Razvoj elektroenergetskega trga jugovzhodne Evrope: Izzivi, ovire in povezovanje z obstoječimi evropskimi projekti

Development of the South-East European Electricity Market: Challenges, obstacles and integration with existing EU projects

Milan Vukasović, foto / Photo: osebni arhiv / Personal archive

Regijo jugovzhodne Evrope zaznamujejo cene energije, ki ne odražajo stroškov in v splošnem ne morejo podpirati novih investicij v proizvodnjo ali privabljati tujih vlagateljev. Hkrati pa umetno nizke cene izničijo odgovorno vedenje odjemalcev, kakršno je prizadevanje za večjo energijsko učinkovitost. Zaradi obstoja navzkrižnega subvencioniranja veleprodajne cene električne energije niso ustrezno spojene in se ne odražajo transparentno v ceni, ki se plačuje na maloprodajni ravni, predvsem s strani gospodinjstev.

Gospodarska kriza, ki se je začela leta 2009, je največje tuje vlagatelje v regiji, predvsem češka, italijanska in avstrijska podjetja, vodila v bolj defenzivno finančno strategijo. Nekateri tako bodisi odhajajo ali se ukvarjajo z mednarodno arbitražo. Številni projekti novih konvencionalnih elektrarn, ki so bili najavljeni v regiji jugovzhodne Evrope pred letom 2009, so bili v tem času začasno zaustavljeni ali dokončno odpovedani. Pomembne vloge pri tem ne igra samo padec veleprodajnih cen, temveč tudi negotov regulatorni okvir. Tuja podjetja se v zadnjem času soočajo s številnimi težavami, med drugim z nenadnim dvigom davka in odvzemom dovoljenj. Poleg tega je energijsko intenzivni sektor v balkanskih državah udarila recesija in veliki metalurški obrati so vlade postavili v zelo nezavidljiv položaj. Ti državni obrati zagotavljajo delovna mesta, vendar začenjajo prispevati k državnemu dolgu. Čeprav vlade lahko pokažejo na vsaj en uspešen primer prodaje zasebnemu podjetju v regiji, pa se je privatizacija v kar nekaj primerih končala s stečajem ali ponovno nacionalizacijo.

V takšnem okolju države jugovzhodne Evrope s težavo uvajajo evropski ciljni model za električno energijo (*slika 1*), ki bi lokalnim proizvajalcem omogočil dostop do več priložnosti na odprtem trgu električne energije.

Terminski trg in vloga regionalne pisarne za dodeljevanje zmogljivosti

Tržni segment za trgovanje z dolgoročnimi produkti, ki se večinoma uporablja za zavarovanje pred tveganji, ki izvirajo iz

The region of South-East Europe has been marked with non-cost-reflective energy price levels which, in general, cannot support new generation investments and attract foreign investors. At the same time, the responsible behaviour of consumers, in areas such as energy efficiency, has been offset by artificially low prices. Due to the existence of cross subsidies, wholesale electricity prices are not properly coupled and transparently transferred back to the price being paid on a retail level, especially by domestic consumers.

The economic crisis, which started in 2009, has led to a more defensive financial strategy of the largest foreign investors in the region, mainly Czech, Italian and Austrian companies. Some of them are either leaving, or exploring international arbitration. Many new conventional power plants which were announced in the region of SEE prior to 2009, have, in the meantime, been put on hold or completely cancelled. Not only the decrease in wholesale price levels, but also an uncertain regulatory framework, plays an important role here. Foreign companies have recently been faced with many problems, among them a sudden tax increase and withdrawal of licences. At the same time, the recession hit the energy-intensive sector across the Balkans. Large state-owned, energy-intensive metal plants, whilst providing jobs, caused difficulties by adding to government's debts. Although governments can point to at least one successful sale to a private company in the region, privatisations have, in several cases, ended in bankruptcy or renationalisation.

In such an environment, the countries of South-East Europe are struggling to implement the European Target Model for Electricity (*Figure 1*) which would allow for local generation companies to explore more opportunities on the open electricity market.

Forward market and the role of the Regional Capacity Allocation Office

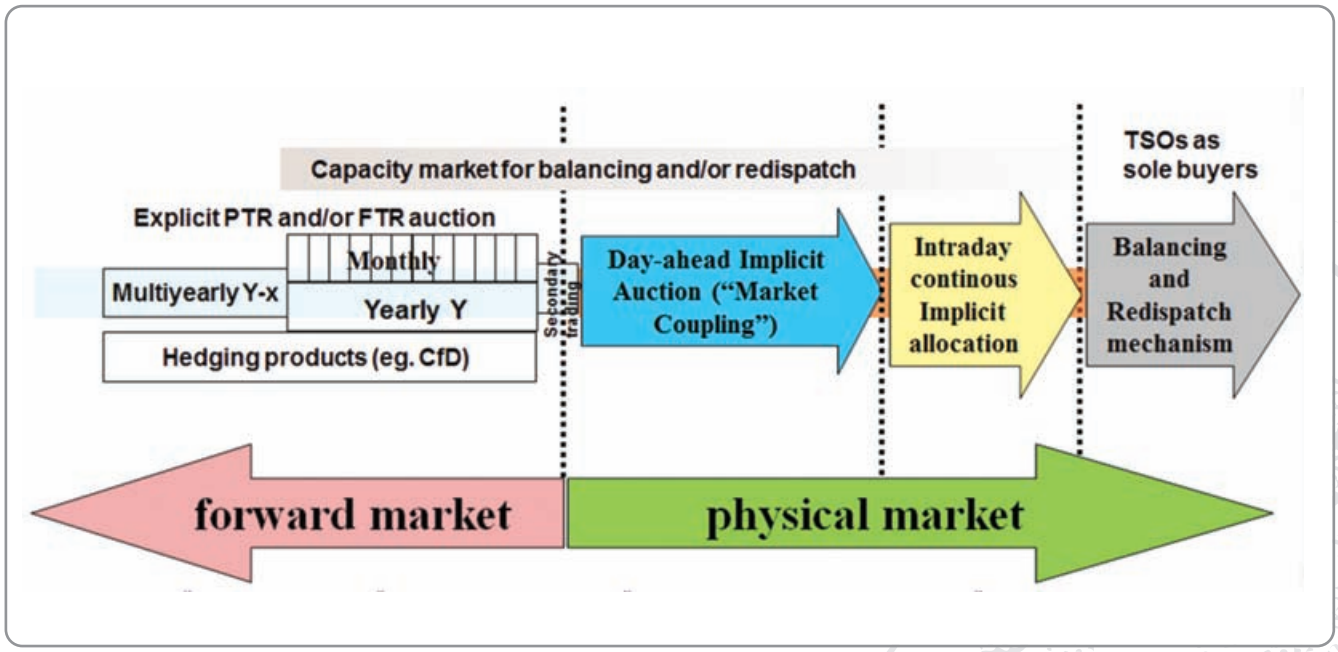
The long-term market segment, mainly used for the purposes of price hedging emerging from a volatile (spot) market spread, but

Milan Vukasović (rojen leta 1981 v Sarajevu, BiH) je doštudiral elektrotehniko na Fakulteti za elektrotehniko v Podgorici v Črni gori. Po tem, ko je v CGES pridobil dragocene izkušnje z upravljanjem prenosnega sistema v realnem času, se je konec leta 2007 preselil v Avstrijo, kjer se je zaposlil v oddelku za upravljanje trga pri avstrijskem sistemskem operaterju Austrian Power Grid AG (APG). V zadnjih petih letih je sodeloval pri najpomembnejših projektih evropskega energetskega trga. Trenutno pri APG usklajuje uvajanje različnih tehničnih omrežnih kodeksov*.

Med njegovimi glavnimi zanimanji so simulacija elektroenergetskih trgov, razreševanje prezasedenosti, uravnavanje povpraševanja, analiza pretokov moči in računalniške aplikacije v elektroenergetskih sistemih. Je sosklicatelj regionalne skupine za trg v jugovzhodni Evropi (razreševanje prezasedenosti in integracija trga) pri združenju ENTSO-E in predsednik ekonomske skupine pri TSC, pobudi varnostnega sodelovanja sistemskih operaterjev prenosnih omrežij (http://www.tscnet.eu).

Milan Vukasovic (born 1981 in Sarajevo, BiH) received his MSc. in Electrical Engineering from the Faculty of Electrical Engineering Podgorica, Montenegro. After gaining valuable experience in real-time transmission system operation in CGES (Cronogorski Elektroenergetski Sistem), he moved to Austria at the end of 2007 where he started to work in the Market Management Department of the Austrian TSO – Austrian Power Grid AG (APG). In the last five years, Milan has been engaged in the most important European energy market projects. Currently he is co-ordinating implementation of various technical Network Codes* within APG.

His main interests are in electricity markets simulation, congestion management, demand-side management, load-flow analysis and computer applications in power systems. He is co-convener of the regional ENTSO-E market Task Force (TF) in South-East Europea (Congestion Management and Market Integration) as well as being the Chairman of the Economic Group within the TSO TSC Security Co-operation (http://www.tscnet.eu).



Slika 1: Različni segmenti načrtovanja trga električne energije na podlagi omrežnih kodeksov za terminske posle, dodeljevanje zmogljivosti ter razreševanje prezasedenosti in izravnavo.

Figure 1: Different design segments of the electricity market according to Forwards, Capacity Allocation and Congestion Management, and Balancing Network Codes

**Omrežni kodeksi so skupki pravil, ki jih je pripravilo združenje ENTSO-E na osnovi smernic Agencije za sodelovanje energetskih regulatorjev (ACER) in so namenjena lažjemu usklajevanju, povezovanju in večji učinkovitosti evropskega trga električne energije.*

**Network codes are a set of rules drafted by ENTSO-E, with guidance from the Agency for the Co-operation of Energy Regulators (ACER), to facilitate the harmonisation, integration and efficiency of the European electricity market.*

nihanja razpona na (promptnem) trgu, a tudi za špekulacijske posle, je trenutno organiziran v obliki dodeljevanja čezmejnih zmogljivosti. Po centraliziranem pristopu, ki si ga uvedli v regijah srednje in zahodne ter srednje in vzhodne Evrope, kjer so že pred časom ustanovili avkcijski pisarni CASC.eu in CAO, so se za podoben centralizirani pristop odločili nekateri sistemski operaterji prenosnih omrežij v jugovzhodni Evropi. V črnogorski Podgorici je bila ustanovljena skupna avkcijska pisarna, ki je trenutno zadolžena za dodeljevanje zmogljivosti in sekundarni trg na dveh regionalnih mejah, in sicer mejah med Hrvaško in Bosno in Hercegovino ter Bosno in Hercegovino in Črno goro. V letošnjem letu naj bi sledila širitev in vključitev dodatnih mej, najprej meje med Albanijo in Črno goro aprila letos. S tem se bo zagotovilo izpolnjevanje določil omrežnega kodeksa za terminske posle, kot je ustanovitev skupne avkcijske pisarne v Evropi. Prvi korak v tej smeri je spojitev pisarn CASC.eu in CAO, ki je v teku in naj bi bila zaključena v letošnjem letu. Vzporedno s tem bo pripravljen osnutek enotnih pravil o dodeljevanju zmogljivosti, trgovci z energijo pa bodo dobili edinstven vmesnik do enotne evropske informacijske platforme za dodeljevanje dolgoročnih prenosnih zmogljivosti – evropsko rešitev po načelu vse na enem mestu. Čeprav to še ni določeno, lahko pričakujemo razvoj tega segmenta trga bodisi v smeri pogodb na razlike (ang. Contracts for Differences oz. CfDs) in/ali finančnih prenosnih pravic (ang. Financial Transmission Rights oz. FTRs), pri čemer so druge bodisi opcijske bodisi obvezne. Če so finančne prenosne pravice vezane na dejanske prenosne zmogljivosti, ki so na voljo za fizično dobavo, pa so pogodbe na razlike izključno finančni produkti, kjer je nasprotna stranka udeleženec na trgu.

Trg za dan vnaprej s fizično dobavo – povezovanje z obstoječimi evropskimi projekti?

Trgovanje z električno energijo za dan vnaprej v jugovzhodni Evropi poteka na prostem trgu (ang. over-the-counter). V regiji je trgovalnih platform malo in imajo zelo omejeno likvidnost. Precizno uravnavanje odprtih poslov, prodaja presežka energije in pokrivanje primanjkljaja – ti posli se sklepajo bilateralno. Težava tega pristopa ni le v tem, da je njegova transparentnost pomanjkljiva, temveč tudi v tem, da udeležence na trgu izpostavlja večjemu tveganju. Edini uspešno izveden regionalni projekt, ki je vreden omembe, je projekt spajanja trgov 4M med Romunijo, Madžarsko, Slovaško in Češko. Ti štirje trgi so spojeni od zadnjega četrtletja leta 2014 dalje, to pa bi lahko odprlo vrata sodelovanju še drugih držav. Srbija z ustanovitvijo nacionalnega organizatorja trga pripravlja regionalni projekt po imenu SEEPEX. Ta temelji na sodelovanju z energetsko borzo EPEX Spot, ki omogoča trgovanje v Nemčiji, Franciji, Avstriji in Švici. V drugi fazi lahko

Ena največjih težav v jugovzhodni Evropi je obstoj številnih relativno majhnih lokalnih segmentiranih trgov. Na nekaterih od njih, na primer v Bosni in Hercegovini, na Hrvaškem in v Srbiji, je opaziti visoko koncentracijo proizvodnih enot, ki so še vedno v lasti državnih podjetij.

also used for speculation deals, is currently organised in the form of cross-border capacity allocations. Following the centralised approach applied in Central-West and Central-East Europe, where the CASC.eu and CAO auction offices were established quite some time ago, a similar centralised approach has been followed by some South-East European TSOs (SEE TSOs). A co-ordinated auction office has been established in Podgorica, Montenegro which is currently in charge of capacity allocation and a secondary market on two regional borders, namely Croatia-BiH and BiH-Montenegro. Enlargement and coverage of additional borders is expected during 2015, the first being Albania-Montenegro to follow from April this year. In such a way, it will be ensured that the requirements of the Forwards Network Code (NC) are fulfilled, such as the establishment of a Single Allocation office in Europe. The first step in such a direction is a merger of CASC.eu and CAO, which is on its way and is to be finalised during 2015. In parallel, one set of capacity allocation rules will be drafted and energy traders will have a unique interface towards a single European IT platform for allocation of long-term transmission capacities – a so-called 'one-stop-shop' solution for Europe. Although still not prescribed, one could expect development of this market segment either towards CfDs (Contracts for Differences) and/or FTRs (Financial Transmission Rights), the second being either options or obligations. While FTRs are referenced to the actual transmission capacity available for physical delivery, CfDs are pure financial products where the counterpart is a market participant.

Day-ahead market with physical delivery – integration with existing EU projects?

Electricity trading on a day-ahead level in SEE is organised over-the-counter. Few trading platforms exist in the region with very limited liquidity. Fine-tuning of open electricity deals, selling of the energy surplus and coverage of the energy deficit, is concluded bilaterally. It is not only that this approach lacks in transparency, it also leads to a higher risk exposure for market participants. The only successfully implemented regional project that is worth a mention is the 4M Market Coupling between Romania, Hungary, Slovakia and the Czech Republic. Four markets have been coupled since the last quarter of 2014 and this could pave the way for other countries to join the process. With the establishment of a national market operator, Serbia is preparing a regional project called SEEPEX. The base is in co-operation with EPEX Spot, the power exchange which has trading hubs in Germany, France, Austria and Switzerland. In the second step, one could expect coupling of the Serbian electricity market with Romania and

One of the main problems in South-East Europe is the existence of many relatively small local segmented markets. In some of them, such as Bosnia and Herzegovina, Croatia and Serbia, a high-concentration of generation units still belonging to state-owned companies can be observed.

pričakujemo spojitev srbskega trga električne energije z Romunijo in Madžarsko. Hkrati je v teku ustanovitev lokalnih energetskih borz na Hrvaškem in v Bolgariji.

Grški veleprodajni trg električne energije je od leta 2005 organiziran kot obvezni centraliziran sistem trgovanja (ang. *mandatory pool*). Nacionalni regulatorni organ je naznanil več prehodnih kratkoročnih ukrepov, ki so nujni za zagotovitev priključitve grškega trga električne energije evropskemu veleprodajnemu trgu električne energije. Dejanska spojitev naj bi se zgodila do konca leta 2015. Centralizirani model trga, ki temelji na določanju razpoložljivosti enot, namreč mora biti združljiv s konceptom cenovnega spajanja regij (ang. Price Coupling of Regions oz. PCR), ki se mu je italijanski trg priključil konec februarja 2015. V naslednjem koraku bi morala slediti spojitev voda za visokonapetostni enosmerni prenos med Grčijo in Italijo ter projekta večregionalnega spajanja (ang. Multi-Regional Coupling oz. MRC). Kljub vsemu pa je treba jasno povedati, da sedanji tržni mehanizem v Grčiji, čeprav je veliko kompleksnejši kot MRC, z vidika sistemov predstavlja optimalnejšo rešitev, saj optimizira tako ponudbe za dan vnaprej kot pomožne sistemske storitve ter daje na lokacijo vezane cenovne signale za omejene prenosne zmogljivosti.

Konkurenca na trgu električne energije in enaki pogoji delovanja v JVE

Ena največjih težav v jugovzhodni Evropi je obstoj številnih relativno majhnih lokalnih segmentiranih trgov. Na nekaterih od njih, na primer v Bosni in Hercegovini, na Hrvaškem in v Srbiji, je opaziti visoko koncentracijo proizvodnih enot, ki so še vedno v lasti državnih podjetij. V nekaterih drugih državah, kot je Črna gora, imajo tuji partnerji manjšinske deleže v podjetju za proizvodnjo energije (44 %) in operaterju prenosnega omrežja (22 %). Avstrijski podjetji EVN in Verbund sta vključeni v hidroenergetske projekte v Albaniji, češki gigant ČEZ pa je kupil večinski delež v distribucijskem podjetju. Romunija se po drugi strani veliko bolj usmerja v zmogljivosti za obnovljivo energijo, predvsem vetrno. Instalirane zmogljivosti je za skoraj 3 GW, po ocenah Transelectrice pa bi bilo mogoče postaviti za še dodatnih 9 GW vetrnih elektrarn. Celo v Grčiji, kjer konkurenca na veleprodajni ravni obstaja od leta 2005, ima PPC 75-odstotni delež vse proizvodnje električne energije, še leta 2009 pa je ta delež pravzaprav dosegal skoraj 100 odstotkov. Neodvisni proizvajalci so prišli do 20-odstotnega deleža, predvsem z uporabo tehnologije proizvodnje električne energije s pomočjo plina (Elpedison 8,9 %, Mytilinaios 5,6 % in Heron Thermoelectric 5,3 %). Koncentracija na nacionalnem veleprodajnem trgu je še vedno zelo visoka; konkurenca se je začela pojavljati do začetka leta 2011, ko je cena plina narasla, hkrati pa so cene energije upadle. A ker ima PPC v rokah najkonkurenčnejšo mešanico goriv, ki vključuje elektrarne na lignit in največje hidroelektrarne, bo enake pogoje delovanja težko omogočiti brez močne konkurence proizvajalcev iz sosednjih držav. Kosovo ima le dve veliki termoelektrarni na lignit – Kosovo A in Kosovo B. Zadnja nenačrtovana zaustavitev termoelektrarne Kosovo A, ki jo je povzročilo uhajanje vodila pri elektrolizi, je pokazala na ranljivost najmanjšega trga v regiji. Izpad več kot 420 GWh domače proizvodnje je povzročil nenačrtovan izredni uvoz po ceni, ki je trikrat višja od regulirane cene, ki jo plačujejo končni porabniki v tej državi. Dogodek je pokazal, da se majhen sistem, kot je ta na Kosovu, spopada s težavami z ustreznostjo sistema, kar bi lahko vodilo v lokalno razbremenjevanje. Rešitev je tesnejše regionalno sodelovanje, predvsem pri neprekinjenem trgovanju znotraj dneva in izravnavi odstopanj, kar bi zagotovilo večjo likvidnost in konkurenčnejše ponudbe blizu obdobij dejanske dobave energije. Z nenačrtovanimi izpadi se je treba spopadati z mehanizmom čezmejne izravnave. ■

Hungary. In parallel, establishment of local power exchanges in Croatia and Bulgaria is on its way.

The Greek wholesale electricity market has been organised as a mandatory pool since 2005. The national regulatory body has announced several transitional short-term measures, which are necessary in order to ensure integration of the Greek electricity market into the European wholesale electricity market. The actual coupling should take place by the end of 2015. Specifically, the centralised unit-commitment-based market model needs to be compatible with the PCR (Price Coupling of Regions) concept, on which the Italian market has been connected since the end of February 2015. A high-voltage DC cable between Greece and Italy should be coupled with the Multi-Regional Coupling (MRC) in the next step. Nevertheless, it should be noted that the current market mechanism in Greece, although much more complex than MRC, provide more optimal solutions from a system perspective, as it co-optimises day-ahead offers and ancillary system services and delivers location price signals for scarce transmission capacities.

Electricity market competition and a level playing field in SEE

One of the main problems in South-East Europe is the existence of many relatively small local segmented markets. In some of them, such as Bosnia and Herzegovina, Croatia and Serbia, a high-concentration of generation units still belonging to state-owned companies can be observed. In some other countries, such as Montenegro, foreign partners have minority shares in an energy generation company (44%) and transmission operator (22%). The Austrian companies, EVN and Verbund, are involved in hydro-energy projects in Albania, and the Czechs giant, CEZ, has bought a majority share in a distribution company. At the same time, Romania has been much more concentrated on renewables capacities, mainly wind energy. Installed capacity is close to 3 GW and, according to estimations made by Transelectrica, it would be possible to add up to 9 GW of wind capacity. Even in Greece, where competition on a wholesale level has existed since 2005, PPC holds 75% of total electricity production. Actually, this percentage used to amount to almost 100% in 2009. Independent producers have achieved a share of 20%, mostly from the use of gas-fired power generation technology (Elpedison 8.9%, Mytilinaios 5.6% and Heron Thermoelectric 5.3%). The national wholesale market is still highly concentrated, but some competition was emerging until the beginning of 2011 when gas prices went up and, at the same time, energy prices decreased. Nonetheless, as PPC holds in its hands the most competitive fuel mix that includes lignite-fired units and the largest hydro power plants, it will be hard to enable for a level playing field without strong competition with the producers from neighbouring countries. In Kosovo only two large lignite-fired thermal power plants (TPP) exist – Kosovo A and Kosovo B. The latest unplanned outage of the Kosovo A TPP, caused by a hydrogen leak in the electrolysis, showed the vulnerability of the smallest market area in the region. A loss of more than 420 GWh of domestic production led to unplanned emergency imports for which they paid three times more than the regulated price being covered by the country's end consumers. The event showed that a small system, such as that of Kosovo, is currently coping with problems of system adequacy which could lead to local load shedding. A solution is stronger regional co-operation, especially for continuous intraday trading and balancing, which would ensure higher liquidity and more competitive bidding close to periods of actual energy delivery. The coverage of unplanned outages has to be dealt with over the cross-border balancing mechanism. ■