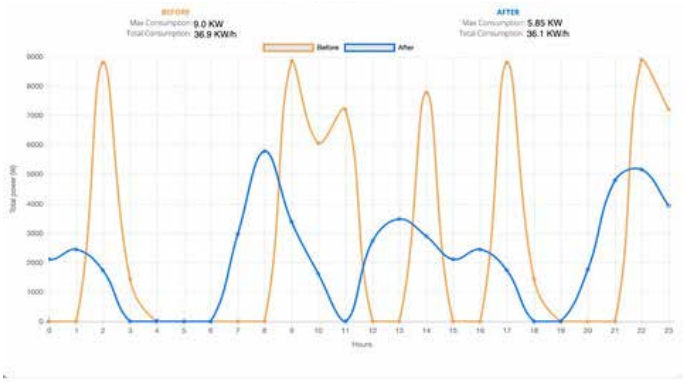
3. Increase flexibility to reduce material use in the future

One of the most productive ways to cut down material and embodied carbon is to design a building that can be easily adapted to different circumstances and future use scenarios.

4. Reduce operational energy with a sustainable building envelope

For a high-performance sustainable building, it is critical to understand how to develop a design that reduces a building's energy consumption. Most of the energy is consumed by the HVAC systems which accounts for 60%-80% of the total energy consumed and the thermostat needs to be changed according to the weather outside that creates a problem for the employees by creating an environment that is not optimum for productivity, a predictive thermostat or a climate intelligence platform can help in maintaining the temperature automatically rather than manually and it would access the database for temperature changes so that the indoor temperature is adjusted accordingly to best suit for the productivity of the employees. With the ability to take in hundreds of data points, a predictive solution has the ability to consider factors like weather forecast, building orientation, positioning of the sun, humidity, air quality and mean radiant temperature to deliver comfort, all the while saving energy. Using the AI-driven Climate Intelligence Platform helps maintain indoor climate parameters, saving 20% - 40% of the building's total energy consumption.





Conclusion

One of the main concerns for building ownership groups nowadays is efficient energy usage. The answer starts with improved building practices, moving away from traditional methods and toward green alternatives. New eco-friendly materials, architectural film, and other solutions all contribute to a brighter future. It's no longer a difficult task to revamp and renovate brownfield buildings - making them smarter, cleaner, and more eco-conscious. As long as everyone does their part, achieving a better balance with the planet is more than possible — it's probable.

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