

ENERGY MARKET REFORMS IN CROATIA: CHALLENGES AND PERSPECTIVES

Nela Vlahinić

Faculty of Economics University of Rijeka

Ivana Filipovića 4, Rijeka

Abstract

Since July 2000 the Croatian energy sector has been subject to market liberalisation, deregulation, restructuring and privatisation, with a strong focus on adaptation of its legislation to the EU Acquis Communautaire. Although the energy market has been formally fully open, there are still not enough market players to create real competition. After the adoption of the Third energy package in 2012 energy market reforms are entering the new phase that requires new development platform, as well as new energy strategy and policy. However, energy reforms have been influenced by unfavourable macroeconomic environment and continuous economic recession since 2009 which hindered new investments and technological upgrading in energy sector.

The aim of the paper is to give an overview of energy market reforms in Croatia with special reference to EU energy policy as a wider framework and to indicate current and future challenges, as well as perspectives for Croatian energy sector.

Key words: energy reforms, Croatia, EU energy policy, market liberalisation

1. Introduction

The liberalization process has changed the structure and relationships in energy sector and resulted with new policy issues and challenges. It has become a very important economic, political and legal issue and reached the highest priority on the European policy agenda. Since energy sector is strongly interrelated with the economic, social and environmental consequences, energy market reforms have significant impact on economy and society as a whole.

Croatian energy sector has been subject to market liberalisation, deregulation, restructuring and privatisation, with a strong focus on adaptation of its legislation to the EU Acquis Communautaire. Although energy market has been formally fully open, there are still not enough market players to create real competition. After the adoption of the Third energy package in 2012 energy market reforms are entering the new phase that requires new development platform, as well as new energy strategy and policy. However, energy reforms have been influenced by unfavourable macroeconomic environment and continuous economic recession since 2009 which hindered new investments and technological upgrading in energy sector, as well as public support for the further reform steps.

The aim of the paper is to give an overview of energy market reforms in Croatia within a wider analytical framework of EU energy policy. Insights from the economic literature help us to establish the major effects of liberalization and to indicate current and future challenges as well as perspectives for Croatian energy sector and energy market liberalization.

The rest of the paper is organized as follows: Section 2 reviews the role of the EU energy policy, especially progress in implementing single electricity and gas market, Section 3 gives a short overview of Croatian energy policy and challenges that has been faced to. Section 4 provides concluding remarks.

2. The EU energy policy as a wider framework

Energy policy is one of the most important economic, political and legal issues today that has reached the highest priority within the EU. Energy sector has the crucial economic and political role and is strongly interrelated with the economic, social and environmental consequences. Therefore energy policy is very complex and comprehensive. There are many relationships between energy sector and European economies and the broad scope of economic effects can be divided as direct and indirect ones. Direct effects are due to the fact that energy sector contributes to GDP by producing energy goods and services and therefore creates jobs and new value. Even more, energy sector supports economic activity and jobs in many energy-related industries and thus its multiplier is very high. Indirect effects are even more important because energy underpins the whole economy. Since energy is the input for almost all goods and services, there is a strong relationship between energy prices on one side and competitiveness, employment and economic growth on the other. According to the macroeconomic theory, in the short run an increase in energy prices leads to an increase in the domestic price level and a decrease in output due to higher costs. This situation decreases the aggregate demand and may lead firms to change or even cancel their investment plans, especially because increased energy prices can result in higher interest rates. The impact on output and employment is determined by the relative supply responses of labour and capital. To the extent that labour market institutions inhibit the adjustment of real wages to the shocks - i.e. higher energy prices imply higher input prices which reduce profitability - the deterioration in the terms of trade following an energy shock can affect the equilibrium employment by creating a wedge between the value-added and consumer prices (Vlahinić-Dizdarević & Žiković 2010).

Obviously, energy sector is crucial for sustainable economic growth and therefore economic and energy policy should tackle all these issues. During the time, European countries realized that energy challenges can often be better met at EU level and the EU energy policy has been broadened with many new issues that are related to sustainability and green growth.

2.1 EU energy policy: the model of energy market reforms

Since the electricity sector has the highest importance because it directly affects competitiveness and standard of living and it has reached the level of internal market within the EU, we shall focus our further analysis on market reforms that have been implemented in the electricity sector of EU Member States. However, compared with oil and upstream gas, assessing the impact of electricity reform is more complex and difficult. This is because reform, as in the case of downstream gas, often involves different combinations of a number of reform steps being implemented simultaneously (Pollitt 2012).

The sequencing of the reform steps in electricity sector usually involves four steps (Vlahinić-Dizdarević 2010): implementation of regulatory reforms, restructuring, market liberalisation and privatisation.

Energy law is generally recognised as a formal precondition for regulatory reforms and establishment of a formally independent regulatory agency. It represents a legal basis for all further steps and signals a country's commitment to implement reforms. It also reduces the uncertainty and risks that are related to issues such as property rights and conflict resolution procedures. Regulatory reforms are often considered as the most important element of the economic reforms in energy sector. Independent regulator should set entry and exit terms, as well as tariffs for those parts of the industry that remain a monopoly.

The second step considers restructuring that involves the unbundling of network operation from the competitive activities. Unbundling starts with the separation of distribution business (Distribution System Operator - DSO) from the generation and transmission activities because much of the inefficiencies in the energy sector arise from distribution and it often suffers from high technical and commercial losses. Distribution is subjected to regulation and experience shows that incentive regulation can result in significant efficiency improvements. After the distribution, the transmission activities are separated from generation and the separate entity (Transmission system operator - TSO)

is established. A clear division of transmission and generation is a precondition for effective competition in the generation segment.

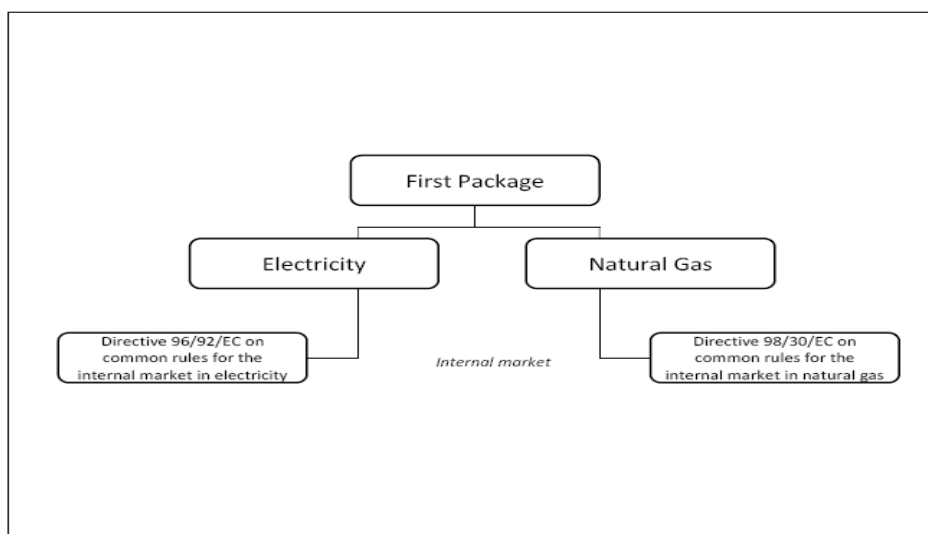
The third step is the establishment of a competitive wholesale market. The breaking of the monopoly in generation involves some form of competition so the generators have to compete with each other to sell electricity. The critical issue in establishing a competitive wholesale electricity market is to create sufficient number of firms.

Privatisation of state owned utility is final, although the least common step of electricity reforms and it is not necessarily connected to liberalization process. In recent years the issue of privatization of natural monopolies has become controversial because of the mixed or even deteriorating macroeconomic results of privatization. In many countries it turned out that possible improved microeconomic efficiency brings benefits (profit) only for their owners. Fiorio, Florio & Doronzo (2007) explored the effects of privatization in electricity sector on electricity prices and customers' satisfaction in EU members. Their main findings are the following: first, panel estimation of prices tend to reject the prediction that privatization per se leads to lower electricity prices, after controlling for other reforms, and other industry and country-specific variables; second, customer satisfaction about prices and quality of services is higher with public ownership than under private ownership. The case of Nordic countries shows that highly competitive national markets and a regionally integrated transboundary market are well supported by an industry structure where public ownership plays a significant role. According to Fiorio, Florio & Doronzo (2007), the fact that electricity generators are often owned by municipalities can be seen as an intrinsic constraint to anti-competitive mergers and acquisitions, that are often motivated not by economies of scale in production, but by the desire to influence prices. The same reasoning may apply to a public sector owned firm exposed to competition (Vlahinić-Dizdarević 2011).

2.2 Progress in implementing single electricity and gas market

From the early phases of the European integration process electricity and gas have been the important issues for the European authorities and the creation of a single electricity and gas market have become one of the most important economic and political objectives due to its important impact on competitiveness and economic growth. The real first step towards the liberalisation of the European energy markets were made in 1990, but it was only in June 1996 that the European ministers passed the Directive 96/92/EC which gave incentive to the liberalisation of the electricity market and the Directive 98/30/EC for the gas market in the Member States. These two Directives are known as the first package of energy market reforms (Figure 1.).

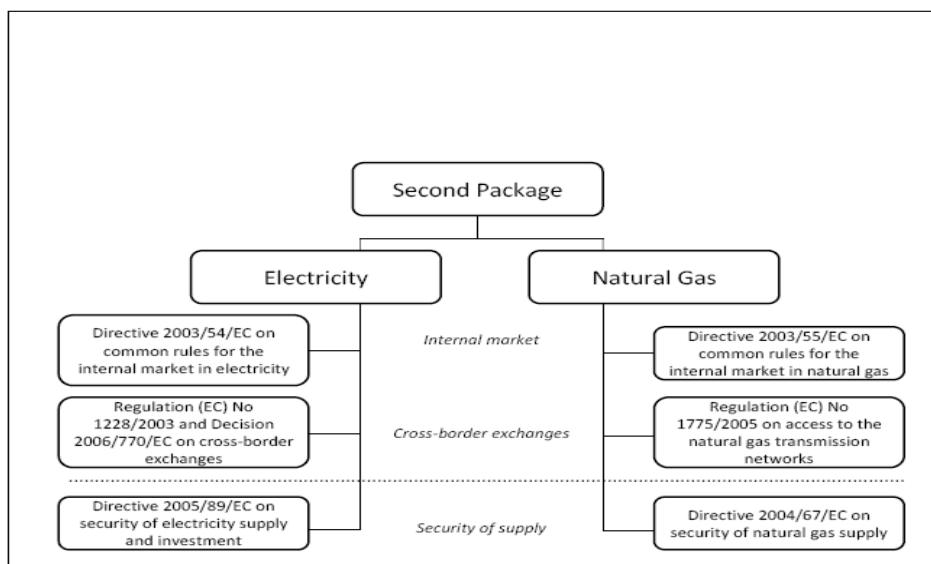
Figure 1 The first energy package



Source: Dizdarević 2012

The new energy package of Electricity and Gas Directives (2003/54/EC and 2003/55/EC) were agreed in 2003 (figure 2) and they placed more strict requirements on Member States to disintegrate their electricity and gas industries and introduce competition in generation and retail supply.

Figure 2 The second energy package



Source: Dizdarević 2012

In November 2005 the Directorate General for Energy and Transport (DG TREN) of the Commission published its report on progress in creating the internal electricity market (EC 2005) and it found that the most important problem on the internal electricity market is the insufficient integration of national markets. The key indicators they used were the absence of price convergence across the EU and the low level of cross-border trade. This was generally due to the existence of barriers to entry, inadequate use of existing infrastructure, insufficient interconnection between Member States and a high degree

of concentration in the industry that impeding the development of real competition. There were some topics that still remained as big obstacles in the further development of the single electricity and gas markets (Vlahinić-Dizdarević & Galović 2007) before the European Commission adopted a third package of energy market reforms in 2009:

- Non-discriminatory access

Network access conditions were still not non-discriminatory and fair across all Member States because there was at least one aspect of network access in all countries that was unacceptable.

- Regulation

The regulators did not have enough power, they were not independent of government and their actions should have been harmonised across the EU.

- Interconnection infrastructure

The availability of electricity network capacity for cross border transactions was not satisfactory either in terms of new investment or in the way the existing capacity was allocated.

- Benefits for small users and households

The literature usually concludes that a high level of switching¹ indicates that consumers are benefiting from the reforms. Since the level of switching was very low and often perceived as risky for the small users and households, the final benefits were insignificant.

- Market openness and price development

Although some benefits have been achieved, for example the 10-20 per cent lower electricity prices in the mid of 2000 due to the electricity and gas surpluses in the new Member States, further development shown that liberalization process failed to support benefits of market opening.

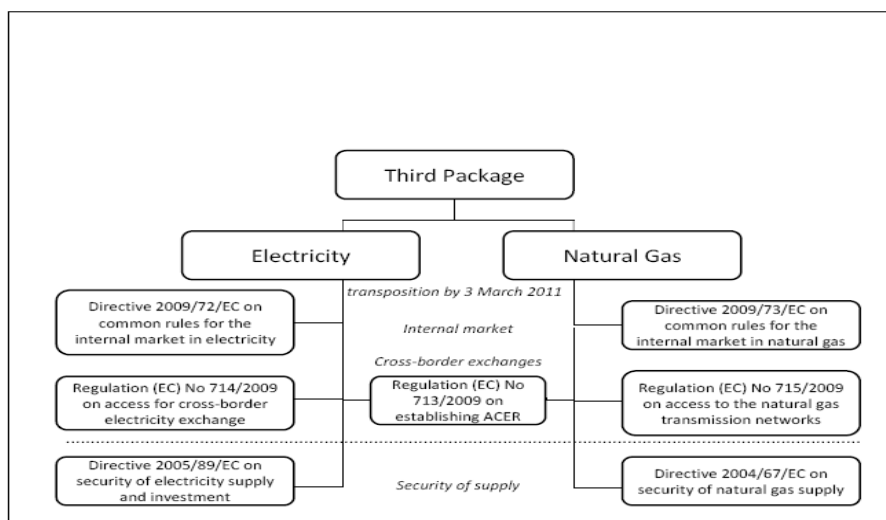
- Independence of system operators

According to most studies, unbundling was not being implemented in a sufficiently robust manner across all Member States.

The third package of energy market reforms was adopted in 2009 (and came into force in 2011) as the extension of earlier reform packages (figure 3).

¹ Switching means changing suppliers of the electricity (op.a.).

Figure 3 The third energy package



Source: Dizdarević 2012

This new package focuses consumer choice, fairer prices, green energy and security of supply as the most important issues. In order to meet these aims, EC requires Member States to fully separate competitive activities (production and supply) from regulated networks (distribution and transmission), to improve effectiveness and independency of national energy regulators, to facilitate cross-border trade in energy as well as cross-border cooperation and investment. The empirical evidence shows that many EU Member States are reluctant in implementing obligatory measures and the results of the Third energy package implementation are rather ambiguous. According to European Commission (EC 2011) there are still some serious problems. First, interconnection capacity between Member States remains generally insufficient and bottlenecks exist which prevent fluid transmission of energy within and between countries. Even if interconnections exist, the absence of harmonisation of market rules in the different Member States leads to market segmentation and higher transaction costs which constitutes a barrier, especially for smaller players. At retail level, the integration of the European electricity and gas markets has not developed sufficiently yet. European gas and electricity retail markets are still characterised by substantial disparities in the different Member States as far as price levels and switching rates are concerned. Decreasing wholesale prices in electricity and gas have not always been passed on to retail consumers. In gas, most households and industrial consumers were able to benefit from a significant decrease of their gas bills, but in electricity, retail prices rose in most of the countries. Although the aim of the energy market liberalization was to allow entry for new market players, energy markets remained highly concentrated with little evidence of new entry of independent suppliers.

3. Croatian energy policy

3.1 Energy sector in Croatia: a short overview

The snapshot on Croatian energy sector shows certain specifics:

The Croatian primary energy mix is comparable to the most of the EU Member States, reflecting a high dependence on hydrocarbons with natural gas having a dominant share of 45.4%. Gas and oil production makes over 60% of total primary energy supply (TPES), hydropower production accounts for 22.7%, while fuel wood still has an important role. Other renewables account for only 1.6%, though their share increased significantly during last 5 years. Domestic production covers about 50% of total energy consumption. The level of import dependency is comparable with the EU average

(54%), but the problem is trend. The import energy dependency of Croatia has increased during last 20 years, especially in electricity, and such a situation brings certain concerns on energy security.

Croatia belongs to the group of countries with low energy consumption per capita. It is positioned below the EU-27 average. In 2010, the Croatian total energy consumption p/c was 2226 kg of oil equivalent and it was 34.7% lower than the energy consumption level in the EU-27 (Energy Institute Hrvoje Požar 2012). Energy intensity² is higher than EU-27 average and there have been some important attempts to improve energy efficiency. In 2008 an energy efficiency master plan was finished and an Act on Energy End-use Efficiency adopted. The National Energy Efficiency Action Plan was prepared to comply with the requirements of the EU Directive on energy end-use efficiency and energy services.

Croatia has considerable potential for renewables but further development needs considerable new investments, especially in transmission network. Croatia introduced obligations to purchase all electricity output from privileged energy producers and aims to increase the share of renewable sources (without large hydro-electricity plants) from 0.8% to 5.8% of total electricity consumption from 2004 to 2010. Including large hydro, renewable energy in 2008 represented the share of 34.7% in total consumption, but the situation is quite different when excluding hydropower – only 1.2% of Croatia's energy comes from renewable sources. Wind power is especially fast growing segment: Croatia has a total wind power capacity of 180 MW in 2012 and it is a 37.5% increase from 2011.

It could be concluded that Croatian energy sector is relatively well developed but it has been faced with economic problems that are the result of insufficient investments in new power plants and energy infrastructure. Therefore there are high expectations regarding new investment cycle in energy sector that could stimulate economic growth.

3.2 Energy policy and strategy

The early stage of the energy reform process started in 1994 when Government adopted an energy strategy by policy area. However, this process intensified and four years later in 1998 a second energy strategy was approved. A new energy strategy was adopted in 2002 and focussed on energy security, energy market opening and sustainable energy development. Finally, the actual energy strategy has been approved and implemented in 2009 with the main issues related to EU accession. At the same time, energy market reforms have been implemented. They formally begun in July 2000 by delivering the Energy Sector Reform Programme and since then the Croatian energy sector has been subject to market liberalisation, deregulation, restructuring and privatisation, with a strong focus on adaptation of its legislation to the EU *Acquis Communautaire*.

At the early stage of reform process, a comprehensive institutional framework has been established in order to develop energy markets in line with those of other EU countries. A key step was establishing and transferring responsibilities to separate bodies: Croatian Energy Regulatory Agency (CERA), a market operator (Croatian Energy Market Operator - CEMO) and an investment support fund (Environmental Protection and Energy Efficiency Fund – EPEEF). CERA was established in 2004 as an autonomous, independent and non-profit public institution. Its main tasks include licensing of energy operators, adoption of the tariff methodology for regulated energy activities³, adoption of regulated final prices, and protection of consumers and settlement of disputes. Although CERA was formally autonomous and independent from the Government, its real independency was questionable because it determined levels of tariffs and final prices only after consulting Government (Ministry of Economy, Labour and Entrepreneurship). However, the new Energy Law adopted in December 2012 has given a more important role to CERA in the field of setting tariffs and final prices. The legal framework for the electricity and gas sectors has been harmonised with EU Directives, first with the

² Energy intensity is opposite to energy efficiency. Therefore high energy intensity means low energy efficiency.

³ Regulated energy activities are: electricity generation for regulated customers, electricity transmission and distribution, electricity supply for regulated customers, gas transport and distribution, gas storage, management of LNG terminals, gas procurement and gas supply for regulated customers.

2003 EU Directives on the internal energy market (for electricity and gas) and now with the 2009 EU Directives and the Energy Community Treaty.

The process of restructuring and unbundling the state energy monopolies (HEP and INA) has been a priority in Croatian energy policy. Monopoly activities (transmission and distribution network) have been separated (unbundled) from commercial activities (generation and supply) in both companies, but with different success. The unbundling of natural gas transmission was completed in 2001 with the creation of PLINACRO, a 100% state-owned company, fully separated from INA that acts as an independent natural gas transmission system operator (TSO). The unbundling process in electricity sector hasn't been so smooth. HEP unbundled electricity transmission by establishing two separate companies within the HEP: HEP-Transmission System Operator (HEP-TSO) and HEP-Distribution System Operator (HEP-DSO). The account and management unbundling was conducted in 2004 and the ownership unbundling has been completed in 2013 by establishing Croatian Transmission System Operator (HOPS) as a separate legal entity. This was the final step in the formal process of restructuring and future challenges are mostly related to further market liberalization.

3.3 Electricity and gas market liberalization

Despite detailed energy policy that was in compliance with EU requirements, opening of electricity and gas markets has been ineffective so far. The calendar of electricity market opening has been very ambitious:

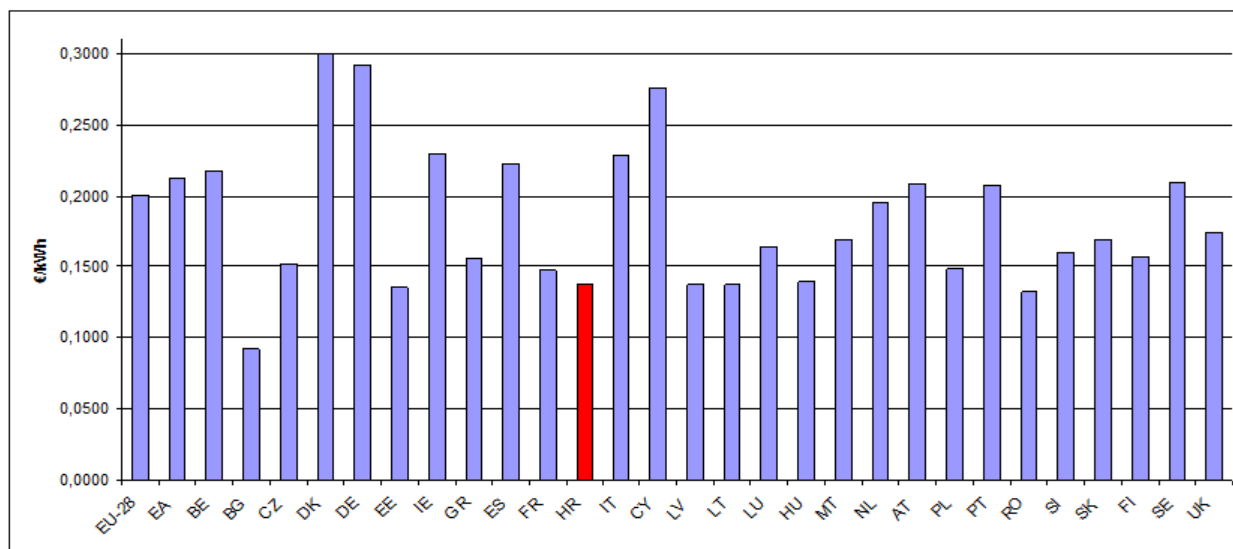
- 1 January 2005 for customers with consumption above 20 GWh
- 1 July 2006 for customers above 9 GWh
- 1 July 2007 for all industrial customers
- 1 July 2008 for all customers.

Obviously the objectives for market opening were unrealistic because supplier switch is completely limited and HEP remains the dominant supplier. In June 2013 the market situation has changed because a Slovenian electricity trading company GEN-I started to offer its electricity to SMEs and households on the Croatian electricity market. The state-owned Croatia Electric Company (HEP) is now facing several more competitors, but its market share is well above 90%. In the recent call for tenders to provide electricity to state institutions, the Croatian government accepted GEN-I's tender to provide electricity to 35 ministries and government agencies for the next two years. Its goal is to have a 17% market share of the Croatian electricity market, while RWE as a 50% owner of the Plomin2 power plant could become a serious future competitor with the short-term goal of taking over 10% of the electricity market in Croatia. This liberalisation is the first step of significant restructuring of HEP that still operates as a state monopolist.

Formal liberalisation of the Croatian gas market started in August 2008. However, since then no suppliers have used the transmission system apart from INA's subsidiary Prirodni Plin. With the new Energy Act and its implementing laws and regulations implemented in December 2012, CERA will set the prices and the process of liberalisation will be formally completed.

Since the main goal of the EU energy market liberalisation is the establishment of the competitive market that would lower and converge the energy prices, next four figures show the comparison of the electricity and gas prices in Croatia and other EU Member States.

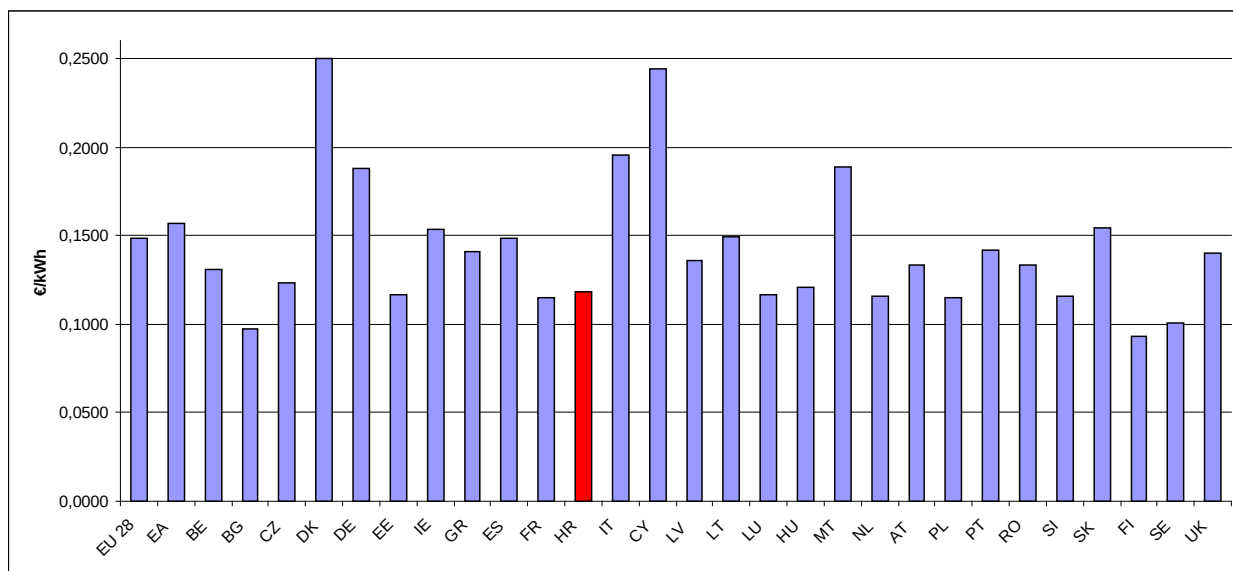
Figure 4 Electricity prices for domestic consumers (in €/kWh, all taxes included) for EU Member States, first semester of 2013



Source: Eurostat database 2014

Although Croatia experienced a growth in electricity prices for households, nominal prices are still lower than in most EU countries. However, prices in purchasing power parity rates are higher and indicate that Croatian households pay relatively very expensive electricity.

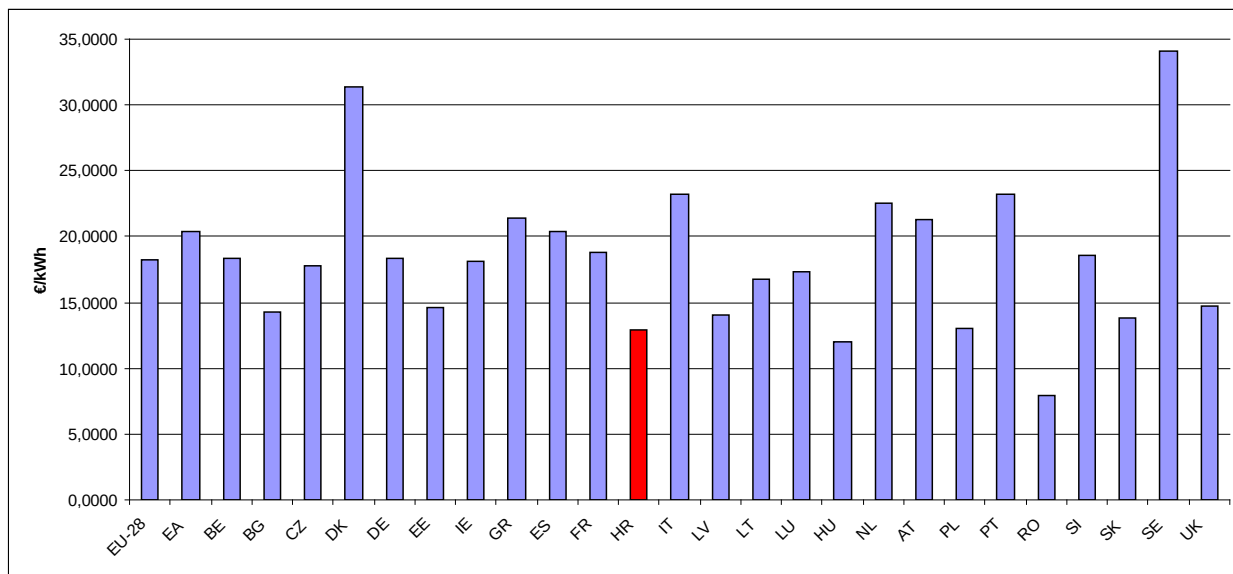
Figure 5 Electricity prices for industrial consumers (in €/kWh, all taxes included) for EU Member States, first semester of 2013



Source: Eurostat 2014

The comparison of gas prices for domestic consumers in Croatia and other EU Member States is presented at figure 6.

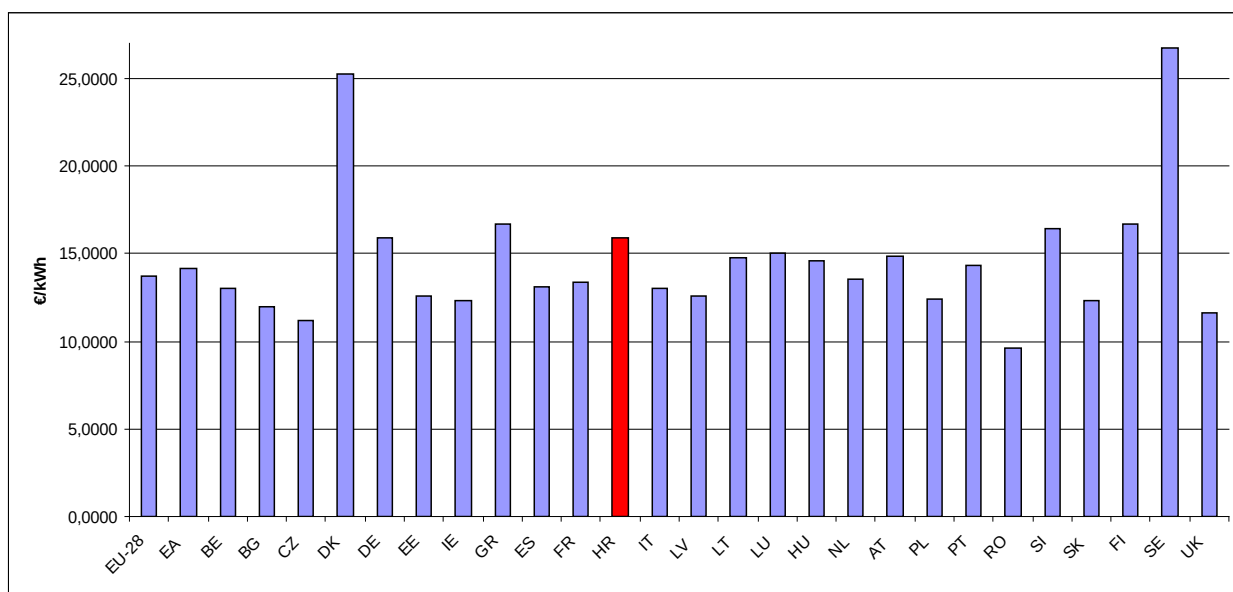
Figure 6 Gas prices for domestic consumers (in €/GJ, all taxes included) for EU Member States, Euro area and Croatia - first semester of 2013



Source: Eurostat database 2014

Although gas prices for households in Croatia were lower than the EU average in the first semester of 2013, the increase in prices during 2013 considerably changed the situation. However, the biggest problem in Croatia in the gas sector is related to high gas prices for industry that significantly lower the industry competitiveness (Figure 7).

Figure 7 Gas prices for industry (in €/GJ, all taxes included) for EU member states, Euro area and Croatia - first semester of 2013



Source: Eurostat database, 2014

Till the end of 2012 Croatian industry was faced with second highest prices of gas in the EU, but the situation changed in 2013. Today industry in Sweden, Denmark, Slovenia, Finland and Greece pays the highest price. There seems to be evidence that industrial prices for gas did fall as a result of gas market liberalization. In some way this situation has been also linked with the changes in the global gas market, especially with the shale gas “revolution” in US (Henderson 2012). It means that US as the major gas importer till 2008 has become self-sufficient in gas with the prospect of significant LNG exports. Though there are significant differences in wholesale gas prices around the world, the sharp decrease in US gas prices influenced the dynamics of the global and European gas market.

3.4 Challenges and perspectives for Croatian energy sector development

There is no doubt that Croatia is facing considerable economic and social changes in time of deep historical challenges that are related to climate changes, technological development, need for energy security, environmental protection and increase in energy efficiency. Since 1st July 2013 Croatia has become a full EU Member State with its legislation harmonised with *Acquis Communautaire*, which has shaped current Croatian energy policy and strategy. Energy development concept is based on the European Union energy targets that have to be met by 2020 known as “20-20-20”: 20% reduction in EU greenhouse gas emissions, 20% increase in energy efficiency and 20% share of renewable resources in total energy consumption. These goals are even more ambitious in the long run: by the year 2050 global greenhouse gas emissions should be reduced by 80-95% according to European Climate Foundation (2010), which will strongly influence a future energy sector development in all countries. As a full EU Member State, as well as the member of international community, Croatia will have to reduce GHG emissions by at least 50% by 2050 compared with the reference year. According to Granić (2012), a new development platform must take into account the cost of climate and environment protection and incorporate it into the real economic relations. It also means that the enforcement of laws and regulations, as well as subsidies should be used only for acceleration of some processes, but not as an underlying mechanism for a change of the value approach to the environment. Subsidies have become very costly mechanism that could not be sustained in the long run. Energy generation should not be divided into market driven and subsidised components (Granić 2012) and it is important to foster integrated market based on actual energy costs which comprise climate and environment protection costs. The issue of subsidising renewable energy sources has recently become controversial in EU Member States, especially in those countries that already pay very high prices of energy due to high renewable share in total energy consumption. Actual trends show the decrease in subsidies for renewables, especially in on-shore wind capacities.

There would be many new developments in energy sector but the most of them in electricity sector that will experience the deepest and profound changes. Further development of Croatian electricity market will be strongly influenced by climate protection policy, increased share of renewables in energy mix, technology development and development of smart grids. As it has been already mentioned, Croatian electricity market has been formally fully open, but in both competitive activities (generation and supply) there is no sufficient number of market participants to make a real competitive market. Since the current bilateral power trading mechanism is not fostering market dynamics and transparent setting of electricity prices, the creation of electricity exchange should contribute to the competition and market dynamics.

Further development of Croatian natural gas market will also take place, even though the process of unbundling has been more successful than in electricity sector. However, liberalisation and opening up of natural gas market is still very limited and it could be expected that new market participants would make market more dynamic and reduce gas prices, especially in industry sector. Gasification of industry and public sector facilities will also go on, especially in cases when replacing oil derivatives.

Further development of institutional and regulatory settings and transparent functioning of relevant institutions, especially regulatory agency CERA, will be very important because it is necessary to depoliticize pricing policy. Only real energy prices that would comprise climate and environment protection costs could stimulate private investments in energy sector. Therefore energy prices and

costs will rise, but in the long run higher costs could be offset by lower need for energy as a result of increased energy efficiency and technology development.

4. Conclusion

As the analysis shows, the development of the EU energy policy did not happen too smoothly. There have always been considerable differences in energy sector of different Member States, for example differences in energy mix, import dependency, transport routes, structure of energy markets, as well as different development level of their energy systems. These differences resulted in differing interests of the Member States, as well as different energy market reforms results. However, a single electricity and gas market have become one of the most important economic and political objectives due to its important impact on competitiveness and economic growth. The process of establishing single electricity and gas market has been evolving from the early phases of the European integration process in the beginning of 90s till the Third Energy Package that has been implemented in 2011 and has strongly influenced Croatian energy market liberalization and overall energy reforms.

Energy market reforms in Croatia formally begun in 2000, but till 2013 the process of market opening and liberalization was only formal, without real market competition. After the adoption of the Third energy package in 2012 energy market reforms are entering the new phase that requires new development platform and new institutional settings. Although Croatian Energy Regulatory Agency (CERA) was formally autonomous and independent from the Government, its real independency was questionable because it determined levels of tariffs and final prices only after consulting Government (Ministry of Economy, Labour and Entrepreneurship). However, the new Energy Law adopted in December 2012 has given a more important role to CERA in the field of setting tariffs and final prices.

The process of restructuring and unbundling the state energy monopolies in electricity and gas sector has been a priority in Croatian energy policy. Monopoly activities (transmission and distribution network) have been separated (unbundled) from commercial activities (generation and supply) in both companies, but with different success. While the unbundling of natural gas transmission was completed in 2001 and a 100% state-owned company acts as an independent natural gas transmission system operator (TSO), the unbundling process in electricity sector hasn't been so smooth. The ownership unbundling has been completed in 2013 by establishing Croatian Transmission System Operator (HOPS) as a separate legal entity and this was the final step in the formal process of restructuring.

Croatian energy sector has been faced with many challenges. Energy market reforms have been influenced by unfavourable macroeconomic situation and continuous economic recession since 2009 which hindered new investments and further market opening. Besides bad macroeconomic environment, the main challenge in the future will be related to the obligation to reduce GHG emissions by at least 50% by 2050 compared with the reference year. It will cause many new developments in energy sector but the most of them in electricity sector that will experience the deepest and profound changes in a way to cope with climate protection policy, increased share of renewables in energy mix, technology development and development of smart grids.

Literature

1. Dizdarević, N 2012, 'Development of a Competitive Market for Electricity and Natural Gas', *Summer School on Utility Regulation*, Florence School of Regulation, Florence, Italy, June
2. Energy Institute Hrvoje Požar 2012, *Energy Efficiency Policies and Measures in Croatia*, ODYSSEE-MURE 2010, Zagreb
3. Eurostat database 2014, *EU Statistics Database*, viewed 22 March 2014, <http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database>

4. European Climate Foundation 2010, *Roadmap 2050 – a Practical Guide to a Prosperous, Low-carbon Europe*, Brussels, viewed 20 February 2014, <<http://www.roadmap2050.eu/>>. Accessed 20 February 2014
5. Fiorio, CV, Florio, M & Doronzo, R 2007, 'The Electricity Industry Reform Paradigm in the European Union: Testing the Impact on Consumers', *Paper presented at the Consumers and Utility Reforms in the European Union Conference*, Milan, 8-9 June
6. Granić, G 2012, 'Vision of energy sector development, relationships and influences in Croatia by 2050', *Nafta*, vol. 63, no. 5-6, pp.149-60
7. Henderson, J 2012, *The potential impact of North American LNG Exports*, The Oxford Institute for Energy Studies, Oxford.
8. Pollitt, MG 2012, 'The role of policy in energy transitions: Lessons from the energy liberalization era', *Energy Policy* 50, pp. 128-37.
9. Vlahinić-Dizdarević, N & Galović, T 2007, 'Macroeconomic context of economic reforms in electricity sector of transition countries', *Proceedings of Rijeka Faculty of Economics – Journal of Economics and Business*, vol. 25, no. 2, pp. 347-71.
10. Vlahinić-Dizdarević, N & Žiković, S 2010, 'The Role of Energy in Economic Growth: The Case of Croatia', *The Proceedings of Rijeka Faculty of Economics – Journal of Economics and Business*, vol. 28, no. 1, pp. 35-60.
11. Vlahinić-Dizdarević N 2011, 'The Effects of Privatization in Electricity Sector: The Case of Southeast European Countries', in: GG Sander & L Tichy (eds), *Öffentliche Daseinsvorsorge in Deutschland und Ostmitteleuropa zwischen Daseinsvorsorge und Wettbewerb*, Verlag Dr. Kovac, Stuttgart, pp. 121-37.