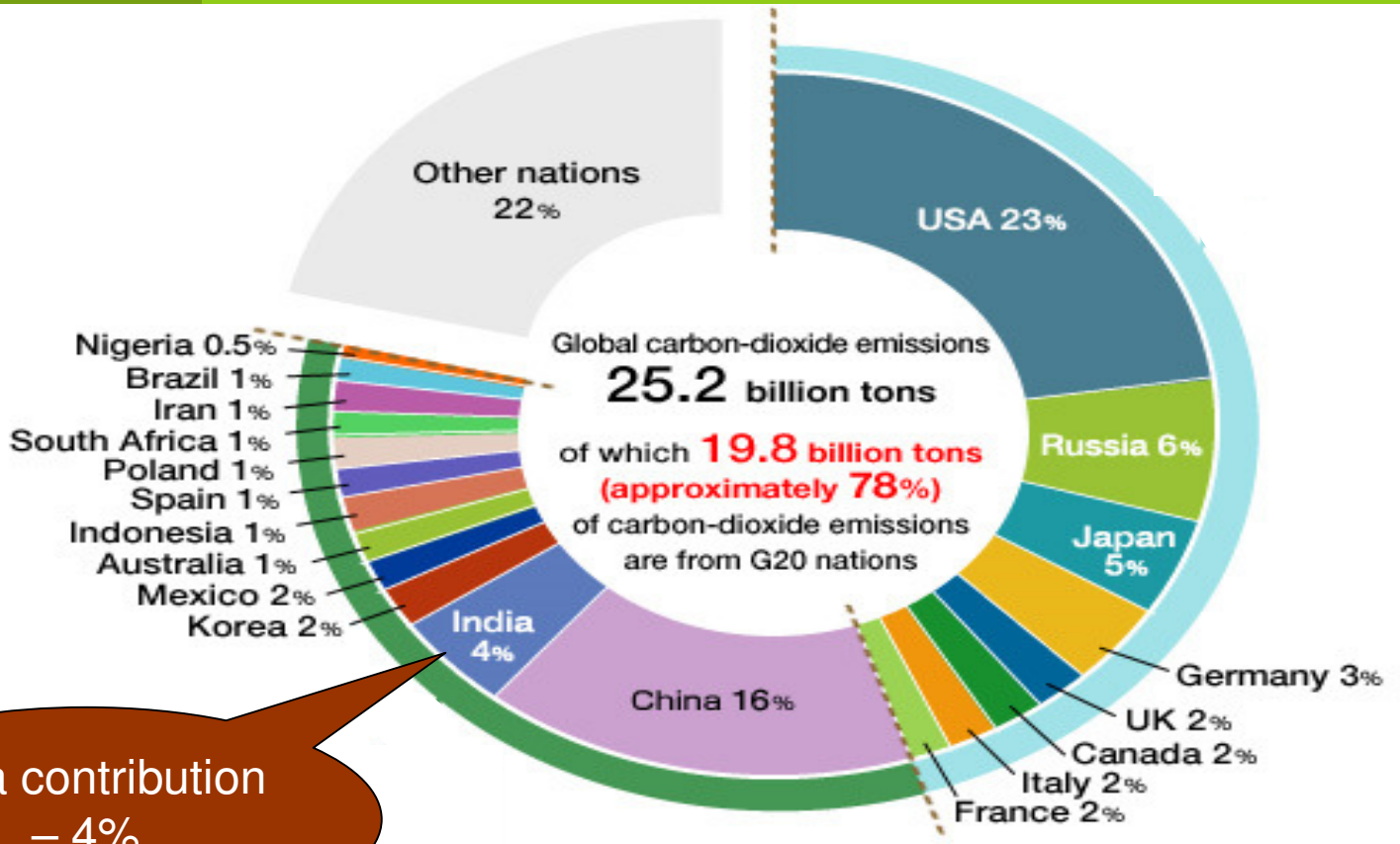
UNDP / GEF (Steel) PROJECT
Of
Ministry of Steel, Government of India

"Energy Efficiency Improvement in Steel Re-rolling Mill Sector in India"

G. Mishra
Project Management Cell

CARBON EMISSION SCENARIO IN THE WORLD



India contribution – 4%

AIMS & OBJECTIVE

- Reduction of Greenhouse Gas (GHG) emissions
- Technology up gradation
- Accelerated adoption Energy Efficient (EE) technologies
- Removal of key barriers to Energy Efficiency measures in the sector

CLUSTER IDENTIFICATION

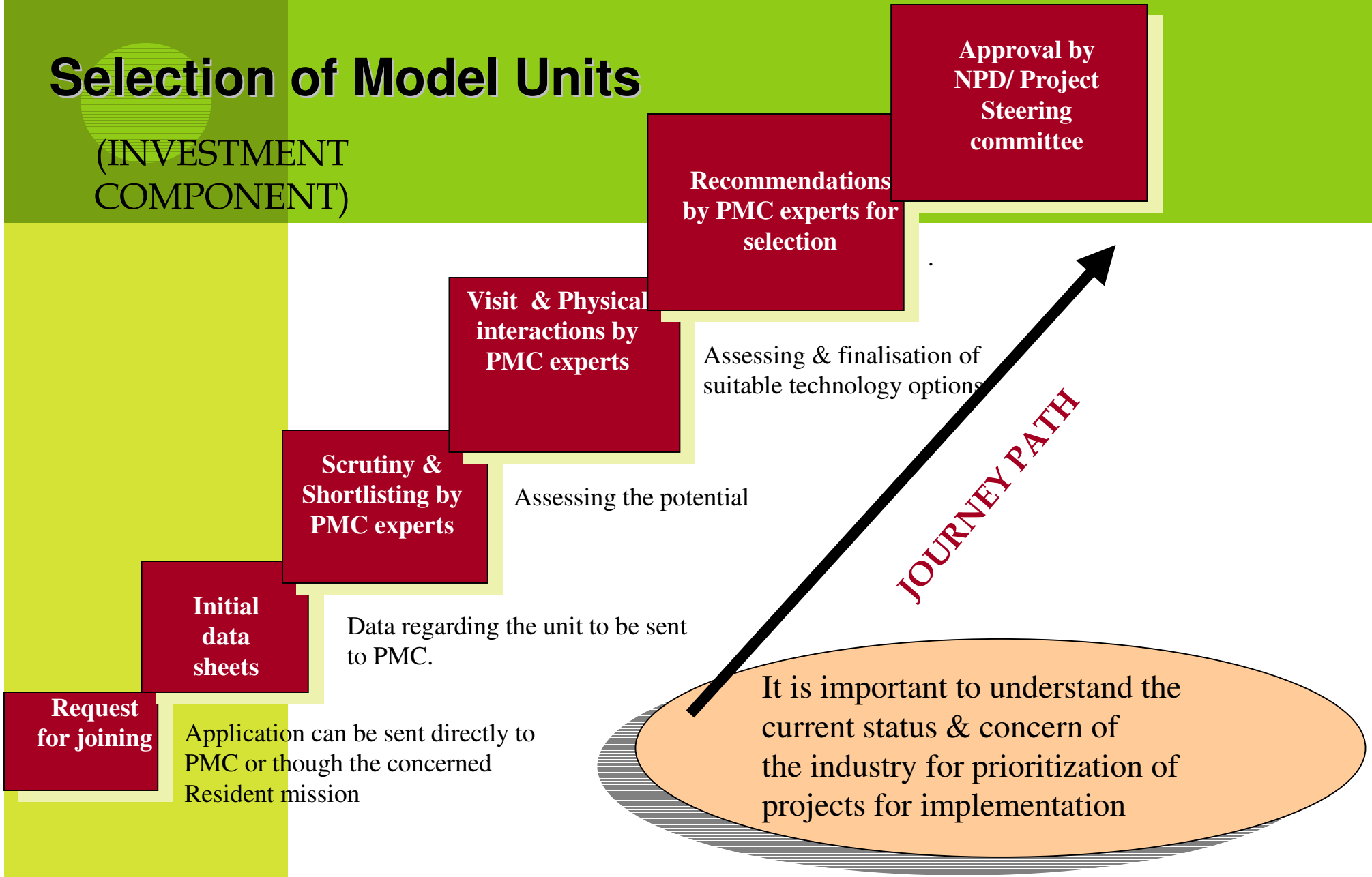
No. of Units

- **Mandi Gobindgarh (Punjab)** **409**
  - J & K, Punjab, Himachal Pradesh
- **Delhi** **206**
  - UP, Haryana, Rajasthan
- **Raipur** **214**
  - Chhattisgarh, Maharashtra, Madhya Pradesh (Nagpur)
- **Kolkata** **150**
  - West Bengal, Orissa, Bihar, Jharkhand
- **Chennai** **198**
  - TN, AP, Kerala, Karnataka
- **Pune** **250**
  - Gujrat, Maharashtra, Goa,

Total 1427

Selection of Model Units

(INVESTMENT COMPONENT)



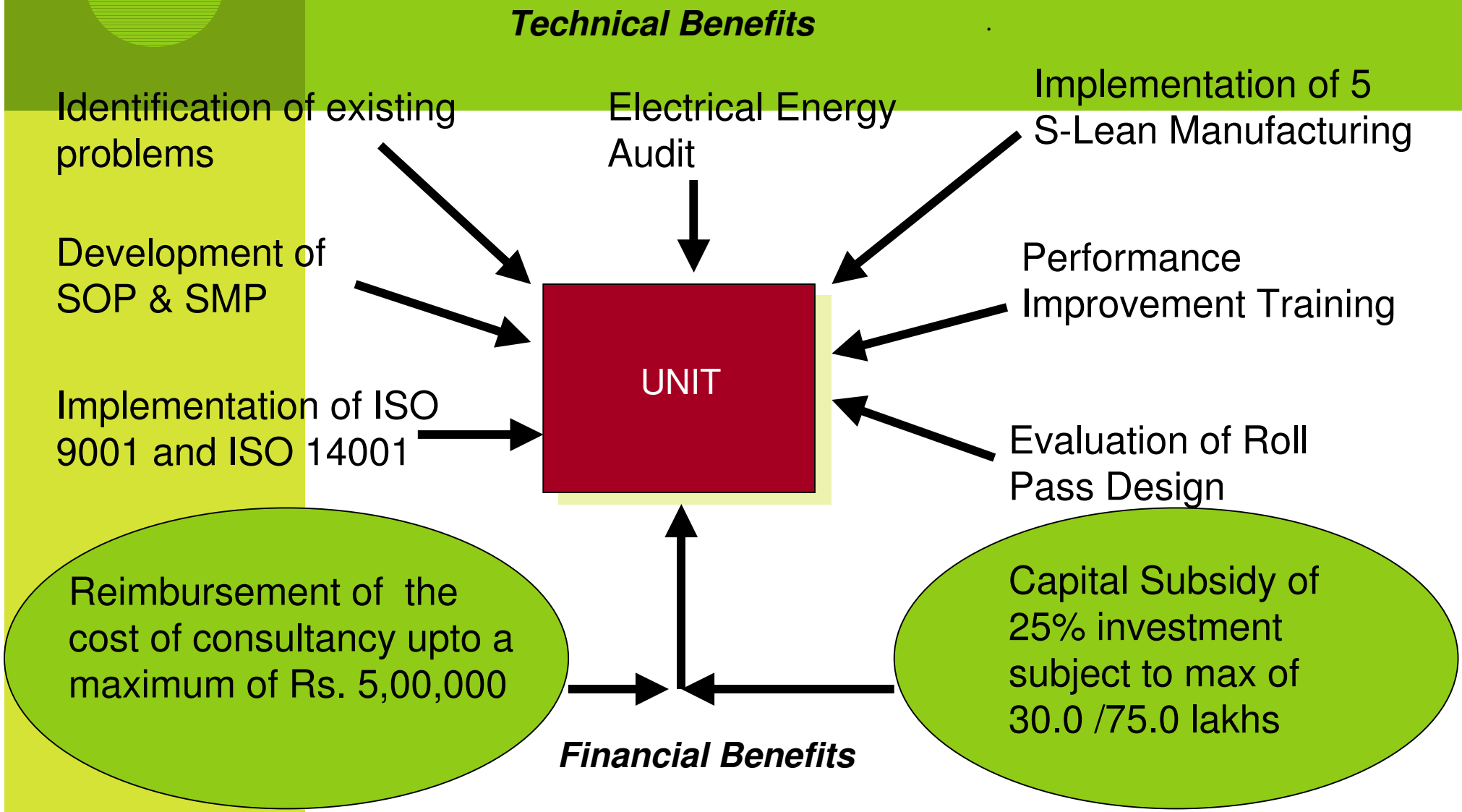
Capital Subsidy

- Model units will be reimbursed 25% of the cost of plant and equipment, as capital subsidy subject to a maximum of Rs. 30 lakhs and Rs. 75 lakhs for Low-end and High-end technologies, respectively.

- The entitlement for capital subsidy depends on whether the unit has saved a minimum of 10% energy after adoption of Technology.In case of switching over from furnace oil to other fuel, it is also to establish a reduction in CO_2 emission by a minimum of 10%.

- In addition to the above, Rs. 5 lakhs (max.)will be reimbursed to each model unit against the consultancy/design charges for their consultant.

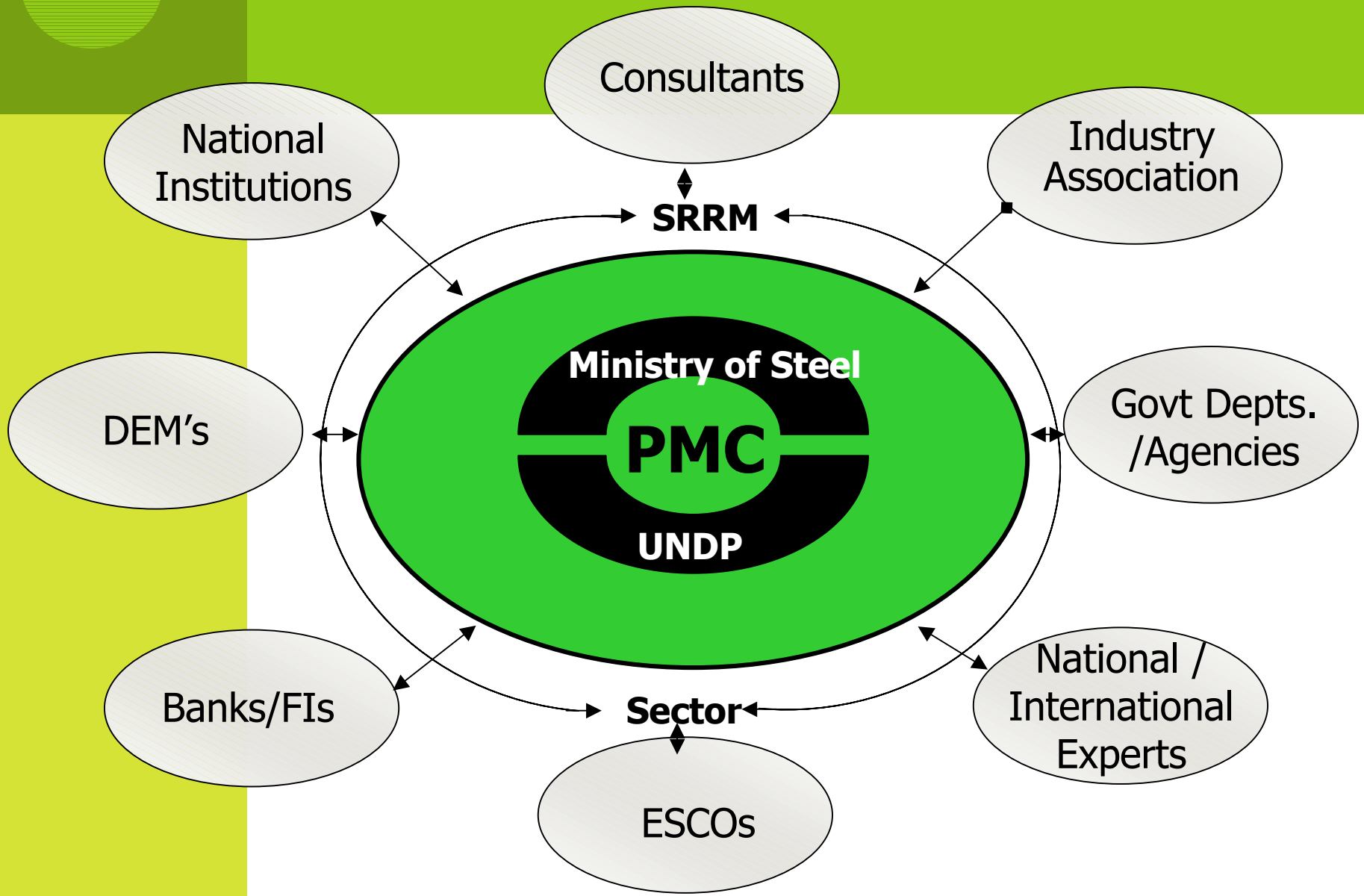
Benefits to Model Units



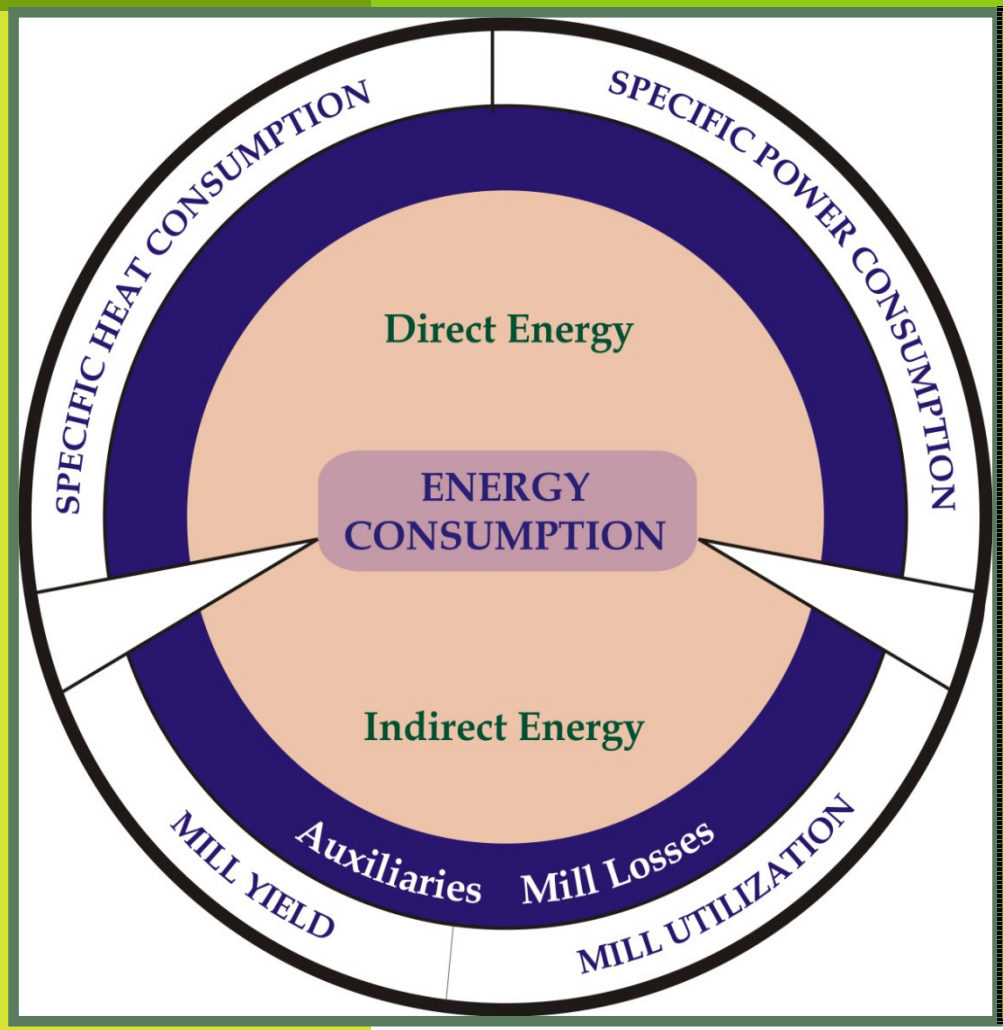
PROGRAM COMPONENT

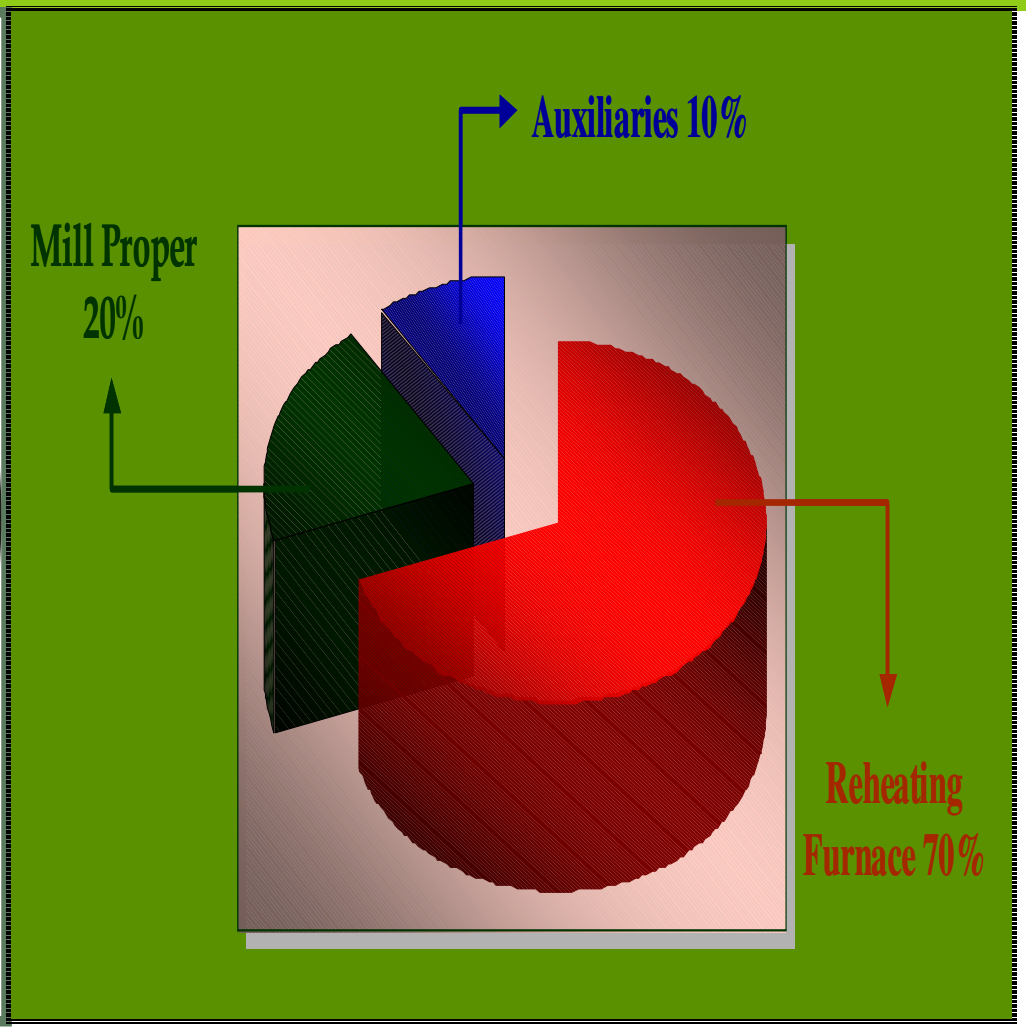
- **Benchmarking of Economically viable Energy Efficient Technology (EcoTech) Options & Packages**
- **Strengthening Institutional Arrangements**
- **Effective Information Dissemination Programme**
- **Enhancement of Stakeholders Capacity**
- **Feasibility of EcoTech Options and Implementation of Technology Packages in 50 Model Units**

PROJECT STAKEHOLDERS



TYPICAL ENERGY CONSUMPTION PATTERN IN SRRM





Energy Efficient Technologies for Steel Re-Rolling Mill Sector

S. No.	Low-end Technologies Investment : (Rs.1.5-2.0 crores) Energy Saving : 20-25%)
1	High Efficiency Recuperator with improved furnace design
2	Change of lump coal/f.o. to coal producer gas as fuel
3	Technology for use of pulverized coal as fuel
4	Use of Bio-mass gas as fuel
5	Technology of use of Coal Bed Methane (CBM) as a fuel

S. No.	High-end Technologies (Investment : Rs. 5.0-6.0 crore) Energy Saving: (30-40%)
1	Regenerative burner system
2	Hot charging of Continuous Cast Billet
3	Top-and-Bottom firing system in reheating furnace
4	Oxy-fuel combustion system in reheating furnace
5	Walking hearth/Beam furnace

Eco-Tech Options in Rolling Mills

- Crop Length Optimization
- Rollers Guide
- Spindle and Couplings
- Anti Friction Roller Bearing
- Installation of Y-Roller Table
- Installation of Drop Tilter
- Installation of Tilting Table
- Qenching and Self-Tempering (QST) of Re-bars
- Oval Repeater
- No-Twist Block
- Slit Rolling
- Computerized Roll Pass Design
- Lubrication Technology
- Cast in Carbide Rolls in Conventional Stands
- Pre-Stressed Housing Less Stands
- Endless Welding Roll
- Reactive Power Compensation
- Energy Efficient Drives for Rolling Mills
- High Voltage (HT) AC Motor for Rolling Mills

RE-HEATING FURNACE AUTOMATION

- Level 1 Automation : On / Off Control System.
- Level 2 Automation : PID Based Control system
- Level 3 Automation : PC – PLC based control system with man-machine interface

PROJECT TARGETS

Consumption of energy & other important performance parameters of re-rolling mills (Model Units)	Unit	Status in the beginning of the Project	Target / Expected Outcome after project completion
Oil consumption in the reheating furnace	Lit/T	42-45	<30
Coal consumption (Pulverized)	Kg/T	80-120	45-65
Gas consumption	Nm3/T	48	30
Productivity of furnace	$Kg/m^2/h$	120-220	300-350
Scale Loss	%	2.5-3.5	<1
Power consumption	kWh/T	90-120	60-80
Yield	%	89-93	94-95
Utilization of mill	%	65-70	80-85

Major Achievements

1. **68,000 Training Manuals were prepared in association with SAIL, MTI and all these manuals have been distributed to 1000, SRRM units in the country.**

2. **Class Room training program were held in various clusters, in which more than 2500 peoples were trained.**

3. **On-job training programs have been conducted in 20 Model units covering all clusters, almost 20 persons in each program participated.**

4. **Awareness CD has been prepared on 1o Technology Packages & 19 Eco-tech options for Rolling mills. 1200 copies were made and distributed.**

5. **Quarterly News letter are prepared and released to all units in the country.**

6. **Website was launched and loaded with information on Recruitment, Tendering, List of Rolling Mills in the country, training programs, workshop presentation, Knowledge portal with Data bank on technology, existing data and cluster mapping report have been loaded.**

7. **Resident Missions have been setup one in each cluster (NISST –4, MITCON – 1, PCRA -1)**

8. **PMC participated in several International Technical Exhibition-cum- Conference (in Greater Noida organized by IIM on National Metallurgist Day ie 14th November, 2008, at Jaipur organized by MSME in January, 2009: at Kolkatta in Feb 2010 organised by Steel Scenario): more than 200 visitors came to Project Stall and had interactions with our experts.**

9. **25 National Awareness Workshops are held so far, in different parts of the country.**

10. **5S lean manufacturing system in 10 Model units have been implemented and some more units will be taken up . This activity is a part of Best Practice Programme.**

11. **SOP & SMP Base documents were prepared and implemented in 5 Model Units. 1000 CD is under Preparation and will be sent to every SRRM units.**

12. **55 -Model units are selected out of which 27 units have implemented E.E.Technologies.Remaining units are actively implementing.**

13. **The M/s Pulkit Steel, Pondichery is the first steel Rolling mill in India. Who has installed a gasifier based on Biomass and has successfully commissioned on 9th July, 2009. It is noted that about 10,000t CO2 emissions will be reduced annually from his unit.**

14. AWARD Received by following three units

A. M/s Prithvi Steel, Jaipur – Received National Energy Conservation Award in 2009

B. M/s Pulkit Steel, Pondicherry - Received Award in 2009 for use of Biomass – a renewal source of energy from the Government of Pondicherry.

C. M/s M.P.K. Steel, Jaipur - Received Energy Conservation Award in 2010 from the Government of Rajasthan

CASE STUDY – 1

Name of the Unit: **M/s Bhambri Steel, Mandi Govindgarh (Punjab)**

- Installation of a New Energy Efficient Top Fired Pusher Hearth Furnace of 18 tph capacity with high efficiency metallic recuperator.
- Up gradation of rolling mill.

CASE STUDY 1

Contd.

Sl.No.	Parameters	Units	Baseline data	Post-commissioning date	Remarks
1.	Specific Fuel Consumption	Lpt	45.3	35.19	**22.31% Reduction**
2.	Specific Power Consumption	KWh/t	87.00	80.00	**8.00% Reduction**
3.	Burning Loss	%	2.4	1.15	**52.08% reduction**
4.	End Cuts	%	2.5	2.2	**12% Reduction**
5.	Yield	%	93.00	95.5	**2.7% Increase**
6.	Mill Utilization	%	66.00	76.36	**16.00% Increase**

CASE STUDY - 2

Name of the Unit : **M/s Bengal Hammer, Kolkata**

- Installation of a New Energy Efficient Top Fired Pusher Hearth Furnace of 15 tph capacity with high efficiency metallic recuperator.

CASE STUDY 2

Contd.

Sl.No.	Parameters	Units	Baseline data	Post-commissioning date	Remarks
1.	Specific Fuel Consumption	Lpt	71.76	53.54	**25.39 % Reduction**
2.	Specific Power Consumption	KWh/t	52.29	46.01	**12.01% Reduction**
3.	Burning Loss	%	1.9	0.92	**51.57 % reduction**
4.	Yield	%	94.57	95.65	**1.14 % Increase**
5.	Mill Utilization	%	64.66	85.46	**32.17 % Increase**

CASE STUDY – 3

Name of the Unit: **M/s Ludhiana Steel Rolling Mills, Ludhiana**

- Installation of a New Energy Efficient Re-heating Furnace oil fired high efficiency metallic recuperator, 12-TPH Capacity
- Up gradation of rolling mill.

CASE STUDY 3

Contd.

Sl.No.	Parameters	Units	Baseline data	Post-commissioning date	Remarks
1.	Specific Fuel Consumption	Lpt	46.0	34.65	**Reduction 24.67%**
2.	Specific Power Consumption	KWh/t	60.0	44.0	**Reduction 26.6%**
3.	Burning Loss	%	2.80	1.4	**Reduction 50.0**
4.	Yield	%	93.5	94.3	**Increase 0.85**
5.	Mill Utilization	%	52.7	66.58	**Increase 26.3**

CASE STUDY – 4

Name of the Unit : **M/s ARS METALS LTD., CHENNAI**

- Installation of New Re-heating Furnace oil based with high efficiency recuperator, 20-TPH.
- Up gradation of rolling mill.

CASE STUDY 4

Contd.

Sl.No.	Parameters	Units	Baseline data	Post-commissioning date	Remarks
1.	Specific Fuel Consumption	Lpt	44.0	33	**Reduction 25%**
2.	Specific Power Consumption	KWh/t	104	89	**Reduction 14.4%**
3.	Burning Loss	%	1.61	1.1	**Reduction 31.0%**
4.	Yield	%	93.86	96.54	**Increase 2.85%**
5.	Mill Utilization	%	85.35	69.72	**Decrease 18.3% (Due to break-down)**

CASE STUDY - 5

Name of the Unit : M/s Vivek Re-Rolling Mills, Mandi Gobindgarh

- Installation of New Re-heating Furnace Pulverized Coal based with high efficiency recuperator, capacity: 6-8 TPH.
- Up gradation of rolling mill.

CASE STUDY 5

Contd.

Sl.No.	Parameters	Units	Baseline data	Post-commissioning date	Remarks
1.	Specific Fuel Consumption	Kg/t	65	48.5	Reduction 25.3
2.	Burning Loss	%	2.5	1.76	Reduction 29.6
3.	Yield	%	93.5	96.2	Increase 2.88

CASE STUDY - 6

Name of the Unit : M/s M.P.K Steels (I) Pvt. Ltd., Jaipur

- Modification of existing Top Fired Pusher Hearth Furnace of 10 TPH to 15 TPH.
- Up gradation of rolling mill.

CASE STUDY 6

Contd.

Sl.No.	Parameters	Units	Baseline data	Post-commissioning date	Remarks
1.	Specific Fuel Consumption	Kg/t	110.35	60.28	45.3 % Reduction
2.	Specific Power Consumption	KWh/t	109.03	76.47	30.2 % Reduction
3.	Burning Loss	%	2.0	1.40	30.0 % reduction
4.	Yield	%	95.41	96.27	30.0 % Increase
5.	Mill Utilization	%	58.32	66.57	13.8 % Increase

CASE STUDY – 7

Use of Biomass gas

Name of the Unit: **M/s Pulkitt Steel Rolling Mills**

Pondicherry

- Bio-mass Briquette Gasifier
- Modification in Re-heating Furnace,
- Up gradation of rolling mill.

CASE STUDY 7

Contd.

Sl.No.	Parameters	Units	Baseline data	Post-commissioning date	Remarks
1.	Productivity	t/h	10.5	15.3	**45.7% Increase**
2.	Specific Fuel Consumption a) Furnace oil b) Biomass briquette	 Kg/t Kg/t	 50.4 -----	 ------ 113	
3	**CO2 Emissions**		**163.75 Tco2/t**	**Consider as zero as per International norm Biomass**	
4.	**Specific Power Consumption**	**kWh/t**	**113.0**	**111.0**	**1.76% reduction**
5.	**Yield**	**%**	**94.5**	**96.0**	**1.5% Increase**

THANK YOU