

## MESSAGE

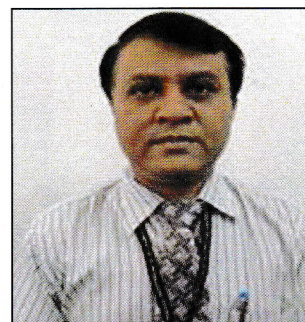
*Dear Technocrat,*

*It is my great pleasure to present this issue of technical magazine "TECHNIFESTO". The purpose of this magazine is to provide opportunity and platform for the young technocrat to express their talent which will also be beneficial to all others to enhance their technical knowledge.*

*It is very true that all technocrats must know the basic fundamentals as well as should be able to acquire new knowledge technology quickly for global competition and move demanding engineering required and regulation. Keeping this in front, it is essential to develop new way to get the information easily. I believe that this magazine will serve the purpose.*

*I forward my wishes to the editorial team of this magazine for taking great efforts to publish this issue of the department.*

*Hereby I appeal all budding technocrats to join us and share their knowledge to make our magazine more dynamic, transparent and professional.*



**Mr. H.P. Chaudhari**  
**Head of Department**  
**Instrumentation Dept.**  
**AISSMS IOIT, Pune.**

## EDITORIAL

*'TECHNIFESTO' magazine is the insight of the talent to be showcased by students on their technical front. This year the theme being AGRO SMART a view to new technical innovations in the areas of agriculture are put forth. The ideas from new budded minds for a smart option to this area in fusion to engineering will be the future of SMART and GREEN Technology ahead .*

*On behalf of the entire Magazine Team I would like to thank our Principal Dr.P.B.Mane and Head of Dept. Mr. H. P.Chaudhari for their kind support and encouragement for accomplishing this edition. Also I would like to thank the students for their active participation.*

*We invite all our readers of 'TECHNIFESTO' magazine to enjoy reading it.*

*Hope all of you like it*



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**Ms.N.S.Nagdeo**

**Editor: 'TECHNIFESTO'**  
**Assistant Professor**  
**Instrumentation Dept.**  
**AISSMS IOIT, Pune.**

## EDITORIAL

*The year 2016, marked my first journey as the editor of our departmental magazine, “Technifesto”. The process of collecting articles, while witnessing contributions of various students via words, projects and models has been immensely knowledgeable and inspirational. I sincerely hope that I too can convey such emotions via this magazine, to all our readers.*

**Deepankar Bhat**

**-Editor**

**-Student**

**-SE Instrumentation**

### Mission Vision

**Mission:** To impart dynamic education and develop engineers, technocrats, and researchers to provide services and leadership for development of the nation.

### Program Education Objectives(PEOs)

**PEO1:** To train the students professionally competent to apply the concepts of mathematics, science and engineering along with modern tools to solve real life problems in Instrumentation engineering and related fields.

**PEO2:** To develop practical skills in students by providing them more practical knowledge.

**PEO3:** To train students to perform independently, as a leader and as a team member in their chosen profession through continuous learning.

**PEO4:** To acquaint the students with social & ethical responsibility and soft skills.

**PEO5:** To inspire students for higher education, competitive exam and entrepreneurship

### Program Specific Outcomes (PSOs)

**PSO1: Problem Solving Skills:** Graduate will have a strong foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze instrumentation problems related to industry and research.

**PSO2: Modern Technology Usage:** Graduate will demonstrate skills to use modern engineering tools such as Programmable Logic Controller (PLC), Supervisory control systems, Lab view and embedded systems for control of manufacturing and processing systems.

### Program Outcomes (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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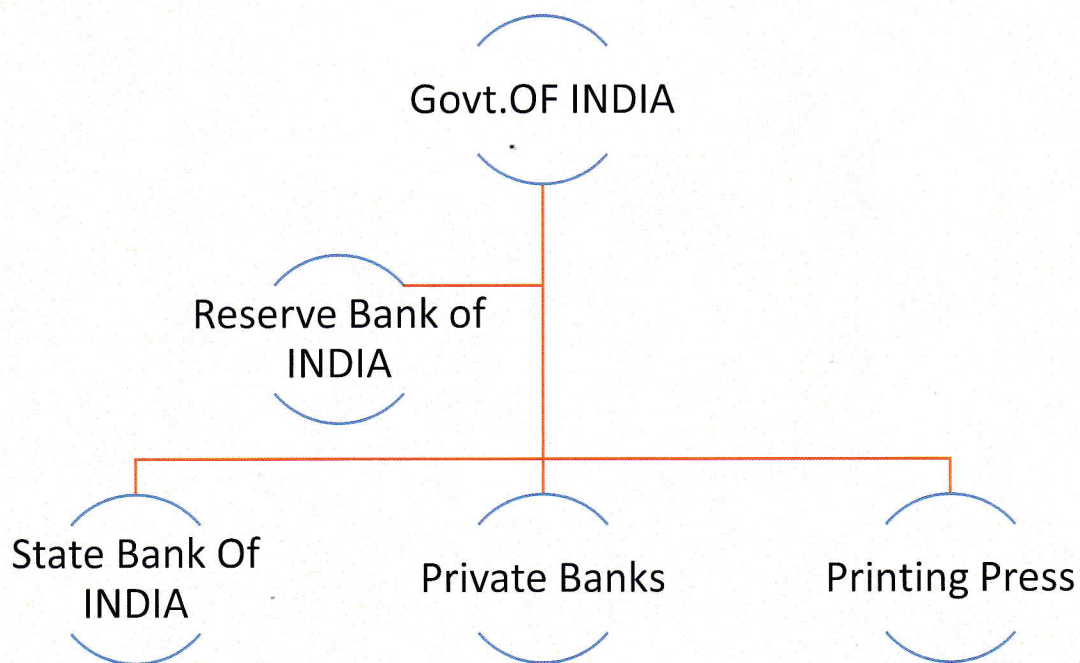
## Demonetisation: The recalibration of ATMs and what it entails, explained

The actual calibration work needs denomination change and size change which can take between 30-60 minutes if all stakeholders are present.

The demonetisation of notes has been the talking point for everybody in the past two weeks. Long queues outside banks and ATMs have been common, with many people being put through inconvenience. Opposition parties have blamed the government for mismanaging the whole process and for bringing financial chaos through this move.

The process of demonetisation involves the recalibration of ATMs all across the country since the size of the newly introduced Rs 2000 note is different from that of the notes currently in circulation. There are about two lakh ATMs in India which need to be recalibrated.

In the wake of this, V Balasubramanian, President- Transaction Processing & ATM Services, Financial Software and Systems (FSS), helps us to get a better picture of the recalibration exercise. FSS, headquartered in Chennai, is a worldwide leader in payments technology and transaction processing.



**What does recalibration mean? Why do we need to recalibrate the machines? Is it because of the size of the notes varying from the old ones?**

Recalibration is a process, where the cassettes that hold cash in the ATMs are modified to suit the size of the currency. Should there be a change in the size of the currency then the cassettes that hold currencies have to be modified / calibrated to suit the new size.

Generally ATMs in the country come with a fixed number of cassettes – either two or four and each cassette is calibrated to hold specific denominations. In case of four cassettes, one cassette is configured for Rs. 1000, two for Rs. 500 and one for Rs. 100.

With demonetisation, both denominations and the sizes of the currencies have been changed, so these cassettes are now being calibrated to dispense Rs. 100 notes and the new Rs. 500 and Rs. 2000 notes.

**Would you like to comment on why the government changed the size of the notes, because if they had kept it the same, they could have avoided this entire recalibration exercise and saved time?**

The size of the currency is changed as per international standards and also with the focus of cutting down the print and production costs. Government has also taken this step and introduced many new security features in the new currency to avoid printing of fake notes.

**How long does it take to recalibrate one ATM machine?**

The actual calibration work needs denomination change and size change which can take between 30 – 60 minutes if all stakeholders are present.

**How many machines do you manage and how long do you expect the entire process to take for all the machines you manage?**

FSS manages 40,000 ATMs across the country. With this new development, we had recalibrated and tested all ATMs managed by us to dispense Rs. 100 notes

on November 11. Once Rs. 2,000 was released, we calibrated the ATMs to dispense them. The government has released the size of the Rs. 500 notes and we are currently in the process of recalibrating the ATMs to dispense them as soon as it is released. We expect the entire process to be completed within a week to 10 days.

**Are there enough engineers/technicians to recalibrate the machines? Is this job done in-house or is it sub-contracted to a third party?**

Recalibration of ATMs is a team effort involving banks, ATM manufacturers, managers and cash management and logistics companies. And the whole industry has come together to tackle this emergency.

A war room has been created where teams from the ATM manufacturers, cash agencies and the managed service providers like FSS have come together to plan for ATM recalibration, logistics and cash management and a common pool of engineers has been deployed in the field to handle this situation. This team is working round the clock to ensure that all 220,000 ATMs across the country are recalibrated at the earliest.

This job is being handled by ATM manufacturers and managers and is not sub-contracted to third parties.

**Has the Govt or RBI instructed companies like yours with regard to recalibration? There have been rumours doing the rounds saying it will take 30 mins per ATM instead of four hours.**

Yes, RBI has given clear instructions to Banks and they have in turn instructed us.

Regarding the time taken for recalibration, it can take 30 – 60 minutes, but the logistics of gathering the teams and moving from one ATM site to another and completing the task takes time. A route in a day covers around 20 ATMs.

**Lastly, do you think that demonetisation of notes is a good move and will help curb corruption / prevent the circulation of black money?**

This is a good move from my perspective as cash deposits in the Banks have seen significant surge. This will bring good dividends to our economy and will have a deep and positive overall impact. However, it is too early to comment on abolition of black money, as this is a just a first step and we have a long way to go. But this first step by the government is definitely in the right direction.

## VoLTE: Voice over LTE



Over the past few months, all of India has been exposed JIO , the recent entrant in the telecom market who has issued 6 MONTHS OF FREE DATA to everyone along with LIFETIME free voice calling however, there is a catch to access this free data ,we must possess a 4G VoLTE enabled smartphone.

Most of us are familiar with 3G and 4G , but WHAT IS VoLTE?

VoLTE stands for voice over LTE . It's voice calls over a **4G LTE network**, rather than the 2G or 3G connections which are usually used. We tend to think of **4G** as mostly being about downloading, streaming and web browsing, and indeed that's primarily what it's been used for so far, but it can also be used to improve calls.

### **What are the benefits of VoLTE?**

Superior call quality - The big advantage of VoLTE is that call quality is superior to

3G or 2G connections as far more data can be transferred over 4G than 2G or 3G. Up to three times as much data as 3G and up to six times as much as 2G to be



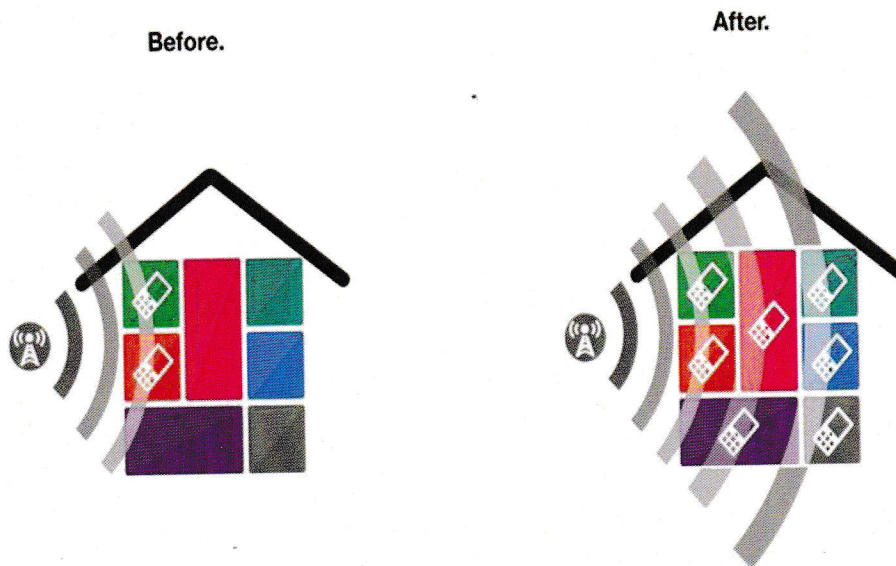
precise, making it easier to make out not only what the person on the other end of the line is saying, but also their tone of voice. Essentially it's an HD voice call and it's a much richer experience over all. Improved coverage and connectivity - VoLTE can connect calls up to twice as fast as the current methods and as 2G and 3G connections will still be available when there's no 4G signal it simply means that there's greater mobile coverage overall, as currently places with a 4G signal but no 2G or 3G means that one you can't make or receive calls.

You might think that would be a rare occurrence, but some of the frequencies that 4G operates on, such as the 800MHz spectrum, have far greater reach than 2G or 3G spectrum, so you'll be able to get signal further away from a mast or in buildings which other signals struggle to penetrate. Indeed, Three is fully relying on its 800MHz spectrum for VoLTE calls.

However, while 2G and 3G services would likely remain they wouldn't be as necessary as they are now and much of the spectrum used for 2G in particular could potentially be repurposed to increase capacity on 4G networks.

Better battery life - Anyone who currently uses 4G could also find their battery life increased with VoLTE, as right now whenever you make or receive a call your phone has to switch from 4G to 2G or 3G, since 4G calls aren't supported (other than on Three Super-Voice) and then once the call is finished it switches back again. All that switching, plus the need to search for a different signal each time, can give the battery a significant hit.

Video calling - It's also theoretically possible to make video calls over 4G, much like a Skype call except you'd just use your mobile number and be able to use the regular dialler and call interface, so you can make and receive video calls from



anyone else with VoLTE, rather than relying on separate accounts.

In fact you may have noticed that Skype and other existing video calls services often seem to have superior audio quality to voice calls. That's because like

VoLTE they use more data as part of a similarly named VoIP system, so you can expect your voice calls to start sounding more like Skype calls, but they won't hit your battery life as much as Skype does.

Not only could video calls become native to the dialler, but other Rich Communication Services (or RCS's) could as well, such as file transferring, real time language translation and video voicemail and there may be applications which haven't even been thought up yet.

As VoLTE is tied to data it could also mean that you won't have to worry about how many minutes you use, as everything will fall under data use.

## **Are there any limitations of VoLTE?**

### **Turning Off Data**

It's probably not the best to turn off data on your cellphone if you're on the Reliance Jio network. Since all traffic on the network is running over a data line, disabling data would effectively put the phone in the equivalent of airplane mode. It should be mentioned that Reliance has clarified that data usage towards voice calls will not be counted towards the data allotment of the monthly plans.

### **HD Calling**

HD Calling is being touted as a major feature of the VoLTE saga, but there is a caveat. Calls are in HD only if the parties engaged in a phone call are both on Reliance's Jio network. The call has to originate and terminate on a VoLTE enabled handset. You can still make and receive calls from other networks, but they won't be in the higher quality standard that you can expect from a VoLTE call.

## **Why haven't we been making calls over 4G with VoLTE all along?**

The problem with Voice over LTE is that 4G LTE is a data-only networking technology, so it doesn't natively support voice calls. While 3G and 2G were primarily designed with voice calls in mind and data was added to them.

As such it's been necessary to create new protocols to support voice calling over 4G and it's a big job, requiring upgrades across the entire voice call infrastructure. There's no one standard for this, with different networks creating their own solutions. There are some common problems and solutions though, most notably the requirement for Single Radio Voice Call Continuity (SRVCC), which simply means that the phone will be able to switch back to a 2G or 3G signal if you move out of a 4G signal zone during the call.

### **FINAL VERDICT**

Reliance JIO has ushered in a new era in INDIAN TELECOM INDUSTRY by introducing the world class 4G VoLTE technology. However, implementation of this technology and adoption rates by the consumers shall remain slow, and is an uphill task for Mukesh Ambani and his team to overcome. However, keeping an

open mind as Engineers, we embrace this technology whole-heartedly and hope to see a DIGITAL INDIA.

- Deepankar Bhat

## GREEN BUILDINGS

Green building (also known as green construction or sustainable building) refers to both a structure and the using of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. In other words, green building design involves finding the balance between homebuilding and the sustainable environment. This requires close cooperation of the design team, 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.

### Highlights of a GREEN BUILDING :

- **Efficiently using energy, water, and other resources**
- **Protecting occupant health and improving employee productivity**
- **Reducing waste, pollution and environmental degradation**

Leadership in Energy and Environmental Design (LEED) is a set of rating systems for the design, construction, operation, and maintenance of green buildings which was Developed by the U.S. Green Building Council. Other certificates system that confirms the sustainability of buildings is the British BREEAM (Building Research Establishment Environmental Assessment Method) for buildings and large scale developments. Currently, World Green Building Council is conducting research on the effects of green buildings on the health and productivity of their users and is working with World Bank to promote Green Buildings in

Emerging Markets through EDGE Excellence in Design for Greater Efficiencies Market Transformation Program and certification.

Although new technologies are constantly being developed to complement current practices in creating greener structures, the common objective of green buildings is to reduce the overall impact of the built environment on human health and the natural environment by:

Efficiently using energy, water, and other resources

Protecting occupant health and improving employee productivity

Reducing waste, pollution and environmental degradation

A similar concept is natural building, which is usually on a smaller scale and tends to focus on the use of natural materials that are available locally. Other related topics include sustainable design and green architecture. Sustainability may be defined as meeting the needs of present generations without compromising the ability of future generations to meet their needs. Although some green building programs don't address the issue of the retrofitting existing homes, others do, especially through public schemes for energy efficient refurbishment. Green construction principles can easily be applied to retrofit work as well as new construction.

### Reducing environmental impact



Hangin' gardens of [One Central Park, Sydney](#)

Globally buildings are responsible for a huge share of energy, electricity, water and materials consumption. The building sector has the greatest potential to deliver significant cuts in emissions at little or no cost. Buildings account for

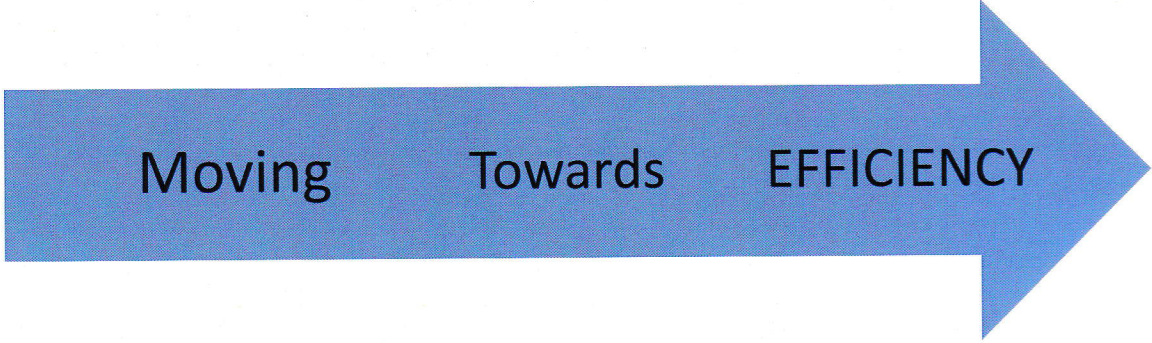
18% of global emissions today, or the equivalent of 9 billion tonnes of CO<sub>2</sub> annually. If new technologies in construction are not adopted during this time of rapid growth, emissions could double by 2050, according to the United Nations Environment Program. Green building practices aim to reduce the environmental impact of building. Since construction almost always degrades a building site, not building at all is preferable to green building, in terms of reducing environmental impact. The second rule is that every building should be as small as possible. The third rule is not to contribute to sprawl, even if the most energy-efficient, environmentally sound methods are used in design and construction.

Buildings account for a large amount of land. According to the National Resources Inventory, approximately 107 million acres (430,000 km<sup>2</sup>) of land in the United States are developed. The International Energy Agency released a publication that estimated that existing buildings are responsible for more than 40% of the world's total primary energy consumption and for 24% of global carbon dioxide emissions

### Goals of green building



**Blu Homes mkSolaire, a green building designed by Michelle Kaufmann.**



## Moving Towards EFFICIENCY

The concept of sustainable development can be traced to the energy (especially fossil oil) crisis and environmental pollution concerns of the 1960s and 1970s. The Rachel Carson book, “Silent Spring”, published in 1962, is considered to be one of the first initial efforts to describe sustainable development as related to green building. The green building movement in the U.S. originated from the need and desire for more energy efficient and environmentally friendly construction practices. There are a number of motives for building green, including environmental, economic, and social benefits. However, modern sustainability initiatives call for an integrated and synergistic design to both new construction and in the retrofitting of existing structures. Also known as sustainable design, this approach integrates the building life-cycle with each green practice employed with a design-purpose to create a synergy among the practices used.

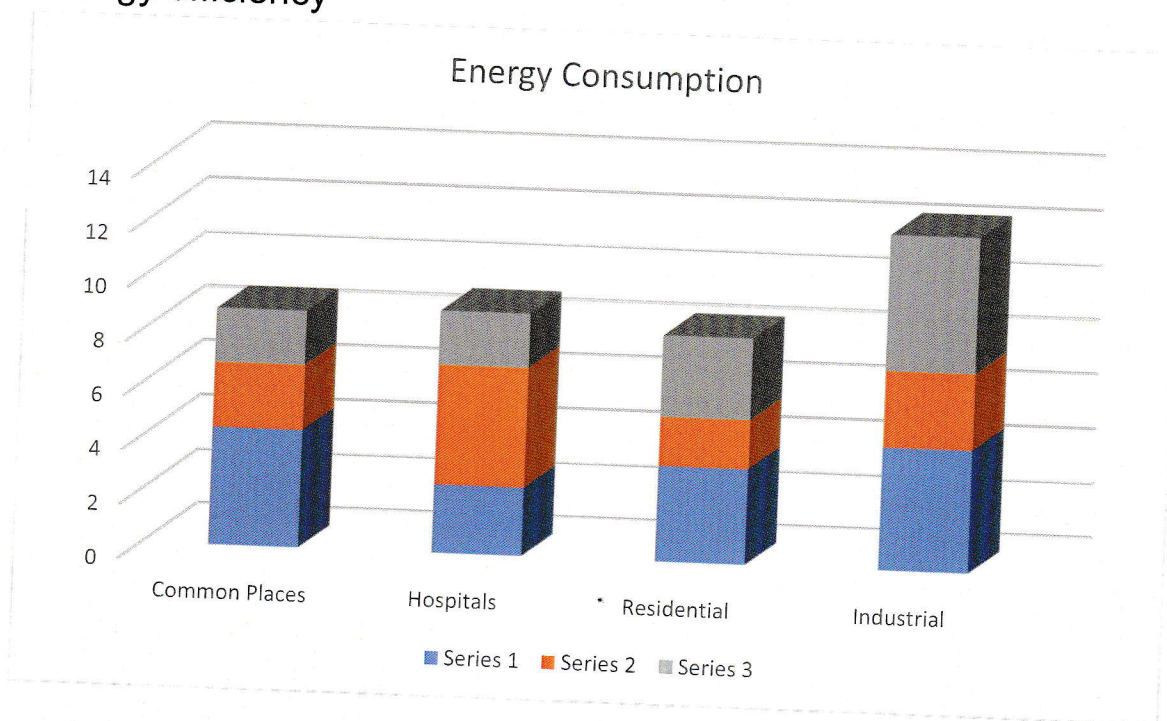
Green building brings together a vast array of practices, techniques, and skills to reduce and ultimately eliminate the impacts of buildings on the environment and human health. It often emphasizes taking advantage of renewable resources, e.g., using sunlight through passive solar, active solar, and photovoltaic equipment, and using plants and trees through green roofs, rain gardens, and reduction of rainwater run-off. Many other techniques are used, such as using low-impact building materials or using packed gravel or permeable concrete instead of conventional concrete or asphalt to enhance replenishment of ground water.

While the practices or technologies employed in green building are constantly evolving and may differ from region to region, fundamental principles persist from which the method is derived: siting and structure design efficiency, energy efficiency, water efficiency, materials efficiency, indoor environmental quality enhancement, operations and maintenance optimization and waste and toxics

reduction. The essence of green building is an optimization of one or more of these principles. Also, with the proper synergistic design, individual green building technologies may work together to produce a greater cumulative effect.

On the aesthetic side of green architecture or sustainable design is the philosophy of designing a building that is in harmony with the natural features and resources surrounding the site. There are several key steps in designing sustainable buildings: specify 'green' building materials from local sources, reduce loads, optimize systems, and generate on-site renewable energy.

### Energy efficiency



Green buildings often include measures to reduce energy consumption – both the embodied energy required to extract, process, transport and install building materials and operating energy to provide services such as heating and power for equipment.

As high-performance buildings use less operating energy, embodied energy has assumed much greater importance – and may make up as much as 30% of the overall life cycle energy consumption. Studies such as the U.S. LCI Database Project show buildings built primarily with wood will have a lower embodied energy than those built primarily with brick, concrete, or steel.

To reduce operating energy use, designers use details that reduce air leakage through the building envelope (the barrier between conditioned and unconditioned space). They also specify high-performance windows and extra insulation in walls, ceilings, and floors. Another strategy, [passive solar building design](#), is often implemented in low-energy homes. Designers orient windows and walls and place awnings, porches, and trees to shade windows and roofs during the summer while maximizing solar gain in the winter. In addition, effective window placement ([daylighting](#)) can provide more natural light and lessen the need for electric lighting during the day. [Solar water heating](#) further reduces energy costs.

Onsite generation of [renewable energy](#) through [solar power](#), [wind power](#), [hydro power](#), or [biomass](#) can significantly reduce the environmental impact of the building. Power generation is generally the most expensive feature to add to a building.

## GALLERIA





Industrial visit of SE Instrumentation students on 15/02/2017 to Electronics Science Department of Savitribai Phule Pune University.



T.E. Instrumentation Engineering students visited at RUBY HALL CLINIC ,WANOARIE,PUNE on dated 30/01/17

