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# Management Crisis in Partial Deregulation of Energy Sector and Modeling the Technical and Economic Results of Organizational Management Structure

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## 1. Introduction

Decentralization through reduction of the state property share aimed at attracting loan and joint stock capital, including foreign capital, in the conditions of continual acute shortage of primary energy sources such as coal, gas and petroleum as well as lack of investment for modernization could be termed as 'partial deregulation' [Nedin & Oricha 1998]. The transition from vertical integrated utility to unbundle utilities made inevitable a number of basic rearrangements of the power industry management both in developed and developing countries.

The practical implementation of restructuring the branch was reflected in energy market creation and partial denationalization of the power industries of different types [Oricha, 1998]. Restructuring was aimed at a number of goals which were unattainable in the conditions of the former organizational management structure. The main goals of the restructuring were to create the competitive environment (first of all in the field of energy production transmission and distribution), as well as to attract foreign investing capital (IC), that will be needed for the large-scale modernization of the fixed capital stock (FCS). The development of competition was substantiated by the opportunity to raise the effectiveness of power production, reduce costs of production and improve reliability of power supply. Unfortunately the above mentioned goals are always unattainable in partial deregulation and could even lead to management crisis with some negative consequences. The main risk in deregulation of energy sector is the risk of unfavourable regulatory decisions and cost overruns due to bad project management [Nedin & Oricha]. It is clear that the best approach toward energy cost reduction is investment and technological modernization. However, introduction of liberalisation in energy markets is removing the regulatory risk shield and thereby exposing investors to various business risks. The level of risk anticipated by an investor in a power plant will be reflected in the level of return expected on that investment [Daniel S.K & Garan .S, 2004]. This means the greater the business and financial risk, the higher the return that would be demanded. The management crisis that would eventually occurs and will also affect the volume of investments in liberalized markets is the inherent uncertainty about electricity prices in electricity markets. This chapter discusses this

management crisis and some of its negative consequences and give suggestions on how to modelling the organizational management structure in power industries.

## **2. Management crisis and its consequences in deregulation of energy sector in Ukraine**

During the transition and breakdown of Soviet Union, Ukrainian energy sector was subjected to deep economic crisis that calls for immediate restructuring and re-organization of various forms of ownership. The failure to achieve the main goals of restructuring the energy sector leads to management crisis in power industry with some negative consequences. One of the first steps in restructuring energy sector in Ukraine by then was to amend some of the normative acts inherited from the monopolistic forms of management. However, decentralization of the state property share to attract loans including foreign investments, created a further management crises in the power industry of Ukraine. The development of competition by creating energy market to raise the effectiveness of power production, reduce expenses and prevent increase in the energy products also were not achieved but resulted in further increase in the prices of energy products.

The three major problems identified as the main reason for restructuring are:

- The basic production assets - fixed capital stock (FCS) were worn out and the low efficiency of their uses
- Serious acute shortage of primary energy sources;
- Low caloric nature of the imported fuels.

These three problems mentioned above refer in particular to the coal thermal power plants, which constitute the basis of the Ukrainian power industry. Thus, 48 % of the thermal power plants generating units have passed their utilization threshold and at least \$30 million and extensive time period is needed for their modernization that would meet the up-to-date safety, economic and ecological requirements. On the other hand, 200 and 300 MW coal generating units are compelled to be used to cover the alternating part of the load schedule because of insufficient maneuver capability in the Ukrainian energy system. It resulted in increased fuel consumption, 30-45 % increase in internal energy consumption, decrease in efficiency factor and increase in fuel unit cost, rising wear level and reduced generating equipment reliability [Nedin, Ryzhov., Oricha & Chastockolenko, 2001].

The above stated conditions caused constant increase of energy production costs that are not paid off by means of present day rates, which consequently undermines the financial state of the power enterprises. However restructuring held in the conditions of continual acute economic crisis not only failed to eliminate the destabilizing factors, mentioned above, but provoked in addition a number of negative consequences, including:

### **1. Application of foreign loans;**

Investing loans of the international financial companies proved insufficient for visible improvement of the technical and economic indicators of the power industry, and their use proved irrational [Nedin, Senko & Shetrenko, 1999]. During the energy crisis in Ukraine, the World Bank provided credits to Ukrainian ministry of energy for thermal power station modernization, which has appeared too minor to improve the economic situation of the power sector in appreciable measure.

Loan repayment and the payment for the expenses on their services according to the lending terms must be made by means of surcharges to the corresponding rates. It overlaps with the general decrease in domestic manufacturing and paying capability of the energy consumers,

posing the threat of increasing loan debt and further destabilisation of the the financial status of power industry.

2. Privatization through the sales of public utilities assets;

Attracting the investment capital (IC) through sales of the 'public power utilities' share holdings without clear regulated and controlled liabilities of the new share holders that cannot guarantee the necessary fixed capital stock (FCS) modernization will leads to loss of state control over the most important basic economy branch. The loss of state control over power sector will results to catastrophic economic consequences that affects other branch of the economy as a whole. From the experience of restructuring energy sectors in various places such as Chile, Carifonia, Russia and etc. became clear that fairely aged power equipment/infrastructures are not attractive to investors. Thefore, the orientation to sell some of the state share holdings to attract investors always deepen the management and economic crisis of the power industry.

3. Introduction of independent power suppliers (IPS) and Introduction of independent power producers (IPP);

Involving many independent power suppliers (IPS) to discourage monopoly and creating a competitive environment for electricity market failed due to problem of lack of payments. In addition to problem of lack of funds, majority of IPS has no direct relation to power production and IPS according to different estimates 60-80% control the entire sales volume profits. And this means that the power industry is losing a lot of funds , which could have been partially used for further investments. The involement of many independent power supliers only added to the burden the consumers bear because the cost of power can only be reduced if there are enough power producers who have no mopolistic power over the price but compete on the basis of price bids and offers. In a competetive electricity market where the producers have no control over the price but want to maximize their profits, will be compel to use those generating units where the production costs will be minimized or use more efficient equipment. In partial deregulation, this could not be achieved because majority of the investors will always feel reluctanct to invest in a sector where prices cannot be forecasted as a result of regulatory action that maybe imposed. In practice, deciding to invest in a new generating plant is considerably more complex because of considerable amount of uncertainty. Construction delays and fluctation in the price of fuel can affect the long-run marginal cost. On the other hand, acording to [Fraser & Huist, 2003], the evolution of wholesale electricity prices over a long period is a nototoriously difficult to forecast because demand might change, competitors might enter the market or new, more efficient generation technologies might be developed. Once the problems mentioned above cannot be predicted and solved, then partial deregulation will always lead to management crisis with catastrophic economics problem of the state.

The idea of allowing IPP to take active part in power generation is to create an environment conducive for electricity markets to exit, with the view that when we have more power producers, there is likely possibilities that there would be surplus in power generation thereby reduces the prices. But unfortunately, competition in partial deregulation is normally limited primarily to the power realization field. This will lead to practically no effective competition that could stimulate tangible decrease in power and heat production costs. This doesn't let stabilize consumers' paying capacities and together with too widely spread and insufficiently grounded use of noncash forms of payment (promissory notes and mutual offset) that cannot create the environment for financial / capital accumulation.

#### 4. Absence of perfect regulatory and legal framework;

Absence of perfect regulatory and legal framework, which could regulate the interaction of market participants of different forms of ownership in all the power industry fields, is aggravated by no practical actions taken to organize mutually beneficial cooperation of the public power sector (PPS) companies with private corporations and enterprises aiming at participating in energy production and investing into it. This essentially restricts the opportunities of private power companies potential use, that could improve the technical and economic indicators of the industry in general. For instance, one of the major problems in deregulation of energy sector in Nigeria is lack of perfect regulatory and legal framework that is discouraging independent power producers (IPP) to participate in the field of electricity generation. It is observed that the largest potential resource for power generation in Nigeria is natural gas, which current estimate of total about 187 trillion cubic feet [The Nigerian Electricity Regulatory Commission, 2008]. Technically speaking, even 10% of this natural gas reserves can support over 10,000 MW capacity power plants operating at a power factor of 80% for 22,000 years. However, the total power generation in Nigeria as of 2010 is not up to 4,000 MW, while the minimum total demand was estimated to be 10,000 MW for fairly constant power supply. It was estimated that the total available coal deposit can support 15,700 MW capacity at 80% capacity utilization for over 50 years but the challenges facing coal power generation in Nigeria include uncertainties in the actual reserves of coal on which long term projects could be based, low productivity of the coal mines, low level of mechanization of production facilities and absence of cost-effective transportation system and lack of investment in coal industry.

The major problems as always explained by Power Holding Company of Nigeria (PHCN) was shortage of gases to power the plants. The reality of the problem is that over the past 50 years of oil and gas production in Nigeria, the greater part of the gas produced had been flared while investment in the usable gas supply had focused more on exports than on domestic utilization. In this situation, oil and gas in Nigeria still remained vertically integrated while privatization to bring competition was introduced in power sector. But Unfortunately, privatization is not a prerequisite for the introduction of competition [Daniel & Garan, 2004]. The Nigerian Electricity Regulatory Commission introduced various codes that further complicated the right of independent power producers and consumers with additional increase in the cost of power production. The amount of charges that an IPP will have to pay in order to be allowed to connect to National grid are so much that practically no IPP will have a strong incentive to participate in power generation.

The major negative consequences in restructuring the energy sector in Nigeria is continuous high prices of goods and services as a result of high cost of electricity generation.

The experience in South Australia suggests that markets can respond to price signal and meet demand and reliability requirements if government policies are consistent with the development of efficient and sustainable electricity markets, and where they are implemented transparently and consistently [Fraser & Huist, 2003]. However, in the examples of restructuring of Ukrainian, Nigerian energy sectors as cited above does not have a consistent and transparent policies that would attract investments for modernization of the basic production assets. These factors mentioned above are the basis for management crisis phenomena in partial deregulation of energy sector.

#### 5. Establishment of power markets;

Power market establishment with non-existent coal and gas market, nonequivalent exchange of coal for power regulated by subjective negotiated prices deepens the coal and gas industry crisis and endangers the next shortage of coal and gas output.



The above listed factors are particularly dangerous not only for the power industry, but also for related industries, because the stable escalation loop of the crisis phenomena (its fragment shown in the figure below) has been formed. In the given loop investment capital (IC) and current capital deficit stimulates further fixed capital stock (FCS) wear escalation and worsening of their technical and economic indicators.

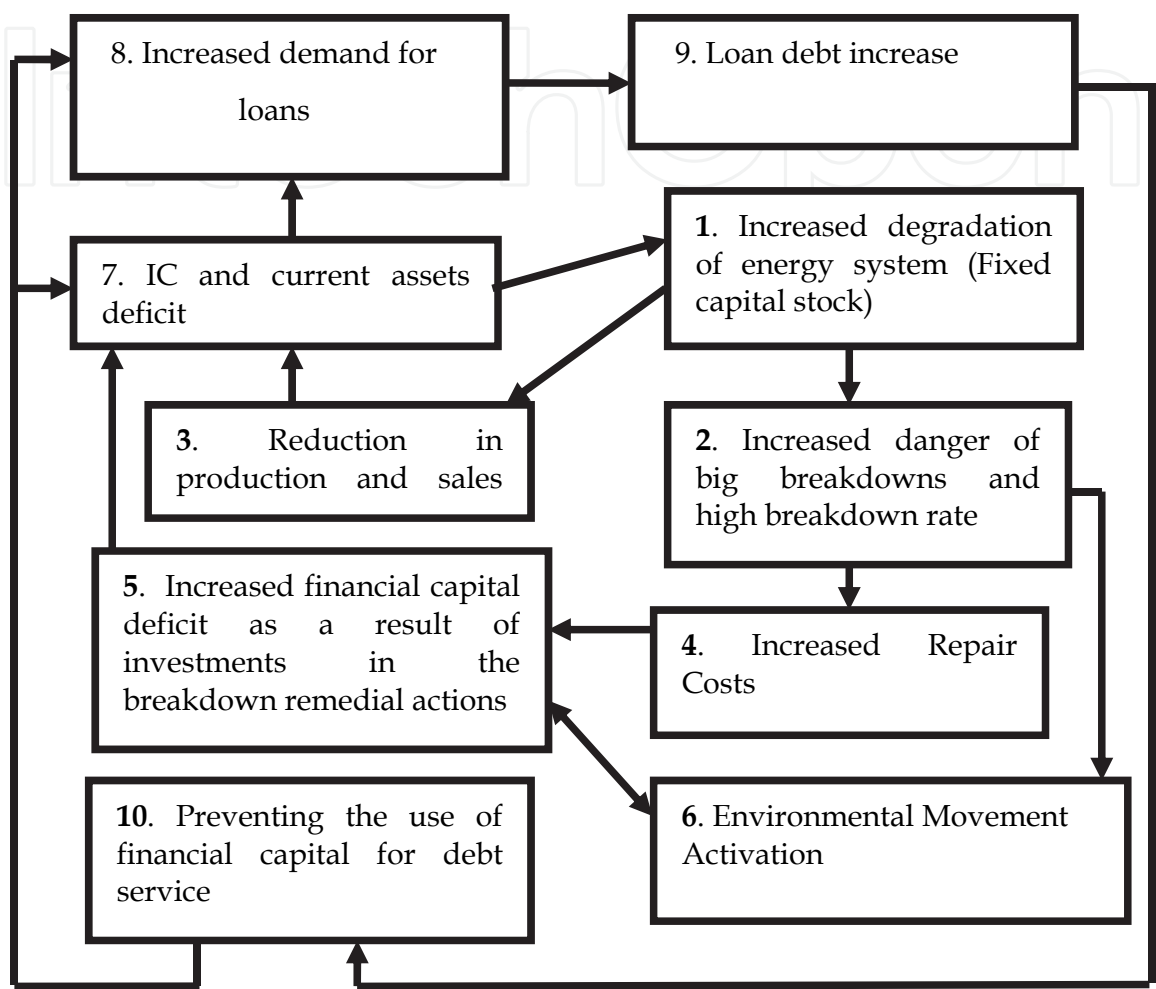


Fig. 1. Degradation factors interplay in the crisis phenomena escalation loop

**3. Escalation loop of the crisis phenomena as a result of partial deregulation of energy sector**

The figure above illustrate the escalation of the crisis phenomena that normally exists as a result of partial deregulation of energy sector. The direction of the arrows indicate how one action or consequence will stimulate the others to happen. In this case there will be continious crisis phenomena in form of loop. Consequently, competitive ability of the power systems in the market economy deteriorates, the danger of big breakdowns and actual breakdown rate increase, which respectively provokes increased spendings on the repair works and, accordingly, prevents the use of resources in other fields of their proper use. In this situation there would be always budget deficit. As a result, the incresed demand for loans and no real prospect to promptly repay them and pay for their servicing, are stimulated. And this means that the further stimulation of such threats to security of energy

supply (ENS) as “investment stock deficit and its inefficient application”, “financial destabilization and non-payment increase”, “violation of import equipment, materials and fuel deliveries” etc.

The above noted phenomena in power industry alone due to increased power selling price and respectively rate increase influence in an extremely negative way the competitive ability of the national economy on the whole, which according to [Nedin., Senko, Shetrenko, 1999] is defined as «the position of the country or the commodity producer at the domestic and foreign markets” (ability to withstand the international competition at these markets). And it is caused by the energy production price rise, what should be considered as reduced competitiveness of energy as a commodity, which seriously complicates realization opportunities of the reproductive processes not only in power industry, but also in other industries. And renewable resources are generally known to be one of the main preconditions to the economic security (ECS) of the state.

The only way to change the established situation is to create preconditions to activate all available investment capital (IC) [6] in order to reach the FCS state when the energy production costs could decrease to the level enough to stabilize consumers’ paying ability and power enterprises financial condition. The opportunities of the power companies, belonging to the PPS of Ukraine, are absolutely restricted. That is why the following directions should be considered as priority to meet the present-day management crisis in power industry:

- i. The use of more rational (compared to the ones suggested by the World’s Bank) schemes to organize investing in power projects, that provide the possibility for prompt loan debt repayment introducing no surcharges to rates and the energy selling price.
- ii. Creating the real competitive environment in the power production field, taking into account existing energy market regulations. Hereby the mutually beneficial cooperation of the market participants of different forms of ownership that would enjoy equal rights should be guaranteed, which may further call for specification and improvement of the regulatory and legal framework of their interaction.
- iii. Provision of economic and organizational conditions to ensure the high-quality fuel supply to the dust-coal thermal power plants, including the formation of regional multifunctional industrial and financial groups encompassing general purpose thermal power plants, mines, coal cleaning, metallurgical and other power-consuming enterprises.

Concerning the first direction financial leasing should be noted as the most reasonable investment form applicable to the energy projects in Ukraine; it can be combined with the “tax holidays” regime [Nedin & Oricha, 1998] and applied to the objects, created by means of effective loan irrespective of its receiver’s form of ownership. At the same time the “tax holidays” should be considered not only the form of tax benefits, but first of all the form of establishing the conditions for tax base extended recreation and growth on the basis of production development and efficiency increase beyond the “tax holidays” duration period.

The second direction suggests that the PPS cooperate in the power production field with private companies, focused to create their own generating capacities on the basis of the most efficient power production technologies use. JSC “Kontsern Energiya / Concern Energy” [Nedin , Oricha & Sheverev, 1999] is one of such companies; it developed the project of use of the combined-cycle plant run on the natural gas, having high efficiency coefficient, not less than 52-55 %. Under current economic conditions such cooperation will let the PPS to expand its structure and the range of sources of income as well as promote

competitive ability of the coal thermal power plants. Here are the major advantages of the cooperation worth mentioning [Nedin I.V., Senko I.V., Shetrenko,1999]:

1. Payment for the specialized construction and mounting organizations of the industry for their participation in building the private power objects. According to [Oricha., Nedin .1998], approximately \$9, 77 billion is expected to be assigned for investing in the power objects taking into account 15 year period of reinvestment. If at least 20% of the sum is used to pay for the services of the organizations, then they will be able to annually receive approximately \$130 million as direct payments as opposed to loans. And the loan liabilities lie with their receiver, not the PPS. At the same time, the sum given substantially exceeds the average annual amount assignable to the industry by international financial organizations.
2. Payment for the traffic through 220-750 kW electrical networks and for the services of traffic control system, which objects are not subjected to denationalizing. If these services are used by a private power company to transfer 11,4 GW of the rated capacity through the energy system networks with the performance life equal to, for instance, 5000 hours per year, then after all the pre-scheduled capacities have been put into operation about 57 billion kW/h could be trafficked annually. If the traffic rate is 0, 17 cent per kW/h the annual total will reach appr. \$97 billion. These are also PPS direct payments and not loans. Certainly this sum will differ according to the year of the JSC "Concern Energy" program implementation, but even when 10 % of the capacities have been put into production this payment would be quite appreciable given the present-day financial state of the PPS.
3. Decrease of the production cost of the power released across the energy system on the whole. [9] illustrates that, with the 10 % combined-cycle plant use share in the energy system capacities the decrease of the production cost of the power released could be compensated by the rate increase, that is inevitable compiling with the terms of the World's Bank and the European bank for Reconstruction and Development debt loan repayment [Nedin I.V, Oricha J.Y, Sheverev, 1999]. In this case, notwithstanding the fact that according to the energy market regulations the specific weight of the power produced by the combined-cycle plants of the private energy company will surpass their value in the rated capacity of the energy system and the respective redistribution of the sold energy volume in favor of the private company, the production cost decrease will generally make it possible to avoid ungrounded increase of the corresponding rates. The latter should contribute to the renewal of consumer paying abilities and in the long run stabilize the payment regime.
4. Stabilizing the energy system operating mode. A more stable operating mode will be ensured by the relatively maneuver combined-cycle plants, preplanned capacity of which significantly surpasses that of the existing thermal power plants, as a part of the rated capacity of the energy system. This will allow increasing the consumer power supply reliability, to reduce the costs for the repair of the coal thermal power plant heat-mechanic equipment, as well as to supplant a part of the thermal power plants from alternating component of the energy union load schedule. Owing to this the fuel consumption will be reduced as the result of lower number of starts and stops. At the same time, in spite of the fact that the power delivery to such thermal power plants will fall, their profitability, as it has been illustrated in [Nedin, Ryzhov., Oricha, Chastockolenko, 2001], can increase rather substantially, being the direct manifestation of their competitive ability. Due to combined-cycle plants more favorable conditions for



the operation of power generating units equipped by the circulating boiling layer (CBL) boilers will be created, the capabilities of their use in the maneuver regime being still sufficiently studied.

5. Possibility for PPS to take part in the public energy companies property. Losses caused by the suppression of the PPS energy producers from the energy market can be partially compensated by the PPS participation as a shareholder-co-owner of the privately owned energy object, which will allow for certain redistribution of the revenues delivered by combined-cycle plants, that produces cheaper power as compared to the thermal power plants. But this being the case, PPS energy companies must bear a part of the responsibility, i.e. investment loan repayment.

On the whole the result of such cooperation helps play for time and accumulate funds, sufficient for improving coal energy technologies.

The third direction is effective in a way that it reduces the power production cost and the costs of end-produce of the consumer enterprises, belonging to a certain union. In this specific case, according to [Lir ., Nedin Oricha & Xalyava], energy consumption in the coal output process is considered as the power spent for internal needs, i.e. power is supplied to the coal mining enterprises at its production cost price. As a result the production price of the heat and power end produce should be reduced. At the same time the conditions for guaranteed higher quality fuel, delivered to the thermal power plants, are created. That is because its supplier operating in a united technological complex is interested in the end result - the decreased of the energy production cost, and therefore in the increase of its production efficiency. The task of restricting the number of mediators, whose activities are based on fuel and energy resale, is simultaneously being radically solved. There are other possible significant advantages of introducing a similar organization of multifunctional enterprises interaction — creation of favourable organizational and technological conditions for utilizing the ash-and-slad thermal power plants' waste products and their relocation into the coal mine uses etc.

The above listed ways of improving the management organization have a significant influence on the production and technological sphere of power industry and must be implemented in compliance with economic and technical solutions, aimed at improving energy production efficiency. Complex realization of the listed directions is possible only with the necessary legislative support provided the latter being at the time insufficient to reach the target results. That is why the burning issue remains: to create the regulatory and legal framework, which can ensure mutually beneficial cooperation of market participants of different forms of ownership in energy production, with the obligatory condition to improve the main technical and economical indicators of power industry (including the production cost of the released energy) and to keep their commercial interests balanced.

#### **4. Modeling the technical and economic results of organizational management structure in power industry**

The introduction of market relations in power industry involves the necessary modernization of organizational and functional management structure (OFS) of the energy systems (ES) control. The necessity of such modernization is stipulated by changed terms of financing, decentralization of control functions, diversity of forms of ownership and other factors. The management OFS of the power facilities and their commercial interaction

influences ES reliability and security, and, consequently, power supply reliability. The structure of interaction of power facilities among themselves, with consumers of energy product, and with the systems ensuring ES operation, is rather complicated. That is why while choosing the OFS version one should not limit himself to intuitive understanding of their possible effectiveness. A meaningful quantitative estimate of the possible consequences of their application is indispensable. Below are some of the principal statements of such estimate.

OFS is considered as a specific case of program-technical complex (PTC), meant to automate ES management, to ensure its reliable operation, etc. That is why to describe the versions of OFS the structural and contingency approach as applied to PTC, examined in [Nedin & Oricha 1998], is used, according to which technological and commercial interaction of the ES objects is reflected by a corresponding structural model, whose composition and internal structure are chosen as based on the level of territorial and operational hierarchy of the control object. The structural model gives account of material and cash flows with regard to their diversity. Material flows imply exchange of products – fuel, energy and various services, and cash flows imply co-payments, assignments to budgets of different levels, crediting, penalty charges, a.o. Material and cash flows can be of unilateral or two-way direction. The choice of the OFS version should be determined only by assessment of consequences of their possible application.

The evolution of technical and economic indicators which characterize the control object and results of its operation as well as characteristics of external environment, including the characteristics of regulatory and legal framework for the industrial and economic activities, is presented with the help of situational models, as it is shown in [Nedin , Oricha , Sheverev]. It should be taken into account that the composition and the nature of interconnection between the elements in the structural model in general case can change over time and thus is of situational nature.

The Figure shows in less detail one of the possible types of power market participant interaction, which operates in the territory of a large energy union.. It also indicates the major material and cash flows and provides interpretation of the numerical symbols standing for the interacting power objects. The material and cash flows in the Figure designate the following:

- ЭIII-I, ЭIV-I, ЭV-I – **power production by PJGC, NPP and APU within the power union network;**
- ЭI-II – **selling of power by energy union to power-suppliers;**
- VI, VII-I, VVI-0, VVI-I, VVI-II, VVI-III, VVI-IV – technical, resource, investment and financial, mediator, a.o. services;
- ОЭ0-III, ОЭ0-IV, ОЭ0-V, ОЭII-0 – payment for power;
- ОY0-III, ОY0-IV, ОY0-VI, ОYII-VI, ОYIII-VI, ОYIV-VI – payment for technical, resource, investment and financial, mediator services.

The first index in the designations of material and cash flows indicated above refers to the object, which markets power, renders services or makes payments, and the second index refers to the object-receiver. Below are the numerical designations of interacting power market participants:

- 0 control center and its regional departments;
- I high voltage 220-750 kW electrical network;
- II public joint-stock power supplying companies (PJSC);



For a higher level of hierarchy, e.g., for a regional level, to assess the effectiveness of a specific OFS version one can use such indicator as the sum of contribution to the budget made by power market participants.

The scheme given in the Figure is used only to illustrate the principle of formalized description of commercial interaction applied to one out of many possible versions. OFS versions in specific calculations can be rather diverse and their variation consists in redistribution of different control functions among them, in changed quantitative characteristics of interaction, etc. The operational reliability of the mentioned objects is in direct relation to the extend to which earnings from payments cover the expenditures on maintenance and repair works (MARW) of the operational equipment, ensure the income accumulation in the amount sufficient for budget contributions, contributions to the centralized funds, whose availability of means can create a possibility to improve the fixed capital stock of the branch, etc. While making an estimate of the considered OFS version effectiveness it is necessary to take into account the conditions, provided in the table below. Factors 1.1-1.9 apply to all the relevant objects. Restrictions 2.1-2.3 apply to PJGC and the energy union integrally, while 2.4 is of a more general character. Restrictions 2.1 and 2.2 determine the lower limit of the PJGC, NPP and high voltage electricity networks operating costs, and restrictions 2.3 and 2.4 – the upper limit of power sales proceeds and earnings from services rendered to customers. Efficiency factors can also be considered selectively depending on what objects the task is related to.

The indicators from (1)-(3), whose interconnection is reflected in the above given structure of interaction, depend on work standards as well as on the numerical level of operating mode indicators of the energy union objects and the consumer power supply reliability. According to the new conditions of economic management, the above mentioned sources and components of payments are practically the only source of funds that ensure industrial and economic activities of the power enterprises.

The process of formation of these means is extended in time. The characteristics of this process depend on a specific content of the OFS modeled, whose structural functional and quantitative parameters are in a general case invariable over time. That is why an indispensable element of the complex of tools used for modeling technical and economic results of OFS implementation must be an appropriate system of situational models, with the help of which it is possible to track and predict the process of returns from the production consumed and services rendered, as well as the accompanying charges in the technical and economic indicators of the control object in a similar way to the one illustrated.. Such tracking makes it possible to get an idea of real possibilities of a specific OFS version within the time interval of a given period of  $T_0$  duration, within the range of which OFS application is planned. To make the situation estimates of the operating mode indicators of energy objects and their reliability, approved standard estimation software tools should be used, and subsequently situational estimate should be generalized for each of the analyzed versions. Meanwhile it must be taken into consideration that the structural model of OFS may be invariable within  $T_p$ , but situational nature of results of OFS application is still possible while there might be a change in macroeconomic conditions, technical state of the equipment in use and in other characteristics of the control object, which cause the change of its maintenance costs, of the size of payment components in (1) – (3). Generally, it should be noted that the OFS proper, meant to be used during a rather lengthy  $T_p$ , is more stable than the indicators estimating it and the organizational – economic and technical factors that influence them.



Conditions, restrictions and results	Contents
1. Accountable factors	1.1. The structure of power objects interaction among themselves and with the external environment. 1.2.The forms of ownership of the power complex objects 1.3. Belonging to administrative and balance units. 1.4. The level of centralization of control over interrelated power objects' operating mode. 1.5. The level of centralization of resources for MARW. 1.6. The share of administrative expenses in the power object operating cost. 1.7. Taxation and other contributions to budgets and centralized funds. 1.8. Product and service sales proceeds. 1.9. Production cost value.
2. Accounted restrictions	2.1. Fuel cost. 2.2. The cost of spares, equipment and other services. 2.3. Power release price. 2.4. The cost of services rendered by power enterprises (reciprocal services and services rendered
3. Possible economic results	3.1. Economically sound level of centralization of control over the operation of power objects. 3.2. Improvement of power supply reliability. 3.3. Reduced operating time of power facilities. 3.4. MARW resource shrinkage if they are ordered and stored centrally. 3.5. Reduction of general expenses on supply of resources (spares, fuel, reduced number of personnel of different categories). 3.6. Increase of power equipment serviceability by means of more effective use of technical diagnostic systems. 3.7. Increased efficiency of settling with the consumers by means of applying respective technical systems calculating energy consumption, which are centrally controlled. 3.8. Increased efficiency of power facility control by means of optimization of MARW Schedule diagram

Table 1. Conditions of selection and possible results of realization of type of commercial interaction among energy complex.

5. Conclusion

In the process of preparing decision on adjusting the normative regulation of industrial and economic activities and managerial decision to the new conditions of energy system operation it is necessary to make a quantitative assessment of the technical and economic results of applying the organizational and functional managerial structures that control



the power objects and of their commercial interaction. Restructuring of energy sector and creation of competitive environment for smooth operation of the market participant interactions should be done in stages starting with the total deregulation of primary energy sources. The various factors that can affect the efficiency and stability of power supply in developing countries according to [Oricha, 2009], are government policy, economy factor, society/community factor, natural phenomena factor, efficient technology and skilled personnel. These factors mentioned above should be taken into consideration when preparing for restructuring of energy sector and privatization of public utilities.

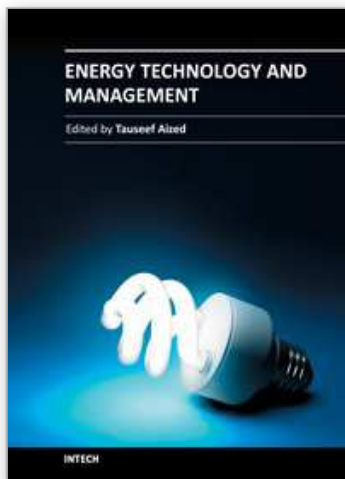
## 6. References

- John Surrey [1992] Energy policy in the European community *The Energy Journal International Association for Energy economics*, volume 16 Number 3
- David M.N [1995] Power markets and market power, *The Energy Journal International Association for Energy economics*, volume 16 Number 3
- Nedin I. V & Oricha J.Y (1998), Management Crisis in Power Industry and Priority Ways to Overcome It. "Power Industry and Market" National Technical University of Ukraine Vol.3(4)- 4(8) 1998 – p26-30. ISSN – 40692.
- Oricha J.Y. The Influence of Subjective Factors on the Ukrainian Energy Market Efficiency "Herald of the Ukrainian House of Economic and Scientific-Technical Knowledge", 1998. Volume 6 - p104-108.
- Nedin I.V, Oricha J.Y, Sheverev V.E. Economic Assessment of Organizational and Functional Structure of Market Participants in Power Industry "Herald of the Ukrainian House of Economic and Scientific-Technical Knowledge-1999 –N5 –p.64-71
- Oricha.J.Y, Nedin .I.V,. Monitoring Process of Mutual Settlement- Conditions of Effective Commercial Interaction in Energy Production. file://Thesis speech scientific conference" Market and Logic in Management system" Lvov State University" Lvov Polytechnic 1998 p138.
- Nedin I.V, Ryzhov V.v., Oricha J.Y, Chastockolenko I.P: Influence of Subjective Factors on Effectiveness of Energy Market Liberalization /Proceeding of the Russian National symposium on Power Engineering (RNSPE) Kazan, Russia, 10-14 Sept.2001, Volume II, p.209.
- Fraser P., Huist N. V (2003), *Power generation investment in electricity markets*. ISSN 75775
- Oricha J.Y, Jimoh Boyi, Muhammed B. Mu'azu. Restructuring the Electrical Energy Sector and Analysis of Electricity Market Models in Nigeria. *International Conference and Exhibition on Power Systems*, University of Lagos July, 2007. ISBN: 978-37052 - 2-9
- Daniel S.K & Garan .S. (2004), *Fundamentals of Power system Economics*, ISBN- 0-470-84572-4.
- Oricha J.Y, Tolu Akinbulire, Peter Ola, C.O.A. Awosope. Comparative Analysis of Crisis in Electricity Sector in Emerging Economy. Proceedings of The 1<sup>st</sup> National Engineering Technology Conference (NETeC 2008) p 140- 144
- The Nigerian Electricity Regulatory Commission (2008), *Guide to the development of independent power plants*

Oricha J.Y. Analysis of Interrelated Factors Affecting Efficiency and Stability of Power Supply in Developing Countries. IEEE Africon conference 2009, Nairobi, Kenya.

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The civilization of present age is predominantly dependent on energy resources and their utilization. Almost every human activity in today's life needs one or other form of energy. As world's energy resources are not unlimited, it is extremely important to use energy efficiently. Both energy related technological issues and policy and planning paradigms are highly needed to effectively exploit and utilize energy resources. This book covers topics, ranging from technology to policy, relevant to efficient energy utilization. Those academic and practitioners who have background knowledge of energy issues can take benefit from this book.

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