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UKRAINE NATIONAL ELECTRICITY REGULATORY COMMISSION REPORT ON KEY REGULATORY ISSUES

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EXECUTIVE SUMMARY

This report is prepared in satisfaction of Delivery Order 18 NERC Deliverable number 8 "Final report on key regulatory issues and recommendations to resolve them "

The report contains three Chapters

Contracts for Differences Energomarket is a power pool in which, with a few relatively minor exceptions, all market members are required to sell power to and buy power from the pool A natural consequence of such power pools is financial contracts between buyers and sellers in order to provide price certainty An example of such contracts is the Contracts for Differences now used in the UK In addition, financial contracts in Ukraine would enable buyers of power to buy power at a lower price in return for cash Such financial contracts do not now exist in the Energomarket This Chapter recommends they be adopted and enumerates measures that should accompany their introduction

Micronets Micronets — Local Electric Companies not controlled by Minenergo — are a profound problem for the regulation of the electric sector, but have been almost completely ignored in the restructuring of the Ukrainian power sector There are literally thousands of micronets, so that they cannot be closely regulated as providers of natural monopoly utility services This Chapter delineates the many problems associated with micronets and offers recommendations on how to begin the process of bringing micronets under appropriate regulation

Independent Electricity Suppliers Independent Electricity Suppliers (IESs) have the potential to act as a powerful positive force in the Ukrainian electric power sector IESs are among the most progressive, imaginative and market-oriented players in the electricity market Competition, when it is possible, is generally far superior to any regulatory agency in providing benefits to consumers However, competition to supply electricity to small consumers is a data intensive, technologically challenging and expensive process Ukraine has not developed the capability to enable competition to serve small consumers, but it nonetheless is allowing IESs to serve remarkably small commercial and industrial customers, and there is a movement afoot to allow them to serve residential customers This Chapter argues that restrictions must be placed on the ability of customers to buy power from IESs on the grounds that otherwise it will be impossible to operate the Energomarket in a rational way

CHAPTER 1
BILATERAL CONTRACTS

1.1 INTRODUCTION

We propose the development of bilateral *financial* contracts between generators and suppliers to use as an adjunct to the Energomarket pool These bilateral contracts must take the form of financial contracts, the generating companies must continue to sell all their output to Energomarket, and suppliers must continue to buy from Energomarket A direct bilateral contract which is not a financial contract (and which hereinafter will be referred to as a "direct contract") between a generating company and a supplier under which the generating company did not sell the contracted output to Energomarket would destroy the Energomarket pool Direct contracts must be strictly forbidden There is nothing wrong with direct contracts per se, as there are many power pools around the world in which such contracts are the norm However, the rules which govern these pools were developed with the existence of direct contracts in mind The Energomarket rules were developed to accommodate a situation under which direct contracts were forbidden Therefore, to allow direct contracts, the Energomarket rules would have to be substantially rewritten

Properly structured, bilateral financial contracts would benefit generators and suppliers by providing

- A vehicle for suppliers to pay cash to generating companies in return for lower energy prices, and conversely allowing generating companies to obtain more cash in return for charging lower energy prices
- A stable energy price for both thermal power generators and suppliers
- An assured price to investors in new generation plants, greatly reducing investors' risk in new power plants and thereby increasing investments in Ukraine

These proposed contracts are closely related to an internationally well-known contracting mechanism in place in the United Kingdom, known as Contracts for Differences (CFDs), and therefore we shall call them CFDs However, the CFDs used in the UK can only be transplanted to Ukraine with adjustments to reflect the low percentage of cash collections received by Ukrainian electricity suppliers

A CFD is a form of futures (or, more precisely, forward)[1] contract Futures and forward contracts tend to arise spontaneously in spot markets in which prices are volatile because, all else equal, buyers and sellers prefer stable prices to volatile prices There are robust futures and forward markets in many countries in numerous products, including crude oil and oil products, natural gas, agricultural commodities, foreign exchange, metals and, in the United States, electricity

1.2 CONTRACTS FOR DIFFERENCES IN THE UK

CFDs dominate the electricity market in the UK As is well known, the electricity pool in the UK closely resembles the Energomarket pool, and indeed was the model for Energomarket The basic CFD mechanism in the UK is that two parties, generally a generator and a distribution company but sometimes a generator and an industrial company

- Enter into a contract with a fixed price per MWh (the "exercise price")
- Continue to buy and sell power from the pool, and
- Outside the pool provide each cash payments to offset the pool price in order to meet that exercise price

Through this mechanism, even though the two parties continue to buy and sell from the pool at a price that varies each half-hour,[2] they effectively buy energy at the exercise price and not the pool price

An example of a CFD is shown the two tables below In this example, the supplier and the generator have entered into a CFD for 100 MW in every hour at an exercise price of $30/MWh The generator and the supplier continue to buy from and sell to the pool, but also directly compensate each other when the Wholesale Purchase Price (WPP)[3] is above or below the contractual exercise price of $30/MWh In this example, we assume that uplift is $2/MWh in every hour [4] If the WPP is $35/MWh, the generator gets $35/MWh from the pool but pays $5/MWh for 100 MWh to the supplier, for a net of $30/MWh, while the supplier

[1] A forward contract is between two parties themselves A futures contract is entered into between an exchange and the party Futures contracts are generally much more liquid than forward contracts are, because generally on futures markets there are many buyers and sellers so that any individual contract can easily be sold

[2] In the UK the pool price changes every half hour rather than the hourly changes that occur in Energomarket

[3] The UK pool uses different terminology for items such as purchase and sales prices, but for ease of exposition this paper uses the relevant Energomarket terms

[4] Uplift is comprised of costs incurred by Energomarket other than purchases of energy from thermal generators, such as purchases from hydro and nuclear generators, NDC costs and high voltage costs

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pays $35/MWh to the pool but receives $5/MWh for the 100 MWh, for a net of $32/MWh ($32/MWh = $30/MWh for the WPP plus $2/MWh for the uplift) If the WPP is $25/MWh, the generator and supplier transact with the pool at that pool price, but the supplier also pays the generator $5/MWh for the 100 MWh, so that again the net price for both parties is adjusted so that the effective WPP for them is $30/MWh [5]

Case 1 WPP = $35/MWh, Uplift =$2/MWh	
WPP	$35/MWh
Exercise Price	$30/MWh
Difference	$5/MWh
Payment **to Supplier**	$5/MWh
Effective Price for Generator	$30/MWh = $35/MWh - $5/MWh
Effective Price for Supplier	$32/MWh = $35/MWh - $5/MWh + $2/MWh

Case 2 WPP = $25/MWh, Uplift =$2/MWh	
WPP	$25/MWh
Exercise Price	$30/MWh
Difference	($5/MWh)
Payment **to Generator**	$5/MWh
Effective Price for Generator	$30/MWh = $25/MWh + $5/MWh
Effective Price for Supplier	$32/MWh = $25/MWh + $5/MWh + $2/MWh

1 3 ADJUSTMENT NECESSARY IN UKRAINE TO COMPENSATE FOR LOW CASH COLLECTIONS

Cash collections in Ukraine are only about 10-15%, on average This causes three problems for CFDs

- Under a CFD, when the pool price is less than the contract exercise price, the generating company is supposed to pay the supplier the difference between the pool price and the exercise price In Ukraine, the generating companies have insufficient cash resources to make credible commitments to honor such obligations in cash

- Once privatized, oblenergos should start to collect more cash An oblenergo that collects cash from its customers can pay cash to generators for its energy needs, and thereby negotiate a lower price for its energy However, in order to do so it must have

[5] As discussed below, a difference between the UK pool and Energomarket is that all generators in the UK selling to the pool are paid the pool price while in Ukraine the nuclear and hydro generators are paid contract prices which on average are below the price paid to thermal generators

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some mechanism under which it can provide that cash directly to the generator A classical CFD would not allow this transfer to take place because payments are only made for the difference between the exercise price and the pool price and not for the whole amount of the exercise price

- Any companies constructing new power plants will want to receive cash, not barter, as payment for their sales Most or all oblenergos today have insufficient cash to make credible commitments to provide the required amount of cash to new generators

The third problem can not be solved by the introduction of CFDs, but can only be solved by increasing cash collections by oblenergos We have heard numerous complaints that the structure of Energomarket reduces the incentive for potential investors to invest in the electric power industry of Ukraine Two of the stated reasons — the lack of a formal relationship between generator and supplier and the risk inherent in fluctuating energy prices — are addressed by the subject of this Chapter However, the other reason often stated — the inability of Energomarket to provide the new generator sufficient cash — is actually a problem stemming from the dismal state of cash collections in Ukraine, and can only be addressed by increasing cash collections There is no oblenergo in the country — with the exception of Kievenergo — that collects sufficient cash to pay a large new generating station

The first two problems caused by the low cash collections in Ukraine can be solved simply by introducing CFDs and (much as today) allowing suppliers and generators to specify a volume of electricity to be valued at the hourly pool price (either WPP or WMP) and having that value deducted from the amount otherwise due to the generator by the pool and from the supplier to the pool CFDs would be external to Energomarket Suppliers and generators that are not parties to a particular CFD would not be affected by the existence of a CFD Deduction of equal monetary amounts does not affect other participants and should continue to be allowed

A generator and supplier could enter into a contract specifying a volume for each hour of the day, and have Energomarket deduct from the amount owed to the generator and owed by the supplier an amount equal to the WPP times the volume or the WMP times the volume, it really does not matter to Energomarket (although for the generator the WPP would be a better choice) As long as the financial amounts are equal (and not greater than the total financial amount owed to the generator or from the supplier in that day), no one other participant in Energomarket would be affected For example, a supplier and a generator could enter into a contract under which the supplier bought 10 MW in every hour Energomarket would simply deduct from the amount owed to the generator and from the amount owed by the supplier an amount equal to the Wholesale Purchase Price times 10 MWh in every hour This is very similar to how Independent Electricity Suppliers purchase power from

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Energomarket today, the only difference is that IESs and generating companies do not today enter into financial side-deals to ensure a stable price

Direct contracts (i e , bilateral contracts that are not financial contracts) between suppliers and either nuclear power companies or hydroelectric power companies would raise the price paid by all other suppliers There are two reasons why nuclear and hydroelectric power companies are today paid a lower average price than thermal generating power companies are paid

- To maintain the profits received by nuclear and hydroelectric power companies at a reasonable level, and
- To maintain the retail price paid for electricity by the citizens of Ukraine at a reasonable level

Direct contracts, removing nuclear and hydroelectric power companies from the Energomarket, would violate the second principle [6]

A supplier and a generator entering into a CFD need to plan for periods in which the generator has insufficient generation or the supplier excess demand For example, a generation company might hedge, say, 80% of its projected output A generation company's output, however, will sometimes be below 80% of average In such a case, the generator will need to pay the supplier out of proceeds other than what it bought from the pool For example, say a generator has hedged 800 MWh but only sells 600 MWh to the pool The exercise price is $30/MWh while the pool price is $35/MWh As a consequence, the generator must pay the supplier(s) $5/MWh for the 800 MWh, or $4,000 This is not any problem for the 600 MWh for which it received $35/MWh However, for 200 MWh, the generator did not generate anything and therefore did not receive any payment from the pool Therefore, it must pay $1,000 (= 200 MWh x $5/MWh) in cash out of its working capital for that hour [7] Over 24 hours, this deficit would sum up to $24,000, which in Ukraine today is a significant amount of cash

[6] This is not to say that we agree with the policy of paying nuclear and hydroelectric power companies less than thermal generating companies are paid However, since the differential exists, it ought to be used for all consumers and not just a favored few

[7] Note that an overhedged generator has an incentive to drive *down* the pool price, rather than the usual incentive to drive the price up (or for a perfectly hedged generator no incentive whatsoever with respect to the pool price) This is because the generator must pay the supplier (or receive from the supplier, depending on which price is higher) the difference between the pool price and the exercise price, and obviously the lower the pool price the lower the payment required to be made by the generator or the greater the payment required to be made to the generator

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1 4 MARKET FUNDS PROCEDURE

An oblenergo that does not collect substantially all of the money owed it in cash will not be financially able to enter into a CFD because it will receive too little cash from the MFP to be able to provide the genco an assured stream of cash to offset the difference between the exercise price and the WPP when the WPP exceeds the exercise price An oblenergo that does collect all or nearly all its accounts receivable in cash will not be affected by the MFP or indeed could be exempted from the MFP by simply paying its bills on time in full in cash

Under the current structure of the MFP, a genco would have a powerful incentive to enter into a CFD because one of the driving forces behind CFDs presumably will be the desire of oblenergos that collect their bills in cash to pay cash for energy at below-market prices That is, the genco could get some cash from the MFP for its unhedged volumes and full cash from the oblenergo for its hedged volumes If its hedged volumes were treated as proposed above, it would not receive any cash from the MFP for those volumes

In short, no changes to the MFP are required to accommodate CFDs

1 5 HEDGING ECONOMIC REQUIREMENTS

Hedging activities are something of an anomaly in that, if performed correctly, they can significantly reduce the risk faced by a firm and thereby substantially increase its financial health, but if performed incorrectly they can significantly increase the risk faced by a firm and thereby substantially reduce its financial health It is therefore important that hedging be carried out with extreme care

The primary purpose of a CFD is to reduce price volatility All else equal, businesses and persons prefer stable prices over volatile prices A residential customer wants to know what its price will be in the coming months and year A business wants to know what its revenues and costs will be Price certainty makes planning easier and, to the extent it reduces risk, increases the value of the firm However, especially for a business, if a CFD locks in an assured price while costs are free to float, or locks in a cost while prices are free to float, the risk to the business can be substantial [8]

[8] Examples of this are legion Two examples are well known in the U S Savings and Loans in the 1970s and 1980s had locked-in, long-term housing mortgage interest rates (the income side) but paid variable short-term interest rates (the cost side) This disparity crippled the Savings and Loans when interest rates rose because their income was fixed while their costs rose Natural gas pipelines in the 1980s entered into long term contracts with gas suppliers at high prices When in the mid-1980s, many customers obtained the right to buy from alternative suppliers, natural gas pipelines were forced to lower prices (income) but could not lower their costs

A generating company, for example, that locks in the price it is paid for electricity it generates runs the risk that its fuel prices will rise The market price of power sold by generating companies in a competitive market in equilibrium is primarily a function of the cost of fuel When the price charged by gencos for electricity is unconstrained by CFDs and free to fluctuate, a rise in the price of fuel would tend to be accompanied by a concomitant rise in the price of electricity However, for power contracted under a CFD, the price of electricity would be fixed and, as a consequence, any rise in the price of fuel would come out of the genco's profits (and, conversely, any decrease in the price of fuel would increase its profits)

When the generation and distribution companies in the UK were first privatized in 1990, the government required the gencos prior to privatization to enter into multi-year CFDs for a substantial proportion of their projected purchases of electricity To balance the generation companies' risk profiles, the government also required the generators enter into take-or-pay contracts with coal companies at stable prices [9] This dual hedging locked in profits for the generating companies, making them more attractive to investors and increasing the price the government could charge for the generating companies' privatization

Distribution companies in Ukraine should face far less risk in CFDs Under the Regulated Tariff Supplier licenses, oblenergos will charge retail customers prices calculated according to a formula under which the price of energy is flowed through to their customers By virtue of this formula, the oblenergo is automatically equally hedged in both its costs and its price – but only for its captive customers [10]

However, if the oblenergo (or any other supplier) enters into a CFD for a price that turns out to be higher than the average spot price, then any IES who buys from the pool at spot will have a competitive advantage over the oblenergo because the IES will be able to undercut the oblenergo's price

An oblenergo or other supplier should enter into CFDs with thermal generating companies for a proportion of its total sales that is equal to the ratio of its indirect purchases from thermal genco to its total purchases of energy For an oblenergo that purchases energy only

[9] "Power Markets and Market Power," Newberry, David, M, *Energy Journal*, v 16, no 3 (1995), 39-66 at 48

[10] There is a question raised here, however, which this paper will simply highlight but not discuss in detail The question is what happens when an oblenergo enters into a CFD at a particular exercise price which later turns out to be higher or lower than the average spot price (WPP)? If the exercise price is higher (lower) than the average spot price, will the oblenergo be forbidden (required) to flow through to its customers part or all of the excess (savings)? If so, then the risk of CFDs is heightened and the oblenergos will be less inclined to enter into such contracts However, if not, then the oblenergos may have an incentive to enter into CFDs with excessive prices It is arguable that oblenergos should somehow split the difference between the average spot price and their CFD price

from Energomarket, this ratio is equal to the ratio of (1) thermal genco sales to (2) all sales to Energomarket For an oblenergo that purchases from sources other than Energomarket, such as embedded CHPs or from small local generators, these non-Energomarket purchases should be added to purchases from Energomarket in computing the applicable ratio [11] This is mainly because the average price paid to thermal generating companies is higher than the price paid to nuclear and hydroelectric companies An oblenergo hedging a proportion of its energy requirements greater than the thermal genco proportion would increase the average price it paid for energy

This need to match the appropriate ratio of genco purchases can lead to problems An oblenergo's customers can switch to another supplier If the oblenergo hedges, say, 40% of its purchases to match a 40% thermal genco ratio, but then it loses 20% of its sales, then its genco ratio goes to 50% [12] This would drive up its price, putting it at a competitive disadvantage to IESs and thereby threatening even more of its sales Also, to the extent that the thermal genco ratio varies seasonally or through time, the oblenergo's hedging proportion should also vary seasonally, but such seasonal matching would be extremely difficult to create under CFDs

A CFD will also lead to seasonal price competitive advantages and disadvantages to the extent the WPP fluctuates seasonally but the CFD exercise price does not For example, if the exercise price is $35/MWh while the average summer WPP is $30/MWH and the average winter WPP is $40/MWH, then the oblenergo is at a competitive advantage in the winter and a competitive disadvantage in the summer That is, an IES buying from the pool could not compete with the oblenergo in the summer but could undercut its price in the winter The oblenergo should therefore enter into contracts with its large industrial customers which preclude the customers from seasonally switching suppliers

A supplier that is fully hedged for its (indirect) thermal genco proportion of purchases will see its price remain practically constant from hour to hour, because peak period spikes in the price of energy will not affect it [13] If it charges its customers according to the same time pattern of prices, then its customers likewise will not see any differentiation in prices over the day In short, CFDs have a tendency to dampen or eliminate the incentive effects of high peak-period prices

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[11] This concern is not raised in the UK pool, because in the UK all generators including nuclear generators, that sell to the pool in any particular settlement period are paid the same WPP

[12] 50% = 40%– (1 – 20%)

[13] In addition, because the hydro companies are paid a relatively low price and hydropower is purchased predominantly at peak, the peak period WMP would, absent any thermal price spikes, actually be lower than the off-peak prices This incentive is so perverse that this paper assumes the problem will be fixed, even absent CFDs, by a change in the Rules that spreads hydro costs evenly over all Energomarket sales throughout the day

CHAPTER 2
MICRONETS

2.1 INTRODUCTION

The term "micronet" refers to a Local Electric Company (LEC) that is not under the control of Minenergo (we will refer below to LECs under the control of Minenergo as "oblenergos" even though they are not all officially denominated as such, in order to distinguish them from micronets) At present, relations of the micronets with oblenergos and consumers are regulated by the Electricity Usage Code Very few micronets have LVNO or RTS licenses The effective Ukrainian Electricity Usage Code calls micronets "consumers having subconsumers " Electricity transmission and supply is sometimes their major but usually their supplementary field of activity, and their size varies from a hundred meters of line, serving only a few residential customers, to large networks with a volume of supply exceeding that of some oblenergos

For the new retail tariff system to be implemented properly, micronets should have some guidelines on how to set tariffs for their customers, how their transmission costs are to be covered, and how subsidies to privileged residential customers could be compensated Conflicts between micronets, and between micronets and oblenergos, have started to develop One such conflict was considered at the NERC's weekly open hearing held on June 3, 1998 The situation considered (a conflict between two micronets, Donetskvugillya and Energovugillya, and between the two of them and Donetskoblenergo) is a difficult one, and cannot be resolved and prevented within the existing framework of licensing in Ukraine

There is a considerable concern at NERC about the methodology for calculation of electricity tariffs for customers who receive electricity through a micronet, or through several generations of micronets [1] Around a year ago, NERC decided not to issue transmission licenses for another year to owners of transmission networks whose volume of transmission is below a certain limit (to exclude all local network operators other than oblenergos, railways, some coal mining companies and Ukrgazprom) With the deadline for issuance of such licenses approaching, NERC needs to develop some long-term policy in this respect

NERC has formed a working group be formed from NERC staff (Vyshinsky, Symonenko, and Krasyuk) to prepare proposals for solutions of this problem

[1] A first generation micronet is connected directly to an oblenergo, a second generation micronet to a first generation micronet, and so on We have heard of seventh generation micronets

The issues of micronets is significant both with respect to its scale – in some regions, such as Zaporizhya, around 90% of consumers are customers of micronets – and with respect to inherent difficulties It is not practical to treat all micronets in the same way as oblenergos because of the extraordinary number of micronets - around 150 of them have a monthly supply volume of greater than 10,000 MWh per month, and there are thousands of micronets in total

There is one more aspect in which the resolution of the micronet problem within the framework of the restructured energy sector in Ukraine would be extremely valuable and interesting Under the Soviet strategy of energy sector development, local electricity networks were built around large factories, and therefore the micronet problem exists in all former Soviet republics to one extent or another

2.2 Micronet Problems and Solutions

2 2 1 Donetskvugillya, Energovugillya and Donetskoblenergo

Donetskvugillya and Energovugillya are two parts of the former electricity network division of the coal mining amalgamation in Donetsk region They belong to the Ministry of Coal Industry Donetskvugillya supplies electricity mostly to residential customers (it has only one industrial customer), and Energovugillya supplies electricity mostly to coal mines Both companies possess LVNO and RTS licenses

The predecessor of these entities (existing before these entities were separated from the coal mining amalgamation and divided into two companies) purchased electricity from Donetskoblenergo, and the cost of its network maintenance and supply was included into the primary cost of coal With the introduction of internal separate cost accounting for different lines of business within the coal mining amalgamation, electricity was sold at cost to coal mining divisions, and at a far higher price to customers which were not part of the coal mining amalgamation Through this pricing scheme, a significant part of the cost of the network maintenance and supply was recovered at the expense of external customers Even with the low internal price, however, the coal mining divisions accumulated a considerable debt for electricity to the micronet When the two companies were separated from the coal mining amalgamation around two years ago the debt issue was not settled, and there are no final documents that divide between the new entities the accounts receivable accumulated at that moment

Electricity was purchased then and is purchased now from the Minenergo entity (now Donetskoblenergo) Energovugillya is connected directly to the Donetskoblenergo network, while Donetskvugillya is in part connected directly (around 10% of its consumption) and in part connected indirectly through the network of Energovugillya (the remaining 90%) Metering at points of interconnection is inadequate, and both companies have no funds to improve the metering Neither micronet has a direct access to the high voltage grid

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These two micronets were among the first to obtain LVNO and RTS licenses (which do not differ at all from the licenses provided to oblenergos) They have skilled personnel who can perform tariff calculations During the period of preparation of the licensing process and license tariff calculation, we participated in several meetings with their relevant staff during their visits to NERC A Donetskvugillya director attended the Hagler Bailly collection conference, and was very enthusiastic about the methods suggested for collection improvement In general, this company is very positive about the changes in the energy sector and ready to implement the new tariff system

The conflicts accumulated were considered at the NERC hearing on June 3, 1998 The conflict has three sides

- Donetskvugillya – Energovugillya
- Energovugillya – Donetskoblenergo
- Donetskvugillya – Donetskoblenergo

Poor metering leads to numerous accounting inconsistencies in relations between the three suppliers

Donetskvugillya – Energovugillya

Besides metering inconsistencies, old (accumulated before splitting of the companies into separate legal entities) and new debts are not fixed, and the companies are stuck in the process of attempting to negotiate the debt levels The personal relationships of the respective managements seem strained

There are also conflicts with respect to determination of service zones There have been cases of employees of one company tearing up payment books of residents who were paying to the other company and telling the residents to pay their company instead

Energovugillya – Donetskoblenergo

The main problem here is in the relationship with Energomarket and independent suppliers Some independent suppliers buy electricity from Energomarket and resell it to consumers in the Energovugillya service territory Sometimes the consumers use much more electricity than was paid for by their independent supplier, but Donetskoblenergo signed documents for the Energomarket with the agreed and paid amount The difference was deemed to be Energovugillya's debt to Donetskoblenergo, with no possibility to claim compensation from the consumer

This was the easiest issue to make decision on at the NERC hearing NERC decided that Energomarket must obtain certifying documents not only from Donetskoblenergo but also from Energovugillya Other problems were left for further consideration

Donetskvugillya – Donetskoblenergo

Here there are conflicts stemming from metering inconsistencies, and also conflicts concerning the tariff at which Donetskvugillya buys electricity from Donetskoblenergo The difference between the maximal possible revenue of Donetskvugillya (assuming 100% collections) and the amount of money to be paid by Donetskvugillya for electricity is too small to cover Donetskvugillya's operation costs

These conflicts illustrate the issues to be addressed in the regulation of micronets

- Relations with independent suppliers if the customer is located within the micronet service territory, Energomarket should be required to agree with the micronet the correct IES quantities and the micronet should receive payment for electricity transit on its territory
- Service territories must be defined accurately in each case Reference to the current status is not sufficient
- Mechanisms for covering of micronet costs should be developed
- Procedures for electricity accounting in cases of inaccurate meters should be developed

2 2 2 Existing types of micronets

Some classification of micronets is very important It is impossible to treat all micronets in the same way, and it is necessary to determine some realistic number of them that can be effectively regulated by NERC

There could be two cases of micronets with respect to the licensed activity micronets which only provide local transmission (customers connected to their network are oblenergo customers with respect to supply), and micronets which both operate the network and supply electricity to the customers connected to the network

If we use as criteria specific problems for particular types of micronets, it is necessary also to determine the following

- Need for subsidy certificates (existence of residential or agricultural customers)

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- Possibility of direct connection to the high voltage grid
- Voltage class and type of connection to the oblenergo network
- Location on the territory of one or several oblenergos
- Number of customers and of downstream micronets
- Financial state of companies, technical state of networks
- Availability of qualified personnel

2 2 3 Tariff problems within the existing methodology

If all micronets were to obtain LVNO and RTS licenses, in principle it would be possible to apply the existing tariff methodology to micronets This could be done by adding the micronet's license local transmission tariff to the retail tariff formula, and by taking into account its loss factor in calculation of the energy component of the retail tariff

Many micronets (owners of smaller local low-voltage networks) are eager to obtain licenses from NERC, as they see here the possibility of recovering their transmission costs At present three different approaches to the recovery of such costs are used

- A micronet performs some calculation of its costs (based on a calculation approved years ago by the Ministry of Economics), and receives compensation from the oblenergo (in theory, in practice, it may be compensated by electricity)
- A micronet calculates its costs and some additional tariff for its customers, and this micronet tariff is added to the usual oblenergo tariff Residential customers in this case pay only the standard residential tariff for the relevant type of the residential consumer, no additional tariffs are applied
- The micronet is not compensated in any way, the transmission cost and electricity losses are included into the cost of the main product of the micronet owner

All three approaches may be combined, and there are cases when micronets set their own electricity tariffs (the Lviv railway, for example, set its own tariffs for shops and kiosks located at railway stations These tariffs were much higher than those set by the Ministry of Economics or NERC)

The first two approaches are not transparent, and all three of them violate the principles of NERC's Temporary Methodology for Setting of Retail Electricity Tariffs All three approaches

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basically generate complaints by micronets that they supply electricity at loss (although some micronets earn a substantial profit from their electric business

The direct extrapolation of the Temporary Methodology for the case of micronets would lead to a considerable increase in the end customer tariff, especially for the multiple-generation micronets For example, the retail tariff formula for the customer of a second-generation micronet that is connected to the oblenergo network at the second voltage class would be

$$RT_i = \left[\left\{EPP/\left[(1-k_1)(1-k_2)\right]+T_2+S_i\right\}/(1-k_m^1)+T_m^1+S_m^i\right]/(1-k_m^2)+T_m^2+S_m^i$$

where EPP is the electricity purchase price (the average price paid by the oblenergo), k_1, k_2 are loss factors for the first and the second voltage class in the oblenergo local network transmission license, and T_2 and S_i are the transmission fee and supply fees for i'th customer class in the relevant oblenergo licenses

k^1_m, k^2_m are license loss factors for the first and the second micronets,
T^1_m, T^2_m are transmission tariffs for the first and the second micronets,
S^1_m, S^2_m are supply tariff for the first and the second micronets

No detailed study of the retail tariffs that would result from application of this formula has been attempted Even if the increase would not be considerable (up to 10%), some would argue that customers of the same type in the same region should pay the same price

2 2 4 Specific problems with respect to the supply to residential customers

Subsidy certificates are, at least in theory, a mechanism that would allow any regulated tariff supplier to recover its losses from supplying electricity to residential customers at set prices lower than those calculated from the license formula

This mechanism does not contain provisions for such compensation for unlicensed micronets, as subsidy certificates can be issued only to regulated tariff suppliers and can be used for purchase of electricity at the Energomarket, not for payment to an oblenergo or an independent electricity supplier

There could be problems with respect to service standards for supply to residential customers This issue requires development of strict service standards to residential customers, and measures to deal with violations of these standards, up to mandatory transfer of the network to the oblenergo

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2 2 5 Transfer of electric networks to oblenergos

The best solution to the micronet problem would have been to transfer them to oblenergos' ownership and operation This option might have been somewhat easily implemented (but for purely technical constraints) some five years ago, before the start of mass privatization

Now many networks belong to privatized companies or joint-stock companies subject to privatization, and the electrical network is included into the statutory funds of these companies If some time ago many government-owned factories were ready to hand their networks over to oblenergos for free (although oblenergos did not want to take them because of extra maintenance cost), now many micronet owners reportedly believe that they can get extra revenue from owning the network

Residential customers viewed some time ago as a burden now are considered by some micronets to be a source of cash If a micronet buys electricity from an independent electricity supplier at a discounted price by means of a non-cash transaction, it may be interested to get more or less stable cash revenue from residential customers

It is necessary to study the issue of the network transfer in detail from the legal point of view Major attention should be given to transfer of the networks belonging to bankrupt companies and to those who are unable to maintain them accordingly

2 2 6 Proposals for a special type of supply license

It has been suggested that micronets should have some separate type of retail supply license This 'minor' supply license would have simpler requirements than a regulated tariff supply license and would allow the micronet to buy electricity from the oblenergo rather than from the Energomarket

If all micronets were to obtain standard RTS licenses and buy electricity directly from Energomarket, the sheer number of them would overwhelm Energomarket's resources Purchase of electricity from Energomarket also requires qualified personnel, and the majority of micronets, being in poor financial condition, would be unable to hire such people

Creating a special license for the regulated tariff supply permitting electricity purchase from an oblenergo or an upper level micronet may be a solution to this problem

2 2 7 Electricity purchase by micronets

It appears that currently many micronets buy electricity from independent suppliers (using barter payments and at highly discounted price compared to the price that would be charged by oblenergos) If the suggested special micronet license were to require that the micronet buy its

electricity from oblenergos, micronets would not want to obtain these licenses as it would raise their purchase prices It even may be quite profitable for them to buy electricity at the discounted price by means of barter, and then sell it at the regulated price to residential consumers for cash

If the current situation with electricity purchase from IESs is allowed, it would be impossible to check the real purchase price that goes into the retail price formula, and some micronets would likely earn excessive profits

2 2 8 Four voltage classes

The existing principles of the tariff methodology could be applied to micronets in a more consistent way if there were four voltage classes, and also a special voltage class for residential consumers (to accommodate additional costs for the maintenance of meters and internal network in apartment buildings)

In this case the prices charged by a micronet to its end use customers would be higher than the prices charged by the oblenergo to its customers, but the difference would be much smaller than under the current two voltage class system

Another option is to spread the micronet's transmission costs among all the customers on the oblenergo territory This option would be easier to implement if the micronet were only a local transmission licensee, and the customers were supplied by the oblenergo's RTS division The oblenergo would pay the micronet for electricity transmission, and include the relevant amount to its total transmission cost It is necessary to mention that this option would cause VAT-related problems

2 2 9 Short-term and long-term policy options

In principle there could be three main policy options (assuming the same treatment for all micronets)

- NERC does not regulate micronets at all (licenses for them should not be issued), and their operation is regulated by the Electricity Usage Code
- Micronets receive standard LVNO and RTS licenses
- Micronets receive special licenses similar to RTS licenses, the main difference being the possibility of buying electricity not from Energomarket, but from the relevant oblenergos (or independent suppliers)

There could be also combination of all three approaches depending on the size of a particular micronet and its features and structure

There is no universal solution to the micronet problem Probably the treatment of a particular micronet should depend on its size and particular features, and the number of micronets of a similar type

The following steps to the solution should be taken

- Perform a preliminary study to make a classification of micronets (by types of customers, levels etc) Determine size brackets for statistical research
- Prepare a questionnaire for NERC's local offices and oblenergos
- Find out the number of micronets in different oblenergos, for each category and size bracket
- Distinguish between micronets that can be in principle be transferred to an oblenergo's ownership and those that cannot
- Evaluate the number of micronets that it would be feasible for NERC to license
  - largest micronets (to be given regular licenses)
  - micronets of the intermediate size to be given special licenses
- Determine the licensing limits for the micronets (the size in each category when it is not subject to licensing)
- Prepare regulations on licensing, tariffs and service standards

CHAPTER 3
INDEPENDENT ELECTRICITY SUPPLIERS

3 1 INTRODUCTION

Article 25 of the Electricity Act of Ukraine states that "Electric power consumers shall have the right for choice of their electricity supplier " No restrictions are placed on this right Reading this clause expansively, then, it has been argued that Independent Electricity Suppliers (IESs) should be allowed to serve all retail consumers, including residential and small commercial customers, without any restrictions

To read Article 25 of the Electricity Act in such a way is, to be blunt, absurd It is impossible — not merely undesirable or less than optimal, but impossible — for Ukraine to implement a policy of allowing IESs unfettered access to all retail customers The metering and data processing requirements of implementing such a policy are enormously expensive and complicated

We therefore propose that Ukraine interpret Article 25 of the Electricity Law to mean that the right to purchase electric power from IESs is restricted to those retail consumers that possess the technical means of enabling such purchases Specifically, the only customers allowed to buy power from IESs should be customers with

- A maximum demand greater than 1 MW and
- An hourly meter with the means to telecommunicate the hourly consumption of the customer to the National Dispatch Center or the Local Electric Company which has a Low Voltage Network Operator license to provide distribution services in the area where the retail customer is located

Operationally, Energomarket must be required to change its current practices in several ways

- Energomarket must take into account low voltage losses for the customers of IESs when determining the amount to charge the IESs for purchased power — today Energomarket does not do so and therefore charges the IESs too little

- Energomarket must account separately for IESs and their affiliates For example, sales to the market by thermal generating companies and purchases from the market by their IES affiliates must be separately accounted for

- In the event that IES customers continue to be allowed to buy under load profiles (i e , hourly meters are not required), those load profiles must be proven to be accurate for the type of customer For example, a customer that ceases operations at night must not be allowed to purchase energy under a load profile that is flat across the entire 24-hours of the day

- All IESs must report *every day* to Energomarket for each customer either the customer's hourly meter readings or, in the case of customers with load profiles, the customer's daily meter readings

The remainder of this Chapter discusses the restrictions that have been imposed in other countries on purchases from entities equivalent to Ukraine's IESs

3 2 THE UNITED KINGDOM

The United Kingdom restructured its electricity market in the late 1980s and privatized the bulk of the industry in 1990 Prior to the restructuring, the electricity market structure in the UK was similar to the electricity market structure in Ukraine prior to the restructuring that has taken place here, and the two structures after restructuring were also similar Indeed, the UK was the model on which the Ukrainian restructuring was based In both countries, prior to restructuring the industry was vertically integrated and owned by the state After restructuring, the industry was vertically disaggregated into its constituent parts of distribution, transmission and generation Both countries allowed competition from IESs[1] to supply customers that had been restricted to buying from the monopoly electricity company and therefore had not had any choice of electricity supplier There was one profound difference between the UK and Ukraine, however In the UK, when IESs began to operate in 1990, only those customers with a demand greater than 1 MW were allowed to purchase from IESs Four years later, in 1994, customers with a demand greater than 100 kW were also allowed to buy directly from IESs The UK was scheduled to begin full direct retail access in April 1998, a full 8 years after restructuring, but this date has been deferred to October 1998 because the computerized billing software was not ready

[1] In the UK, IESs are called "second tier suppliers " For the sake of clarity, however, this paper calls them "IESs "

Retail customers in the UK able to buy directly from IESs enjoyed numerous benefits They obtained "significantly lower prices" and "a greater choice of contractual terms, including billing and payment methods "[2] Customers who were eligible to buy from IESs but chose to continue to purchase power from the relevant LEC also enjoyed those same benefits, because the LEC was forced by competition to provide those benefits or lose the customer to an IES [3]

All customers who bought power from IES were required to use a meter which read their consumption every half hour (the UK pool sets prices every half hour, rather than the hourly pricing followed by Ukraine's Energomarket) This meter was read remotely every day The cost of such a meter and the necessary communications interface was £150 to £200 per year per metering system Moreover, the LECs charged all customers in the greater than 100 kW market an average of £299 per year to pay for the necessary communications links [4]

Beginning in October 1998, the UK will allow all customers, regardless of size, to buy power from IESs The regulator, OFFER, considered the option of continuing to require all customers buying from an IES to use a half-hourly meter, but decided that the cost of the required metering and communications systems was prohibitive [5] Instead, the regulator decided to allow the use of load profiles for customer types Under this system, a residential customer will be assigned a load profile, with a percentage of consumption in every hour That hourly percentage is applied to his total consumption to arrive at his half-hourly consumption His half-hourly consumption is applied against the relevant half-hourly pool price (or some blended pool/CFD price) to derive his half-hourly charge The LEC and the IES are required to use the same load profile for any particular customer [6]

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[2] *The Competitive Electricity Market from 1998*, Office of Electricity Regulation, January 1995, at 2

[3] Id

[4] Id At 6

[5] Id At 7-9

[6] Id At 9-11

In brief, the contrasts between the UK and Ukraine are

Parameter	United Kingdom	Ukraine
Size of customer allowed to buy from IES?	1st 4 years only customers with demand > 1 MW Next 4 years only customers with demand > 100 kW	None
Meter required to buy from IES?	8 years half-hourly meter After 8 years approved load profile	None
Total transition period	8 years	3 years

3.3 THE UNITED STATES

There are 50 states in the United States, each with its own mode of retail electricity regulation, so that it is impossible to describe any one model of treatment of IESs There is one area of similarity between states, however caution In each state which is moving toward complete retail access, at least one utility in the state has instituted a pilot program under which a small subset of consumers has been granted complete retail access Only after lessons are learned from the pilot will the program become statewide For example, New Hampshire held a pilot using four utilities and a mere 17,000 customers New York operated a pilot with 1,500 residential customers Illinois's pilot was for 2,365 customers in three small towns [7]

Where load profiling has been allwed under direct retail access, extremely strict guidelines have been applied A good example is the guidelines of the PJM pool which operates primarily in Pennsylvania, New Jersey and Maryland The PJM pool, like Energomarket, is an hourly pool All purchasers, including IESs, submit to PJM a schedule containing prices the suppliers are willing to pay and load forecasts of consumption for the following day PJM then schedules and dispatches the pool on the day of operations and determines loads for each supplier Inevitably, however, there will be differences between the load profiles and the actual consumption In the future when residential customers are allowed to buy directly from

[7] "Residential Pilot Programs," *Public Utilities Fortnightly*, Jan 1, 1997 at 16

IESs, there will inevitably be differences between projected and actual consumption because (1) the load profile will contain not just hourly percentages but also amounts and (2) the residential customer's meters will be read only after the IES pays the energy bill These monetary differences will be reconciled by a transfer of money between the IES and the relevant LEC [8]

- *Precisely this same reconciliation provision should apply to any IES purchases under a load profile in Ukraine, but today it is not applied*

California now allows complete retail access, but this began only after an extremely careful and expensive process In 1995, California began the process of moving to retail access, when the California Public Utilities Commission issued an order setting forth its general policy on the matter The State legislature enacted the relevant law in 1996 Retail access was slated to begin January 1, 1998, but was delayed until April 1, 1998 because computer software and systems could not be tested on time

California established the following work groups, manned by representatives of LECs, generators, IESs, large industrial customers, consumer advocates, the regulator and others, *before* direct access began [9]

- Data Quality and Integrity Working Group
- Direct Access Tariff Review Group, including a Customer Data Transactions subcommittee
- Distribution Loss Factor Working Group
- Load Profiling Workshops
- Permanent Standards Working Group, with four subcommittees
  - Meter Equipment
  - Meter Communications
  - Meter Data Management and Meter Reading
- Universal Node Identifiers System Working Group

Even with all this, California could not begin the retail access program as scheduled

Other states that are actively moving toward retail access are being equally cautious The state of Maine enacted a bill in 1997 that calls for direct access as of March 1, 2000 The state regulatory commission has established an "ambitious" schedule with 13 rulemaking proceedings to reach that goal The Michigan regulatory commission issued an order in 1997

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[8] "Meter Madness," *Public Utilities Fortnightly*, Jan 15, 1998

[9] See the internet website of the California Public Utilities Commission

that opened 2 5% of the state's total load to competition in 1998 and then another 2 5% every year thereafter through the year 2001, with complete retail access slated to begin only on January 1, 2002 Montana enacted a law in 1997 that requires retail access by July 1, 2002 [10] More examples could be provided, but these states are typical Full retail access is complicated, it can be successfully implemented only after a careful, time cnsuming and expensive process

3.4 CONCLUSION

On paper, Ukraine is the most advanced country in the world in terms of retail access The reason for this is purely historical accident When the western consultants proposed the restructuring of Ukraine's electric power sector, one of their key recommendations was that only customers with hourly meters could buy directly from IESs However, events overtook plans The emergence of barter in Ukraine created IESs even before Energomarket began to operate That is, LECs and generating companies had no cash and were forced to buy goods and services from their input suppliers with electricity rather than with cash These input suppliers had to have a way to sell this electricity, so they began to sell the electricity to retail customers Trading firms emerged to provide multi-party trading arrangements, so that a fuel supplier could sell its electricity to, say, a chemical plant, which provided chemicals to a different party, and so on, and in the end the fuel supplier could receive agricultural products All these new electricity suppliers were required to become licensed IESs

There have been proposals to solve the IES problem by limiting the number of IESs This solution would not work The problem is not the number of IESs, it is the number of customers Allowing even one IES with unlimited authority to sell to any retail customers would overwhelm Energomarket's ability to process the necessary data, as this one IES could easily have hundreds of thousands or even millions of retail customers spread across 27 oblasts

The question is how to put the genie back into the bottle Under today's political conditions, a simple order from NERC forbidding IESs to sell electricity to anyone with a demand greater than 1 MW would be ignored, and it could not be enforced The answer is to change the prevailing legal and political climate so that NERC's orders are enforced To begin the process, NERC should forcefully publicize the fact that the current system of IESs is unworkable and must be changed

[10] "Kilowatts by Choice, Ready or Not," *Public Utilities Fortnightly*, Nov 1, 1997, at 38