Innovative Price Adjustments Technique for Thermal Coal: A Study of Operation Function under Changing Techno Environment

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Abstract

Coal is a vital source of energy in India. Major portion of energy requirement in India fulfill by coal based thermal power plant. Price of electricity indirectly depends on raw material (coal). In India coal trading generally done on over the counter basis, in which price of coal is depend on settlement price of coal as per the quality of coal. Coal price is generally calculated on certain parameter moisture content, calorific value, ash content, sulfur content. India supplier settles coal prices on some formula to adjust coal price.The object of this paper is to highlight the price adjustment formula which buyer and seller used to calculate price settlement for their contract agreement. Price of coal is generally decided by their calorific value, moisture content, ash content and sulphur content in coal. So for the adjustment in price Coal supplier and buyer use some formula as per quality to adjust quantity.The aim of this paper is to amend existed formula, and to give innovative approach to implement a price adjustment formula of coal as per the quality bases.

Index terms— Coal is a vital source of energy in India. Major portion of energy requirement in India fulfill by coal based thermal power plant. Price of electricit

1 Introduction

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Coal being a commodity does not have uniform quality of coal. The quality of coal changes with every shipment and is different for every rake supplied to power utilities. Commercially, in India and various countries some adjustment is done in case of variation Author Assistant Prof Selection Grade Department of Accounting and Finance University of Petroleum and Energy Studies, Dehradun. E-mail : sumeetbgh2007@gmail.com Associate Prof and Head Department Finance University of Petroleum and Energy Studies, Dehradun. E-mail : mspahwacs@gmail.com Student -MBA Energy Trading. E-mail : ankuruptti@gmail.com in quality of coal. There are some quality parameters guaranteed by supplier within the quality range, as finalized with their Suppliers.

2 a) Price Adjustment Formula

The imported coal to be supplied under any agreement between two parties follow price adjustment formula based on calorific value of coal specification. There is specified range of guaranteed parameters which depends on agreement specified earlier:

Typical price basis for supply of coal to major thermal power plants in India Total Moisture: 16% Ash content: 10% Sulphur content: 80% Gross calorific value: 6400kcal/kg Generally a range of coal parameters are specified along with base parameter for price. The indices of these base parameters are published daily e.g. API4, NEX, global Coal Index.

Based on the published indices and actual quality of coal supplied, price of coal is determined.

3   c) Sulphur (As Dried Bases)

If the sulphur content in delivered coal quantity is increased by some percentage then penalty should be levied as per the agreement in the contract. In the variation of the quality parameter, suitable adjustment will carried out as per the formula given here: a) Total Moisture (ARB) If there are moisture present in the coal then adjustment in quantity of coal in weight for x% increase over the guarantee total moisture, total weight is reduced by x%.

But the in case of decrease in total Moisture below the guaranteed value is ignored. ARB: as received bases.

4   b) Ash Content (ADB)

For every increase of x% of the ash content, the weight of coal reduced by x%.

But the decrease in the ash content below the guaranteed value will be ignored. So from the above result we justified that 640 kilo cal heat is required if coal contain 1 kg of water as form of moisture. So there should be a requirement of amendment of price adjustment formula of coal as specified above.

5   d) Adjustment

? One kg of coal equivalent to 6300kcal of energy.

? One kg of water requires 640kcal of heat to evaporate. So in a adjustment formula 1 kg of water = 0.1 kg of coal e) Finding Actual amendment in price adjustment should be 1.1x% of reduction in quantity of coal if there is x% moisture contain in imported coal. Because this excess of amendment should be done due to equivalent the amount of heat require to evaporate water inform of moisture present in coal.

6   f) Mechanical Work done on Excess of Moisture Contain in Coal

There are also some mechanical work should be done to uplift the weight of coal due to the excess of moisture which can be calculated as:Work = Force x Distance

7   Example -Work done by Force

Let if 100 kg of coal have 1% moisture that means it have 1kg of water, so to lift this excess amount of coal work has to be done, which can be calculated as follow:

The work done by force 1 kg water moving a body 50 m can be calculated as W = F*L =mg*l where m is weight and g is gravitational force. =1*10*50=500Nm Work is described as the product of the applied pressure and the displaced volume: Work = Displaced volume x Applied pressure The unit of work is joule, which is defined as the amount of work done when a force of 1 Newton acts for a distance of 1 m in the direction of the force.

8   J = Nm

So total energy required is 500 joule.

9   Example -Work due to Gravitational Force

The work done when lifting a mass of 1kg an elevation of 10 m can be calculated as W = m* g* h = (1 kg)* (10 m/s 2)* (10 m) = 100Nm (J)

IV.

10   Result

Energy required lifting and transport of moisture contain in coal can be calculate by excess of work done on weight of moisture. Amount of this energy is variable in nature depends upon distance travelled by coal.

Finding: First finding of our report due to moisture content require following amendments: ? If imported coal content x% moisture above the agreed limit then we should decrease coal quantity by 1.1x% because of extra energy requirement of burning of coal. ? There should be amendment because of uplifting the excess moisture, which cause excess of freight charges to transport coal.

Sulphur is a most harmful and environmentally damaging pollutant in our air. Each year, uncontrolled power plants release much more sulphur into the air then cars, truck and factories. Power plants sulphur comes from burning coal. SO 2 emissions are a major problem in the burning of coal and depend on the level of their sulphur concentration. Thermal coal is used in power plant is,a major source of sulphur emission in India. a) Price Adjustment for Sulphur: (Air Dried Bases) i. Present Penalty Adjustment in Indian Industry

The sulphur content in coal should be limited to 0.8 % and there shall not be any penalty for sulphur content in the coal received upto 0.8 %. The penalty for sulphur content upto 0.9% shall be @ Rs.10/-per MT for every 0.1% rise and the same above 0.9% shall be @ Rs.15/-per MT for every 0.1% rise .

It is to be noted that if the sulphur content exceed 0.9% for which buyer has to pay penalty for SOx emission above permissible limit that has to be borne by the party.

Calculation of penalty for Sulphur Content (ADB) above 0.8 % Let the coal sample is having sulphur content of 1 %.

Thus the penalty for high sulphur will be levied in two slabs as below: 5

? @ Rs. 10/-per MT for every 0.1% rise in Sulphur upto 0.9%. As per this, penalty will be for 0.9 (-) 0.8 = 0.1 % = Rs.10/-? @ Rs. 15/-per MT for every 0.1% rise in Sulphur above 0.9%. As per this, penalty will be for 1.0 (-) 0.9 = 0.1% = Rs.15/-Hence, penalty deduction per MT for coal received having Sulphur 1.0% the penalty will be: Since the desulphurization cost data is of 2001 and in absence of current data, we may make price adjustment for the inflation.

Assuming a minimum of 5% inflation, compounded inflation factor for 10 years becomes $(1.05)\string^10 = 1.63$ So from the above calculation average cost per ton of pollutant removed is 500$/ton. =500*54 * 1.63 Rs per ton =44000 per ton =44 Rs per kg of pollutant removed Such that if our coal sample content 0.1% of excess of sulphur per metric ton of coal = 1 kg of sulphur per metric ton of coal So penalty should be levied should be more than the cost of desulphurization i.e. Rs 44.00 per Mt of coal.

More aware, consumers of steam coal are aware of the fact and have updated the penalty of sulphur. M/s West Bengal Power Development corporation Limited charges Rs 50 PMT for 0.1% increase in sulphur from the guaranteed parameter of 0.8% and charges rs 150 for every 0.1% VI.

11 Recommendation

Sulphur content in coal is also a major problem for environment. Coal based Thermal power plant are reluctant to cut sulphur contain and their policies are not stringent to contain sulphur pollution in future. Sulphur has ill effect for environment as well as health. Penalty levied on imported coal should be more than cost of desulphurization there should be proper regulation on sulphur emission act. [1]

Figure 1:

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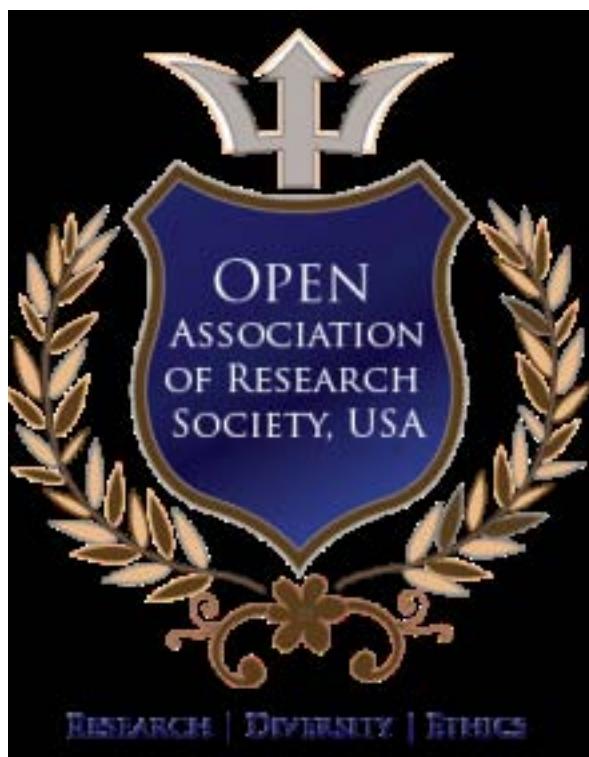
11 RECOMMENDATION

119 [Eurostat year book ()] *Eurostat year book*, 2008.

120 [Gwc Coal and Handbook] Gwc Coal , Handbook . *ASTM & ISO Standards & others,*