

Comments/Suggestions on Compensation methodology for operating A Thermal (Coal) Generating Unit below 55% Minimum Load

A. FIXED COST

a) Capital Expenditure:

The compensation offered against “Capital Expenditure” and categorization of plants is adequate. The measures mentioned in the approach paper should be adequate (for most of the units) to enhance the flexibility capability of the units, unless there are issues with improper upkeeping of the equipments (as has been seen at some stations).

However, it must be ensured that the retrofits offered/sought by the OEMs/others are not the same what was in the original specs and were supplied and supposed to be demonstrated during the PG tests during low load operations/start-ups. For example, the Secondary Air Damper Controls (SADC) in the CE designed boilers are supposed to control the windbox pressure & secondary air flow into the furnace. But as was observed during the pilot studies, even in a four-year old unit, the SADC’s fail to control the secondary air flow at 40% load (which was to be demonstrated during PG tests). Compensating the utilities to fix this problem will be technically unethical and undue profit to the respective OEM.

Moreover, the “capital Expenditure” must be only for enhancement of unit flexibility and not for replacement of old/aged equipment. There must be a clear distinction between the Capital expenditure against flexibility and R&M.

The penalty clause for not being able to run the units in flexible operation must be defined in details. Like- recovery of the capital expenditure allowed and paid. A clause for “eligibility to charge for capital expenditure” can be defined – full recovery@ 85% compliance to flexibility scheduling or partial recovery if less than 85% compliance (on prorated basis).

Some of the units will need to run on frequent starts and even two-shifting. A separate category may be introduced to cover these units (for example a unit having more than 40 starts in a year). These units will require some further retrofits like- automated start-ups, changes in chemical regime, modified efficient burners and flame scanners, air flow modifications etc.

b) O&M Costs

The proposed increase in O&M costs for low load operation are significant and more than adequate, even for extreme levels of flexible operation (except for two-shifting).

With only low load operation (up to 40% or lower), the O&M costs will be significantly lower than the proposed cost recovery. Utilities in US and Europe typically incur much less costs during low load operation, which is even lower at 10-20% (typically the costs are in the range of 3 to 5%). The main costs come from the start-ups and shutdown- because of the large temperature transients resulting in higher levels of stress. The temperature transients during stable low loads are very low and almost insignificant, if the units are prepared for the low load operations.

It may be noted that while deriving these costs, (during the pilot studies) and included in the CEA’s Report “Flexibilization of coal fired power plants” the following components were included:

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- Ramping Costs/ Load following costs.
- Low load operation costs
- Start-up Costs
- EFOR

Moreover, these costs were derived from unprepared units on business-as-usual (without retrofits or other interventions). With proper interventions, these costs will be much lower.

Even during lower loads, the costs (for the generator) will depend on the number of load follows and number of start-ups. With the proposed costs, the generators should be able to compensate for the services they are asked to deliver.

The penalties for noncompliance with the flexibility requirements must be defined beyond low load operation. This requires a mention of the metrics of the flexibility criteria in the compensation document, which the generators must fulfill during low load operation - (level of low load/turndown, start-up within a defined time, ramp rates up to 3% in defined load range). The compliance with these flexibility parameters should be 85% of all the requests from the load scheduler.

The **compensation for EFOR @1paise/kwh should be removed** as it is included in the O&M costs.

May also Note: There is a compensation for ramp rates already built as per the following:

Proviso (iii) to regulation 30(2) of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 states that ...

“in case of thermal generating stations with effect from 1.4.2020:

- a) Rate of return on equity shall be reduced by 0.25% in case of failure to achieve the ramp rate of 1% per minute;*
- b) An additional rate of return in equity of 0.25% shall be allowed for every incremental ramp rate of 1% per minute achieved over and above the ramp rate of 1% per minute, subject to ceiling of additional rate of return on equity of 1.00%*

The compensation for ramp rate is included in the compensation for minimum load operation (in this approach Paper). There would be a **“double compensation”** if the provisions in reg30(2) are not removed.

Further, the services delivered, and compensation paid under AGC and RRAS should be adjusted.

With the scenario of 450-500 GW RE addition, two-shifting will be a common operational requirement. Already, a few utilities are undergoing 2-shifting operation. A separate compensation structure must be included for two-shifting operation. Intertek AIM can support this with its global experience and a pilot study which it has proposed to take up.

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B) VARIABLE COST

The compensation is adequate and based on the inputs from the OEMs/OEDs. It should offer incentives to the utilities for part-load efficiency optimization on which there is a lot of scope. Utilities can also go for equipment modifications (like installing VFDs, efficient equipments), which they can fund from the savings in efficiency.



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