

A Possible Solution for CHPs¹

The present plans for liberalizing the Polish electricity markets present a real question as to what can and should be done for the CHPs in Poland. As it presently stands, there are about 26 CHPs in Poland that provide more than 60% of the population of the country with domestic heat. From a social policy standpoint, the future of these CHPs is a sensitive and important matter. Any threat to the availability of heat at reasonable and stable prices will result in severe political consequences for any government that fails to avert that threat.

The present plan for liberalization of the electricity markets calls for the establishment of a pool market for electricity much as presently exists in England. In short, the power plants will bid into the pool to sell electricity, and the pool operator will accept bids up to the current demands on the system for electricity. Those whose bids are too high, above the cut-off price, will not sell any electricity.

Presently in Poland there is substantial over capacity to generate electricity. The overcapacity situation is exacerbated by the existence of long term contracts between the Polish Power Grid Company (“PSE”) and some of the system power plants.

The present “nameplate” capacity in the Polish electricity generation system is about 32,000 megaWatts, including about 4,000 megaWatts in the CHPs. About 12,000 megaWatts of this capacity is under long term contract to PSE. Under the terms of those contracts, that 12,000 megaWatts of capacity provides about 65% of all the electricity consumed in Poland. Given that these long term contracts are legally valid and binding, it is likely that they will continue as a “must take” for the system in the future, and free market pool trading will be limited to the remaining 35% or so until the long term contracts expire or are canceled by agreement of the parties.

The arithmetic is clear: 12,000 megaWatts supplies 65% of the electricity demanded, and 20,000 megaWatts competes to supply the remaining 35%. That is a recipe for brutal and destructive price competition. It is a competition that the CHPs are especially ill-equipped to meet.

It is generally accepted in Poland that the technical and environmental condition of the CHPs is especially poor. They need modernization. There are estimates that an investment of between \$1.5 and \$3.0 billion is needed to bring the CHPs up to modern standards of technical condition and environmental performance.

The economies of scale, unfortunately, work against modernizing the CHPs in an open, competitive market for electricity. Economy of scale is important in power generation: small plants use capital far less efficiently than large plants do. Even the largest CHPs are small in comparison to the big system power plants. The fact is, a modernized CHP cannot expect to sell its electricity into a competitive pool market where there is an abundance of cheaper power available from large system plants. Therefore, modernization of the CHPs cannot occur without some steps being taken to carve out a place in the market for these heating plants.

There are, of course, other alternatives. One alternative is to scrap the CHPs (and district heating systems altogether) and install small boilers, probably gas-fired in most cases, in individual apartment buildings or complexes. Technically, this is a simple solution. Economically, it would result in an immediate and large increase in the cost of heat to the residents of those apartments. Socially, this would not be a preferable solution.

¹ CHP is “combined heat and power,” or co-generation plant; in Polish “elektrociepłownia.”

Another solution is to retain the district heating systems and to modernize the CHPs by replacing their existing equipment with heat-only boilers, either coal or gas fired. Then, the problem of selling the electricity goes away. But this, too, would increase excessively the cost of heat to consumers.

Generally, it is accepted that co-generation of heat and power is the most cost effective way to supply heat to district heating systems. It appears to be government policy to continue down that road. Therefore, a solution must be found for the economic problem of to whom, or how, to sell the electricity at prices that will support economic modernization and life extension of the CHPs. The problem is that these prices, due to the economies of scale, will be higher than the prices for electricity from large, system power plants.

One solution that has been already suggested is simply for the CHPs to sell the electricity for whatever they can get from the price pool, and to make up the losses in the heat price. Unfortunately, this is a very poor solution; worse than installing heat-only boilers. The parameters of a CHP make revenues from electricity generation far larger than revenues from heat sales, simply because most of the energy is converted to electricity, not to heat. Therefore, a small drop in the price of electricity must be compensated for by a large increase in the price of heat just for the total revenues to the plant to remain the same. Letting electricity prices float on the market, therefore, is not a workable solution.

Our solution for this problem is modeled on a scheme developed in Argentina to allow the construction and operation of peaking power plants. This scheme may also be what PSE is implementing for peak power in Poland through the establishment of PSE Electra. The idea, we believe, can be extended to CHPs.

A special purpose company can be established (let's call it "Moc S.A.") that will be chartered to buy capacity from the CHPs in Poland as they modernize and repower. (Capacity costs are the fixed costs incurred by a power plant. Looked at another way, they are the costs the plant would have when it is idle and not producing heat or power. The additional costs, like fuel, incurred when running the plant are known as the "energy" costs.) "Moc" would obtain its revenues to pay these charges through a surcharge imposed on all electricity sales, probably at the wholesale level.

In order to ensure the perception and reality of fairness and transparency, "Moc" would be controlled in two ways. First, we suggest its ownership should be spread amongst the CHPs (the beneficiaries of its existence), the distribution companies (who are paying the surcharges), and the public (who ultimately pay the bill) through a listing on the Warsaw Stock Exchange. Secondly, contracts entered into between "Moc" and the CHPs would come under the regulatory scrutiny of the Polish Energy Regulatory Agency ("URE").

We admit that this solution tampers with the market. It puts in place cross-subsidization between heat and electricity. Our defense against these objections, and they are valid objections, is that not tampering will simply result in the eventual bankruptcy of the sector, preceded by years of deteriorating service and environmental damage. In the end, it is a policy question for the government to decide: whether to tamper or not to tamper, to preserve or not to preserve the idea and existence in Poland of district heating. If the government chooses a route like this to put incentives in favor of CHPs, it will be in good company. Many other countries are doing likewise because cogeneration makes economic and environmental sense.

Given the investment Poland already has in district heating systems, we believe that tampering is the better choice.