

# EFFICIENT REGULATION – PRECONDITION FOR ELECTRICITY MARKET DEVELOPMENT

*Eraldo Banovac<sup>1\*</sup>, Darko Pavlović<sup>2</sup>, Dalibor Pudić<sup>1</sup>, Igor Kuzle<sup>3</sup>*

<sup>1</sup>*Croatian Energy Regulatory Agency, Ulica grada Vukovara 14, 10000 Zagreb, Croatia*

<sup>2</sup>*Plinacro Ltd., Savska cesta 88a, 10000 Zagreb, Croatia*

<sup>3</sup>*Faculty of Electrical Engineering and Computing, University of Zagreb, Unska ul. 3, 10000 Zagreb, Croatia*

*\*eraldo.banovac@zg.t-com.hr*

**Keywords:** electricity market, energy policy, regulation, weighted average cost of capital

## Abstract

A well-defined energy policy is a precondition for the successful development of any country. The European Union set the general objectives of national regulatory authorities. National regulatory authorities fulfill significant tasks in the Member States with respect to the creation of a fully operational internal market in electricity. Social regulation, Rate-of-return and RPI-X regulation are described in the paper. Special attention is paid to the mathematical basis of the RPI-X regulation and the weighted average cost of capital, which regulatory authorities use to ensure that returns are equal to the opportunity cost of capital.

## Introduction

Breaking monopolies and opening the electricity market impact national economies. During the last twenty years, the European Union (EU) has set its energy policy with three energy packages [1-3]. Furthermore, the European Commission presented the legislative proposal "Clean Energy for all Europeans" (so-called Winter Package) on 30 November 2016. The Winter Package pursues three main goals: putting energy efficiency first, achieving global leadership in renewable energies and providing a fair deal for consumers. The Winter Package covers measures relating to energy efficiency, renewables, electricity market design, security of supply and governance rules for the Energy Union [4]. The Winter Package also tackles energy poverty.

The EU assigned important obligations to the regulatory authorities (regulators), which carry out regulation in Member States, targeting the creation of a fully operational internal electricity market. According to the EU rules, Member States guarantee the independence of regulators and ensure that they exercise regulatory power transparently.

The concept of energy regulation was first established in the United States about a hundred years ago [5]. In the context of energy policy, an efficient regulation is of the utmost importance for the development of utilities and the electricity market. Moreover, appropriate regulation can contribute to a more productive society. Therefore, monitoring of energy activities still remains an important duty of regulators [6].

A lack of regulation in electricity market occurs when:

- there is no efficient regulatory regime to secure competition and supply of electricity at the most competitive price,
- market players are not encouraged to reduce costs (they may transfer all their costs to the customers despite the fact that they are not consistent with the expenses incurred in purchasing electricity and in supplying electricity to the customers),
- market players are not obliged to provide sufficient information to consumers, which are necessary for making reasonable choices,
- there are no adequate measures to promote a more efficient use of electricity for which a secure supply is a precondition,
- there are significant externalities not covered by those who imposed them, but paid by a society as a whole (for example, an older energy plant creates some external costs to the environment arising from its process – and pollution is considered as an externality because it imposes costs on those who are not involved in any way in the operation of such a plant).

When considering regulation in this paper the following is presumed: an appropriate regulatory framework, which encompasses a set of laws, sub-laws and methods with rules essential for a well-functioning electricity market. Decreasing the costs of regulated utilities by improving business efficiency, supporting the security of energy supply and protecting the environment are also included in the main goals. Such a regulation, which is carried out by the entitled regulators, requires the use of a range of efficient regulatory methods and techniques, a sufficient regulatory budget and a competent staff. In the EU, a Member State guarantees that the regulator carries out its duties impartially.

## 7 References

- [1] Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity, OJ L 027; Directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas, OJ L 204
- [2] Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC, OJ L176/37; Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC, OJ L176/57
- [3] Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC, OJ L 211; Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, OJ L 211
- [4] Communication from the Commission to the European parliament, the Council, the European economic and social committee, the Committee of the regions and the European investment bank, "Clean Energy For All Europeans", COM(2016) 860 final, Brussels, 30.11.2016.
- [5] Banovac, E., Stojkov, M., Kozak, D.: Designing a global energy policy model, Proceedings of the Institution of Civil Engineers – Energy, 2017, 170, (EN1), pp. 2–11
- [6] Banovac, E.: Monitoringgrundlagen der kroatischen Regulierungsbehörde für Energie (in German), EW – das Magazin für die Energie Wirtschaft, 2004, 103, (1–2), pp. 14–16
- [7] Prosser, T.: Models of economic and social regulation, in: Oliver, D., Prosser, T., Rawlings, R. (Eds): The Regulatory State: Constitutional Implications (Oxford University Press, 2010), pp. 34–49
- [8] Comnes, G.A., Stoft, S., Greene, N., et al.: Performance-based ratemaking for electric utilities: review of plans and analysis of economic and resource planning issues (Lawrence Berkeley National Laboratory University of California, Berkeley, November 1995)
- [9] Kahn, A.E.: The economics of regulation: principles and institutions (Cambridge, MA: MIT Press, 1988)
- [10] Rothwell G., Gomez, T.: Electricity economics: regulation and deregulation (Piscataway: IEEE Press, 2003)
- [11] Banovac, E., Kuzle, I.: Applicability of the LASPs in the electric-power industry. Proc. Int. Conf. IEEE EUROCON 2009, Saint Petersburg, Russia, May 2009, pp. 1152–1157
- [12] Banovac, E., Kozak, D.: An analytic review of the characteristics of the lot acceptance sampling plans used for acceptance of large lots, International Review of Electrical Engineering (I.R.E.E.), 2008, 3, (6), pp. 1070–1076
- [13] Tešnjak, S., Banovac, I.: Analysis of attribute acceptance sampling properties, WSEAS Transactions on Systems, 2014, 13, pp. 720–729
- [14] Banovac, E., Štritof, I.: Analysis of applicable methods of incentive regulation in the field of distribution of electricity, WSEAS Transactions on systems, 2005, 4, (8), pp. 1224–1232