

2.1.3 ICT in Building Sector

Smart Buildings

Smart buildings is a term used to encapsulate the suite of technologies employed to make the design, construction and operation of buildings more efficient. It is to be applied to the properties of both existing and newly-built buildings.

Carbon emissions from buildings count towards 8% of the global total emissions in 2002. ICT renders the potential to reduce carbon emissions from the Building sector by 15% in 2020, with the help of national guidelines that promote the implementation of best practice standards in energy efficiency. Some of the better known schemes are stated as follows:

National Schemes

1. EnerGuide for Houses (energy retrofits and upgrades) and New Houses (new construction) (Canada)
2. Green Building Council/House Energy Rating (Australia)
3. DGNB (Germany)
4. BREEAM (UK)
5. CASBEE (Japan)
6. Leadership in Energy and Environmental Design (LEED) (USA)

How ICT can help:

According to the study conducted by GeSI and The Climate Group, consumption of energy in buildings depends on two factors - energy intensity and surface area. ICT shows potential in providing monitoring, feedback and optimization tools to decrease both energy intensity and surface area. This reduction is extended to all stages of a building's life cycle, from design and construction to use and demolition.

Monitoring

1. The ability to change the local conditions based on occupant behaviour
2. Occupancy-based lighting
3. Demand control ventilation
4. Correction of hardware controls
5. Measuring building performance/networking
6. Modelling and simulating energy consumption
7. Daylight control systems

Technologies and services:

- Sensors for remote monitoring and measurement
- Chips and controllers for BMS
- In-building network systems
- Building equipment (e.g. LED lighting)
- Building automation solutions (e.g. occupancy-based lighting)

Providing Feedback and Optimization

1. Recommission to find inefficiencies in BMS. The two areas of the greatest impact are lighting and HVAC
2. Improve engagement and involvement from users
3. Building and energy management control systems (EMCS)
4. Removal of software errors
5. Remote building management
6. Improvements to operations and maintenance
7. Energy modelling from design through building use

Technologies and services:

- Building design and simulation software (e.g. temperature modelling, fluid dynamic modelling)
- BMS
- Implementation of building automation (e.g. shade control systems, motion-based refrigerator case lighting)
- Interconnectivity between building systems (e.g. EMCS, lighting, security systems)
- Appliance interconnectivity and networking and remote appliance control
- Operations and maintenance of building communication

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References

1. GeSi (2008), SMART 2020: Enabling the Low Carbon Economy in the Information Age, Retrieved 10 Nov 2008 from <http://www.gesi.org/files/smart2020report.pdf>