


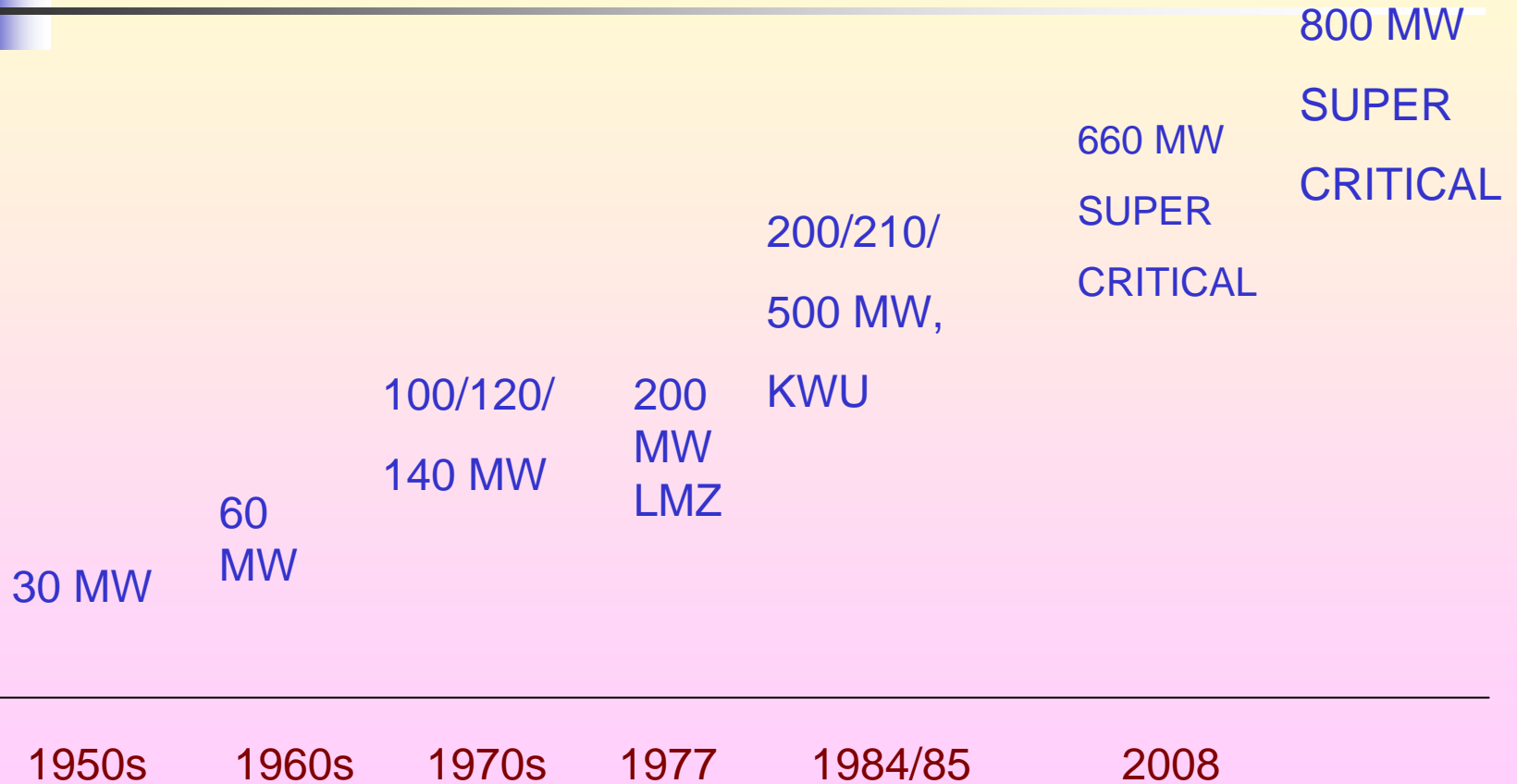
Indo-German Symposium on Energy Efficiency

INDIA'S REQUIREMENT FOR EFFICIENCY RELATED R&M/LE PROGRAMME

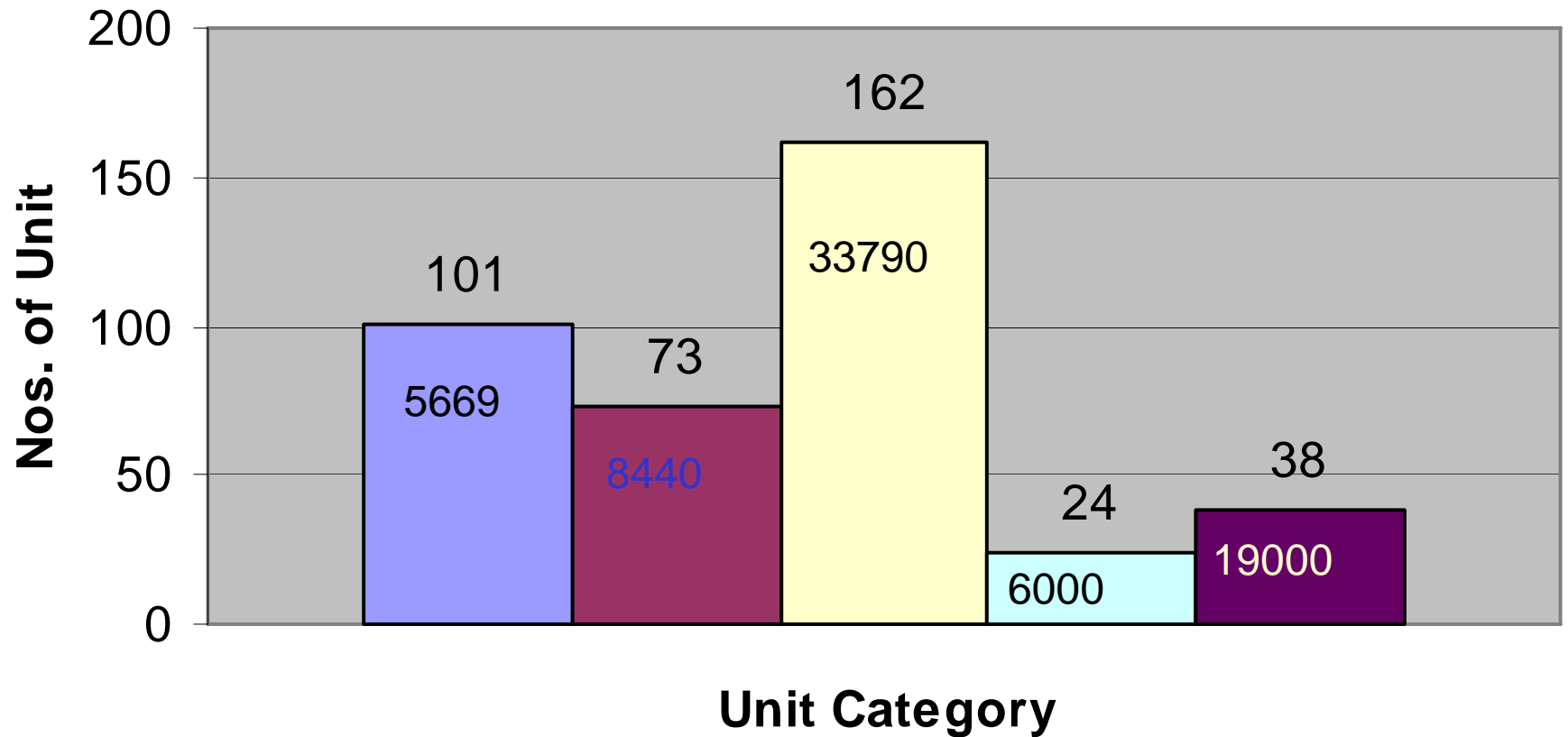


CENTRAL ELECTRICITY AUTHORITY (CEA)
NATIONAL THERMAL POWER CORPORATION (NTPC)
- May 2008-

GROWTH OF UNIT SIZE IN INDIA



DISTRIBUTION OF UNIT SIZES



■ Up to 100 MW ■ 100-200 MW ■ 200-210 MW ■ 250 MW ■ 500 MW



AGE PROFILE OF LARGE SIZE THERMAL UNITS

Capacity range (in MW)	> 15 years but <20 years	More than >20 years
200/210	37	77
500	10	5



NEED FOR R&M

- Increased capacity utilization of existing units to supplement new generation capacity addition
- A low cost and short gestation period option for enhanced generation.
- Restoration of derated capacity and/or extension of economic life.
- To overcome technological obsolescence & non availability of spares.
- Environmental & safety requirements.

Thus R&M is a technical necessity -Extent of R&M could depend on cost -benefit options.

STATUS OF R&M ACTIVITIES IN INDIA

- Planned R&M started in 1984
- Programme & Achievements in various Five Year Plans

Plan		No. of Units (MW)	Additional Generation (Eqvt. MW)
7 th Plan		163 (13570 MW)	100000 MU (2000 MW)
8 th Plan (1992-97)		198 (20869 MW)	5085 MU (763 MW)
9 th Plan (1997-02)	R&M LE	127 (17306 MW) 25 (1685 MW)	14500 MU (2200 MW)
10 th Plan (2002-07)	R&M LE	PERFORMANCE 11 (985 MW)	SUSTENANCE 2000 MU (300 MW)

NON-IMPLEMENTATION / DELAYS IN R&M PROGRAMMES



- Reluctance by utilities
 - New built more attractive.
 - Long shutdowns required.
 - Uncertainty about benefits.
- Accumulated work order with original equipment manufacturers (OEM) resulting in delays, OEM more concentrating on new projects
- Lack of contracting & executing agencies.
- Delays in conducting RLA studies.
- Non resolution of contractual issues.

R&M to be taken as a one time approach and not a substitute for regular maintenance.

Need for improved O&M practices in post R&M scenario.



MARKET SCENARIO

- Large number of small size inefficient units not viable candidates.
- Emerging potential candidates are the large fleet of 200/210MW units.
- LMZ machines of 200/210MW units (53 Nos.) more than 20 years old are priority candidates for enhanced output and higher design efficiency due to :
 - low design efficiency
 - spares non-availability
 - Ageing
 - derated output
 - obsolscence
- 200/210 MW (37 Nos.) & few 500 MW units which are more than 15 years old can also be considered depending on resources and plant condition.

DRIVERS FOR EFFICIENCY INTEGRATED R&M



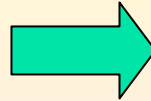
- Increased emphasis on Environment for clean technology.
- Reduction in cost of generation as power market is set to be more competitive in future.
- Fuel, Land & Water availability becoming more and more difficult.
- Efficiency enhancement feasible in existing plants.
- CDM opportunities arising out of global warming concerns.
- Accrued benefit in a typical 200/210 MW unit include
 - increased output by about 10%
 - Improved heat rate by 5 - 8%
 - Extended plant life by 10 years or more

FUTURE APPROACH TOWARDS R&M

NEAR PAST

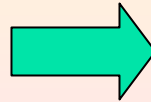
FUTURE

In-kind replacement



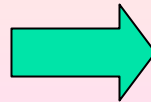
Cost effective technology upgrades

Restoration of lost capacity



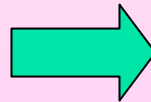
Uprating of capacity

Attain design efficiency



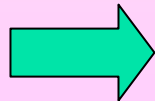
Improve upon design efficiency

Reactive R&M



Pro-active R&M

From Time based R&M



Condition Monitoring & R&M
Optimisation through cost benefit evaluation



CONSIDERATIONS IN EFFICIENCY INTEGRATED R&M

- To identify & select optimal R&M technology options.
 - Requires reworking of evaluation criteria.
 - To have suitable model for cost-benefit sharing.
- Compressed time schedule for implementation.
- Flexibility in contract agreements for different options from a base study to different levels of performance targets.
- To built in performance guarantees & non-performance penalties.
- Focus towards larger size units—optimal utilization of available resources.

POTENTIAL FOR EFFICIENCY INTEGRATED R&M

- 200/210 LMZ machines have proven to be potential candidate,
- A large number of 200/250 MW of KWU and some 500 MW Units with German Technology are in operation for more than 15/20 years and have considerable potential for life extension & efficiency improvement

Age	Total No. of units	No. of units as potential candidate	
		>15 years	>20 years
200/210 MW Units (LMZ design)	53	53	53
200/210 MW units (KWU design)	88	37	12
500 MW units	35	10	5

- Thus large portion of existing capacity (15000 MW) can be considered for efficiency integrated R&M on priority basis
- Investment Requirement would be of the order of US 6 billion \$.

STUDY ON EFFICIENCY INTEGRATED R&M



Objectives

- To identify the **Optimal R&M technology options** for both 200/210/500 LMZ and KWU makes.
- Few units to demonstrate methodology, cost effectiveness, technology choices and implementation strategy.



STUDY ON EFFICIENCY INTEGRATED R&M

Methodology:

- Identification of specific power units as demonstration projects.
- Selection of consultant (s) to carry out the desired study.
- Analysis of present condition of the plant.
- Carry out study at the Power Plant to establish optimal conditions for the power plant retrofit.



STUDY ON EFFICIENCY INTEGRATED R&M

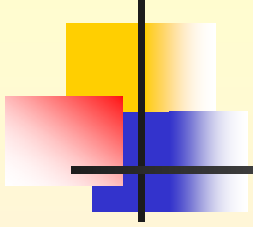
Deliverables from the Study.

- Identification of current international practices in the areas of RLA / CA and Retrofitting, up gradation and Life Extension appropriate for Indian conditions.
- Identification of optimized R&M option for retrofit of the power plant along with the time schedule for its implementation.
- Development of efficiency/performance parameters benchmarks considering Indian coal quality & climatic conditions.
- Cost-Benefit Analysis.



CONCLUSIONS

- Bilateral support would help in Incentivising R&M activity.
- Scope and options of R&M to be widened—from basic R&M to integrating efficiency improvement & enhanced output to make it cost effective, and environmental friendly.
- Area of cooperation could include
 - Development of state of art NDE tools and techniques in RLA and condition assessment.
 - Process mapping from concept to implementation of R&M schemes.
 - Development of model specification for RLA and R& M works.
 - Development of service providers/suitable partners for RLA and R&M.
- Bulk implementation in a phased manner of major activities could be considered
 - Faster implementation.
 - More cost effective.
 - Manufacturer can plan equipment supplies in advance.
 - Balance work can be site specific.



Thank You