

CENTRAL ELECTRICITY REGULATORY COMMISSION  
New Delhi

Staff paper  
on

**Blending of imported coal with domestic coal  
to mitigate the domestic coal shortage**

**June, 2022**



## **I: Background**

1. The recent sharp increase in electricity demand has necessitated that the thermal generating stations produce electricity to their maximum feasible level. However, shortage of domestic coal is constraining the generating stations to restrict their generation thereby resulting in shortfall in supply of energy. In order address issue of depleting coal stocks and building stocks before monsoon, the Ministry of Power directed the concerned stake holders to import at least 10 % of their requirement of coal for blending and higher amount blending in future, if required. However, it has been observed by some generating companies that they are facing a problem to comply the above direction of Ministry of Power on account of delay and in some cases absence of permission by the concerned beneficiaries.
2. In this context, Ministry of Power has issued direction to CERC under section 107 of Electricity Act, 2003 to amend the Sub Regulation 3 of Regulation 43 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 to facilitate higher blending of up to 30 % with imported coal subject to technical feasibility, without the requirement of prior consultation with beneficiaries up to 31.03.2023 to maintain resource adequacy and 24X7 supply to consumers.

## **II: Present Regulations of CERC for Computation and Payment of Energy Charge for Thermal Generating Stations**

3. The Regulation 43 of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019(hereinafter referred to as “2019 Tariff Regulations”) provides for Computation and Payment of Energy Charge for Thermal Generating Stations and the same is extracted as follows:

“43. Computation and Payment of Energy Charge for Thermal Generating Stations

*(1) The energy charge shall cover the primary and secondary fuel cost and limestone consumption cost (where applicable), and shall be payable by every beneficiary for the total energy scheduled to be supplied to such*



beneficiary during the calendar month on ex-power plant basis, at the energy charge rate of the month (with fuel and limestone price adjustment). Total Energy charge payable to the generating company for a month shall be:

*Energy Charges = (Energy charge rate in Rs./kWh) x {Scheduled energy (exbus)for the month in kWh}*

(2) Energy charge rate (ECR) in Rupees per kWh on ex-power plant basis shall be determined to three decimal places in accordance with the following formulae:

(a) For coal based and lignite fired stations:

$$ECR = \{(SHR - SFC \times CVSF) \times LPPF / (CVPF + SFC \times LPSFi + LC \times LPL)\} \times 100 / (100 - AUX)$$

(b) For gas and liquid fuel based stations:

$$ECR = SHR \times LPPF \times 100 / \{(CVPF) \times (100 - AUX)\}$$

Where,

*AUX = Normative auxiliary energy consumption in percentage.*

*CVPF = (a) Weighted Average Gross calorific value of coal as received, in kCal per kg for coal based stations less 85 Kcal/Kg on account of variation during storage at generating station;*

*(b) Weighted Average Gross calorific value of primary fuel as received, in kCal per kg, per litre or per standard cubic meter, as applicable for lignite, gas and liquid fuel based stations;*

*(c) In case of blending of fuel from different sources, the weighted average Gross calorific value of primary fuel shall be arrived in proportion to blending ratio:*

*CVSF = Calorific value of secondary fuel, in kCal per ml;*

*ECR = Energy charge rate, in Rupees per kWh sent out;*

*SHR = Gross station heat rate, in kCal per kWh;*



*LC = Normative limestone consumption in kg per kWh;*

*LPL = Weighted average landed cost of limestone in Rupees per kg;*

*LPPF = Weighted average landed fuel cost of primary fuel, in Rupees per kg, per litre or per standard cubic metre, as applicable, during the month. (In case of blending of fuel from different sources, the weighted average landed fuel cost of primary fuel shall be arrived in proportion to blending ratio);*

*SFC = Normative Specific fuel oil consumption, in ml per kWh;*

*LPSFi = Weighted Average Landed Fuel Cost of Secondary Fuel in Rs./ml during the month:*

*Provided that energy charge rate for a gas or liquid fuel based station shall be adjusted for open cycle operation based on certification of Member Secretary of respective Regional Power Committee during the month.*

*(3) In case of part or full use of alternative source of fuel supply by coal based thermal generating stations other than as agreed by the generating company and beneficiaries in their power purchase agreement for supply of contracted power on account of shortage of fuel or optimization of economical operation through blending, the use of alternative source of fuel supply shall be permitted to generating station:*

*Provided that in such case, prior permission from beneficiaries shall not be a precondition, unless otherwise agreed specifically in the power purchase agreement:*

***Provided further that the weighted average price of alternative source of fuel shall not exceed 30% of base price of fuel computed as per clause (5) of this Regulation:***

***Provided also that where the energy charge rate based on weighted average price of fuel upon use of alternative source of fuel supply***



**exceeds 30% of base energy charge rate as approved by the Commission for that year or exceeds 20% of energy charge rate for the previous month, whichever is lower shall be considered and in that event, prior consultation with beneficiary shall be made at least three days in advance.**

*(4) Where biomass fuel is used for blending with coal, the landed cost of biomass fuel shall be worked out based on the delivered cost of biomass at the unloading point of the generating station, inclusive of taxes and duties as applicable. The energy charge rate of the blended fuel shall be worked out considering consumption of biomass based on blending ratio as specified by Authority or actual consumption of biomass, whichever is lower.*

*(5) The Commission through specific tariff orders to be issued for each generating station shall approve the energy charge rate at the start of the tariff period. The energy charge rate so approved shall be the base energy charge rate for the first year of the tariff period. The base energy charge rate for subsequent years shall be the energy charge computed after escalating the base energy charge rate by escalation rates for payment purposes as notified by the Commission from time to time under competitive bidding guidelines.*

*(6) The tariff structure as provided in this Regulation 42 and Regulation 43 of these regulations may be adopted by the Department of Atomic Energy, Government of India for the nuclear generating stations by specifying annual fixed cost (AFC), normative annual plant availability factor (NAPAF), installed capacity (IC), normative auxiliary energy consumption (AUX) and energy charge rate (ECR) for such stations.*

4. The 2019 Tariff Regulations provides flexibility to the generators to blend alternate fuel up to a threshold limit on its own. The Regulations do not restrict



blending beyond the said limit but only require them to seek consent of the beneficiaries so that the beneficiaries on whom the additional financial liabilities due to such blending devolve and who make the payment must be aware of the impact of blending alternate fuel. The Electricity Act, 2003 enjoins upon the Regulators to protect interest of consumers. Therefore, the 2019 Tariff Regulations safe guards the consumers' interest consistent with the objectives of the Electricity Act, 2003. The Regulation 43 provides a framework for the beneficiaries to take a considered decision whether to procure costly electricity.

**III: Analysis of the blending of imported coal with domestic coal under different scenarios**

4. An analysis has been carried out to assess the likely change in ECR as a result of blending of imported coal under different scenarios as depicted below (this is only for illustration purpose):



<b>Name of Company</b>	: XYZ Ltd.
<b>Name of Station</b>	: XYZ STPS (500 MW)
<b>Tariff Norms</b>	: 2019-24

Imported Coal Price(assumed)	No blending	\$140	\$180	\$200	\$220	\$275
Capacity (MW)	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00
Target Availability (%)	85%	85%	85%	85%	85%	85%
Energy Generated (MU)	7446	7446	7446	7446	7446	7446
Aux. Power Consumption	6.25%	6.25%	6.25%	6.25%	6.25%	6.25%
Energy Sent Out (MU)	6,981	6,981	6,981	6,981	6,981	6,981
Gross Station Heat Rate (kCal/kwh)	2,390	2,390	2,390	2,390	2,390	2,390
Specific Fuel Oil Consumption (ml/kwh)	0.50	0.50	0.50	0.50	0.50	0.50
<b>Oil Stock</b>						
Weighted Avg. GCV of Oil (kCal/Lit.)	10,230.00	10,230.00	10,230.00	10,230.00	10,230.00	10,230.00
Heat Contribution by Oil (kCal/kwh)	5.12	5.12	5.12	5.12	5.12	5.12
Annual Requirement of Oil (lts)	3723000	3723000	3723000	3723000	3723000	3723000
Weighted Avg. Price of Oil (Rs./KL)	56,433.74	56,433.74	56,433.74	56,433.74	56,433.74	56,433.74
<b>Coal Stock</b>						
Weighted Avg. GCV of Coal (kCal/kg)	3,834.62	4,263.73	4,263.73	4,263.73	4,263.73	4,263.73
Heat Contribution by Coal (kCal/kwh)	2,384.89	2,384.89	2,384.89	2,384.89	2,384.89	2,384.89
Specific Coal Consumption (kg/kwh)	0.622	0.559	0.559	0.559	0.559	0.559
Annual Requirement of Coal (MT)	4630932	4164861	4164861	4164861	4164861	4164861
Weighted Avg. Price of Coal (Rs./MT)	1,868.14	4,547.70	5,245.20	5,593.95	5,942.70	6,901.80
<b>Variable Charges (Ex Bus)</b>						
Coal (Rs/kwh)	1.239	2.713	3.129	3.338	3.546	4.118
Oil (Rs/kwh)	0.030	0.030	0.030	0.030	0.030	0.030
Rs./kwh	1.269	2.743	3.160	3.368	3.576	4.148
Increase in ECR		1.47	1.89	2.10	2.31	2.88
<b>% increase in ECR over Nil blending</b>		<b>116%</b>	<b>149%</b>	<b>165%</b>	<b>182%</b>	<b>227%</b>
<b>ECR with 30% increase</b>	<b>1.6497</b>					
<b>Permissible blending to achieve ECR of 1.651</b>						
Domestic		92.86%	94.46%	95.02%	95.48%	96.38%
Imported		7.14%	5.54%	4.98%	4.52%	3.62%
<b>Imported Coal Price(assumed)</b>						
		\$140	\$180	\$200	\$220	\$275
<b>Domestic</b>						
GCV	3,919.62	3,919.62	3,919.62	3,919.62	3,919.62	3,919.62
Price	1,868.14	1,868.14	1,868.14	1,868.14	1,868.14	1,868.14
<b>Imported</b>						
GCV		5350	5350	5350	5350	5350
Price		10800	13125	14288	15450	18647
<b>Permissible Blending</b>						
Domestic	100%	70%	70%	70%	70%	70%
Imported	0%	30%	30%	30%	30%	30%
Wt. Avg. GCV of Coal (kCal/kg)	3,920	4,349	4,349	4,349	4,349	4,349
Wt. Avg. Price of Coal (Rs./MT)	1,868	4,548	5,245	5,594	5,943	6,902

\*Weighted Average GCV of Coal is net of 85 kCal/kg

ECR with 100% Domestic Coal	1.269	1.269	1.269	1.269	1.269	1.269
ECR with 100% Imported Coal		5.248	6.372	6.933	7.495	9.040
<b>Weighted Avg. ECR</b>	<b>1.269</b>	<b>2.743</b>	<b>3.160</b>	<b>3.368</b>	<b>3.576</b>	<b>4.148</b>

5. The above analysis reveals that in most cases the weighted average energy charge rate (ECR) exceeds the threshold limit of ECR even at less than 10% blending with imported coal, thereby requiring consent of the beneficiary to blend the imported coal as per the 2019 Tariff Regulations.



6. However, seen in the context of the prevailing coal shortage scenario and the price trends in the Power Exchange market, the weighted average ECR as reflected in the above analysis, is less than the current level of market clearing price for several blocks in the Day Ahead Market or the Real Time Market in the Power Exchange.
7. At the same time, the above analysis also shows that with a high price of important coal, blending of even less than 10% also increases the ECR substantially.

#### **IV. Stakeholders Feedback**

8. In view of the above analysis, comments are invited from the generating companies, distribution companies and all other stakeholders on the following:

*If further flexibility is to be provided to the generators to blend imported coal without the permission or consultation of the beneficiaries, then*

- *to what extent of blending of imported coal be allowed without the permission or consultation of the beneficiaries?*
- *to what extent the increase in energy charge rate over and above base energy charge rate, approved by the Commission for that year, be allowed upon blending of imported coal without the consent or consultation of the beneficiaries?*

9. Based on the comments, feedback and responses received, the staff will process the matter and seek appropriate directions from the Commission with regard to facilitation of the blending of import of coal up to 30%, subject to technical feasibility.

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