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Dig the key factors of influencing power generation enterprises value according to economic value added

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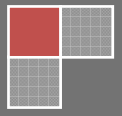
ABSTRACT

State asset management Commission assess state-owned key enterprises by introducing EVA, how power generation enterprises create EVA and how to do valuable managements based on EVA is becoming a urgent and key problem. The article firstly analyze the value creating drive factors according to characters of power generation enterprises, and then use the method of Clustering - Grey correlation to analyze 2013 panel data of listed power generation enterprises, finding the EVA factors such as operating income, tax payable, accounts payable, permanent assets, construction in progress and operating cost, pointing the direction of power generation enterprises' value creating and value management.

KEYWORDS

Power generation enterprises; EVA; Factors effecting value; Value management.



INTRODUCTION

The state-owned assets supervision and Administration commission has introduced EVA to assess stated -owned key enterprises, sending clear singles: they must transfer from scale guidance enterprises to value creating guidance enterprises. Value creating needs analyse and dig the key drive factors to create system of value creating indicator so that certain the direction of value creating. Power generation enterprises are carrying out and pushing EVA. EVA can lead enterprises to invest cautiously, urge enterprises to increase the efficiency of the assets, can make enterprises pay more attention on risk control and cut down the assets-costs efficiency, can lead enterprises to raise efficiency of the assets, cutting down the occupation of assets, can lead enterprises to complete the performance evaluation and excitation mechanism. How the power generation enterprises certain EVA key drive factors effectively and divide them into definite value creating indicator and then distribute to specific departments to becoming the motivation of EVA value creating and standards of behavior to achieve maximization of enterprise value,which are very important.

Main research methods: firstly, according to EVA analyse Thermal power enterprises' value drive factors to build up an indicator system; Secondly, using the method of Clustering - Grey correlation, taking listed Thermal power enterprises as examples to dig key factors of value creating.

ANALYSIS OF KEY VALUE DRIVE FACTORS BASED ON EVA

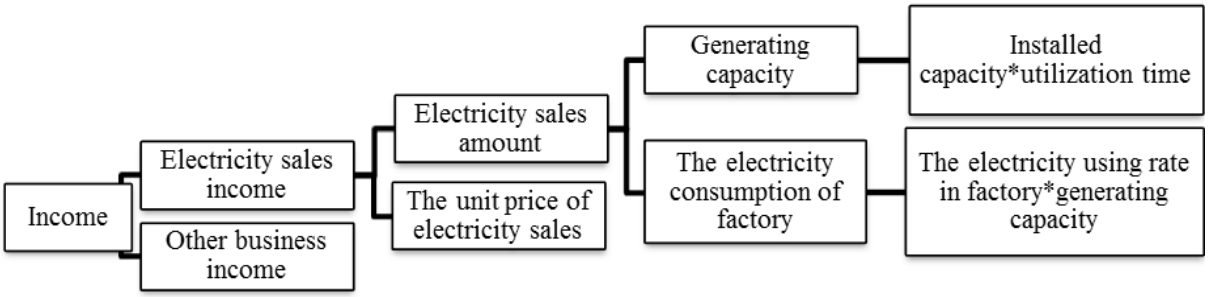


Figure 1: The driving factors in operating income analysis

And generating capacity can be divided into the figure 2

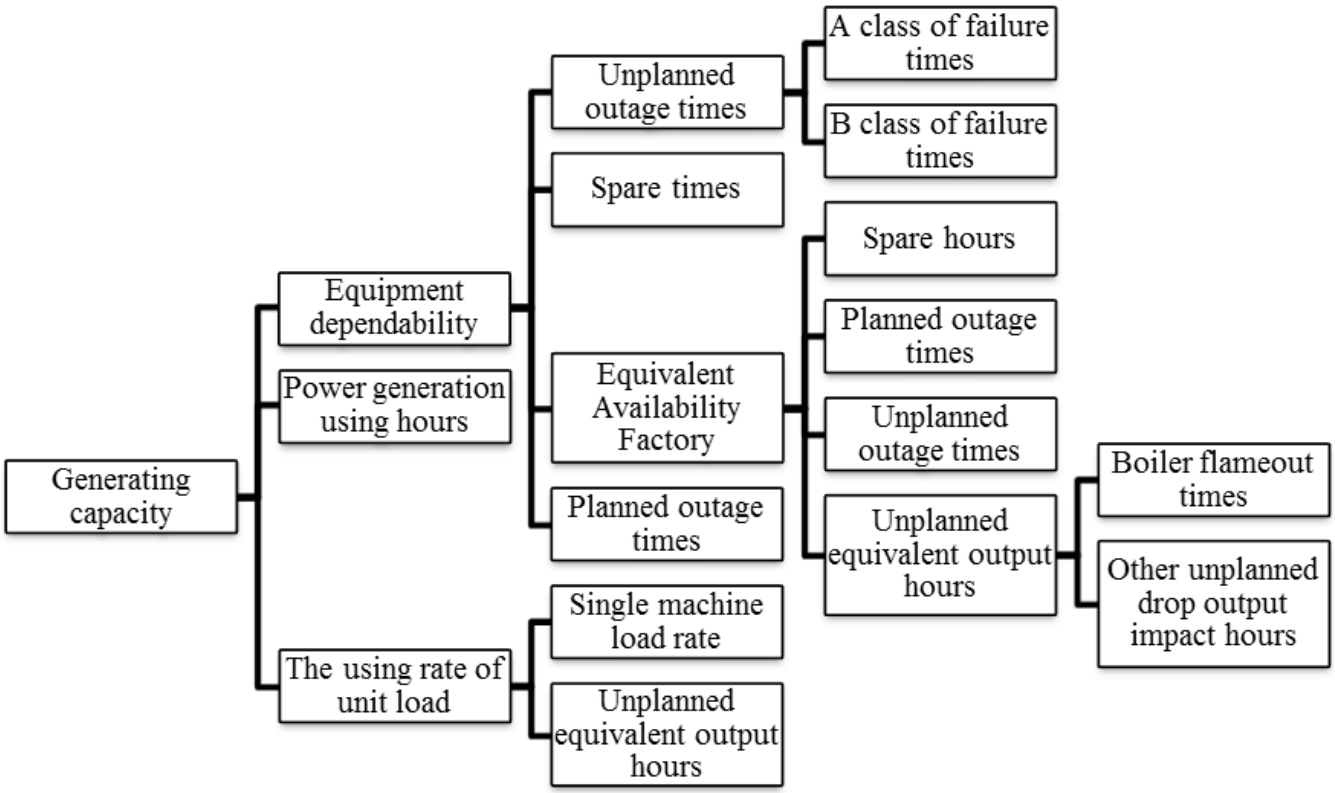


Figure 2 : The driving factors in generating capacity analysis

There are several types of measure of value indicator, some are based on accounting profits indicator, some are based on economic profits indicator. Now China is pushing EVA for state-owned key enterprises. The formulas are as followed.

EVA=net profit after tax -capital cost =net profit after tax -adjusted asset*average capital cost ratio

Net profit after tax=net profit + (interest expense + research development expense reconciliation items – non-recurrent profit and loss reconciliation items*50%)*(1-25%)

Capital after adjustment = average owners' equity+ total of average liabilities-average -average non-tax current liabilities-average construction in progress

According to the formulas, taking Thermal power enterprises as example, the main value drive factors are as follows.

Decompose the value drive factors of net profit after tax

(1)Operating income

Thermal power enterprises' Operating income mainly comes from selling electricity income. The influencing factors are as figure 1.

(2)Operating cost and expense

Thermal power enterprises' operating cost and expense mainly include fuel cost of producing power, other variable costs, depreciation and salaries expenses. As shown in figure 3.

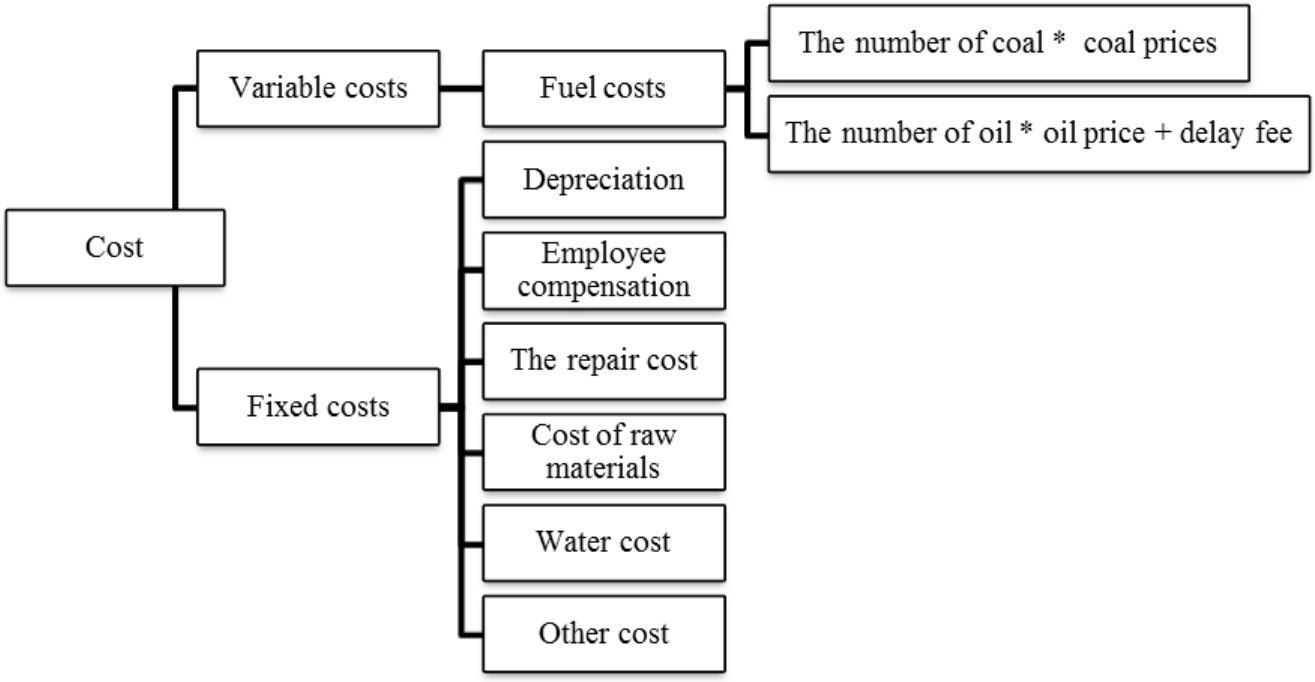


Figure 3: The driving factors in cost analysis

Decompose capital occupation project drive factors

Decompose Thermal power enterprises' capital occupation projects drive factors. As shown in figure 4.

CONSTRUCT THERMAL POWER ENTERPRIES' VALUE CREATING KEY INDICATOR SYSTEM

Indicator system and sample alternative

Based on above-mentioned analysis and the procurability of sample data, in order to choose the key factors influencing EVA,I will pick cash x_1,tax payable x_2, prepayment x_3,other receivable x_4,other current asset x_5,account payable x_6,salary payable x_7, other account payable x_8,inventory x_9, permanent assets x_{10},construction in progress x_{11},asset-liability ratio x_{12},current asset turnover ratio x_{13},operating income x_{14},operating cost x_{15},accumulated depreciation x_{16},management expense x_{17},operating tax and addition x_{18},financial cost x_{19},yield x_{20},non-operating income x_{21},non-operating cost x_{22},income tax x_{23}, 23 indicator are regarded as initially selected indicator system.

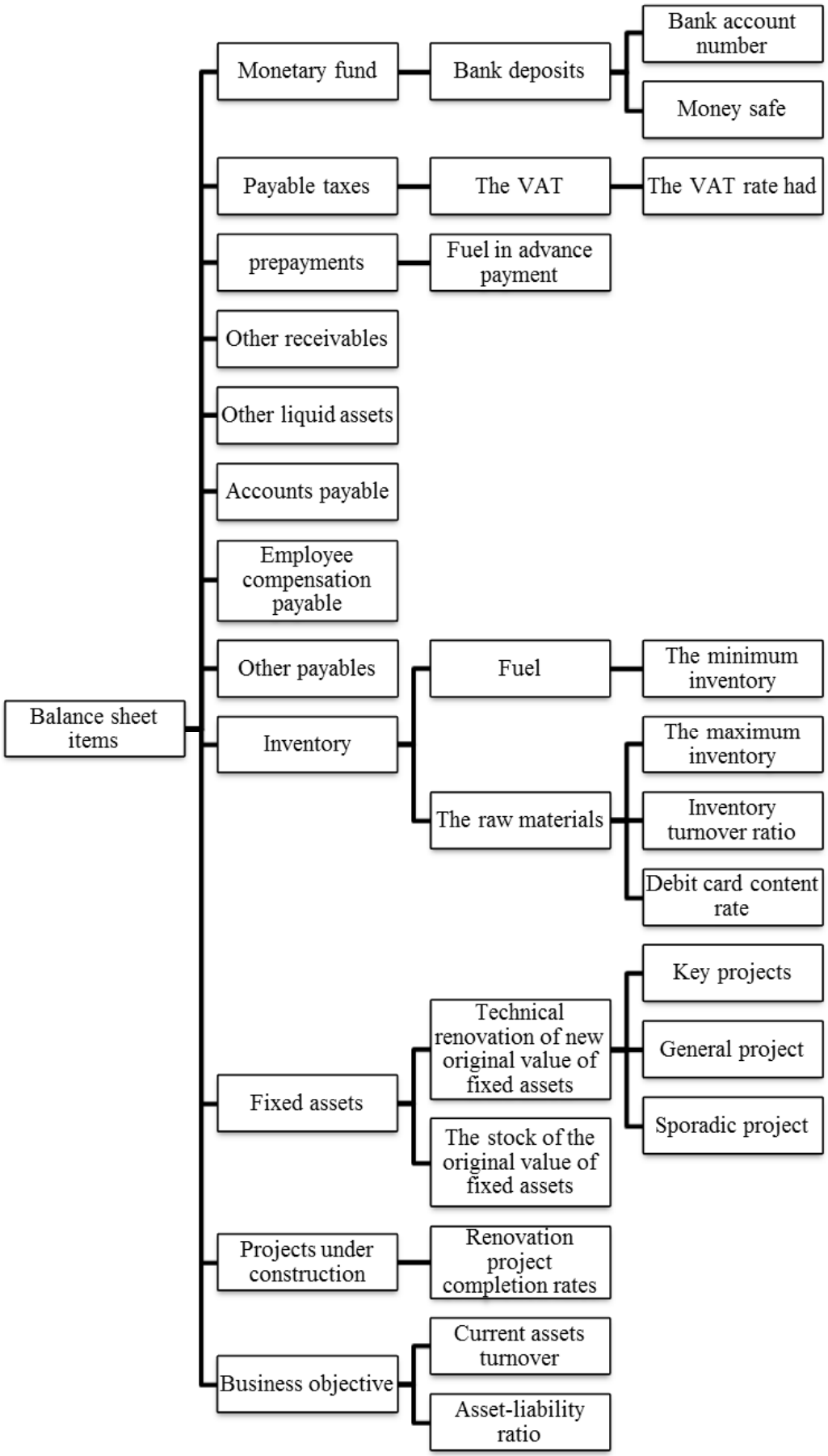


Figure 4: The driving factors in balance sheet items analysis

According to CSRC category of employment in CCER database, taking Shanghai and Shenzhen's Thermal power enterprises' financial data as samples, combining the recent three years' annual report's data, getting rid of enterprises which having the uncommon data, and finally choosing 10 in Shenzhen and 14 in Shanghai. As shown in TABLE 1.

TABLE 1: Sample companies

Stock code	Stock abbreviation	Stock code	Stock abbreviation
000027	Shenzhen Energy	600098	Guangzhou Development
000037	Shennan Electric Power	600292	Zhongdian Yuanda
000531	Guangzhou Hengyun	600396	Jinshan Share
000539	Guangdong Electric Power	600509	Tianfu Thermo Electric
000543	Anhui We Energy	600578	Jingneng Power
000767	Zhangze Electric Power	600642	Shenneng Share
000875	Jidian Energy Power	600726	Huadian Energy
000899	Gan Energy Power	600744	Huayin Electric Power
000966	Changyuan Electric Power	600795	Guodian Power
001896	Yuneng Holding	600863	Inner Mongolia Electric Power
600021	Shanghai Electric Power	600886	SDIC Power Holding
600027	Huadian Power International	601991	Datang Electric Power

Choose indicator based on Clustering-Grey correlation method

On the basis of data preprocessing, using SPSS17.0 to analyse and classify the 24 listed companies' 23 financial indicator. Distance between samples using Euclidean distance, minimum of the number of clustering is 2 and the maximal one is 8. x_{10}, x_{11}, x_{14} and x_{15} become a category, don't need to reduce, only need to calculate grey cognate analysis of other two indicator according to clustering analysis.

(1)Take pole changing to these indicator and transfer all indicator to positive tropism indicator

(2)All indicators are non-dimensioned. Figure out the average of indicator. Taking x_1, x_6, x_9 as examples, assuming that the averages of the three indicator are $\overline{X_1}, \overline{X_6}, \overline{X_9}$. Making $X_i'(k) = X_i(k)/\overline{X_i}$, i=1,6,9,k=1,2,…,24. Results are as shown in TABLE 2.

TABLE 2: Results of equalization

Company sequence number	X_1	X_6	X_9
1	$X_1'(1)$	$X_6'(1)$	$X_9'(1)$
2	$X_1'(2)$	$X_6'(2)$	$X_9'(2)$
……	……	……	……
24	$X_1'(24)$	$X_6'(24)$	$X_9'(24)$

(3) Calculate difference sequences if $\Delta ij(k) = |x_i'(k) - x_j'(k)|$ i,j=1,6,9 and i≠j,k=1,2,…,24。 $\Delta ij = (\Delta ij(1), \Delta ij(2), \ldots, \Delta ij(24))$,i,j=1,6,9 and i≠j.

(4) Calculate the maximal difference and minimum difference of two poles, the maximum and minimum in difference sequences and be recorded as Max and Min.

(5) Calculate correlation coefficient $\gamma_{ij}(k) = Min + \rho Max/\Delta_{ij}(k) + \rho Max$, $\rho \in [0,1]$ i,j=1,6,9 and i≠j,k=1,2,…,24.

(6) Calculate the degree of association $\gamma_{ij} = \frac{1}{n}\sum_{k=1}^{n} \gamma_{ij}(k)$ i,j=1,6,9 and i≠j,k=1,2,…,24.

When x_1 is regarded as reference sequence, we can arrive double correlative numbers γ_{16}, γ_{19},the degree of association between x_1 and x_2,x_3. Larger the correlative numbers, Stronger the degree of association between indicators. Changing reference sequences and determine x_6, x_9 as reference sequence, we can arrive the degree of association between indicators. Finally we can draw the following matrix.

$$\begin{bmatrix} \gamma_{11} & \gamma_{16} & \gamma_{19} \\ \gamma_{61} & \gamma_{66} & \gamma_{69} \\ \gamma_{91} & \gamma_{96} & \gamma_{99} \end{bmatrix}$$

Calculate above matrix 's every row average $\overline{\gamma_i} = \frac{1}{9}\sum_j \gamma_{ij}$, $j = 1,6,9$we can draw $\overline{\gamma_1}$, $\overline{\gamma_6}$, $\overline{\gamma_9}$ larger the average the more important the indicators are. Sort the three averages and choose the largest one as final indicator. Other groups choosing methods are like this method.

Use Clustering - Grey correlation method to classify and choose all indicators of second group and third group. The results are as shown in TABLE 3.

TABLE 3: Results of clustering - grey correlation

Analysis (1)								
Second group indicator		**Importance degree**				**Choosing results**		
$\overline{\gamma_1}$		0.722						
$\overline{\gamma_6}$		0.772				Reserve x_6		
$\overline{\gamma_9}$		0.753						
		Analysis (2)						
Third group indicator	$\overline{\gamma_1}$	$\overline{\gamma_2}$	$\overline{\gamma_4}$	$\overline{\gamma_5}$	$\overline{\gamma_7}$	$\overline{\gamma_8}$	$\overline{\gamma_{12}}$	$\overline{\gamma_{13}}$
Importance degree	0.814	0.745	0.799	0.753	0.803	0.786	0.733	0.748
Third group indicator	$\overline{\gamma_{16}}$	$\overline{\gamma_{17}}$	$\overline{\gamma_{18}}$	$\overline{\gamma_{19}}$	$\overline{\gamma_{20}}$	$\overline{\gamma_{21}}$	$\overline{\gamma_{22}}$	$\overline{\gamma_{23}}$
Importance degree	0.747	0.800	0.779	0.782	0.752	0.796	0.783	0.763
Choosing results	Reserve x_2							

CONCLUSIONS

At this point, by Clustering – Grey correlation analysis, we finally determine tax payable x_2,account payable x_6, permanent asset x_{10},construction in progress x_{11},operating income x_{14},operating cost x_{15} as key drive factors of influencing power generation enterprises' EVA value creating. According to this, power generation enterprises can making valuable and strategic planning, making budget of value, value making processing control and value performance appraisal so that enterprises can achieve the maximization of enterprises value.

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