Abstract: Engineering of energy management; Models of Engineering operational applied to efficient utilization of energy; Development durable decision of economics-engineering systems approach.

Key words: energy management, energy system, economics engineering

1. REENGINEERING OF ENERGY MANAGEMENT

As a method of the modern management, reengineering requires a new design of the systemic problems in view of process innovation and human resources reshaping. The reengineering of the industrial management uses informatic tools which supervise the leading of industrial organisation so that the technical, economic and financial risks should be under entire control. The reengineering approaches the commercial organisation inclusively the companies as a reunion of processes which are subdued by entire innovation (technology resources, economics activities, management, decisions). The new designed industrial organisations are focused on customers' necessities in view of entire integration of the resources in order to built a new market based on integrated consumption. In this point of view, the organisation charts are designed as a matrix where the responsibilities are found at level of each employee. The reengineering allows to go from management focused on command - control to performance management concentrated on team leader that is based on abilities development in resources allotting and dysfunctional studies through current and forecast activities monitoring. The informatic supervision of entire technical - economics activities allow to eliminate the limitation in real process functioning.

The reengineering is used after covering the following: increasing the quality of human factor and training the team that will implement the reengineering in analysed company, establishing the activities at input and output and picking out the perturbation points, redesigning of the processes that are increasing the entropy, replacing old equipment by new ones, designing working places in ergonomics view, designing the quality of products which will be turned out in the new industrial organisation.

The revolutions in informatic and cognitive fields are considered as start points of reengineering. These revolutions allow going from the production based on improving of the physical proprieties to innovation of thinking process. As a result of this process, the level of products will be increased by value of new assimilated knowledge in new created installations. By this way, the quality of products and equipment could be doubled and the price could be cut down to 30%. After all, the customers' problems can be settled without any risk in terms of benefit increasing.

The reengineering is applied entirely to design the new industrial objectives. This method can be used by companies which are monopoly of state, too. Applying this method of reshaping at the CONEL Corporation has brought new companies. Figures 1 + 4 outline the reshaping process at the CONEL Corporation. The new managerial structures will be viable if the benefit of the forecast level at the National Energetic System differs from nothing. Passing from current managerial structures of CONEL corporation to new ones (National Company of Electricity, Company of Nuclear Energy and so on) will allow tuning up the competitive market of energy and improving, customer's supplying with energy in terms of decreasing energetic tariffs.
for decision makers training, \(E_{de} \) = the effort made in order to achieve the direct and reverse connection between settled objectives and working system, \(E_{dc} \) = the effort made in order to make up the decision.

This mathematics model constitutes the base for making up the costs and tariffs through cost-benefit centres which are implemented in National Energetic System.

3. DEVELOPMENT DURABLE DECISION OF THE ECONOMICS – ENGINEERING SYSTEMS

3.1. The pattern of decision models

a) Model based on economic - engineering efforts

\[
M_{DE} = E_{search} + E_{forecast} + E_{catastrophe} + E_{stock} + E_{pay} + E_{ergonomics} + E_{economic regime} + E_{quality} + E_{remuneration} = \min
\]

b) Model based on economic - engineering efforts

\[
M_{LP} = \max_{j} \left( \sum_{i} \frac{p_{ij} \cdot p_{j}}{n_{j}} \right) \quad M_{WM} = \max_{i,j} p_{ij}
\]

\[
M_{HW} = \max_{i} \left\{ \text{opt} \left( A_{i} + c_{pes} \cdot a_{i} \right) \right\}
\]

\[
A_{i} = \max_{j} p_{ij}; \quad a_{i} = \min_{j} p_{ij}
\]

\[
M_{DW} = \max_{i,j} p_{ij}
\]

\[
M_{SV} = \min_{i,j} r_{ij}; \quad r_{ij} = \left( \max_{i} p_{ij} - \min_{j} p_{ij} \right)
\]

where: \(M_{LP} \) = the model of Laplace decision; \(p_{ij} \) = the benefit placed at the intersection between the lines \((j)\) and columns \((i)\) from the matrix of benefits that could be achieved; \(n_{i} \) = the probability of achievement benefits \((P_{i})\) depending on the nature situations \((n_{i})\); \(c_{pes} \) = the optimistic and pessimistic coefficients; \(M_{HW} \) = the model of Hurwicz decision; \(M_{DM} \) = the model of maximum decision; \(M_{SV} \) = the model of Savage decision; \(r_{ij} \) = the regret that it have not been able to achieve the performance solution; \(p_{ij}^{\max} \), \(p_{ij}^{\current} \) = the maxim and current benefits.

Further on, there are some applications concerning to profitableness of innovations at the level of reshaped energetic installations.

3.2 Applications concerning to Systems' profitableness subdued to sustainable development

A. There are known:
- Installed power: \(P_{1} = (10000 + 100 \times 4) \text{ MW} = 10400 \text{ MW} \);
Specific investment: \( i_{sp} = (1000000 + 1000 \times 4) \) lei/KW;
Working time: \( t_i = (7000 + 50 \times 4) \) hours/year = 7200 hours/year;
Price of intern energy: \( P_{ei} = 1400 \) lei/KWh;
Price of extern energy: \( P_{ee} = 100 \) S/MWh x 30.000 \( \times 10^{-3} = 3000 \) lei/KWh;
Rate of actualisation: \( r_a = r_d + r_{inf} = 0.24; \) \( r_a = 24\% \).

\[
\begin{align*}
C_{tan} &= \left(\sum_{i} (1 + r_a)^{-i}\right)^{-1} = 10; \\
C_{tan} &= \left(\left[k_i x l_i\right] + \left[p_{ev} x E_p \right] \right) \text{lei/year}\end{align*}
\]

where: \( k_i = (0.033 + 0.04), \) \( l_i = i_{sp} x P_i, \)
The analysed branch is developing with a power of \( k_i = \) 2800 MW; \( l_i = 900.000 \) lei/Gcal; \( C_{opt} = C_{par} = 0.5; \) \( g = 0.8; \) \( d_i = (35 + 25) \) years - installation time life;
\( k_i = k_{d_i} = 0.5; \) \( P_i = \) [lei incomes/lei invested].

There is known the pattern of energy cost:

\[
\begin{align*}
\text{Rate of actualisation: } r_a &= (0.033 + 0.04); \\
\text{CET without thermofication: } V_{a1}\tan &= (100 \times 7200 \times 1.5 - 0.04 \times 100 \times 4000 - 100 \times 7200) \times 10400 \times 10^3; \\
\text{CET with termofication: } V_{a2}\tan &= (3336.8 \times 10^8 = 33,36 \times 10^{10} \) lei/year \Rightarrow \text{it is advantageous that the objective should be fulfilled.}
\end{align*}
\]

CTE with partial working:

\[
\begin{align*}
V_{b1} &= (V_{a1}\tan + t_i \times Q_p \times b_{bac}) = (3.326.336 \times 10^3 + 35000 \times 3000 \times 10) \\
V_{b2} &= (V_{b1}) = 332,6 \times 10^{10} \) lei/year \Rightarrow \text{it is advantageous that the objective should be fulfilled.}
\end{align*}
\]

2. Costs and tariffs of the electric energy:

a) \( C_{sp} = C_{tan} / E_p; \) \( t_{ee} = c_{sp} + tva + tdv + \text{profit}; \)
\( t_{ee} = 1.31 \times C_{sp} = 1.3 \times 0.5 \times (C_{tan}/E_p); \)

but:
\[
C_{tan} = k_i x l_i + p_e x E_p; c_{tan} = (k_i x i_{sp}) + (p_e x E_p);
\]
Replacing in formula will result \( t_{ee} = 790 \) [lei/KWh].

b) \( c_{sp\tan} = c_{sp}/(q_i x E_p x d_j); \) \( t_{ee} = c_{sp\tan} + t_{solution} + r_{fe}; \)
\( t_{ee} = 1.31 \times c_{sp\tan} x 0.5; \)
\( t_{ee} = 1.31 \times c_{sp\tan} x 0.5 = 0.655 \times c_{tan}/(q_i x E_p x d_i) = 780 \) [lei/KWh].
3. Expenses on functions of SEN

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<tr>
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<th>SEN</th>
<th>SEE</th>
<th>SEM</th>
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<tbody>
<tr>
<td>C_dev</td>
<td>$0.04xc_{in} = \frac{41.62 \times 10^6}{x_{in}}$</td>
<td>$0.05xc_{in} = \frac{52.02 \times 10^6}{x_{in}}$</td>
<td>$0.30xc_{in} = \frac{312.12 \times 10^6}{x_{in}}$</td>
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<td>C_prod</td>
<td>$0.15xc_{in} = \frac{156.06 \times 10^6}{x_{in}}$</td>
<td>$0.17xc_{in} = \frac{176.87 \times 10^6}{x_{in}}$</td>
<td>$0.15xc_{in} = \frac{156.06 \times 10^6}{x_{in}}$</td>
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<td>C_hum-eng</td>
<td>$0.07xc_{in} = \frac{72.83 \times 10^6}{x_{in}}$</td>
<td>$0.21xc_{in} = \frac{218.48 \times 10^6}{x_{in}}$</td>
<td>$0.08xc_{in} = \frac{83.23 \times 10^6}{x_{in}}$</td>
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<tr>
<td>C_fin-cont.</td>
<td>$0.02xc_{in} = \frac{20.81 \times 10^6}{x_{in}}$</td>
<td>$0.25xc_{in} = \frac{260.10 \times 10^6}{x_{in}}$</td>
<td>$0.07xc_{in} = \frac{72.83 \times 10^6}{x_{in}}$</td>
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<tr>
<td>C_comm</td>
<td>$0.03xc_{in} = \frac{31.21 \times 10^6}{x_{in}}$</td>
<td>$0.10xc_{in} = \frac{104.04 \times 10^6}{x_{in}}$</td>
<td>$0.10xc_{in} = \frac{104.04 \times 10^6}{x_{in}}$</td>
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<tr>
<td>C =</td>
<td>$0.70xc_{in} = \frac{728.28 \times 10^6}{x_{in}}$</td>
<td>$0.22xc_{in} = \frac{228.89 \times 10^6}{x_{in}}$</td>
<td>$0.30xc_{in} = \frac{312.12 \times 10^6}{x_{in}}$</td>
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It could be observed that the achievement of energetic objectives in our country are profitable on account of the net incomes are positive.

Also, in can be observed that whatever method we should use, we will obtain the same optimum solution (CNE). This situation confirms the international tendency and, also, shows that in România SEN will be developed economically through designing and construction of CNE.

BIBLIOGRAPHY