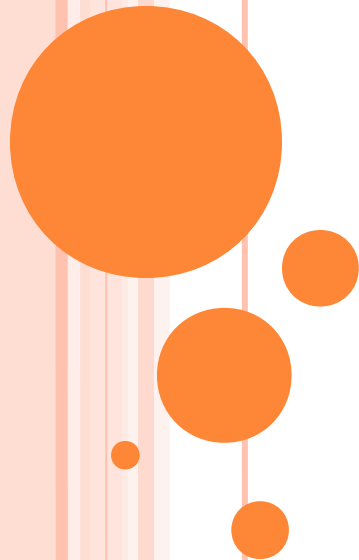# Perform Achieve and Trade Scheme- Thermal Power Plant

Praveen Gupta, Director, CEA

- National Action Plan on Climate Change (NAPCC) released by the Hon'ble Prime Minister on 30th June,2008

- NAPCC outlines 8 Missions

- One of the mission is National Mission on Enhanced Energy Efficiency

  - Define Perform Achieve and Trade scheme

Designated Consumers

- Aluminum

- Cement

- Chlor-alkali

- Fertilizer

- Iron and Steel

- Pulp and Paper

- Textile

- Thermal Power Plants

Thermal Power Plants in PAT - I

- Total No of Designated Consumer (DCs) = 144

- Threshold limit to be DC = 30,000 tons of oil equivalent (TOE) per annum (all power plants above 11-12 MW will be covered in PAT scheme)

- Total Target Set for power sector= 3.2 MTOE out of total 6.686 MTOE

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Thermal Power Plants [DC :144 Nos]

Diesel [7]   Gas [40]

Target Setting in TPPs

○ Net Design Heat Rate

$$\text{Net Design Heat Rate} = \frac{\text{Gross Design Heat Rate}}{1 - \text{APC\% operative}}$$

Net Operative Heat Rate

$$\text{Net operative Heat Rate} = \frac{\text{Gross operative Heat Rate}}{1 - \text{APC\% operative}}$$

Target Setting in TPPs

○ Heat Rate Deviation (%)

Heat Rate Deviation (%) = $\dfrac{\text{(Operating Heat Rate} - \text{Design Heat Rate)} \times 100}{\text{Design Heat Rate}}$

○ Heat Rate Deviation

Heat Rate Deviation = (Operating Heat Rate – Design Heat Rate)

Net Heat Rate Target

Net Heat Rate = Gross Heat Rate / (1- **APC**%)

Parameter	Plant-1	Plant-2
Gross HR(GHR)	2500 kcal/kWh	2500 kcal/kWh
APC	8%	10%
Net HR (NHR)	2717 (= 2500/0.92) kcal/kWh	2777 (=2500/0.90) kcal/kWh

Target Setting for Reduction of NHR

Deviation in Net Station Heat Rate from Design Net Heat Rate	Reduction Target for Deviation in Net Station Heat Rate (%)
Up to 5 %	10 %
More than 5% and Up to 10 %	17 %
More than 10% and Up to 20%	21 %
More Than 20 %	24 %

Correction factor considered for effect on heat rate due to coal quality:

○ Average "ash", moisture, and gross calorific value for the previous three years in case of baseline for first cycle and as per rule 14 for consequent cycles and specified year in case of target year, shall be taken into account for the baseline year and correction factor shall be worked out based on the following boiler efficiency formula:-

$$\text{Boiler Efficiency} = 92.5 - \frac{[50*A+630(M+9H)]}{GCV}$$

where,

A= Ash % in Coal

M = Moisture % in Coal

H = Hydrogen % in Coal

GCV = Gross Calorific Value in Kcal/Kg

Station heat rate (Kcal/kWh) = Turbine heat rate or Boiler efficiency

(b) The permissible error shall be ±0.05 % in terms of toe for the purpose of determining entitlement of energy savings certificates.

➢ Non availability of fuel and schedule

Station operating at part load condition following correction factors to be consider while resetting the targets:-

1. Design heat rate
2. Operating heat rate

➢ Environmental Factors

Increase in auxiliary power consumption due to change in environmental condition may be consider during target year. Like addition of additional fields in ESP, Change in Environmental norms etc.

PAT targets for Eastern Region TPS

Name of the station	Net Heat Rate kcal/kwh	Target Net Heat Rate kcal/kwh
Barauni TPS	5134	4618
Khalgaon TPS	2614	2605
Bokoro TPS	3560	3374
Chandrapura TPS	3188	3038
Patratu TPS	3534	3438
Tenughat TPS	2936	2899
Budge Budge TPS	2669	2644
DPL	3317	3214
Durgapur DVC	3278	3134
Kolaghat TPS	3246	3105

Cont..

PAT targets for Eastern Region TPS

Name of the station	Net Heat Rate kcal/kwh	Target Net Heat Rate kcal/kwh
Mejia	2781	2739
New Cossipore	3818	3743
Farakka	2596	2574
Sagardighi	3584	3465
Santaldih	3768	3600
Southern Repl.	3154	3057
Titagarh	3182	3145
Bakeshwar	2974	2873
Bandel	3731	3503

Penalty for non-compliance

- Rs. 10 lakhs + Rs 10,000 per day + the value of noncompliance measured in terms of the market value of tones of oil equivalent (Rs 11154/toe)

- ECERTs to be traded through Power Exchanges

- ECERTs can be traded among different DCs

Thank you for your patient listening