



SUSTAINABLE APPROACH OF RENEWABLE ENERGY AND ENERGY EFFICIENCY

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PREFACE

- **RENEWABLE ENERGY**

Renewable energy is energy from which its source is constantly getting replenished and hence will not finish.

- **ENERGY EFFICIENCY**

It means the efficient use of natural resources. It has the goal to reduce the amount of energy required to provide products and services.

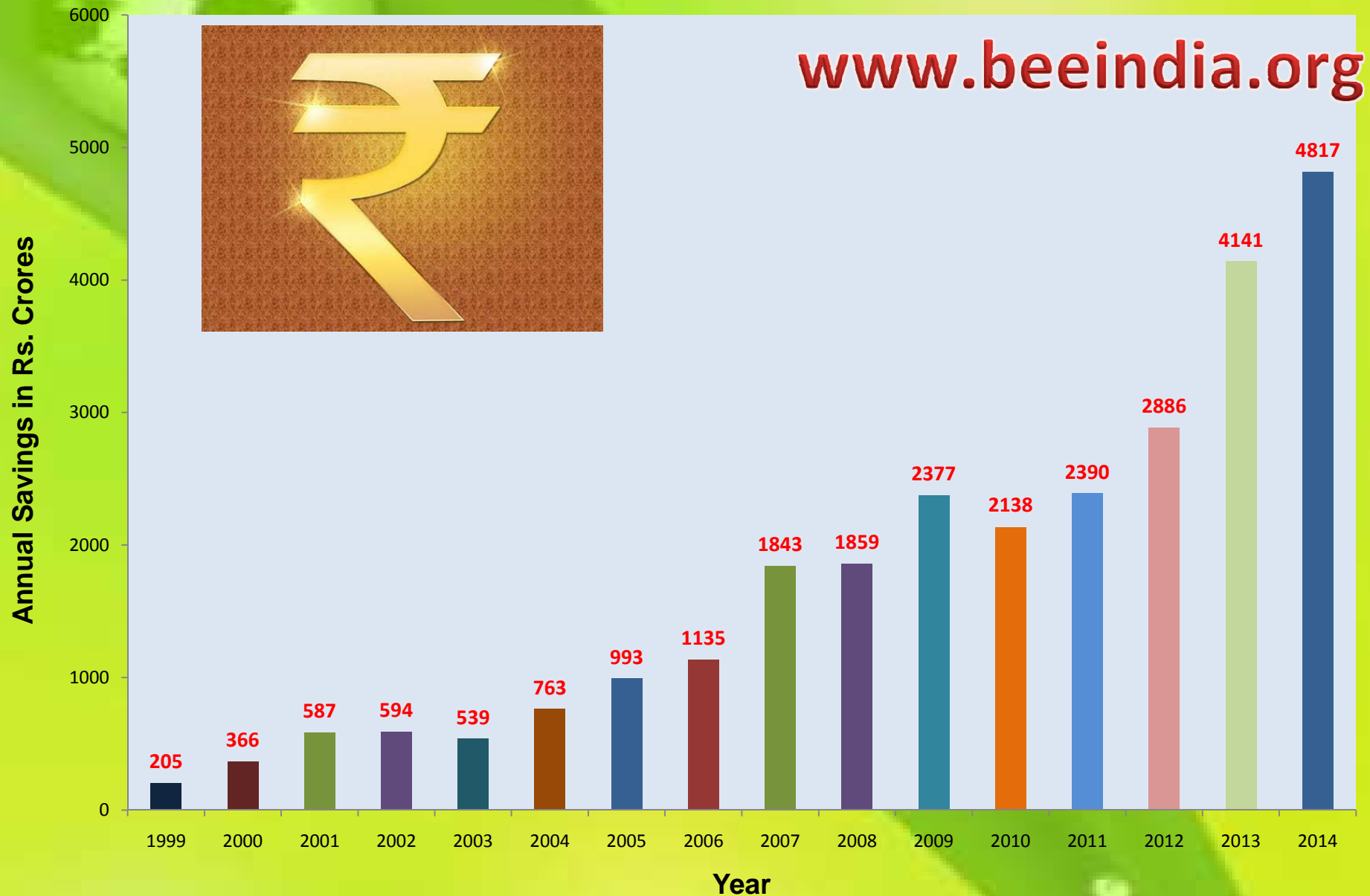
ENERGY EFFICIENCY---BEE



The **Bureau of Energy Efficiency** is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 Energy Conservation Act. The agency's function is to develop programs which will increase the conservation and efficient use of energy in India.

SOURCE: www.beeindia.org

MONETARY SAVINGS IN EFFICIENCY





MNRE

- The **Ministry of New and Renewable Energy (MNRE)** is the nodal Ministry of the Government of India for all matters relating to new and renewable energy. The broad aim of the Ministry is to develop and deploy new and renewable energy for supplementing the energy requirements of the country.

SOURCE: www.mnre.gov.in



BENEFIT OF INTEGRATED APPROACH

- Reducing the demand through **ENERGY EFFICIENCY** and then implement **RENEWABLE ENERGY** program as RE has the high initial cost.
- Use of more **RENEWABLE ENERGY RESOURCES** to reduce the cost of generation.

RKM,RANCHI :CASE STUDY-1



ENERGY EFFICIENCY

- Replacement of conventional bulb with CFL.
- Replacement of old fan with Energy Efficient fan.
- Application of load side capacitor bank.
- Use of Energy Efficient Air Conditioner

RENEWABLE ENERGY

- Utilization of Bio-mass gassifier and Biogas Plant.
- Replacement of old geysers by solar water heater.
- Installation of Roof top solar panel
- Replacement of Diesel driven pump set by SPV system

SOURCE:IISWBM RESEARCH WORK



USE OF SPV INSTEAD OF DG SET

- OPTION 1: RE WITHOUT ENERGY EFFICIENCY

INVESTMENT - Rs.7,00,000
PBP - 3.63 YEAR

- OPTION 2: ENERGY EFFICIENCY WITHOUT RE

INVESTMENT - Rs.21,275
PBP - 0.78 YEAR

- OPTION 3: BOTH EE AND RE

INVESTMENT - Rs.2,00,000
PBP - 1.85 YEAR



NABAJIBAN, HOWRAH: CASE STUDY 2

ENERGY EFFICIENCY

- Replacement of Incandescent Lamps with compact fluorescent lamps.
- Replacement of Conventional Fan by Super Efficient Fan
- Replacement of conventional tubes by T5
- Application of load side capacitor bank

RENEWABLE ENERGY

- Installation of Biogas Plant
- Installation of grid connected SPV system
- Installation of Solar Water Heater.
- Installation of roof top rain water harvesting system

SOURCE: IISWBM RESEARCH WORK



USE OF CFL INSTEAD OF BULB

- OPTION 1: RE WITHOUT ENERGY EFFICIENCY

INVESTMENT - Rs.3,00,000
PBP - 9.52 YEAR

- OPTION 2: ENERGY EFFICIENCY WITHOUT RE

INVESTMENT - Rs.34,004
PBP - 2.12 YEAR

- OPTION 3: BOTH EE AND RE

INVESTMENT - Rs.1,20,000
PBP - 7.48 YEAR

BESU, SIBPUR: CASE STUDY-3



ENERGY EFFICIENCY

- Use of Electronic Ballast In Place of Copper Ballast
- Use of CFL In Place Of Incandescent Lamps
- Use of Energy Efficient AC, such as, Vapour Absorption Cooling System
- Use of Electronic IC Based Regulator In Place of Resistance Regulator

RENEWABLE ENERGY

- Biomass based TRIGENERATION
- Solar roof top water heater system installation
- Grid connected solar SPV system

SOURCE: IISWBM RESEARCH WORK



VAM THROUGH BIOGAS

- OPTION 1: RE WITHOUT ENERGY EFFICIENCY

INVESTMENT - Rs. 8,75,000
PBP - 2.15 YEAR

- OPTION 2: ENERGY EFFICIENCY WITHOUT RE

INVESTMENT - Rs.32,89,588
PBP - 9 YEAR

- OPTION 3: BOTH EE AND RE

INVESTMENT - Rs.6,75,000
PBP - 5.73 YEAR

AVANI RIVERSIDE MALL, HOWRAH



LOAD	Unit	Present Daily Consumption of Energy	Energy saving potential (%)			Reduced Energy Consumption (kWh/day)		
			Scenario +1	Scenario +2	Scenario +3	Scenario +1	Scenario +2	Scenario +3
Lighting	kWh/day	2356.1	34%	57%	91%	1564.1	1006.1	214.1
AC	kWh/day	9229.0	60%	62%	85%	3691.6	3507.0	1402.8
Lift	kWh/day	162.8	N.A	17%	17%	N.A	135.5	135.5
For (ng)	kWh/day (~10 x kg/day)	561.8	NA	80%	80%	N.A.	112.4	112.4
er er	kWh/day	79.0	NA	100%	100%	NA	0.0	0.0
ain	kWh/day	14357.7				14357.7	14357.7	14357.7
D aption	kWh/day	26746.5	26%	29%	39%	19855.3	19118.8	16222.6
D aption ar)	kWh/day	31192.5	If the floor area of 45541 m2 had a typical consumption of 250 kWh/yr/m2 (i.e. the figure for 5 star Commercial Buildings in Warm and Humid climate)*					
D aption eral e)	kWh/day	49907.9	If the floor area of 45541 m2 had a typical consumption of 400 kWh/yr/m2 (i.e. bordering figure for 1 and 2 star Commercial Buildings in Warm and Humid climate)*					

* Source: BEE (SCHEME FOR BEE STAR RATING FOR SHOPPING MALLS, 2011)

Scenario +1 : Further Application of Enhanced Energy Efficiency (Simulated)

Scenario +2 : Further Application of Renewable Energy Systems (Simulated)

Scenario +3 : Further Applications of Enhanced Energy Efficiency and Renewable Energy Systems (Simulated)



CONCLUDING REMARKS

- Adopting Energy Efficiency Measures and applications of Renewable Energy Systems play complimentary role for sustenance of human civilization
- Already, harmonization of the two approaches have brought economic viability of some applications
- Technology, Technique, Awareness and appropriate policy initiatives are necessary to further explore huge potential of the said integrated approach



THANK YOU