

Smart Apartments in Smart cities: an Approach

APR Srinivas

Asst professor, Lingayas university, Faridabad. sprayyagari@gmail.com

ABSTRACT: Annual urbanization rate in India is 2.4 percent. The building sector estimated to be 10 percent global GDP. Buildings electricity consumption could be reduced 30-80 percent with the available technologies. Smart buildings interaction empower building operators and occupants with new visibility levels and actionable information. A green and smart building uses both technology and process to create an environmentally friendly, cost-effective and intelligence driven facility that is safe, healthy and comfortable to occupants.

KEYWORDS: energy, building, occupant, technology

Date of Submission: 08-02-2023

Date of Acceptance: 20-02-2023

I. INTRODUCTION AND LITERATURE SURVEY:

Annual urbanization rate in India is 2.4 percent [1]. The largest contributor to greenhouse gas emissions, building sector, use about 40 percent of global energy, 25 percent of global water, 40 percent resources and emit 30 percent greenhouse gas emissions due to fossil fuel based energy consumption [2]. UNEP says, the emissions double by 2050, with the usual continual of the business [2]. The building sector estimated to be 10 percent global GDP [2]. Buildings electricity consumption could be reduced 30-80 percent with the available technologies [2]. Smart buildings operation use information technology to connect a variety of independently operating sub-systems, for total building optimal performance [2]. Smart buildings are connected and responsive to the smart power grid [2]. Smart buildings interaction empower building operators and occupants with new visibility levels and actionable information [2]. Building management systems consist of data acquisition, database management, analytics, visualization, controls etc, for cost-effective operational savings [2]. The operational phase buildings should purposefully reduce waste such as paper, plastic, glass, food, cans, electronic waste, office equipment and furniture, at-source [2]. A green and smart building uses both technology and process to create an environmentally friendly, cost-effective and intelligence driven facility that is safe, healthy and comfortable to occupants [2]. Intelligent buildings optimize the occupant experience while cyber security be a key differentiator in intelligent building solutions [2]. IOT- internet of things connect physical objects such as vehicles, devices, buildings etc to internet and enable data exchange to a cloud based platform, for data analytics [2]. A net zero energy building is the one that produces as much energy from renewable sources as it consumes to achieve appropriate thermal comfort levels [2]. A zero energy footprint building is an all energy positive building that produces more energy from renewable sources than required to achieve comfort levels [2]. By 2040, worldwide renewable energy is estimated to be 60 percent of the electricity generated [2]. Roof top Solar panels convert sunlight into electricity, with more than 20 years lifetime, however an annual performance degradation of 0.3 to 1 percent happens over years [2]. Elevators consume around 5 percent electricity in office buildings but energy savings possible [2]. An occupant behavioural change measures achieve 5-15 percent energy savings on a community-scale [2].

II. METHODOLOGY AND DISCUSSION:

- a) Rooftop solar water heaters and solar heated water utilized in household purposes
- b) Rooftop solar electricity to light up corridors night-time
- c) Parallel connections of bathroom LED lights from a solar panel
- d) Rooftop bonsai plantation to eat pollution
- e) Balcony bonsai plantation to freshen indoor air
- f) Rooftop dish antenna - wired signal distribution into homes
- g) SMS visitor details for better security, save paper
- h) Recycle bathroom waters for increased ground water levels
- i) Fluorescent bathroom running water taps
- j) Rooftop RO treated drinking water supply
- k) Fluorescent painted 7-xxx series high strength aluminum apartment main door replace wood to reduce carbon emissions
- l) Apartment numbers chemical machined on the main door

- m) Parking space to charge electric vehicles
- n) Door bell ring time recorded in wall clock
- o) Door bell ringtone programmable
- p) Elevators to have touch sensitive buttons instead of press buttons
- q) Elevators record number of touch downs in the ground floor
- r) Cloud -IOT - LAN in apartment buildings

Every 100 liter solar water heater installed on apartment buildings terrace reduce 0.4 to 1.0 tons annual carbon emissions, with annual electricity savings of 1500 units per every household geyser [5]. Conventional electricity generation involves carbon emissions of 0.85 kg per KWH [6]. Solar heated water results in percentage annual savings of 9.73 percent per every Indian household, in LPG used for cooking food [7]. The roof top solar installations light up series and parallel connections corridor lights all night, in apartment buildings. Parallel connections apartment buildings bathroom LED lights save carbon emissions in conventional electricity generation. Apartment terrace space utilized for pollution eating creeper plants bonsai plantation reduces carbon pollution and gives fresh air. Similarly, balcony bonsai plantation improves indoor air quality in apartment buildings. Instead of individual dish-antennas, an apartment building could have a single larger rooftop dish antenna wired into apartments rooms. It saves material and manufacturing costs. The apartment security mobile phone number recorded at the area police station sends visitor details to the home dweller, in sms. The mobile phone number message center records all the SMS and gives an additional security feature, besides saving paper. The greywater bathroom sewerage pipes separated from the blackwater toilet pipes with a separate plumbing system, for recycling the waters. Similarly, greywater washbasin pipes. The recycled water to be fed into a ground pit to increase ground water levels [8]. The bathroom running water taps to have a fluorescent green and red indications, to help night times and conserve electricity night times. Roof top water treatment plant saves cost and maintenance of the individual water treatment plants in apartment buildings. The roof top water treatment plant saves on chemical costs involved in the water treatment. Fluorescent coloured high strength 7-xxx series aluminum doors replace wooden household doors, to reduce carbon emissions with reduced tree chopping. A 21 trees less chopped result in 762.3 ton reduction in carbon emissions [9]. The apartment number chemical machined on the main door of the flat reduces material consumption, besides technology obsolescence. Chemical machining takes fewer time than the conventional methods involved in making the number plate of apartment number. The apartment parking spaces to accommodate charging of electric vehicles all night, thus renting out the parking space make a passive revenue source. Apartment elevators to have touch sensitive buttons instead of press buttons, a technology obsolescence. The apartment door bell to be programmable and the wall clock records the time of ringing the door bell, a security feature. Elevators to record number of touch downs to the ground floor in twenty four hours along with the time and generate data in an excel sheet. The elevator to have an artificial memory to record the date wise excel sheet workbook, for retrieval whenever required. An apartment building provides wired or wireless internet in local area network to every apartment, in the monthly maintenance cost. The LAN may use Internet of things – IOT and cloud storage, for data analytics. The internet service provider may be a private vendor or the municipality.

III. CONCLUSION:

The paper talks of building a prosperous national momentum towards a sustainable future. The building sector plays a key role in achieving sustainability with the available technologies. The paper explains various measures to in high rise buildings to achieve energy efficiency and carbon emissions reduction. The paper expects the sustainability directions in all the three thousand urban level blocks across India and thus not to consume agriculture land in horizontal expansion of urban living. Instead, indian cities grow vertical upto 200-250 storey energy efficient buildings, sky scrapers.

REFERENCES:

- [1]. Lindsay Hughes, Meeting India's Energy Requirements in 2030, Future Directions International
- [2]. Niles Y. Jadhav, 'Green and Smart Buildings Advanced technology options', Springer, ISBN: 978-981-10-1000-2.
- [3]. APR Srinivas, 'Solar Water heater: An employment generation perspective to reduce carbon footprint', International Journal of Scientific & Engineering Research Volume 9, Issue 8, Augsut-2018, ISSN 2229-5518.
- [4]. APR Srinivas, 'Residential solar installations driven economy to reduce carbon emissions', International Journal of Applied Research 2021, 7(6): 290-291, issn: 2396-5869.
- [5]. APR Srinivas, 'Solar Installations and Reduction in LPG Consumption', AKGEC INTERNATIONAL JOURNAL OF TECHNOLOGY, Vol. 10, No. 1, issn: 0975-9514.
- [6]. APR Srinivas, 'A DEFENSE TACTIC TO MITIGATE A NUCLEAR ATTACK DESTRUCTION', Journal of Emerging Technologies and Innovative Research, volume 7, issue 7, July 2020, www.jetir.org, issn: 2349-5162.
- [7]. APR Srinivas, 'Carbon footprint reduction and sustainable reuse of recycled plastic', Journal of Emerging Technologies and Innovative Research, volume 6, issue 6, June 2019, pg 859-861, www.jetir.org, issn: 2349-5162.