

Towards galactic energy civilization

“We have to save, but not at any cost. We need to learn how to conserve energy and how to produce it locally. But we should not be poor in energy: if we are to be a ‘normal’ member of the European Union we should be able to afford energy-efficient workplaces and homes provided with all the necessary amenities, like air-conditioning, household appliances, and IT, radio and television equipment,” Andrzej Sikora, president of Instytut Studiów Energetycznych Sp. z o.o. (ISE), a research and consulting company for the energy market, tells “Polish Market’s” Jerzy Bojanowicz.

PM Sweden produces as much electricity as Poland, which means that its per-capita consumption is four times higher than in our country and two times higher than in Germany. On the other hand, in the past 30 years Sweden’s GDP has grown by almost 80% while its annual electricity consumption has remained more or less stable.

If a Pole uses four times less electricity than a Swede then why should we save and reduce consumption? It is impossible to compare the energy markets of Poland and Sweden. Our neighbours produce as much as 85% of their electricity from hydropower and nuclear power. Meanwhile, Polish rivers do not have enough hydropower capacity to justify the construction of water power stations while the nuclear program is still in its infancy.

However, the Swedes also have some problems. The Ustka-Karlshamn submarine power cable is used to export Polish electricity to Sweden because there is a shortage of electricity in the southern part of the country compared to regions located in the north. Electricity from the hydroelectric power stations built in the north is transmitted at a distance of 1,600 kilometres – the resulting losses are higher than those generated by Poland’s whole obsolete power grid.

The statistical figures you have cited show that each country is governed by its own rules. Poland will be making savings but they will mostly result from an improvement in energy efficiency.

PM Will the single electricity market be a panacea for the problems



Andrzej Sikora
president of
Instytut Studiów
Energetycznych
Sp. z o.o. (ISE)

PM Will we have a shortage of electricity in 2016?

There may be some local shortages in Poland. But since we are integrated with the European Union’s energy system (ENTSO-E/UCTE)¹, we will probably be importing electricity – and much more of it than we now expect. However, I do not think there will be any blackouts. We have already experienced such situations, but they resulted from bad weather and affected isolated areas. The blackouts that may take place in four years’ time would be caused by shutdowns of power generating units. And since we will not manage to build by that time new generating units to replace the old ones we will have to import electricity.

PM But we do not have a sufficient number of cross-border connections.

At present, their number is sufficient. However, in keeping with the EU programme, new gas and electricity connections are being built. By 2014 the EU wants to create a single electricity

and gas market. The improved infrastructure is one of the factors ensuring the stability of the system.

PM And what about negawatts?

This program, prepared by PSE Operator, is among the cheapest energy conservation programs. It is an attempt to adjust electricity consumption to the generation potential. In other words, it is about persuading consumers not to use peak electricity and paying them for that.

If we look at present electricity consumption levels, it turns out that electricity consumed during peak hours accounts for only 5–7% of the generating capacity while the price of this electricity is not prohibitively high. Unfortunately, building special peak units is still not economically justified in Poland.

Electricity generation costs are still too high in Poland and electricity is still too expensive compared to the neighbouring countries. But we still have much capacity for improving the efficiency of electricity generation.

¹ ENTSO-E / UCTE – Union for the Coordination of the Transmission of Electricity. On 1 July 2009 UCTE was wound up. All operational tasks were transferred to ENTSO-E. In its final year of existence, UCTE represented 29 transmission system operators of 24 countries in continental Europe. The Union for the Coordination of the Transmission of Electricity coordinated the operation and development of the electricity transmission grid for the Continental European synchronously operated transmission grid, thus providing a reliable platform to all participants of the Internal Electricity Market and beyond. Since 1951, the Union for the Coordination of Production and Transmission of Electricity (UCPTE) had coordinated synchronous operations through meetings of experts and managers from at first a small number of interconnected companies at the interface of Switzerland, France and Germany, and over various stages from a growing number of companies and countries. The UCPTE’s operational and planning recommendations helped ensure reliable supply of electricity in Continental Europe. In 1999, UCTE re-defined itself as an association of TSOs in the context of the Internal Energy Market. Building on its experience with recommendations, UCTE turned to make its technical standards more binding through the Operation Handbook and the Multi-Lateral Agreement between its members. These standards became indispensable for the reliable international operation of the high voltage grids which are all working at one “heart beat”: the 50 Hz UCTE frequency related to the nominal balance between generation and the electricity demand of some 500 million people in one of the biggest electrical synchronous interconnections worldwide.

associated with the need to shut down old generating units?

The panacea will be the new generating units which we have to build, including coal-fired ones with efficiency higher by at least 5-7% compared to the existing units. However, the biggest problem of the Polish power system is the old transmission network built in the 1970s.

PM But replacing a generating unit takes time.

It is impossible to modernize the power sector within the time span from one election to another. Here, a period of three or four years means "tomorrow". A horizon of at least 10-12 years is needed, coupled with a stable environment.

It is already clear that we will not manage to build the planned coal-fired generating units by 2015 or 2016. On the other hand, because of the current level of gas prices and its consumption, investors will have big problems with acquiring funding for the construction of gas-fired units.

At least 10-12 years are needed to carry out the nuclear power programme and this also requires finding the sources of funding. Renewable energy sources cannot form the basis for the power system in a country like Poland.

PM But the EU wants most of its energy to come from renewable sources because by 2050 it wants to reduce carbon dioxide emissions by 80% compared with the 1990 level. At the meeting of the EU Transport, Telecommunications and Energy Council on June 15, Poland vetoed this proposal of the EU Council. But how long can we protest single-handedly?

I think that the EU has lost the sharpness of vision in this respect. In 2010, carbon dioxide emissions from the Icelandic volcano were higher than the EU countries managed to produce in the past 30 years. Let us remember that the 500 million people living in the EU are responsible for 7% of the global carbon dioxide emissions. As much as 70% of the emissions comes from transport and 10-15% from industry and the power sector. This means that the overall reduction to be achieved under the directive specifying the 20-20-20 targets is less than 1.5%. I like to be "clean and green," but I would like others to be clean and

green as well. Being clean among the "dirty" is a doubtful pleasure.

It has been calculated that the 30% emissions reduction the EU has pushed for is equivalent to the amount of emissions China produces over two weeks. We should consider if it is worthwhile to go it alone. Perhaps our priority should be to seek allies for our emissions reduction programme instead.

PM What do you think about nuclear power?

I am its enthusiast. I studied solid state physics and regard nuclear power generation as one of the cleanest and sophisticated technologies. But I hope that in 30-50 years humankind will be able to produce hydrogen - first, from methane, which is in abundance on the Earth. It is true that the greenhouse effect of methane is 20 times stronger than that of carbon dioxide but methane stays in the atmosphere for a much shorter time.

The biggest problem associated with nuclear power in Poland is a shortage of knowledge about it.

PM What are you proud of as president of the ISE company?

ISE is an independent private consulting company, but not a lobbying one. We tell our customers the truth because they should take decisions based on the best available knowledge. We provide them that knowledge and this is why some call us "strange advisers."

ISE works not only with large Polish energy and gas companies. Its success is that over the recent seven years it has also signed contracts for advisory services with the biggest US, Canadian and EU corporations. It gives us great satisfaction that our company, set up with the Central European market in mind and focused on oil and gas - on what we call the monetization of these hydrocarbons for the petrochemical, chemical and energy industries - is in sync with the revolution triggered by gas from unconventional sources, that is shale gas. We are now preparing a report on Polish shale gas deposits for one of our customers.

It is thanks to us, in a way, that natural gas will have its due place in the Polish energy sector instead of the minor importance it was given by the government in its energy policy until 2030

adopted in 2009. The energy policy took into account the obligations Poland had taken on when signing the treaty of accession to the European Union, including the obligations concerning reductions in carbon dioxide emissions. They meant the need to build one or two nuclear power plants and to build and subsidize high-capacity renewable energy sources. By 2030 the consumption of natural gas was to increase by less than 10%, of which 600 million cubic metres was designated for a new gas-fired heat and power generating plant. At present, there are plans to build several or perhaps more than 10 such plants.

Methane, with the chemical formula CH₄, contains four atoms of hydrogen. The implication is that we may transform our global civilization into a galactic one. Once we have learnt to efficiently produce hydrogen from water (H₂O) and methane, I hope we will go on to master nuclear fusion.

PM What kind of energy mix will Poland have in 20 or 30 years' time?

The share of natural gas and renewable energy sources will increase but the share of coal, especially lignite, will still be high - up to 60%. And since the costs of extracting shale gas from a single licence area run into tens of billions of zlotys, I do not believe we will have a nuclear power plant by that time. Especially if the documented shale gas reserves turn out to be large - as I believe they will - and Poland will see the same revolution as the one that has already taken place in the United States. But Poland will not be able to cope on its own - either with gas or nuclear power.

I also hope I will live long enough to see the times when everyone will have at home an atomic pile the size of the gas stoves which are now widely used. The elements used as the fuel will be safe because it will not be possible to build an atomic bomb with them.

For the time being, I would like everyone to be aware what it means "to be profitable" in the context of energy balance, to know what it means to switch on a wind turbine and why we have to build biogas plants, and to have basic knowledge about nuclear power. I hope we will become a galactic civilization and will stop using exclusively renewable energy sources - coal and oil are also renewable sources only their renewal takes longer. ::