

1. Yes, there are some SFs in India which are currently developed by NSGM (National Smart Grids Mission). Below are the list of projects:

1. CED, Chandigarh (Sub Div-5)
2. CED, Chandigarh (Complete City Excl. SD-5)
3. JBVNL, Jharkhand (Ranchi)
4. OPTCL, Odisha (Rourkela)
5. JVVNL, Rajasthan (6 Urban Towns)

the above ones are approved by the government and still not yet completed.

1. IIT Kanpur Smart City Pilot
2. CESC, Mysore
3. UHBVN, Haryana
4. Smart Grid Knowledge Center, Manesar
5. HPSEB, Himachal Pradesh
6. UGVCL, Gujarat
7. PED, Puducherry
8. WBSEDCL, West Bengal
9. TSECL, Tripura
10. TSSPDCL, Telangana
11. APDCL, Assam

some of the projects in the above list are completed some are yet to be done.

Smart-grid technologies are already deployed cost-effectively in many instances today, enabling higher penetration of renewable energy sources. Policies and regulations need to be developed for smart grids and renewable energy sources as soon as, if not before, large-scale deployment takes off. And above are the cities and towns where smart grids are deployed.

2. Yes, but not all the micro grids are smart grids. The main difference comes in their scale. Microgrid (less than 100kW) is an integral part of smart Grid. The smart grid exists in every scale and geographical location. The smart grid extensively uses advanced monitoring and control based communication technologies. A microgrid (AC/DC) is an electrical system that includes multiple loads and distributed energy resources. A microgrid (AC/DC) can also be a smart grid. Smart grid is an intelligent power system that is based on ICT infrastructure, also micro grid is a local and small power system. Micro-grid can be smart or not to be.

3. FLEXIBLE LOAD: Load flexibility involves shifting the timing of building energy consumption to reduce stress on the electricity grid during peak periods. Enabling building systems to act as distributed energy assets for the grid can achieve significant cost savings. Shifting building loads to off-peak times can help avoid both curtailment and wasteful overgeneration of renewable electricity and increase grid resilience, reliability and energy affordability.

Building-to-grid communications can support load flexibility by allowing utilities to incentivize consumers to shift energy usage to off-peak times. In addition, load flexibility plays a key role for distributed energy resources – including solar power, battery storage, and electric vehicles – that offer more capacity to the grid.

FIXED LOAD:It means that it doesn't shift its value from time to time it has a fixed load associated with it.

4. Yes, Smart Grids are economically viable for domestic consumers. Firstly, smart grid techniques improve the amount of intermittent renewable generation in power system, increasing the capacity of grid-connected clean energy such as solar energy, wind energy and photovoltaic system. Secondly, smart grid promotes energy saving in power system. Today's new smart metering and communication technology could enable consumers and system operators to monitor and potentially control consumption—and cost—at 15-minute intervals. Such improved awareness gives consumers incentives to reduce energy use by switching to more efficient appliances and light bulbs, adjusting thermostat temperatures, and turning off lights and other energy consuming devices when not in use. Consumers will become more active participants in the energy market, as they will be able to more easily compare monthly bills applying different electric retailers' rates to their actual usage. Improved market transparency will allow consumers to easily seek the best retail prices and services. Based on nation wide pilot data, consumers could reduce their electricity consumption by up to 25% during peak periods. In this way it is economically viable for domestic consumers.

5. Currently NSGM (National smart grids mission) has done all the initiatives and projects in India. And also India Smart Grid Forum has spreading the knowledge of smart grids across the country. But, at a ground level we engineers who are striving for the smart development of our country has to implement the smart grid in India and around the world.

6. Smart grids have become a topic of intensive research, development, and deployment across the world over the last few years. The engagement of consumer sectors—residential, commercial, and industrial—is widely acknowledged as a key requirement for the projected benefits of smart grids to be realized. Although the industrial sector has traditionally been involved in managing power use with what today would be considered smart grid technologies, these past applications have been one-of-a-kind, requiring substantial customization. This paper provides an overview of smart grids and of electricity use in the industrial sector. Several smart grid technologies are discussed, with particular focus on the promising topic of automated demand response. Four case studies from aluminum processing, cement manufacturing, food processing, and industrial cooling plants are reviewed. Future directions in the development of interoperable standards, advances in automated demand response, and more dynamic markets are discussed.

The application of smart grid in rural area optimizes crop growth conditions, lowers production costs, reduces manpower and improves efficiency. Thus it further promotes the economic development and agricultural production intelligent construction.

7. Specifically, the Smart Grid is comprised of a power layer, communications and sensors layer, and a software layer. And that we need control, security, and of standards to be effective and to reliably communicate with the downstream power loads to turn them on/off as needed. The number of standards necessarily increases as we refine requirements for the Smart Grid. Initially, it was about facilitating and managing connections and the operation of all energy

sources, but that quickly became about optimizing energy use and delivering reliability and security.

8. For example let us take making of home to smart home.

Nearly everything in your home — including air-conditioners, thermostats, lights and garage doors — can be connected to the internet and be remotely controlled with a mobile device or smart speaker. But setting up a so-called smart home can be mind-boggling: There is a plethora of different accessories that work only with certain products, and some work better than others. Here are some ways to help you sort through the jumble and become acclimated to your first voice-controlled smart home.

Amazon's Alexa

Google's Assistant

Apple's Siri

In the above way we can use the existing technology to make it smart.

9. India Smart Grid Forum (ISGF) has taken the initiatives to the Global smart grid projects across some countries mainly in USA, South Korea, Japan, China.

In the USA :Recovery Act Smart Grid Program

The American Recovery and Reinvestment Act of 2009 provided the U.S. Department of Energy with \$4.5 billion to modernize the electric power grid. These projects that utilized these investments to deploy smart grid technologies and their impact on grid performance.

In the Japan: The Japanese government is aiming to increase the reliability of the grid system by introducing sensor networks and to reduce opportunity losses by introducing smart meters. The introduction of the smart grid will promote the use of renewable energy by introducing a demand response system.

In the South Korea: According to Korea Electric Power Corporation (KEPCO), one of the leaders of the initiative, "smart grids would help the country use more renewable energy sources and cut overall energy consumption." The "smart" in a grid is achieved through an installed software rather than hardware, banking more on the element of intelligence for more consistent upgrades, patterns learning, and timely response to new technologies.

In the China: In China, the State Grid Corporation of China has proposed the concept of a "Global Energy Internet." It is based on having a smart grid connected to an ultrahigh-voltage power grid that could potentially deliver clean energy worldwide.

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