Polskie Sieci Elektroenergetyczne

European Electricity market – diagnosis

Executive summary

June 2018

For years, the power system has remained unchanged. Its backbone was a transmission network connecting power plants with demand centres. However, the recent decades have shown the emergence of an integrated European energy market which has contributed to the European economic integration and transformation of the sector. The European Union countries, through a series of regulations shaping the electricity market, have tried to provide an even playing field for all. This opened up the market to new electricity generation and distribution players. Consumers, have been given a special protection by the European regulators.

The establishment of the electricity market and its subsequent liberalization led to the separation, in terms of ownership and competence, of the system management from generating units and distribution network operators. The operational specificities of the transmission network and, perhaps even more so, of the distribution network, have started to change. Distribution networks have become active, with power flowing not only from the transmission network to the distribution network, but also within the distribution network.

The technological change affected the rules of the game in the sector. With the current rate of change of the regulatory environment, participants of the market process often fail to keep up with adjustments (technical/organizational, etc.). In this context, the following questions should be asked from the point of view of the transmission system operator: what are the most serious challenges for the power system and the energy market in Europe, and what are their sources.

Nowadays, European power system is confronted by an unprecedented fluctuations of operation conditions, increasingly dependent on weather conditions on the one hand, and on a variation of demand (now still hard to forecast) on the other hand. Therefore, the system management becomes an increasingly complex and dynamic process.

Consequently, technological revolution unfolding in power generation, transmission and distribution brings about serious challenges in terms of maintaining operational stability of power systems, especially if interconnected into large geographic areas.

Simultaneously, societies are facing growing costs of network management and development, resulting in particular from the needs of new transmission and distribution investments, depreciation of those already completed and, not less importantly, social costs of investments, which may fail to return (stranded costs). This gives rise to concerns about further market integration in Europe, in particular whether the current market solutions are able to facilitate innovation in the sector and offer social welfare benefits to the consumers.

In such a situation, an efficient market design, consistent with the laws of physics, should strengthen the transformation of the energy system. Unfortunately, despite increasingly visible new challenges resulting from ongoing energy transition in Europe, new regulations such as CEP Package still aim at addressing the yesterday's problems. As a result, it is likely that even the post-CEP European market design will still be inadequate to ensure efficient power system management and to achieve goals of European energy policy.

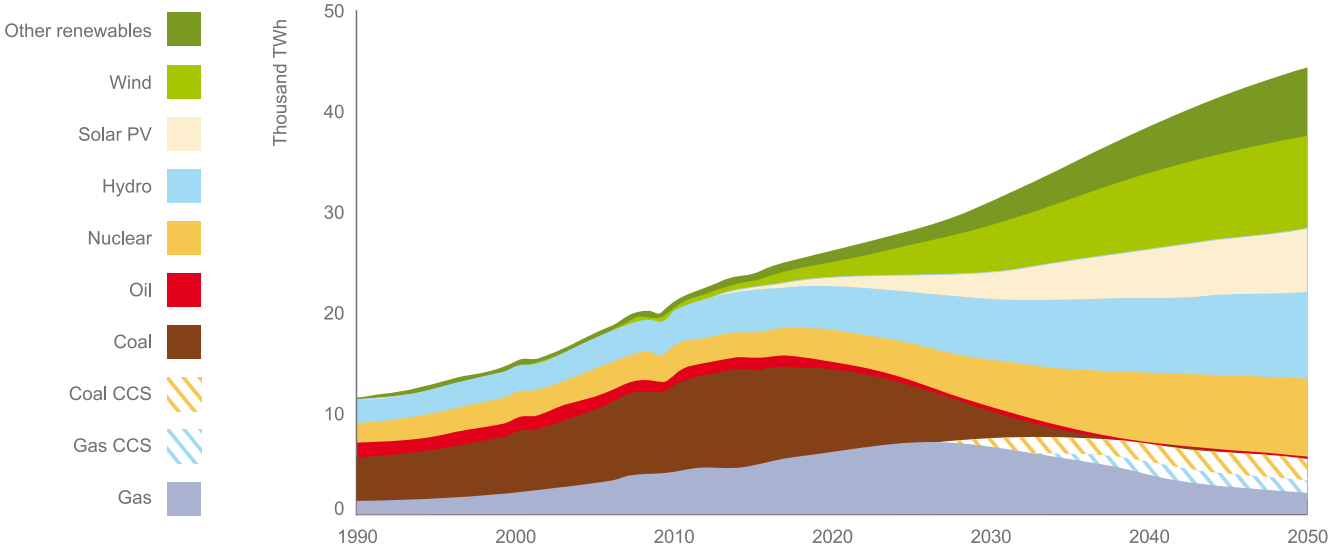
What have become foundations of European energy policy are zonal architecture of the common energy market, commitment to the energy only market, and the climate policy.

Simple, zonal, energy-only market model chosen at the beginning of liberalization has served the purpose of fostering early integration efforts. However, the same features are now becoming an obstacle to more efficient use of the grid. Network representation in the zonal model is highly simplified, causing detachment of market and system operations from physical reality. European market outcome is thus often technically infeasible, requiring TSOs to take special measures outside of the wholesale market to correct market-based dispatch.

Moreover, change in the configuration of zones will always infringe interests of those market participants who have decided to enter into long-term, e.g. multi-annual transactions for electricity purchase/sale. Finally, the emergence of zones covering the territories of many states will give rise to problems with the management of the security of supply, which operators will seek to avoid. Thus, current and future problems of European electricity market cannot be resolved by regulations, that enable the corrections of configuration of zones.

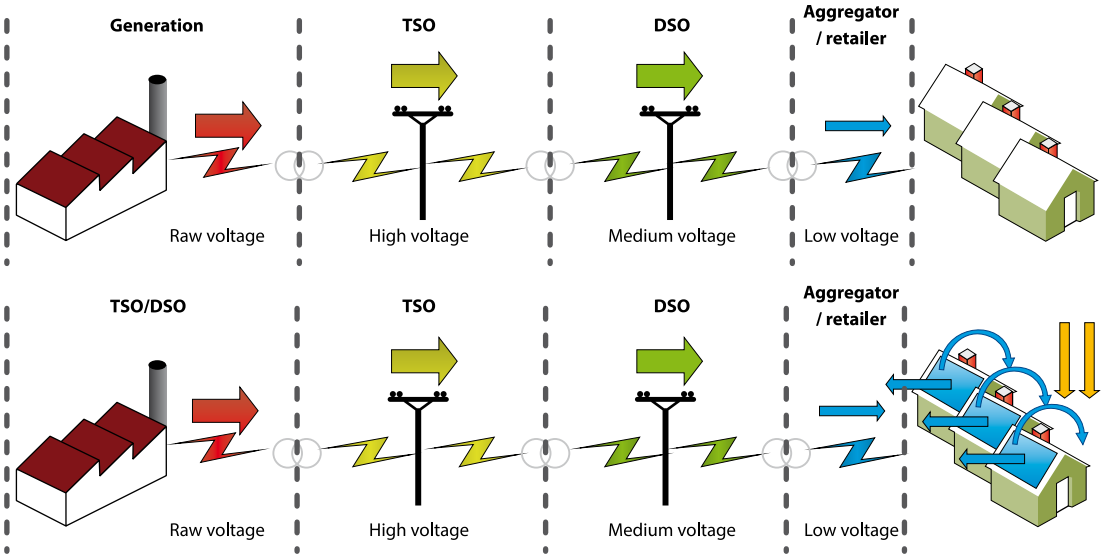
Based on the experience of the operation of the electricity market in Poland, it can be concluded that there is a risk that in future, the energy-only market, another foundation of European energy policy, will not ensure covering the costs of all stable generation sources necessary to guarantee the operational security of the power system, will not create sufficient signals for investing in new stable generating capacity, and will not provide correct signals for investing in network development, which may lead, in some cases, to oversizing investments.

Deep decarbonization – scenario of changes in the energy market according to IEA (according to generation source)



Source: *http://www.powermag.com*

Transmission and distribution network including and excluding prosumers



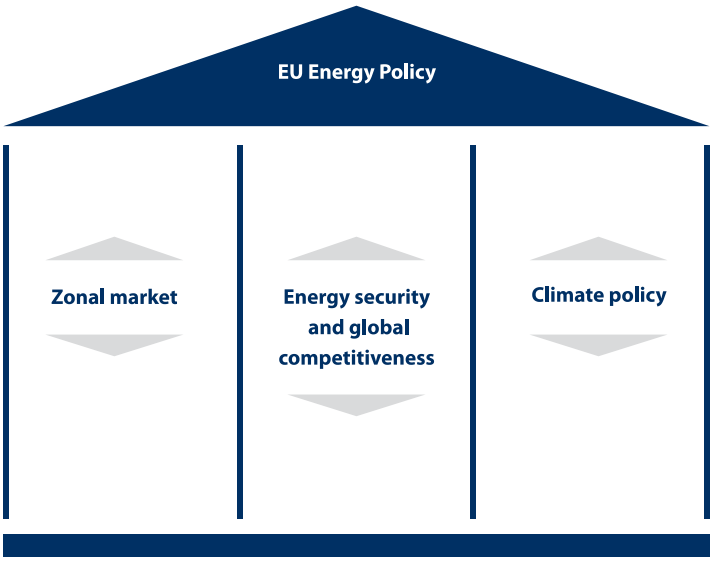
Source: *https://www.researchgate.net*

Moreover, according to European regulators, the market is to support the pan-European integration of the sector, owing to which cross-zonal exchange is given regulatory preferences over intra-zonal exchange. Such approach causes growing problems of the network management. Many of them arise from the contradiction between "copper plate" assumption of unlimited transmission capacities and trading possibilities within each bidding zone as well as preferences given to cross-zonal exchange. As a result of such preferences, transactions - and subsequent physical flows - between partners in different biding zones should take precedence over transactions and subsequent physical flows between partners in one price zone in order to make full use of the cross-border infrastructure. However, underutilization of cross-border infrastructure is mainly due to loopflows and zonal market imperfections. More locational market design would allow for much better grid utilization without going beyond the secure boundaries of system operation. In turn artificial benchmarks and regulations concerning cross-zonal exchange may only pose a threat to the stability of the power system as a whole.

Finally, today the objectives of European climate policy are implemented directly in energy policy. Support to the development of the RES sector at the expense of other electricity generation subsectors is an important element of this approach. As a result, in addition to CO_2 reduction itself, the EU climate targets include a target share of electricity from renewables and elimination of emission sources specifically in the energy mix. To achieve those targets (or even more ambitious targets set previously by governments at the national level, as was the case e.g. with Germany), the Member States have implemented various support mechanisms, some of which turned out to be oversized, leading to the deterioration of competitive conditions for stable conventional sources which guarantee the security of electricity supply. Consequently, problems with the power balance and availability of ancillary services are growing. However, despite the advantages of RES in terms of low costs and energy sustainability, the energy sources are yet unable to guarantee the security and stability of energy supply.

Thus, the technological revolution unfolding in power generation, transmission and distribution brings about serious challenges in terms of maintaining operational stability of power systems, especially if interconnected into large geographical areas. It should be taken into account by regulators. Unfortunately, it is not the EU electricity market case.

Pillars of the EU energy policy



Source: *Own compilation*

Contrary to expectations and favourable attitude of the lawmakers, the lawmaking process yields regulations that may fail to support the transformation of the energy sector. Just the opposite – an unstable and unpredictable regulatory environment may slow it down. Therefore, perseverance of European policy markets to rigidly maintain market design based on large bidding zones is quite artificial, is rather short sighted. Unfortunately, one cannot recognize any signs of efforts to adjust market framework to new challenges.

We are sure, that European electricity industry cannot not be closed for new ideas, and should rather look for enriching experiences and drawing inspirations from solutions applied throughout the world. We are convinced that improved, more locational market design would allow for much better grid utilization without going beyond the secure boundaries of system operation. Locational market design also enables to reach all objectives of the European energy policy contributing to higher social welfare for all Europeans.

In Autumn 2018, PSE intends to publish its position paper on a future market design, focusing on four fundamental pillars: economic efficiency, system security, incentive compatibility and market transparency.

The full version of the diagnosis can be found on www.pse.pl