



# Asian Institute of Intelligent Buildings

## Intelligent Zero-carbon world and sustainable energy development

Apply concepts of Zero-carbon Construction and Sustainable Energy in Intelligent Zero Energy Building (iZEB) & i-Constructions

# What is your slogan?

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"Leadership is having effective management & strong collaboration"

"AI: developing iZEB and i-Construction for Sustainable Energy Goals"



# Asian Institute of Intelligent Buildings

“ Leaderships should provide good management skills & strategy with the effective tools & minds to build strong teammates, which include in the resources to control and monitoring on the performance of intelligent zero energy building & i-construction for sustainable development “

“ AI Challenges are your opportunities to develop the goals of intelligent & net zero carbon intelligent buildings achieving sustainable energy in our life & society growths are our commitments ”

## First mind of AI construction management for marketing strategy :-

It should predict and prevent management errors to optimize organizational resource allocations and enhances project scheduling accuracy. AI can also identify patterns and provide actionable insights that human analysis may overlook. This helps construction companies find solutions faster.



*Benefits of AI construction project management are as follows:*

- AI Simulation test : Which can provide different cases of iZEB to improve & understand in project situations and reduce errors & project cost.
- AI predictive project analysis and risk management of i-Construction : There are using the past experience to consolidate the different data to find out the project patterns and trends. By the analyzing project performance, it can provide different potential risks and proactive risk to be removed.



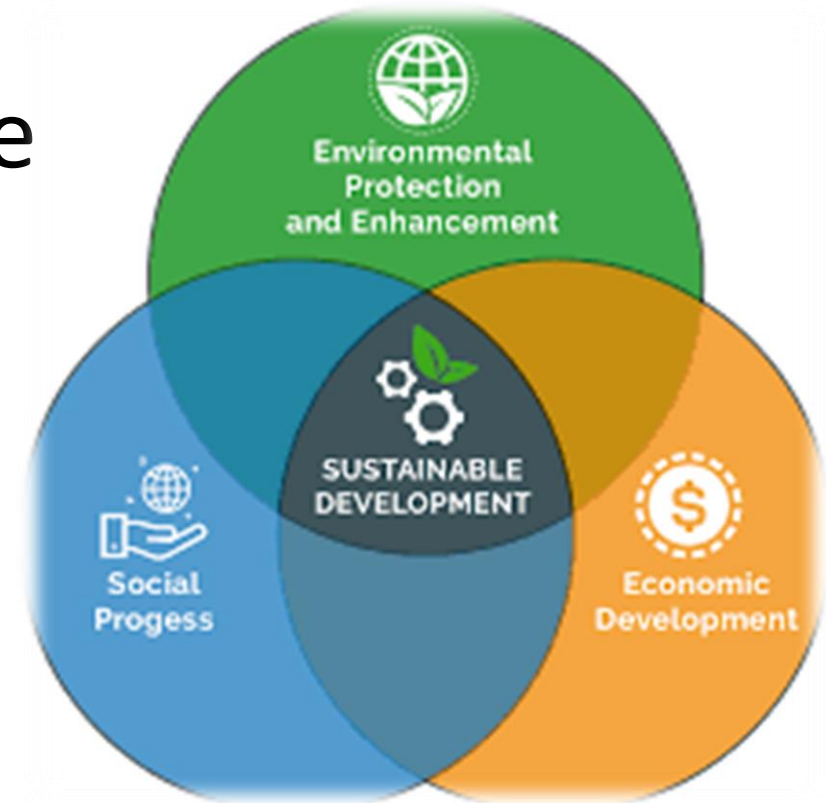
*Benefits of AI construction project management are as follows:*



- **Quality control:** AI technology can provide with project monitoring and control i-construction to identify the potential site safety, quality issues and enhance the project management skills to take corrective action in real-time and improving the project quality and efficiency.
- **Resource optimization:** The project schedules and labour productivity of iZEB can reduce project waste, improve productivity, and complete projects within the budget of solutions for i-construction.



In iZEB & i-construction, how to use AI technology & tools to develop the organizational achievement in the environmental enhancement, social progress & economic development for sustainable development.



# How to design AI strategy for Intelligent Zero Energy Building (iZEB) ?

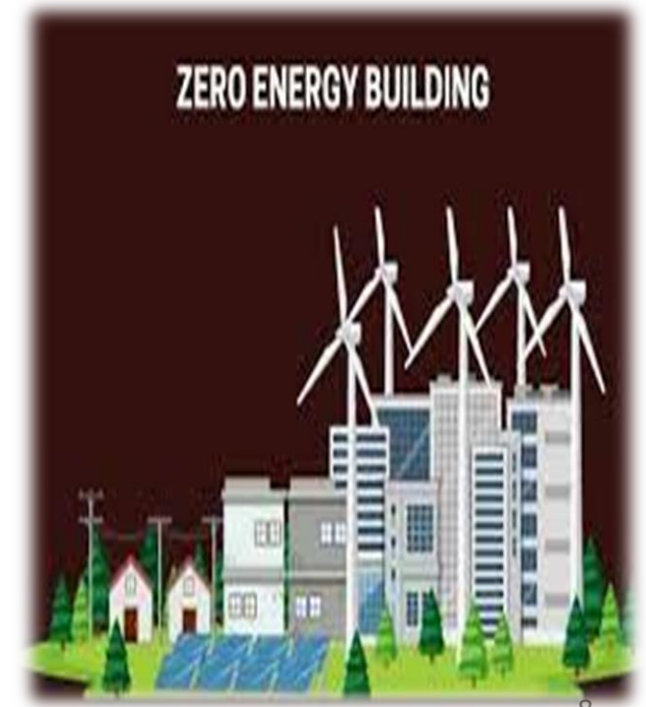
Designing AI strategy for intelligent Zero Energy Buildings (iZEBs), we can use AI to optimize energy efficiency, reduce energy consumption and maximize renewable energy generation. We can apply for highly energy-efficient methods and meet with all energy needs through on-site or off-site to achieve the common goals as follows:-

iZEBs can be using ten ( 10) methods :



## **High Energy Efficiency**

iZEBs are designed and constructed to minimize the needs for energy use in the first place. This is achieved through a combination of energy-efficient design, construction methods, materials, and technologies, such as enhanced insulation, efficient HVAC systems, and optimized use of natural light.





# How to design AI strategy for Intelligent Zero Energy Building (iZEB) ?

iZEBs can be using into (10) ten key methods :



## Renewable Energy Production

iZEBs can use renewable energy strategy to generate the expected power requirements. The common method is solar energy collecting sunlight energy by photovoltaic (PV) panels into power supply system. In connection with different operations of wind power, solar thermal energy, and geothermal systems can be used by AI technology to compare with the benefits creating the maximum values.



## Energy Measurement and Verification

The net-zero energy building can use AI tools to calculate the measurement and verification of energy use and production including different analysis for building operations & consumptions to monitor & control the systems that which may track energy flows in and out of the building over time.



## Grid Interaction

iZEBs aim to be self-sufficient, they are often connected to the energy grid, allowing them to draw power when necessary and supply excess energy back to the grid. From the grid interaction, AI is easily to analyze human behaviors & balance the building's energy profile across different seasons and conditions by operators & designers.

# How to design AI strategy for Intelligent Zero Energy Building (iZEB) ?

iZEBs can be using into (10) ten key methods :

## Automation and Control

In automated control system, AI tools can provide multiple tasks and decision-making steps to design & analyze the control systems of window shades, lighting, HVAC systems, and other energy-consuming devices to optimize for comfort and energy savings and calculate the energy use to prevent energy waste in iZEBs

## Advanced Energy Management

Smart Building Management Systems (SBMS) use AI technology to provide the different energy & environmental building patterns and conditions to fine tune the real-time performance to reduce energy consumption and provide the predictive Analytics for iZEB ,which will provide the forecast models of proactive operations to adjust to customer's expectations from building heating load, cooling loads and lighting loads consumption for reference.



## Performance Monitoring

AI tools can provide with the continuous commissioning & monitoring systems to check and optimize building operations, which can ensure the system operation at peak efficiency under the control & fault detection and diagnostics, and to provide the predict potential system failures before accidents occur & to minimize downtime & maintenance costs for the building's life.

# How to design AI strategy for Intelligent Zero Energy Building (iZEB) ?

iZEBs can be using into (10) ten key methods :

## **Balance Energy and Production**

iZEBs focus on the energy balance between the initial & operating cost to calculate the amount of renewable energy, which produce over the course of a year. AI technology can support to design the iZEB to compare with consumption of the non-renewable energy at certain times, it offsets this by producing surplus renewable energy at other times, leading to a net-zero energy consumption annually.

## **User Interaction and Feedback**

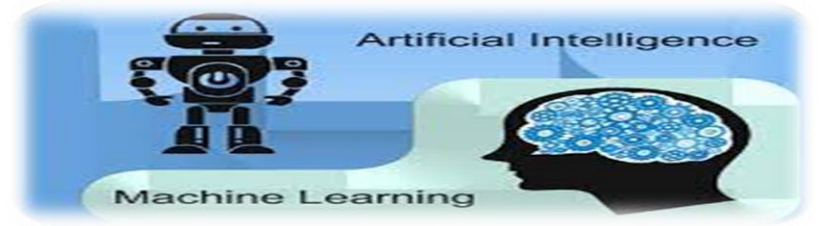
AI tools can collect different feedback from the employee & customer's satisfaction by day to day operation for the energy analysis to provide real-time measurement and check the energy consumption, encouraging energy-saving behaviors & to adjust automatically in temperature and lighting for the comfortable environment by different occupants.



## **Sustainability**

AI can provide the resource optimization skills to manage electrical & water waste & other resources by predicting usage patterns for system enhancement. In the system lifecycle analysis, AI software tools can provide the analysis of environmental impact in building materials and operational strategies & minimize the carbon footprint over the building's life.

# Where iZEB tools for your applications?



iZEB tools are integrated in construction industries involving in the digital tools, software & platforms to enhance different phases of the construction process from planning and design passing through the execution and management as follows:-

## **Virtual & Augmented Reality (VR/AR)**

The technology is used for visualization of project before construction starts for training purposes & supporting different maintenance and renovation activities.

## **Cloud Computing**

Which enables data storage and access from remote site server system for different stakeholders providing with construction project phasing.

## **Big Data Analytics**

There are processing large volumes of data for insights that can drive decision-making and predict trends.

## **3D Printing**

The manufacturing techniques will construct iZEB components and structures, which can provide the material savings and complex designs for construction cost.

## **Artificial Intelligence (AI) & Machine Learning (ML)**

AI can predict & analyze the project risks, optimize project schedules & provide good design decision making for iZEB.

# Where iZEB tools for your applications?



iZEB tools are integrated in construction industries involving in the digital tools, software & platforms to enhance different phases of the construction process from planning and design through to execution and management as follows:-

## **Building Information Modelling (BIM)**

BIM of the digital representation will show in physical and functional characteristics of the construction facility in different stages for building environment for the building lifecycle of iZEB.

## **Project Management Software**

AI Tools of project management can provide different scheduling, budgeting, safety issues & management skills for the effective & efficient management of construction projects.

## **Mobile Technology**

The smart phone & iPad tools can easily assess & operate the real-time project works & communicate on the construction change for iZEBs.

## **IoT and Sensors**

IoT sensors and devices can provide collect data to measure the construction site environment & energy use including site security & data collection for the construction stages & after iZEB completion for system performance.

## **Drones and Robotics**

Drones equipped with cameras will provide for aerial surveying & site progress monitoring; In connection with robotics, which can reduce labour for construction tasks such as bricklaying, painting, welding & other delivery works.

# Design & implement for Environmental Social Governance (ESG)



## Overview of ESG Components:

- 1) ESG policy should provide a environmental building's design & prevent the impact on nature, focusing on sustainable resource use and reducing pollution & energy use for social development.
- 2) Social governance involves in enhancing organizational well-being , social green, energy development and community welfare.
- 3) ESG is fully complied with regulation, laws, ethical standards & transparency for the organization.



# Design & implement for Environmental Social Governance (ESG)



## Overview of ESG Components:

- 4) iZEB design & construction of ESG are fully committed by management for sustainable development, risk prevention, stakeholder's benefits & expectation in the future.
- 5) The role of building designers & owners should provide ESG solutions by integrating sustainable development & implementation for energy efficiency design & ethical practices into the built environment & strategy.
- 6) The environmental & society regulation shall comply with the requirement, which should promote to the organizational growth in iZEB to reduce environmental impact & maintain transparent, responsible governance throughout a building's lifecycle of ESG for sustainable development .

# Benefits of iZEB

## Policy and Regulation

- **Government Incentives** : Many governments offer incentives for iZEBs, such as tax credits, rebates, and grants, which can offset the higher initial costs.
- **Regulatory Compliance** : Some regions are moving toward mandatory energy efficiency standards that iZEBs will meet or exceed.



## Long Term Trends

- **Global Energy Transition** : As the world transitions to a low-carbon economy, iZEBs are in alignment with global energy trends and policies aiming to reduce fossil fuel reliance.



# Benefits of iZEB

## Technological and Market

- **Innovation** : The push for iZEBs drives research and development of new energy technologies and smarter building materials.
- **Market Differentiation** : iZEBs can provide a competitive edge in the property market, appealing to environmentally conscious buyers and tenants.
- **Green Branding** : For businesses, a iZEB can enhance brand image by demonstrating a commitment to sustainability and corporate social responsibility.



## Social and Health

- **Improved Indoor Environment Quality** : iZEB designs often lead to better indoor air quality and thermal comfort, which can improve occupant health and productivity.
- **Educational Value** : iZEBs can serve as a model for sustainable practices, educating the public and inspiring broader adoption of renewable energy technologies.



# Benefits of iZEBs

## Environmental Impact of iZEB

- **Carbon Emission Reduction** : iZEBs significantly reduce carbon emissions because they rely on renewable energy instead of fossil fuels.
- **Sustainability** : iZEBs encourage the use of sustainable materials and responsible resource management, which can lead to reduced environmental degradation.



## Economic Benefits of iZEB

**Energy Cost Savings** : iZEBs can drastically reduce or even eliminate energy bills due to their energy-efficient features and use of on-site renewable energy generation.

- **Increased Property Value** : Buildings with high energy efficiency and sustainability features often have higher market values and attract tenants more easily.
- **Stable Energy Expenses** : iZEBs provide protection against fluctuating energy prices and potential future increases in energy costs.



Your success is easily for iZEB as follows:-

- 1) Design clear iZEB goals for your organization
- 2) Develop a good implementation plan for ESG policy
- 3) Focus on high value & excellent tasks for sustainable organizational development
- 4) Using AI technology to develop the environmental protection & enhancement, social progress & economic development for sustainable organizational development
- 5) Develop a spirit of benefiting ourselves & others to create iZEB in the future



# Thank you for your hearing

