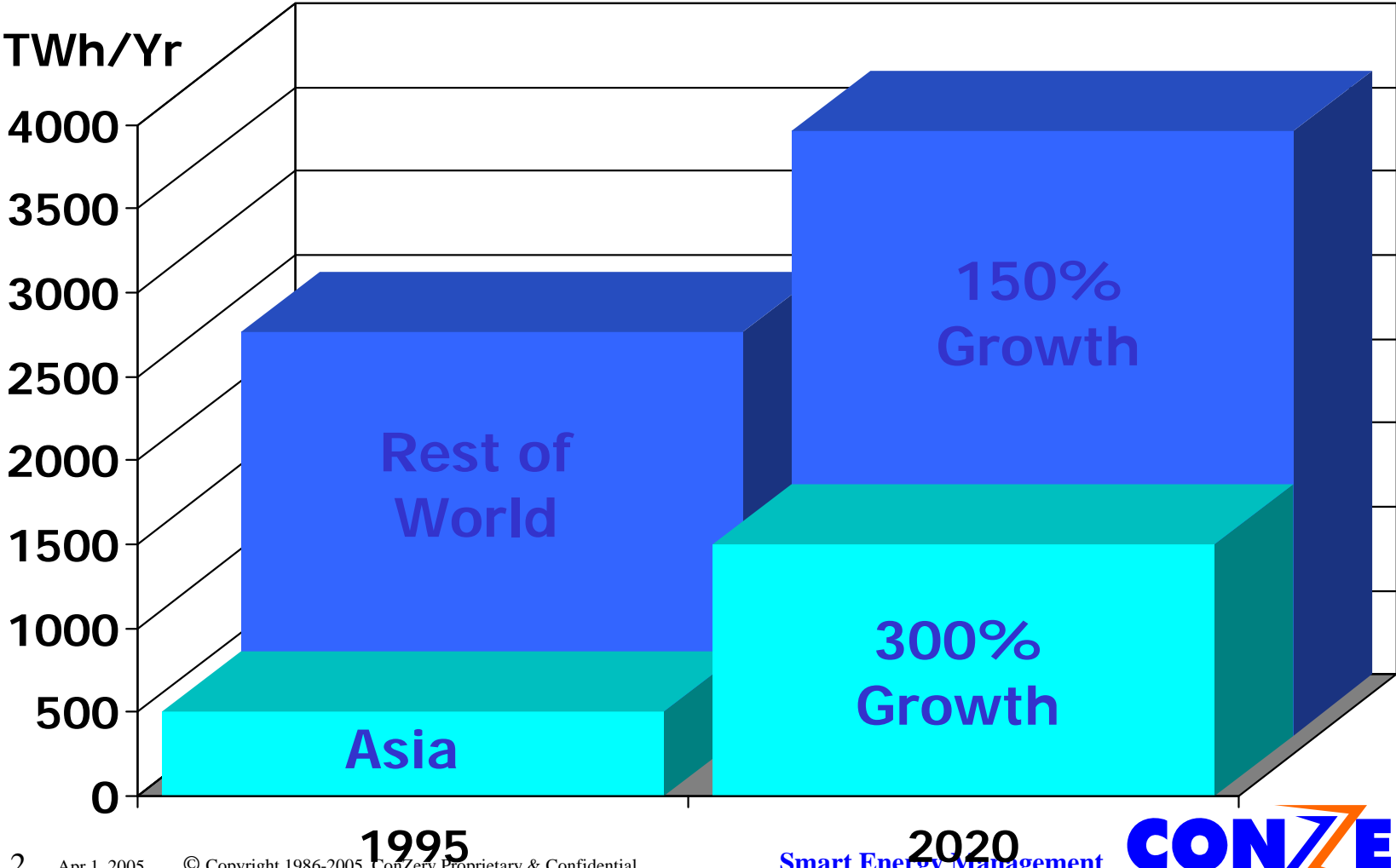
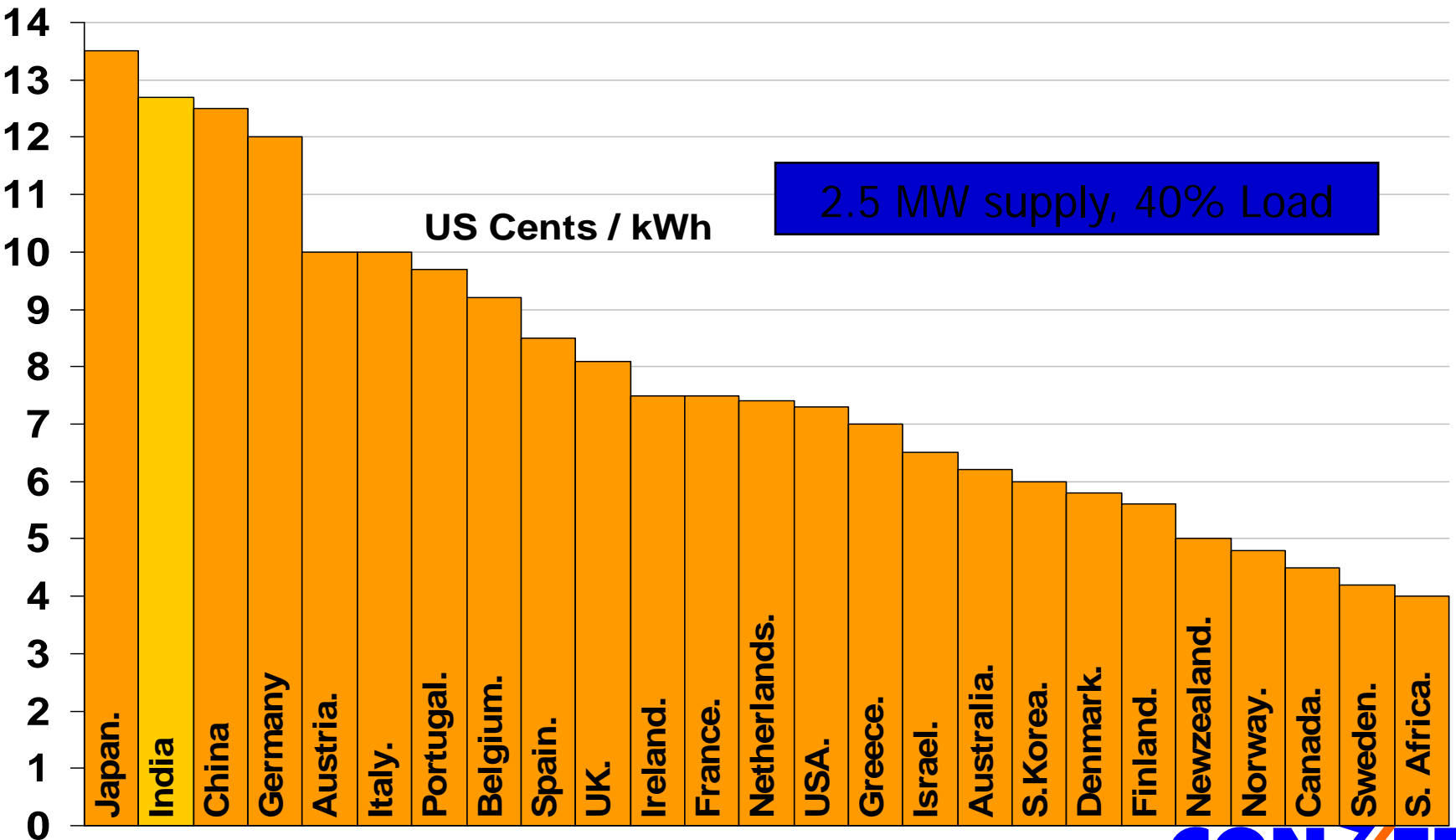

Technological Issues in

Demand Side Management

Expected Growth Of Electric Energy Demand



Industrial Power Costs Worldwide



Current Shortages in Western Region

(Source: energylineindia.com)

Shortfall Estimated by WRPC	Mar 08	Apr 08
Maharashtra	5016 MW	5417 MW
Gujarat	3581 MW	4112 MW
Goa	47 MW	11 MW
W Region Overall	11441 MW	12041 MW

Demand Side Management – Present Status

- Demand side management has come to mean tracking of consumer billing thru various methods including GPS
- The main aim is energy accounting so that all consumers are metered and billed
- Due to various reasons utilities do not have accurate information about the energy supplied and revenue collected
- Consequently all efforts are focussed on that area in distribution

Demand Side Management of Load

- Utilities carry out DSM thru penalties and incentives in tariff structure
- Penalties are levied for exceeding contract demand
- Low PF is also penalised and high PF is incentivised
- Consequently, customers play safe and contract for more than required KVA
- Others with genuine need may have to rely on DGs

Demand Side Management of Load

- Existing OFF LINE monitoring system suffers from many disadvantages:
 - >> Measurements are carried out thru devices storing data with a periodicity of 30 minutes which imposes severe limitation on the parameters to be monitored.
 - >> This data has to be physically accessed from meter every month by a meter reader who downloads this storage and only at the month end it enters the system.
 - >> This method only enables imposition of penalties and does not contribute to load management in real time.
 - >> The system can only do post mortem or operate post facto.

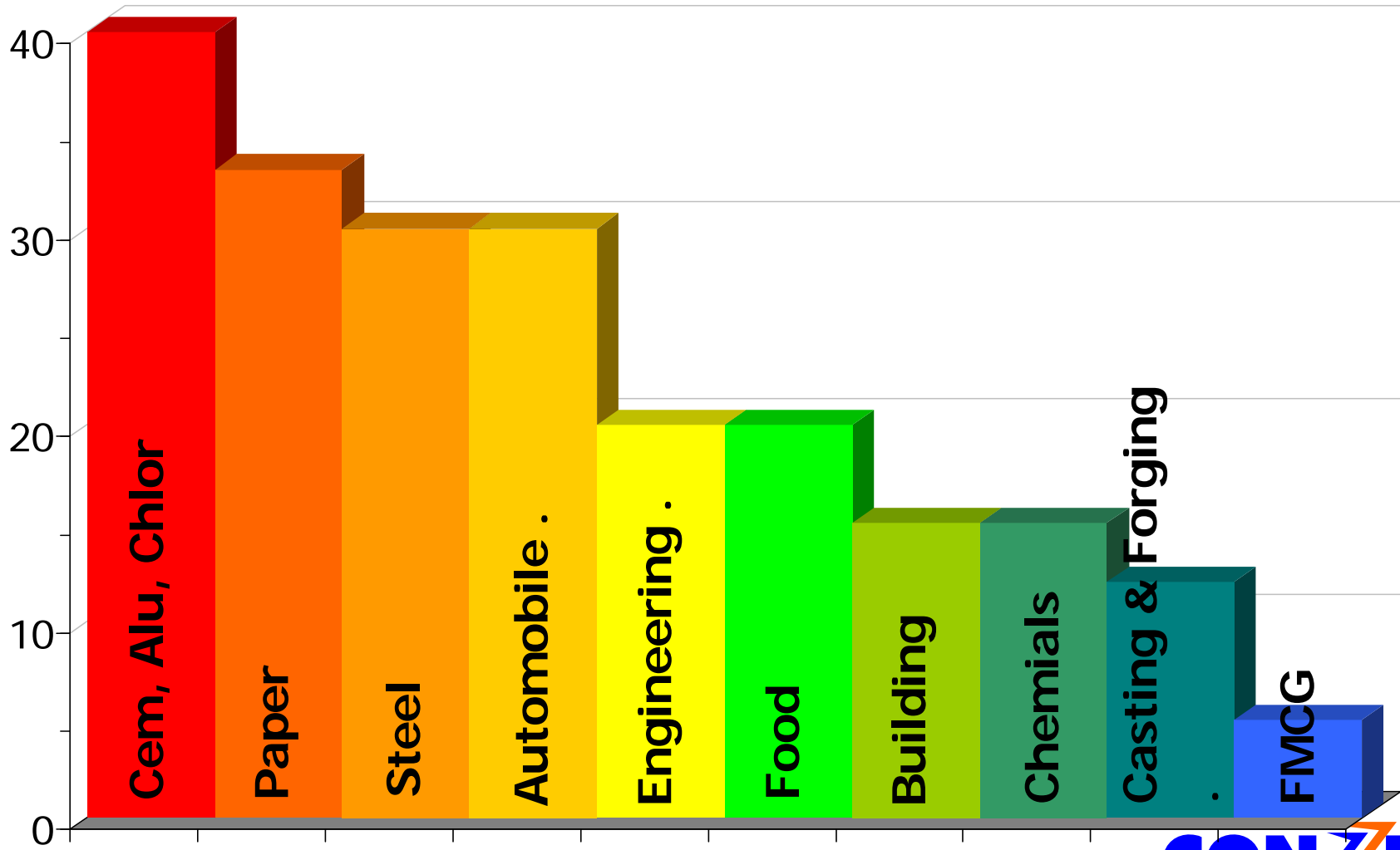
Role of DSM in GDP Growth of 8.50% in 10 years

- 12.75%pa growth of installed generating capacity
 - Investment in Power Sector
- Macro DSM for Power utility systems
- Micro DSM thru energy efficient load management at factory level - medium & large industrial units
- Energy Efficiency Improvements in Public Utilities and Agriculture must also begin

Value of Energy Efficiency

- One KWH saved thru energy efficiency is said to be eqvt to several times one KWH generated
- There is no T&D loss
 - No capital expenditure in generation and transmission
 - No environmental damage or CO2 emission
 - Available immediately

% Energy of Total Manufacturing Cost



Global Power Productivity 2000-01

Source : World Development Report 2003

Country	Electricity Used Bn kWh		GDP	Mfg Industry Value Add	
	Total	Industry	Rs. Cr	Rs. Cr	Rs / kWh
India	510	179	22,912,416	3,149,952	18
China	1,356	452	55,633,488	17,896,128	40
Malaysia	69	23	4,225,968	1,424,256	62
Singapore	31	16	4,111,104	1,195,008	76
Germany	567	284	88,611,312	19,338,528	68
Japan	1,082	541	198,788,688	49,408,128	91
Korea	283	127	20,264,016	8,308,224	65
USA	4,003	2,002	483,132,720	75,196,800	38
UK	372	186	68,356,512	11,273,136	61

Demand Side Management – Wider Canvas

- **Energy Efficiency** - not yet being driven by utilities

Energy Efficiency in designated industries- Pvt sector, Power plants, Railways?

Energy audits of non designated industries- Only commercial considerations are relevant

Energy efficiency in residences

DSM – Wider Canvas

- Power Quality

Uninterrupted supply- Problems of alternatives in use by consumers, costs?

Voltage Stability- many industrial users avoid utility power due to fluctuations

Harmonics free voltage

Demand Side Management System

- To infuse necessary dynamism in load management the system should function in real time.
- Input power available as well as consumption pattern should be on line.
- System should be available to supplier as well as consumer.
- Ultimately, it should be an integrated system from Receiving stations to consumer end.
- System should contribute to energy management and conservation for the consumer.

DSM for Utilities

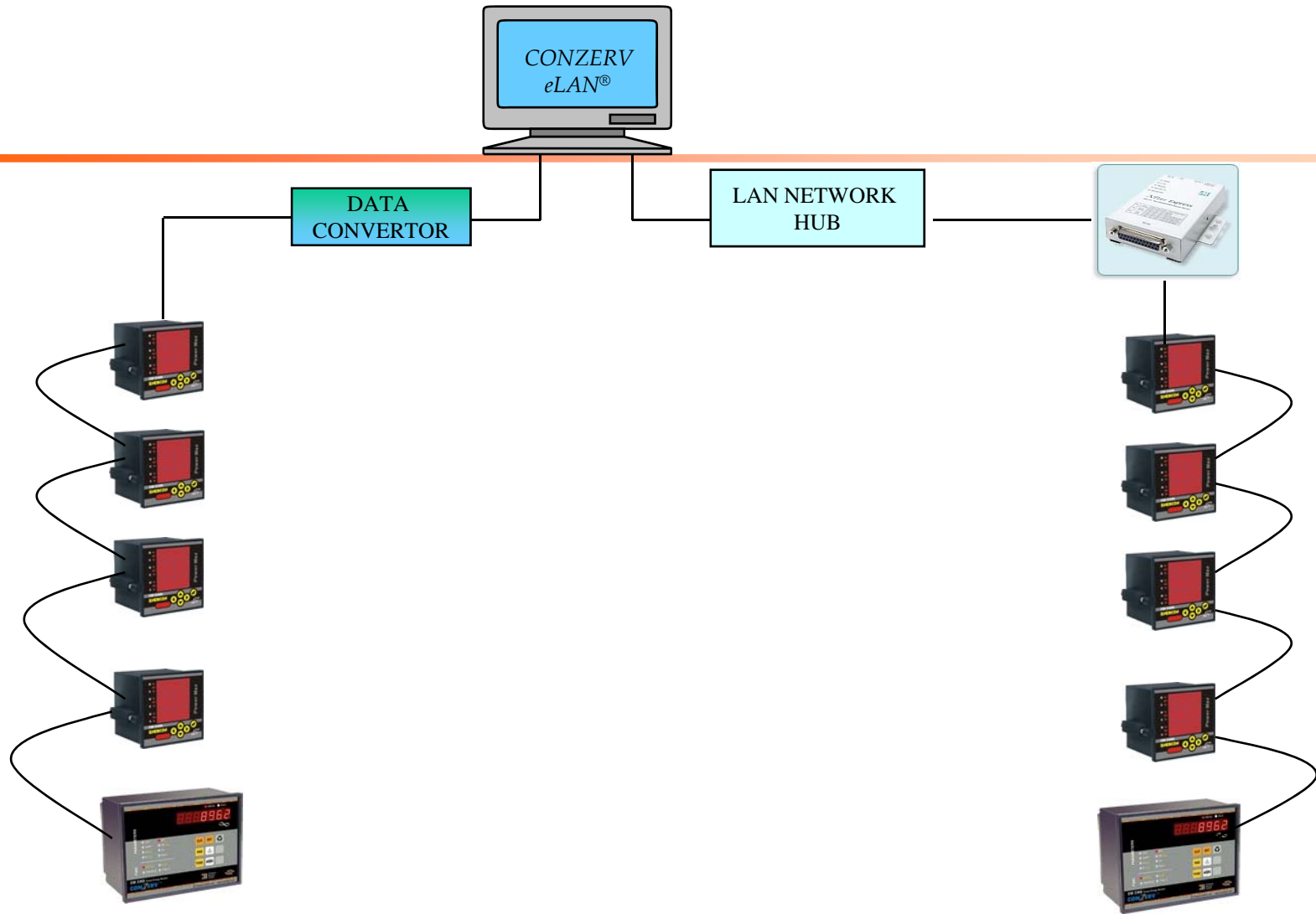
- For dynamic situation in distribution use on line monitoring for accounting
- Integrate the system from receiving end to substations, DTs.
- Make it available for supplier as well as consumer by having subsystems
- System to be used for energy management and energy efficiency

Energy Efficiency in Industries

- Some attention for energy productivity in procurement for plant utilities like motors, air compressors, HVAC, pumps & blowers etc.
- All talley plate data determined from 'standard/controlled/lab' conditions. Actual operating conditions are always different.
- Subsequently:
 - Motors are frequently rewound
 - Air compressors efficiency goes even lower
 - HVAC efficiency deteriorates

Need for continuous monitoring of energy consumption

EMS SYSTEM



EM 6000 Series



EM 3000 Series



ETHERNET
CONVERTOR



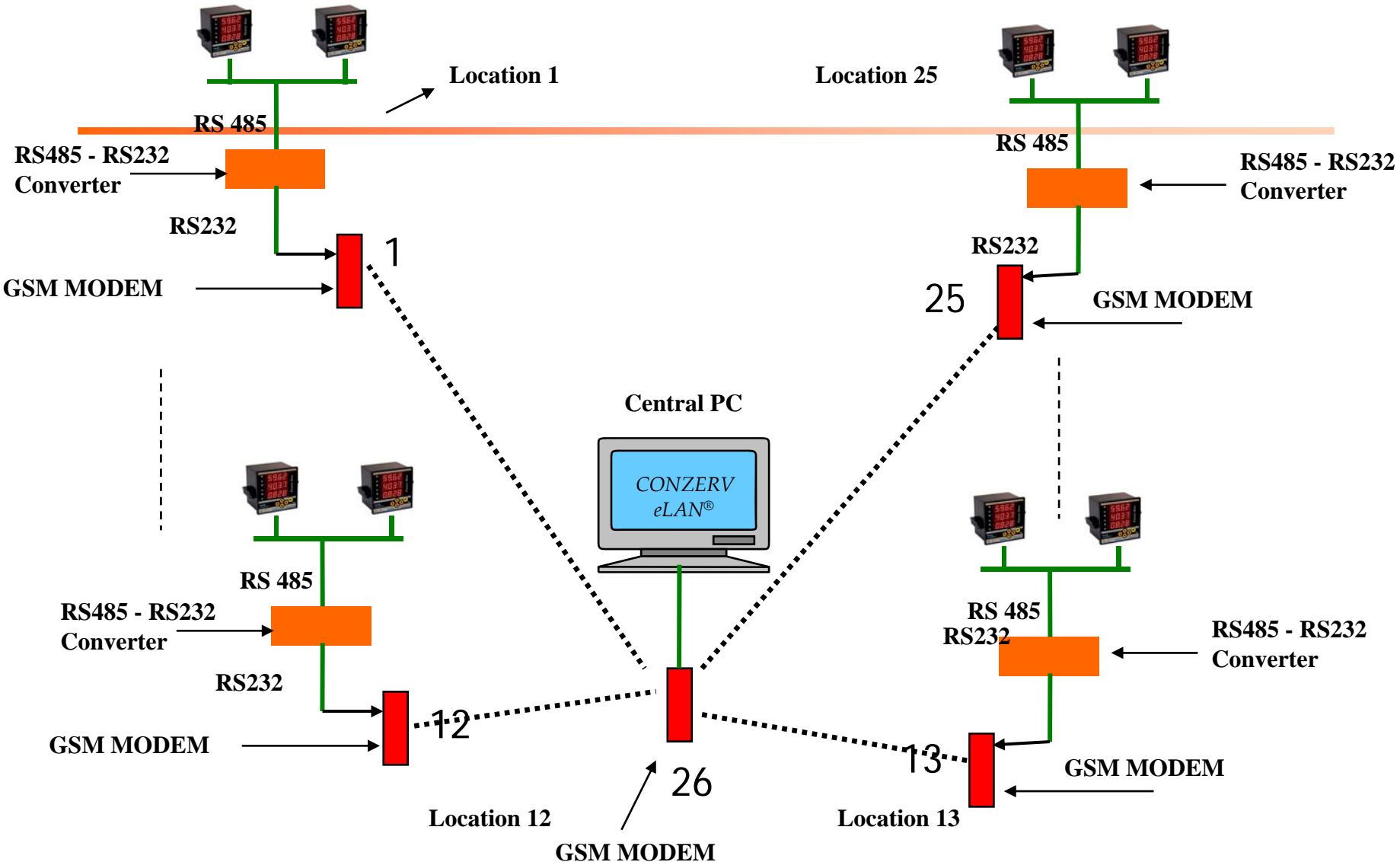
DATA
CONVERTOR

RS 485-RS232
CONVERTOR

Substation Monitoring

- On Line Monitoring of each substation which can provide
 - >> Power from Incomers as well as outgoing feeders
 - >> Energy output from each feeder which can be used for energy / revenue accounting
 - >> System can capture data from feeders and DTs ON LINE thru networking not offline thru MRIs
 - >> System can be extended down the line

System Configuration for Time Interval based



Distribution Monitoring - Advantages

- Energy account reconciliation on daily basis - no need to wait till month end or accumulate large unaccounted gaps.
- Centralisation of system is possible ie data of all substations can be brought to Discom HQ.
- System can provide T&D losses within primary distribution from Main Load despatch stations to substations and DTs.
- System is simple and cost effective.

DSM thru Technology

- Standards and Labelling Program of BEE
- Incentives for Development of Energy Efficient Domestic appliances
- HVAC development
- PF improvement in distribution

Pune Industrial Power Scenario

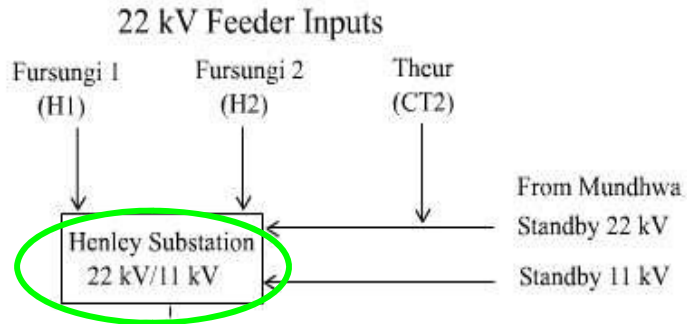
- 389 Feeders
- 1000 Industries
- 425 MW

- 20% = 85 MW Reduction
 - To meet Peak Demand Shortage

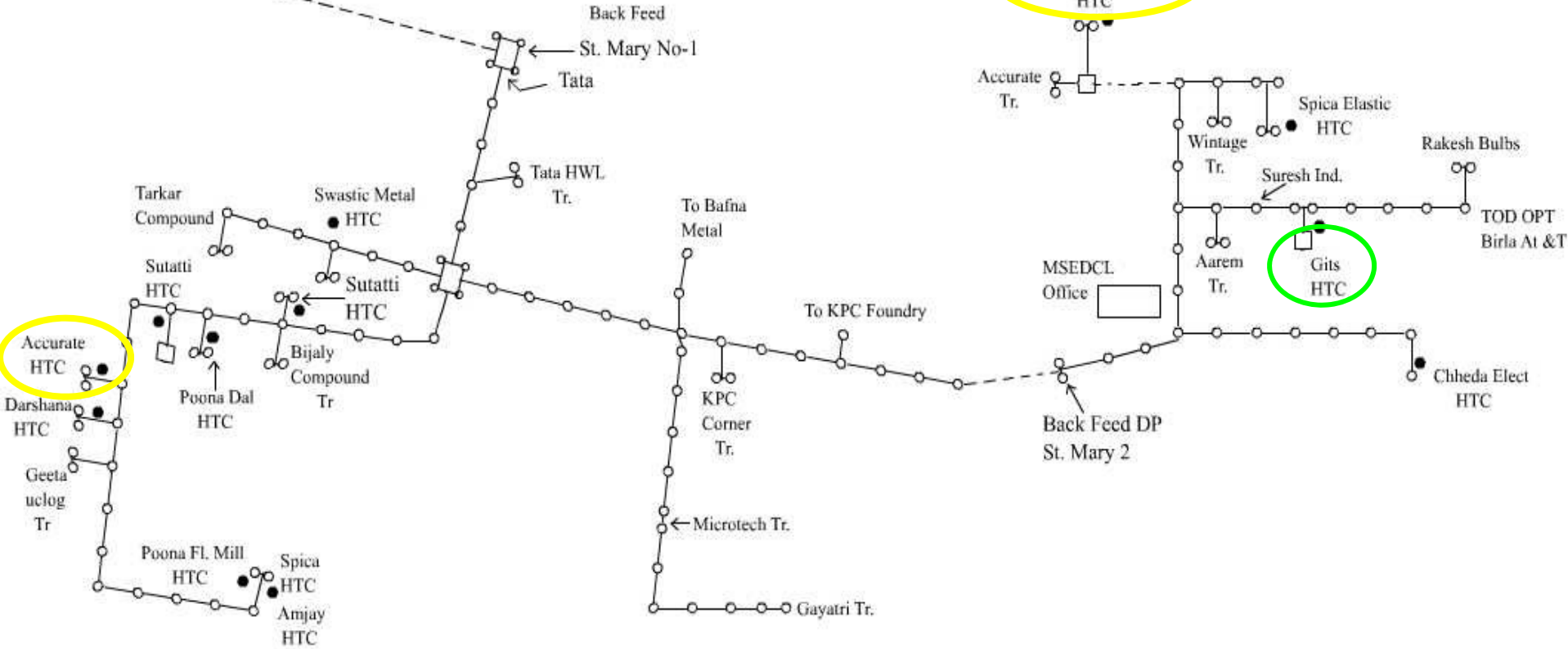
DSM Pilot Hadapsar Indl Area

- Henley, Gits - initial success
- Institute of Toxicology
- 3 more

22 kV Industrial Feeder (Hadapsar)



Key		
○	Pole	Total (81)
∞	D.P	Total (17)
⊠	Four Pole St.	Total (2)
—	Line	5.64
---	Under Ground Cable	0.51
□	Feeder Pillar HT	



Gits Foods Case Study

12 months data

Savings	Savings Rs	Investment Rs	
By DSM	151,200	140,000	For Recording and Controlling (Metering) Mechanism
By Illumination Survey	90,006	108,500	For Tube Ligths
By Motor Survey	80,833	165,054	For Motor
		240,000	Performance Charges
TOTAL	322,039	653,554	

Demand Side Management – Delhi case

- To reduce load shedding Delhi Govt made announcement for closing all shops by 7 pm.
- Due to strong reaction from shopkeepers the notice was quickly withdrawn.
- As shops use maximum electricity for lighting it is possible to reduce consumption by use of 'Lighting Energy Saver'.
- Saving of power by upto 20% in lighting can help in avoiding load shedding for shopping areas.

Thank you



Contact Details

- Conzerv Systems Pvt Ltd
44P Electronic City Ph II
Hosur Road
Bangalore
Ramesh Bhatia
General Manager (Corporate Sales)
Mobile no 098685 29414
Email: ramesh.bhatia@conzerv.com