

### SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution)

### **COIMBATORE-35**

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

**UNIT I** 

# Conventional Grid vs Smart Grid

19EEE308 – SMART GRIDS III year / VI Semester

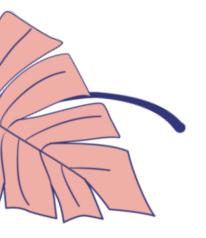




### What is smart grid?



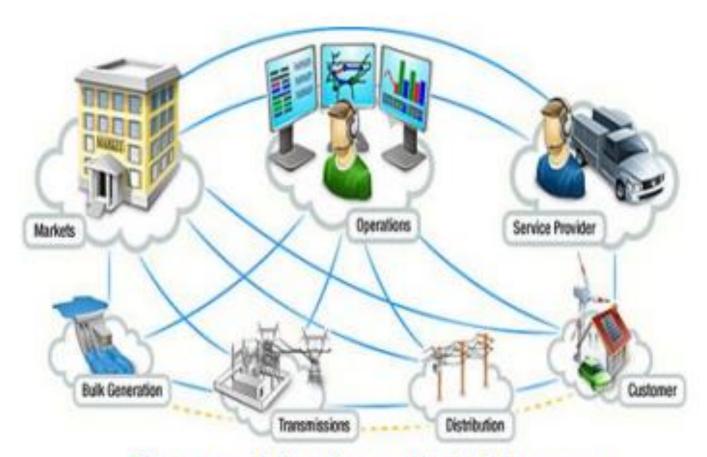




#### Smarter

- Generation
- Transmission
- Distribution
- Customer participation
- Operations
- Markets
- Service Providers





Source: http://smartgrid.ieee.org

Smart/best/optimal utilization of all the available resources.

#### Initial references:

- DOE document at <a href="http://www.oe.energy.gov/smartgrid">http://www.oe.energy.gov/smartgrid</a>
- EPRI document at <a href="http://intelligrid.epri.com">http://intelligrid.epri.com</a>





### What is smart grid?...contd.



# Definition by National Institute of Standards and Technology (NIST), USA:

A modernized grid that enables bidirectional flows of energy and uses two-way communication and control capabilities that will lead to an array of new functionalities and applications.

### IEEE:

- ☐ Smart grid is a large 'System of Systems', where each functional domain consists of three layers: (i) the power and energy layer, (ii) the communication layer, and (iii) the IT/computer layer.
- ☐ Layers (ii) and (iii) above are the enabling infrastructure that makes the existing power and energy infrastructure 'smarter'.

Domain of Smart Grid spans over Generation, Transmission,
Distribution till Customer Devices





### Conventional Grid Vs. Smart Grid

		Ch	naracteristics			
Architecture	Consumer Participation	Generation and Storage Options	Power Quality	New Product and Services	Asset optimization	Self Healing
1	1	1	1	1	1	1
		Conven	tional Power	Grid		
Hierarchical and Vertical Structure	Non- participative And uninformed	Central Generator dominance, no Storage framework	Poor quality, focus on outage	Limited, poor customer focus	Poor, little data integration	No Self Healing
1	<b>\$</b>	1	1	<b>Û</b>	<b>\$</b>	1
			<b>Smart Grid</b>			
Unbundled and Distributed Structure	Informed and participative customers	DERs with plug and play features	Power Quality is a priority	Better market and services for	Data driven, predictive asset management	Self Healing, automatic & predictive fault
				customers		address





## Conventional Grid Vs. Smart Grid .. Contdc

		Ch	naracteristics	3		
Cyber Attack	Disaster Management	Event Analysis	Communi - cation	Predictive	Intelligence	Efficiency
1	1	1	1	1	1	1
		Conven	tional Power	r Grid		
Vulnerable to cyber attack	Slow and reactive response to natural disaster	Slow and tedious event analysis process	Mostly one way communi- cation	Non- predictive processes and apps	Limited intelligence	Poor efficiency
<b>\$</b>	<b>\$</b>	<b>\$</b>	1	<b>Û</b>	<b>\$</b>	<b>\$</b>
,			Smart Grid			
Resilient to cyber attacks	Quick and proactive response to disasters	Smart analytics with forecast	Integrated two way communi- cation	Predictive processes & apps.	Intelligent to integrate and process critical info.	Efficiency focus





# Summary



Activity







# KEEP LEARNING.. Thank u

SEE YOU IN NEXT CLASS

