

Energy Efficiency Improvement & GHG Reduction in Power Plant

BEE 3L Workshop at Dahanu (May 13-14,2010)

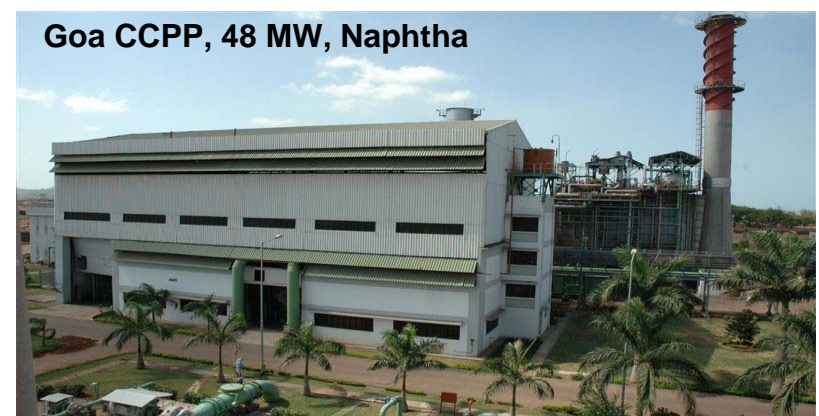
Presentation By :

- Mr. Satya Narayan Palai
Reliance Infrastructure Ltd., Mumbai

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- ❑ *About Generating Power Plants*
- ❑ *Energy Usage*
- ❑ *National Mission on Enhanced Energy Efficiency & PAT*
- ❑ *Energy Management System*
- ❑ *Energy Conservation & Efficiency Improvement Initiatives*
- ❑ *GHG & Carbon Footprint and reduction opportunity*

Generating Plants



Energy Use in India

- ❑ Energy demand is increasing : rising incomes, accelerated industrialization, urbanization and population growth
 - 2003-04 : 572 Mtoe
 - 2016-17 : 842-916 Mtoe
 - 2026-27 : 1406-1561 Mtoe

- ❑ Meeting increasing demand only through increases in supply :
 - Reduced energy security due to volatility in availability and prices of imported fuels

- ❑ Scarce Natural Resource
- ❑ Higher Energy Intensity
- ❑ Energy conservation and energy-efficiency are an essential part of national and Industrial energy strategy

Eight National Missions for Climate Change Mitigation and Adaptation

- 1. National Mission for Enhanced Energy Efficiency**
2. National Solar Mission
3. National Mission on Sustainable Habitat
4. National Water Mission
5. National Mission for Sustaining the Himalayan Ecosystem
6. National Mission for a Green India
7. National Mission for Sustainable Agriculture
8. National Mission for Strategic Knowledge for Climate Change

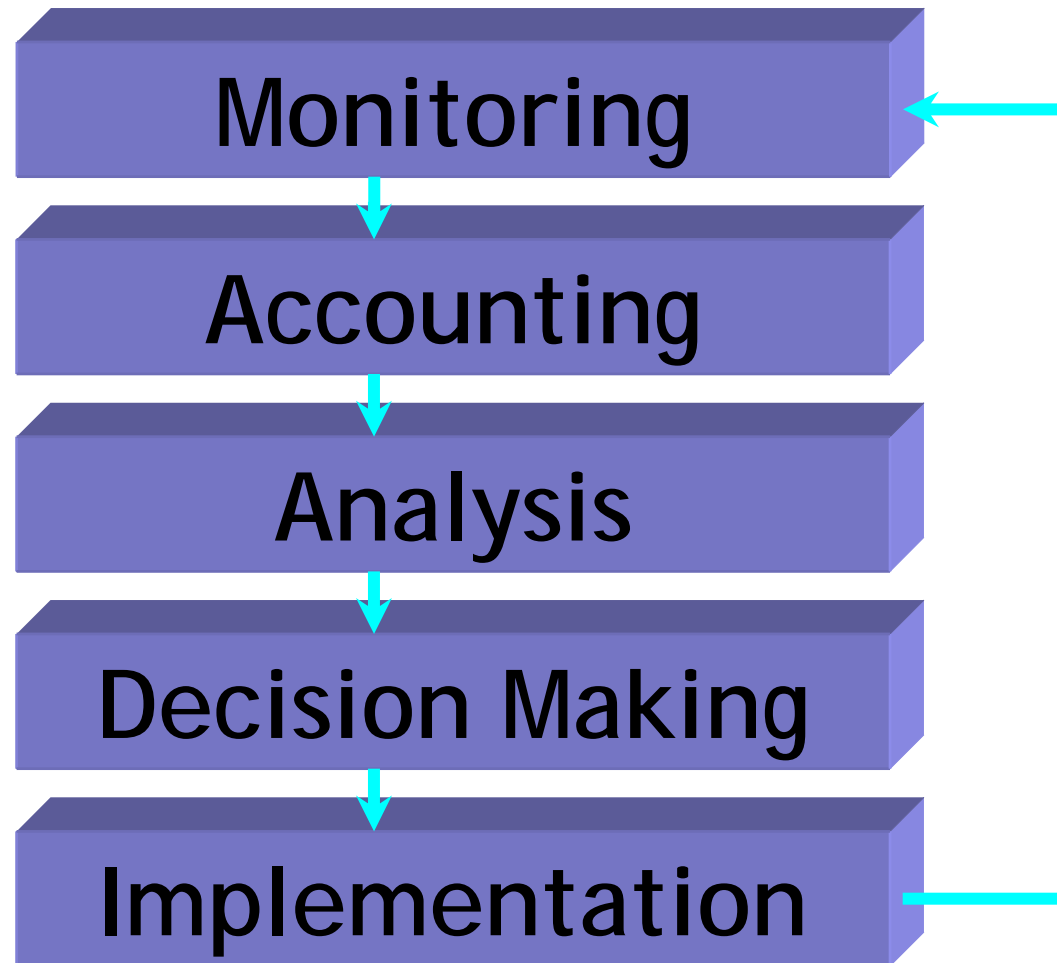
National Mission for Enhanced Energy Efficiency

- ❑ A **market based mechanism to enhance cost effectiveness** of improvements in energy efficiency in energy-intensive large industries and facilities, through certification of energy savings that could be traded.
- ❑ Accelerating the shift to **energy efficient appliances** in designated sectors through innovative measures to make the products more affordable.
- ❑ Creation of mechanisms that would help **finance demand side management programmes** in all sectors by capturing future energy savings.
- ❑ Developing **fiscal instruments to promote energy efficiency** namely Framework for Energy Efficient Economic Development
- ❑ **Promote ECBC** and retrofit of existing buildings

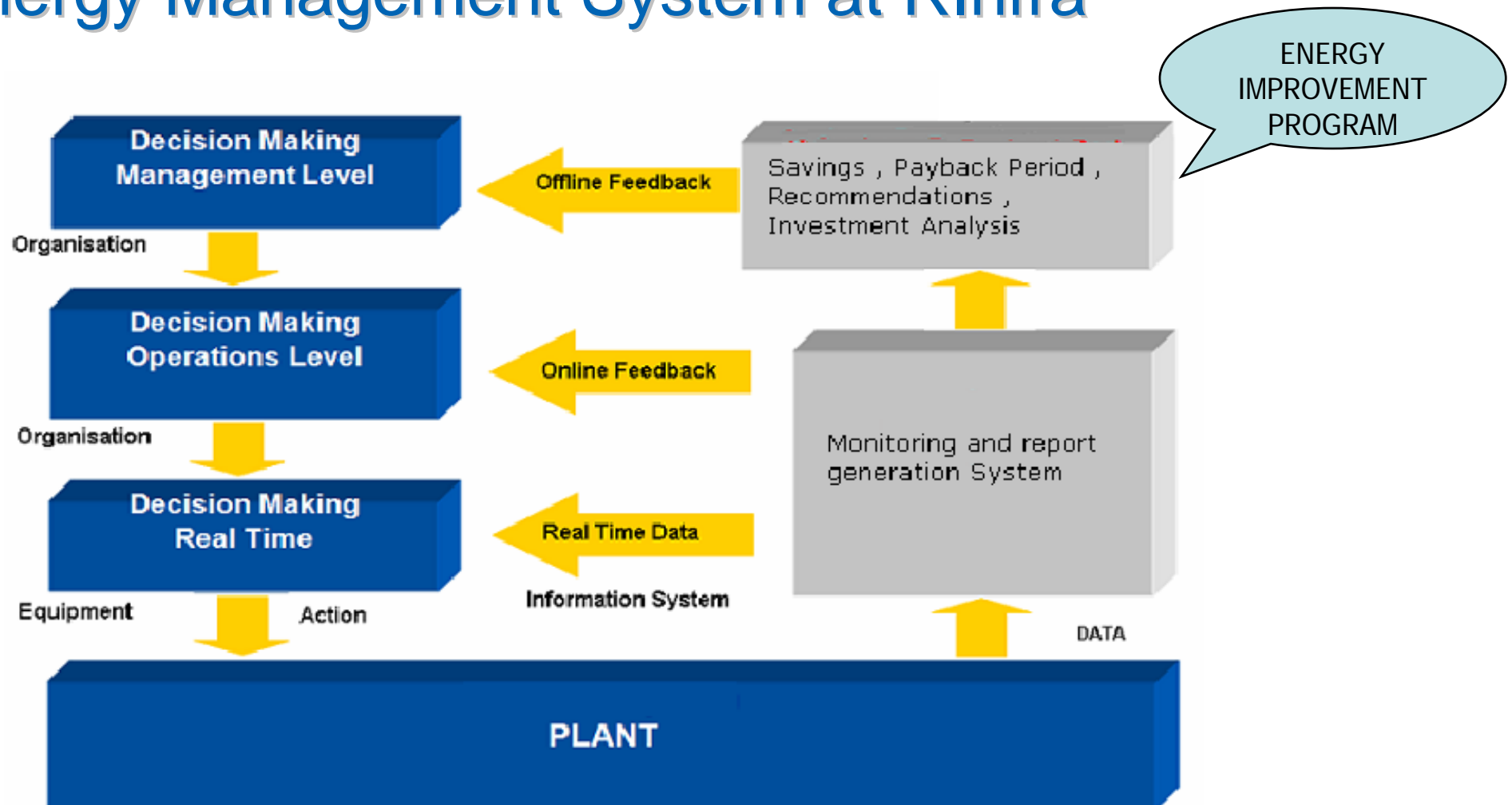
Focus Areas of PAT (Perform, Achieve & Trade)

- ❑ **Energy Saving Certificate** (like White Certificates) - Certifying energy savings and trade in Certificates
- ❑ Mandating **phased reductions in Specific Energy Consumption** in large energy consuming industries and facilities (the Designated Consumers under EC Act)
- ❑ Providing a framework to **certify energy savings** in excess of mandated savings
- ❑ The certified excess savings may be **traded** amongst companies to meet their mandated compliance requirements
- ❑ Or **banked for the next (higher) cycle of energy savings** requirements

Effective Management of Energy



Energy Management System at RInfra



Energy Management Policy


RELIANCE Energy
Anil Dhirubhai Ambani Group

ENERGY MANAGEMENT POLICY

Reliance Infrastructure Ltd. is committed to be one of the most energy efficient utility. Our mission is to use all energy resources efficiently and thereby minimizing the impact of our operations on environment and conserving the scarce natural resources.

This we plan to achieve by,

- ❖ Adopting appropriate energy efficient and clean technologies in process design, procurement, implementation and also continually upgrade our performance.
- ❖ Managing efficient use of all forms of energy by adopting industry wide best practices.
- ❖ Continually benchmarking our energy performance and improving our competitiveness by capacity building measures.
- ❖ Creating awareness about efficient use of energy and conservation methods amongst all our stakeholders.
- ❖ Carrying out regular energy audits to identify areas for improvement.
- ❖ Complying with all relevant regulatory and statutory requirements on energy management.


S.C. Gupta
Director(Operation)

Date: 29th September, 2008

Energy Conservation and Efficiency Improvement Approach

- Capacity Utilisation
- Operational Optimisation
- Technology Upgradation / Adoption
- Renewable Energy

Energy Efficiency Improvement Measures at Dahanu

SL	Energy Efficiency Measures
1	VFD of CEP in Unit # 1 & #2
2	VFD for Vent Air Fans of Dry Ash Silo System
3	VFD of Seal Air Fans
4	Corrocoating of CW Pumps and ACW Pumps
5	Lighting Transformers : Voltage reduction by optimising tapping position
6	Solar Lighting
7	VFD in Colony Water Pump
8	Energy efficient lighting System and Group switching of lighting
9	Wind Turbo Ventilator for Store
10	Vapour Absorption Machine for centralised Air Conditioning System
11	Hybrid Wind Turbo Ventilator for TG Hall
12	Wind Turbo Ventilator for DTPS Capex Store
13	Solar LED Lighting
14	Solar Water Heater
15	Intelligent Compressed Air Distribution System
16	Energy efficiency optimisation of ECW pumps
17	Installation of Screw Air Compressor in place of reciprocating Compressor

Energy Efficiency Improvement Measures at Samalkot

SL	Energy Efficiency Measures
1	VFD for HPBFP
2	VFD of LP BFP
3	VFD for Raw Water pumps
4	De-staging in CEP#2
5	Corrocoating of CW Pumps
6	LPH Bypass & Condenser Preheater Recirculation Pump optimisation
7	Reiprocating Air Compressor : Energy Efficiency measures
8	Installation of Energy Saver for Lighting
9	Modification in DD Hydraulic Oil System
10	Installation of Energy Efficient Lighting
11	Installation of Wind Turbo Ventilator in CW Pump House, GT hall & ST hall
12	Installation of Energy Efficient Hollow FRP CT Fan Blades (9 nos.)
13	Air Conditioning System Optimization
14	Steam Turbine & HRSG optimisation
15	Replacement of CT Make-up Water Pump by gravity system
16	Augmentation of Cooling Tower

Energy Efficiency Improvement Measures at Goa

SL	Energy Efficiency measures
1	Installation of Energy Efficient Hollow FRP Epoxy coated CT Fan
2	Installation of Multistage pressure reduction drag valve
3	Installation of Energy Efficient Lighting system
4	Optimisation of HP, LP & Deaerator pressure
5	Replacement of CW Pump with efficient Pump
6	Installation of improved Water Distribution System & Spray Nozzles in Cooling Tower to enhance Vacuum of Condenser
7	VFD for HPBFP
8	Installation of Solar LED Lighting
9	Installation of Vacuum Pump in place of steam ejector
10	Augmentation of Cooling Tower for enhancing Vacuum of Condenser of ST
11	Heat Recovery from HRSG through replacement of HP-Evaporator Tube Bank

Energy Efficiency Improvement Measures at Kochi

SL	Energy Efficiency Measures
1	Destaging of CEP pumps
2	Destaging of LPBFP pumps
3	Optimisation of Air Compressor operation and attending air leakages
4	CRT monitors replaced with TFT monitors
5	Replacement of inefficient impeller of MCW pump with efficient impeller and corrocoat
6	Energy Efficient Lighting system
7	Installation of Energy Efficient Hollow FRP(Epoxy Coated) CT Fan
8	Installation of Vacuum pump in place of Steam Ejector
9	MCW Uprating
10	Installation of additional CPH(Condensate Pre-Heater) unit to reduce flue gas temperature and enhance HP & LP Steam and Turbine output
11	ACW pump uprating
12	Interconnection of Chillers

Energy Efficiency Initiatives

Energy Efficiency Initiatives						
	Unit	Dahanu	Samalkot	Goa	Kochi	Total
<u>Projects Completed</u>						
Energy Savings	MU / Yr	11.25	9.86	4.43	5.83	31
<u>Ongoing Projects</u>						
Energy Savings	MU / Yr	1.1	4.65	10.8	1.04	18



Green House Gas(GHG)

- Human activities are releasing greenhouse gases (GHG : CO₂,CH₄,N₂O,HFC,PFC,SF₆, etc.) into the atmosphere.
- Climate change is a global issue:
1 tCO₂ emitted in India = 1 tCO₂ emitted in USA.

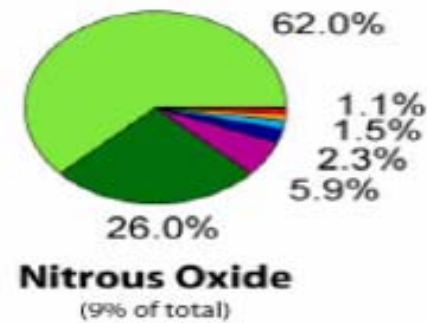
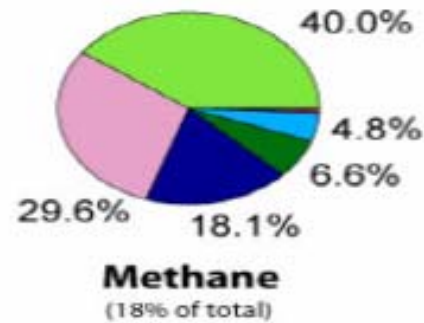
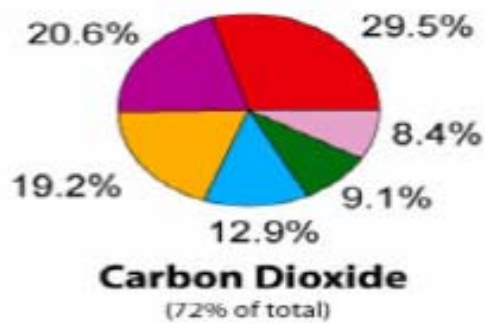
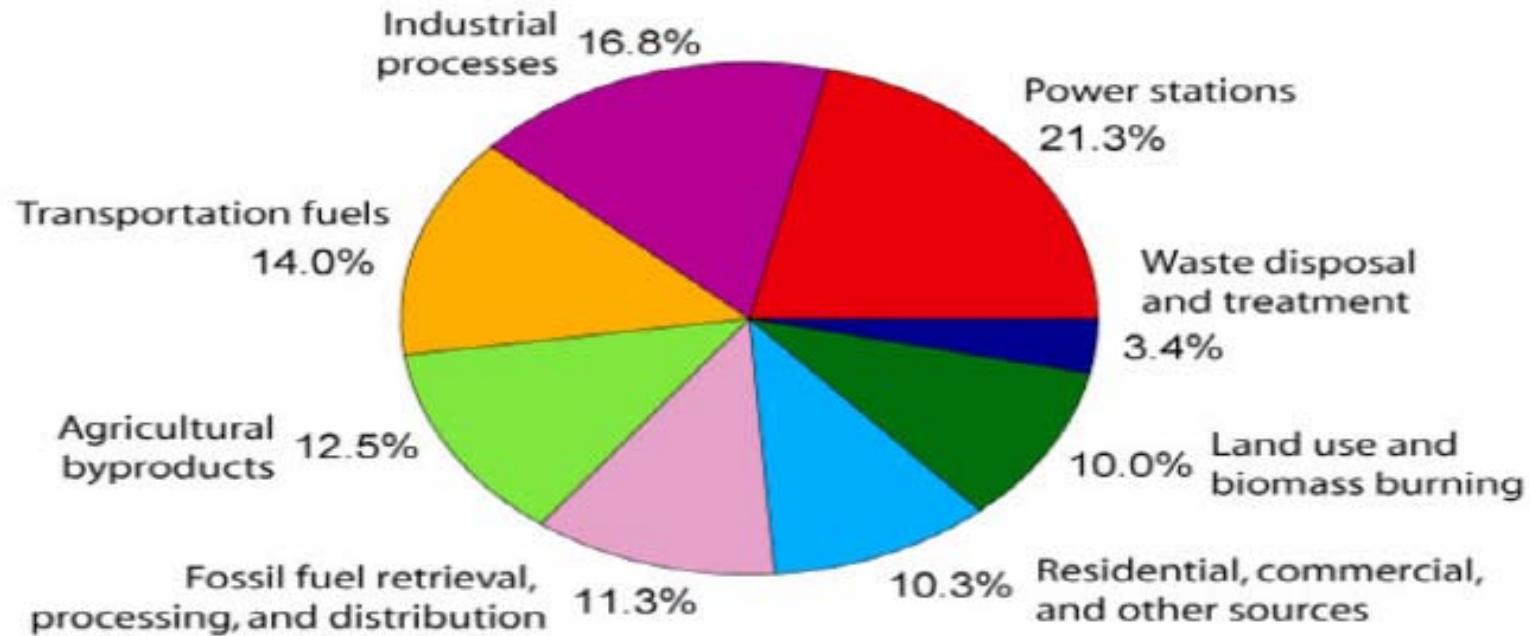


The greenhouse gas effect

- 1) Solar radiation
- 2) Reflected back to space
- 3) Absorbed by atmosphere
- 4) Infra-red radiations emitted from Earth
- 5) Some of the IR passes through the atmosphere
- 6) Some is absorbed and re-emitted by greenhouse gas molecules

 The effect is increasing temperatures on Earth

Annual GHG by Sector



Types of Emissions

- ❑ Scope 1
 - Direct emissions owned or controlled by the plant
- ❑ Scope 2
 - Indirect emissions from the generation of purchased electricity
- ❑ Scope 3
 - All other Indirect emissions

GHG Reduction through Energy Efficiency Initiatives

Energy Efficiency Initiatives							
	Unit	Dahanu	Samalkot	Goa	Wind	Kochi	Total
<u>Projects Completed</u>							
Energy Savings	MU / Yr	11.25	9.86	4.43	20.8	5.83	52
<i>Specific CO₂ Emission</i>	<i>Kg CO₂ / Kwh</i>	<i>0.878</i>	<i>0.42</i>	<i>0.66</i>	<i>NA</i>	<i>0.52</i>	
Carbon Mitigation (GHG Reduction)	Tonnes CO₂ / Yr	9878	4141	2924	20176	3032	40150
<u>Ongoing Projects</u>							
Energy Savings	MU / Yr	1.1	4.65	10.8	NA	1.04	18
Carbon Mitigation (GHG Reduction)	Tonnes CO₂ / Yr	921.9	1953	7128	NA	541	10544

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Reduction Opportunities of GHG(Carbon Foot Print)

Continuous Improvement ...

1. Reduction in auxiliary power consumption
2. Reduction in Heat Rate
3. Fuel Substitution
4. Increasing Renewable Energy contribution





Benefits come not just from reductions, sustainability must play an equal part

INTI



- Reductions from sustainable projects
 - Offer better returns
 - Helps create an economic basis for low carbon growth
- Tomorrow's challenge is to low-carbon pathways for growth



Thank you

