

Private sector

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Electricity Reform in Ukraine

The impact of weak governance and budget crises

Many countries are struggling to liberalize their energy markets and to replace rigid state controls with private initiative and ownership. Ukraine illustrates the extreme difficulties of this transformation when a country's macroeconomy is severely imbalanced, enterprise governance is poor, and political leadership is ineffective—shortcomings that also exist in several other countries of the former Soviet Union. This Note is the first of three on Ukraine's energy reforms; the other two are on the gas and coal industries.

Although reform of Ukraine's electricity sector is far from complete, the experience so far shows that ingrained attitudes are harder to change than written rules of the game. Moreover, the reemergence of old behavioral patterns during political, macroeconomic, or sectoral crises can quickly undermine early gains from reform. Thus the long time needed to achieve deep and irreversible changes places a high premium on stamina and patience for reformers. By contrast, and contrary to some predictions, in Ukraine it was relatively easy to put in place the basic systems for a functioning competitive electricity market. Dispatch center, generation, and distribution company employees quickly learned to work with the new procedures and demonstrated a remarkable ability to adapt imported solutions to local conditions.

FIGURE 1 THE ENERGY SECTOR REFORM CHALLENGE—HIGH CONSUMPTION, HEAVY DEPENDENCE ON IMPORTED FUEL, VULNERABILITY TO TERMS OF TRADE SHOCKS

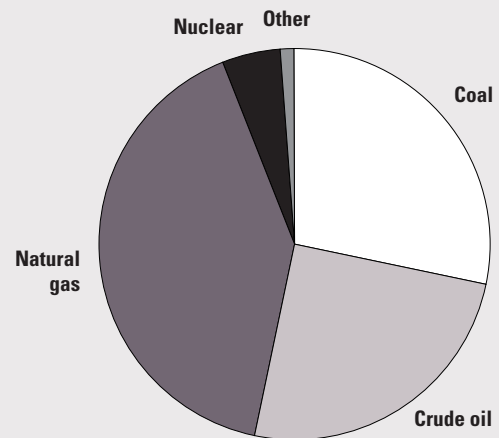
Per capita energy consumption relative to GDP, 1990

Energy consumption per capita (thousands of kilograms of oil equivalent)



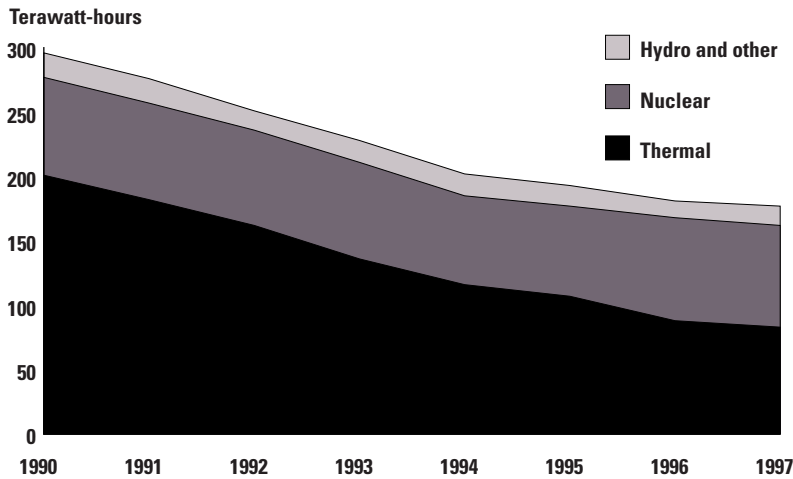
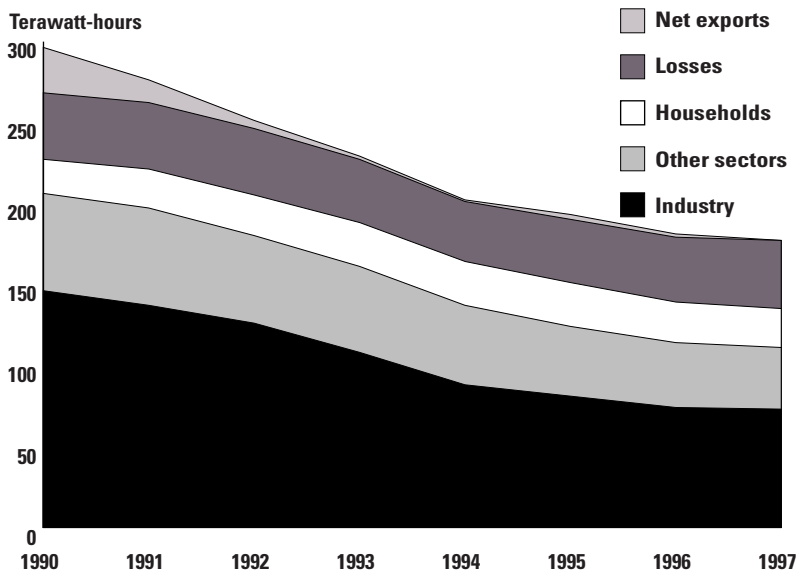
Note: The trend line in the chart is the result of a least-squares regression of the logarithm of energy consumption per capita in nineteen market economies with climates similar to those of the five transition economies shown, using the logarithm of their GDP per capita as the explanatory variable.
Source: World Bank 1992.

Energy consumption, 1990



Source: Ukraine Ministry of Economy.



FIGURE 2 DECLINING SUPPLY AND DEMAND**Electricity generation, 1990–97****Electricity consumption, 1990–97**

Source: Ukraine Ministry of Power and Electrification (Minenergo).

Ukraine became independent in late 1991. In that year the new state consumed 229 million tons of oil equivalent of primary energy, more than most countries in Europe on a per capita basis (figure 1). Half of Ukraine's energy demand was supplied from Russia at prices that were quite low relative to world market prices.

In early 1992 the Russian government announced that the price of fuels exported to the "near abroad" would be raised to world market levels (within a year for oil, and within two years for gas), giving Ukraine little time to prepare for the coming terms of trade shock.

Following intense lobbying by domestic energy producers, the Ukrainian government decided that the best defense was to substitute for imported oil and gas through a combination of domestic fuels (mostly coal) and energy-saving measures. The government also decided that higher prices for imported fuels would be reflected in domestic energy prices, with a lag so that industrial and residential consumers could adjust. The budget was left as the only source of funding for the necessary investments in domestic coal production and energy conservation.

Over the next three years the budget deficit reached 10 percent of GDP, the energy intensity of the economy increased 10 percent, coal production dropped 30 percent, and the value of unpaid energy imports surpassed US\$5 billion. Energy utilities—electricity, gas, and district heating networks—could not cover their operating costs, and service quality rapidly deteriorated. The leadership of the electricity industry was the first to respond to the wake-up call.

The electricity industry in 1991–94

Ukraine inherited a very developed electricity industry and high levels of energy consumption from the Soviet Union. With a generation capacity of 52,000 megawatts (65 percent thermal, 25 percent nuclear, and 10 percent hydro), 18,000 kilometers of high-voltage lines (220 kilovolts and higher), and 50,000 kilometers of low-voltage lines, the power industry provided 296 terawatt-hours of electricity in 1991, including 28 terawatt-hours for customers outside the former Soviet Union (figure 2). The nonnuclear part of the power industry was organized into seven vertically integrated regional monopolies under the Ministry of Power and Electrification (Minenergo). The five nuclear power

plants were overseen by a separate state committee (Goskomatom).

Despite a growing surplus of (nameplate) generation capacity due to decreasing domestic demand, a sizable backlog of investments started to accumulate in the early years of independence. Ukraine's Western partners began demanding safety upgrades for nuclear plants. Aging thermal and hydropower plants desperately needed rehabilitation. And automatic controls and flexible peaking capacity had to be installed to improve the quality of the electricity supply (stability and security).

The origin of reform

The leadership of Minenergo actively studied electricity reforms in other parts of the world. They were particularly impressed by the reform that took place in the United Kingdom in 1989–90. First, they noted the similar size and generation mix of the two countries' power systems. Second, they liked the comprehensiveness of the U.K. reform, which established specialized generation companies to sell electricity through a competitive pooling arrangement, introduced a license-based regulatory system, and privatized the sector. Third, they wanted to restore Ukraine's place as a leading force in Eastern Europe's power industry. (The Soviet Union's first large hydropower plant as well as the largest nuclear power plant had been built in Ukraine. In addition, the transmission lines exporting the Soviet Union's electricity to Central Europe had been controlled from Kiev.)

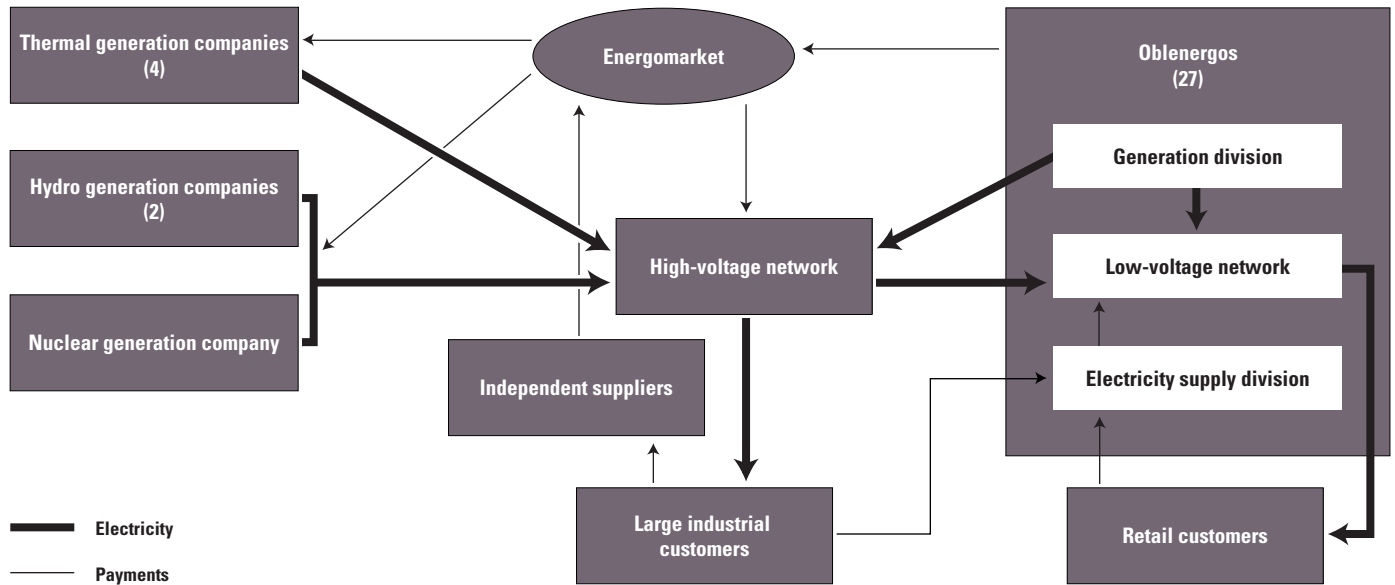
Minenergo also concluded that the structure and governance of the power industry impeded modernization. Electricity prices needed to be depoliticized, but this was unlikely without an autonomous, transparent, rule-based regulatory system and extensive competition among generators and suppliers. The industry needed know-how and investment that the current owner (the state) could not provide, but the privatization of regional monopolies seemed politically unacceptable in a fragile new state.

The new industry structure

In May 1994 the president of Ukraine issued a decree requiring the unbundling of the power sector and the development of a competitive national wholesale market for electricity. Restructuring took place in 1995–96, supported by extensive technical assistance from multilateral and bilateral donors. Today Ukraine's power sector is organized as follows:

- The fourteen largest thermal power plants are owned and operated by four joint stock generation companies (figure 3). Two joint stock companies own and operate the eleven hydropower stations. A nuclear generation company—Energoatom—owns and operates the five nuclear plants. (Goskomatom was merged with Minenergo in 1997.) The state, represented by Minenergo, owns the majority of the shares of the thermal power companies, and 100 percent of the shares of the hydropower and nuclear companies.
- Twenty-seven joint stock companies (*oblenergos*) own and operate the low-voltage networks and some generation capacity (mostly combined heat and power plants) in the twenty-five oblasts and two city administrations (Kiev and Sevastopol). The state owns the majority of the shares of most of the *oblenergos*. As regulated tariff suppliers, *oblenergos* have an obligation to serve all customers wishing to buy electricity at the regulated retail price.
- Several licensed, nonregulated tariff suppliers purchase electricity from the wholesale market and resell it to large consumers. By late 1997 these privately owned suppliers accounted for 20 percent of electricity sales.
- Ukrenergo, a state company, owns and operates the high-voltage network and the National Dispatch Center. The dispatch center performs a number of functions. It controls and finances the high-voltage grid. It purchases all electricity from generators (except industrial self-generators) and resells it to regulated and nonregulated tariff suppliers. It dispatches power generators. And it purchases ancillary system services.

FIGURE 3 STRUCTURE OF THE POWER MARKET



Source: Ukraine Ministry of Power and Electrification (Minenergo).

Technical and financial market operations are governed by market rules laid out in the Energomarket Members Agreement signed by generators, suppliers, and Ukrenergo. The price of electricity purchased from thermal power plants and their dispatch are determined on the basis of hourly bids. A National Electricity Regulatory Commission, established in 1995, issues and monitors licenses for electricity generation, high-voltage transmission, low-voltage distribution, wholesale market operations, and tariff and nontariff supply. The licenses stipulate the methodology for calculating high- and low-voltage network fees, the National Dispatch Center's margin, and retail tariffs applied by oblenergos. Between 1994 and 1996 the average retail price of electricity tripled (in U.S. dollar terms), eventually reaching US\$39 per megawatt-hour—a level that was close to electricity's economic cost.

In mid-1997 the foundations were laid for competition in electricity generation and supply. The wholesale market had a functioning

governance structure and a demonstrated capacity to evaluate hourly bids, implement dispatch accordingly, determine financial claims and obligations, and implement the financial transactions needed to settle those claims among market members. Access to the high- and low-voltage networks was regulated by an entity (the National Electricity Regulatory Commission) independent from power companies and government ministries. The regulator made a commitment to allow the full pass-through of justifiable costs (including the market-determined wholesale price) to retail tariffs.

The new industry structure and basic operating principles received parliamentary approval in October 1997, when a new law on electricity was passed. Despite these remarkable achievements, the main promises of reform—depoliticization of electricity price setting and attraction of investment and know-how to the power industry—remain unfulfilled.

Half-hearted stabilization

The tripling of the average electricity price in 1994–96 coincided with macroeconomic stabilization and the introduction of a new currency, the hryvnia. Macroeconomic stabilization measures applied rigid controls over the cash deficit of the state budget, eliminated directed credit, and tightened monetary policy, leading to high interest rates on domestic loans. These factors, coupled with the poor status of most industrial enterprises and an inadequate social safety net, led to rapidly growing payment arrears and the barterization of the economy.

Energy suppliers—electricity, gas, and district heating companies—were particularly hard hit. Their best self-defense mechanism, reducing or cutting off deliveries to delinquent customers, was undermined by pressure from central and local government officials to protect important constituencies (such as municipal services, fiscal budget-funded organizations, agricultural cooperatives, coal mines, and “strategic” industrial enterprises). By determining which individuals and enterprises could consume energy without paying for it, the government was able to selectively cushion the impact of tight monetary and fiscal policies on enterprises, workers, and the general population. In essence, the government used the energy sector as a substitute for the social safety net and as an instrument of industrial and agricultural policy. This strategy slowed structural reforms in the economy, delaying the supply response and ultimately undermining the entire stabilization effort.

Political interference in market operations

According to the market rules, oblenegos that have not fully paid for the electricity purchased from the wholesale market should be cut off from future electricity deliveries. The National Dispatch Center, as operator of the wholesale market, had to choose between following the market rules or obeying instructions from Minenergo. Minenergo opposed curtailing de-

liveries to oblenegos and tried to address the problem by reaching agreements with central and local governments on customers that could be disconnected without political repercussions. Because Minenergo represented the dispatch center’s owner, the state, the dispatch center had little choice but to continue delivering electricity to delinquent oblenegos. The Energomarket Board, the governing body of the wholesale market, did not raise objections to the noncompliance with market rules because its members were also under Minenergo control. Although the regulator theoretically could have intervened as the last line of defense, it was still subject to strong government influence (see below).

In a parallel development, the government became concerned about the impact of electricity price increases on the rest of the economy. In late 1996 the National Electricity Regulatory Commission was (informally) instructed by the Cabinet to leave retail prices unchanged until further notice. Minenergo was ambivalent about the indefinite postponement of the planned price increase. On the one hand, it recognized that the average retail price could not fully cover generation, transmission, and distribution costs. On the other hand, higher retail prices would have increased the tax obligations of the sector, while the increase in actual revenues would have been negligible as long as delinquent oblenegos continued to receive electricity. The regulatory commission knew that it could not keep retail prices unchanged without changes in the wholesale market price. Accordingly, it instructed the National Dispatch Center to apply (ex post) downward corrections to the daily average marginal price, contrary to the market rules. (According to the market rules, the system marginal price should be determined by the bid of the most expensive generation unit needed to meet demand.)

The proliferation of barter and other noncash payment modes (mutual cancellation of payment obligations, promissory notes, tax write-offs) further compromised application of the market rules. Because noncash payments

had limited fungibility, the National Dispatch Center could only collect and allocate cash payments. Noncash transactions offered significant tax advantages because cash received in the bank account of an enterprise was often confiscated by the tax service. In addition, the reduced transparency of noncash transactions provided opportunities for personal gain. As a result generators and other market members had strong incentives to maximize barter. Soon the share of noncash transactions in the power industry surpassed 80 percent. (The economy-wide average was about 40 percent.) In essence, only the general population paid cash for electricity.

The perverse incentives created by the exemption of barter from revenue allocation rules could have been solved by reducing the cash entitlements of market members by the reported value of the barter transactions they entered into. But generators and oblenergos were reluctant to fully disclose their noncash transactions and constantly lobbied for exceptions to the market rules (for example, generators argued that they needed a minimum amount of cash to pay wages and buy spare parts). These demands were accommodated by the Energomarket Board as well as by the National Electricity Regulatory Commission, and the incentives favoring barter remained in place.

Not surprisingly, these “adjustments” to the market rules—the tolerance of nonpayment by oblenergos, regulatory control over the wholesale market price, and the implicit preference given to noncash payments in the allocation of revenues—strongly deterred lending institutions and equity investors. The European Bank for Reconstruction and Development canceled a US\$62 million loan to the power sector, and the World Bank suspended disbursement of a US\$314 million loan. Both institutions also slowed down the preparation of new loans for additional nuclear and hydro capacity. Similarly, strategic investors became much less willing to purchase stakes in the thermal power companies that the government planned to privatize.

Lack of a privatization strategy

Unbundling and demonopolization of the power industry were expected to be closely followed by privatization. But privatization has proven considerably more complicated than restructuring. First, there was disagreement between the government and Parliament about the distribution of responsibilities in the privatization process. Second, key players—the State Property Fund, Minenergo, the Cabinet of Ministers, and various parliamentary commissions—could not agree on the method of privatization and on the amount of shares to be kept in state hands. These disagreements, coupled with a lack of a sense of urgency, resulted in little progress in 1996–97 (apart from limited sales of shares to workers and managers).

By mid-1997 reformers in the central government and in the power industry recognized that continued majority state ownership of electricity companies undermined the autonomy of the Energomarket Board. Moreover, major improvements in payment collection were unlikely unless oblenergos were privatized. Only strong, experienced, and independent operators could be expected to resist the political pressure placed on regulated tariff suppliers. The privatization plan adopted by the State Property Fund in 1997, however, assigned a high priority to selling only minority blocks of oblenergo and generation company shares to financial investors (after satisfying the demands of managers, workers, and other holders of privatization certificates). Attempts to implement this plan in early 1998 failed because of limited investor interest in minority stakes.

Recent developments

To reduce the share of barter, in May 1998 the National Electricity Regulatory Commission ordered the National Dispatch Center to take into account all barter transactions when allocating cash revenues among market participants. In addition, as part of a comprehensive financial recovery plan for the electricity industry, the regulatory commission raised the average re-

tail price of electricity by 22 percent in May 1998 and by 3.5 percent in June 1998. The tariff increases, combined with decreasing oil and gas import prices and reduced electricity demand, made it possible to liberalize the wholesale market price by the fall of 1998. But these achievements remain fragile. A recent law passed by Parliament, for example, prohibits increases in utility tariffs for residential consumers until the budget's wage and pension arrears are eliminated.

In mid-1998 new oblenergo privatization tenders offered the right to manage remaining state-owned shares for five years to investors that win the tenders for minority stakes and fulfill other tender conditions (such as injecting working capital to settle overdue payables). Because of deficiencies in the preparation process and in the assurances offered to bidders, the tenders again failed to attract strategic investors. Local financial investors, however, acquired majority stakes in seven oblenergos by purchasing shares from workers, at the stock exchange, and through these tenders. There has been no change in the treatment of delinquent consumers and the acceptance of non-cash payments by these oblenergos. It remains to be seen whether Ukraine recognizes the need to adopt a privatization approach that has worked well in other countries (such as Hungary) that sold distribution and generation companies to strategic investors.

Lessons

Electricity reform in Ukraine is only now entering its second stage, privatization. Still, events since 1994 have generated several important lessons.

Governance

The Ukrainian government and Parliament have been reluctant to give up day-to-day control over the electricity industry. Numerous manifestations of this desire to maintain control—exercising de facto and de jure limits on the regulatory commission's authority to set electricity prices,

elevating decisions about the disconnection of nonpaying customers to the political level, keeping under state ownership the majority of the shares of electricity enterprises—have seriously undermined both domestic and foreign confidence in the reform. While some recent steps have sent positive signals, restoring the confidence of investors will require major and sustained changes in government policy.

Formal rules are necessary but insufficient for ensuring the independence of the regulatory body. The lack of a tradition of independent regulation and the high importance attached to short-term political benefits make the temptation to intervene in professional decisions too large to resist. Even under the best circumstances (legal guarantees, financial autonomy, high-quality staff, substantial technical assistance) the ability and willingness of regulators to balance short- and long-term interests and the interests of producers and consumers will increase only gradually.

Wholesale market

Contrary to some predictions, it was relatively easy (with adequate technical assistance) to put in place the basic systems for a functioning competitive electricity market. Dispatch center, generation, and distribution company employees quickly learned to work with the new procedures and demonstrated a remarkable ability to adapt imported solutions to local conditions.

A centrally managed "gross" pool for electricity generation and distribution is a key feature of the power industry model selected by the Ukrainian government in 1994. The Ukrainian gross pool determines the dispatch of all electricity generators according to their bids (subject to certain constraints). The alternative option, a "net," or residual, pool, accepts bilateral contracts as a basis for generator dispatch, and the bidding process is applied only to the generation of electricity needed to satisfy demand not covered by these contracts. Furthermore, payments for all electricity delivered to

consumers flow through a gross pool, while a net pool handles payments only for the part of electricity deliveries not covered by bilateral contracts between generators and distributors or large consumers.

In a country being pulled in all directions by culturally and politically distinct regions, the government placed a high premium on the cohesive force that a technically and commercially unified power system was expected to provide. A gross pool was expected to increase this cohesion. This feature, however, made the treatment of delinquent customers more susceptible to political intervention because it made it easier to spread the cost of nonpayment across all generators. Under a net, or residual, pool with an obligation to cover planned energy purchases through direct contracts with generators, oblenegos that continued to provide electricity to nonpaying customers might have had more difficulty obtaining power, since individual generators would have been reluctant to enter into bilateral contracts with them. Although establishing a flexible net pool that could accommodate a wide range of direct contracts would have been technically more demanding, this extra effort might have created a more resilient market structure.

Reference

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