

# A Review on the Study of Difference between the Smart Building and Green Building

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**Abstract**— Commercial buildings consume more amount of energy today and in future it will be increased. This consumption leads the use of carbon production fuels which have environmental impacts. Green building is a successful to built a environment building. This article shows a difference between the smart and green building. Smart and green building are the subset of sustainable building and they have similar characteristics. Smart building is based on advanced technology and green building is based on the environment. Purpose of smart building is to increase in use of advanced technology to reduce the use of energy. Green building is made by using green concrete and the building is designed in such a that it has a good impact on the environment. The use of natural resources such as sunlight, rain water, etc. to avoid the use of more energy.

**Keywords**—Energy, green building, smart building, sustainable building, technology.

## I. INTRODUCTION

This research tells about the smart building and it's importance in human life. A building which can bewield environment by it's own is known as smart building. A smart building reduce the impinging or a strong influence on environment as well as on human. To a green building one can also called it as a smart building and it is a subset of smart building. GREEN BUILDING is one which reduce the energy consumption. Although the commercial buildings consume more energy as compared to smart or green building. There are some techniques to install which has to be in smart buildings and they are 1) Installation of Solar Panels on the top of building can reduce the use age of energy. 2) Install the interior water pipelines such that the water from the bathroom get collect and store in a huge container and then the same water is use for the flush in washrooms this is how the same water is used twice a day and reduction of water is done. 3) Every interior of a building should have an fresh air, so there must be an installation of a small garden outside of every balcony.

## II. WHAT IS SMART BUILDING ?

The smart building are used for the need of holistic and integrated design. Smart buildings are buildings which are account of intelligence, enterprise, control, material and construction as entire building system with the adaptability, not reactivity, energy efficiency, longevity, comfort and etc. A smart building is a building in which everything is infrastructured according to modern technologies which consider all the IT infrastructure management and day to day technologies. It has great benefits to the builders and property owner/facilities provided in it are some costly but its a one time investment and used for lifetime with less maintenance cost. It is also lead to the backbone of IT infrastructure.

Everything provided in a smart building is made up of eco-friendly materials and not harmful to people living in or as well as out. The installation of this system in a building is of great effort but once done it will provide a great autonomous systems in buildings. Once the individual building is

integrated with networks it can be monitored at one place and can be controlled by the same interface. Smart building deals with the best sensors and upgraded technology integrated inside every steps which a green building cannot support in it. A smart building can give the owner a significant market rate with accurate rents and can reduce turnover through customer service added technologies and increased technologies with research and development.

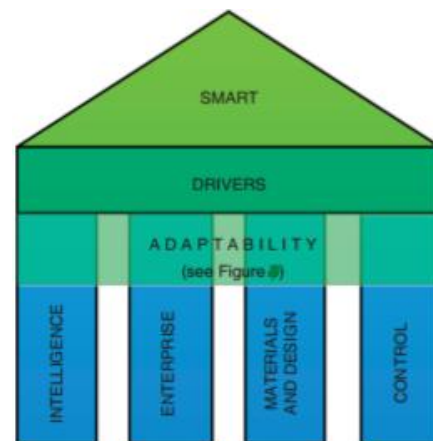


Fig. 1. This figure shows the pillar of smart building.

Smart building are highly efficient buildings with less operating cost comparatively with the commercial buildings. The accurate energy use and monitoring and controlling the less energy used lights uses very less amount of electricity. The internet facilities will be provided inside it which will give the real time conditions and monitored professionally and give each and every problems off-site and make it fixed immediately. For life safety and security against fire a fire alarm will be triggered such that if any smokes exhaust dampers open the fans operate it will immediately be known to the person and instructions will be provided and the access control will able to unlock the doors and the person will come out of the building.

Now a days mobiles phones are best way to track the location of the person. In such a way that the smart buildings are installed with wireless live video cctv cameras and the real time live videos will be traced on the laptop or television or on his mobile phone immediately. He will be able to see all the actions going inside the buildings with the cameras allocated and connected to his mobile with the high speed internet protocol. A smart building is enough to accept this technology quickly.

To operate a smart building is also a difficult task and require special skills and to monitor it 24/7 at every point requires a special network and a great speed and operate a unlimited number of systems with a secure web services.

A smart building may be a sustainable one towards the eco-friendly and the infrastructure with a great technologies used in it. A green building isn't smart but have very less consumption of energy compare to commercial buildings. But both smart building and green building are constructed with IT technologies. A green building is constructed for the facilities which are outcome of sustainable construction for the purpose of providing occupant health and resource health minimizing the built for the natural ecology system.

### III. WHAT IS GREEN BUILDING?

Green building (also known as green construction or sustainable building) refers to both a structure and the application of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from planning to design, construction, operation, maintenance, renovation, and demolition. This requires close cooperation of the contractor, the architects, the engineers, and the client at all project stages. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Basically green building is made up green concrete.

### IV. WHAT IS GREEN CONCRETE ?

Green concrete can be defined as the concrete with material as a partial or complete replacement for cement or fine or coarse aggregates. The substitution material can be of waste or residual product in the manufacturing process.

TABLE I. Material replaced concrete green concrete.

S. No.	Components of Concrete	Replaced Material for Green Concrete
1.	Cement	Sludge ash, fly ash, etc.
2.	Coarse aggregates	Silica fume, waste glass, etc.
3.	Fine aggregates	Demolished bricks, quarry dust, micro silica, marble, sludge powder, etc.

### V. PROPERTIES OF GREEN CONCRETE

It improves Mechanical properties like strength, shrinkage, static behaviour, etc.

It improves the workability.

Fire resistance (I.e. heat transfer), etc.

It improves new deterioration mechanism & It improves environmental impact.

It improves strength development & It improves durability.

It improves the curing properties.

It improves corrosion protection.

It improves frost.

### VI. SOME FACTORS COME UNDER CONSTRUCTION OF GREEN BUILDING

#### A. Indoor Air Quality

When buildings are airtight, good ventilation is essential to allow fresh air to come in from the outside and stale air to leave through vents, or air to be recirculated and filtered. Ventilation and insulation also control moisture, which can lead to mold and bacteria growth if not checked. Demand-controlled ventilation can use occupancy sensors or CO2 sensors to adjust fresh air intake to the needs of the building occupants.

VOCs have harmful impacts on health and comfort, so green building attempts to use construction materials, interior finishes and paints, and cleaning products with low or no VOCs. Unlike most paint, coatings made of natural materials like clay, lime, linseed oil, chalk, milk protein, plant or mineral dyes and natural latex are generally non-toxic.

#### B. Roofs & Walls

Many traditional rooftops can be up to 90° hotter than the surrounding air temperatures, especially in cities. Cool roofs, which reflect solar heat instead of absorbing it, lower temperatures inside a building, reduce the need for air conditioning and thus energy costs, and require little maintenance. They can be coated with white or colored paint-like material made of foam or multiple layers of material that lessen the absorption of solar heat, utilize clay tiles or asphalt shingles, or be constructed of metal.

#### C. Windows

Window placement in relation to the angle of the sun can affect the energy efficiency of a building as well as heating and cooling costs. Windows facing east and west allow in more heat than windows facing north and south. Energy efficient windows include double-paned windows filled with argon or krypton for insulation, heat-absorbing tinted windows, insulated windows made of two or more layers, windows with reflective coatings that block more light than heat, and low-emissivity coated windows that block heat but allow light to pass through. Smart windows can change from transparent to translucent when low voltage electricity passes through them, altering the wavelengths of light that can pass through. While they are more costly, they can save money on heating, air conditioning and lighting, and avoid the need for blinds or curtains.

#### D. Lighting

Since most people spend 90 percent of their time indoors, lighting is critical. Daylight should be allowed to come into the building as much as possible, while ensuring that there are blinds or shades to reduce excess heat from windows and skylights. Incandescent bulbs are being phased out; compact fluorescent lamps and LED bulbs use less energy and last longer.

### E. Renewable Energy

Passive solar technology or day lighting depends on window placement, the use of thermal mass and the building's proper orientation to the sun to provide light and heat without any other apparatus.

### F. Water

Globally, buildings use 13.6 percent of all potable water, so reducing water consumption is a key aspect of green building. Water can be conserved with ultra-low flush toilets and low-flow faucets. Greywater systems recycle water that comes from washing machines, sinks or dishwashers. In residential buildings, 50 to 80 percent of the water can be considered greywater and thus recycled for use in landscaping (not for edible plants) or if treated, to flush toilets.

### G. Landscaping

Green landscaping attempts to keep the natural features intact, using native plants and grasses, which require less water. Mulch should be organic, and plants should be fed compost instead of chemical fertilizers. Drip irrigation, which waters the plants at their roots, wastes less water than sprinklers, and rainwater can be collected in barrels for watering plants. Composting should be practiced to minimize waste going to the landfill and produce nutrient-rich humus for the soil. Paved areas need natural drainage to control stormwater runoff, erosion and flooding during heavy rains.

### H. Cost of Green Building

While a green building has been found to cost about 2 percent more than a non-green building, energy savings alone help recoup the extra cost of the building in about six years.

## VII. CONCLUSION

In this article we discussed about the smart building and green building. Smart building introduced by many researchers and they said that the smart building are designed in such a way that it improves the use of technology like security system, CCTV cameras, and many more.

Green building are the building which are consist of many thing solar panel on top of building, indoor air quality, water, lighting, roof and walls, etc. Green building has a good impact on the environment. Construction of green building increases the cost by two percent of conventional building but the life time is increased by 6years. And the use of green concrete to construct a building is increases the strength and durability of building.

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