Máté Tóth (Dr. Jur., LL.M.)

COMPLEX SYSTEM NORMATIVITY:

Hungarian Energy Law as an Example of Using Complex System Viewpoints to Understand Risks in Public Administration Normativity

Doctoral dissertation

Supervisor: **Gyula Vastag**, Professor,
Doctor of the Hungarian Academy of Sciences,
Vice-Rector for Research, Corvinus University of Budapest,
Research Professor, National University of Public Service.

Győr
2021 May 20
Széchenyi István University

Doctoral School of Regional and Business Administration Sciences

Máté Tóth (Dr. Jur., LL.M.)

COMPLEX SYSTEM NORMATIVITY:

Hungarian Energy Law as an Example of Using Complex System Viewpoints to Understand Risks in Public Administration Normativity

Doctoral dissertation

Győr, 2021

Author's Declaration

No portion of the work referred to in this dissertation has been submitted in support of an application for another degree or qualification of this or any other university or any other institution of learning.

Furthermore, this dissertation contains no material previously written and/or published by another person, except where an appropriate acknowledgement is made in the form of bibliographical references, etc.

Abstract

Abstract of the dissertation submitted by: Máté Tóth

For the degree of Doctor of Philosophy and titled: Complex System Normativity (subtitle: Hungarian Energy Law as an Example of Using Complex System Viewpoints to Understand Risks in Public Administration Normativity)

Month and year of first submission: January 2021, final submission: May 2021.

The present dissertation focuses on the **Hungarian energy sector**, a turbulent and thunderous field of regulation with detailed, often strict and even cogent rules in nature and with recurrently spectacular occasions of State intervention like (i) the overhead charge reduction campaign ("*rezsicsökkentés*"), (ii) the reintroduction of regulated electricity production prices to the free market and the so-called luxury profit scandal and (iii) the forced termination of the long-term contracts of power generators. These three specific types of state interventions as well as the turbulence of the considered sector in general are **associated with and manifest in certain risks** of transdisciplinary nature: *country risk*, *decreasing trust in (the quality of) public administration* and, beyond these, *systemic risk*. Transdisciplinarity of the sector becomes apparent through these risks, where multiple levels of the same reality cross each other from legislation and public administration to the interest of the market players affected regarding their financial operation, making losses and, allegedly, fizzled out legitimate expectations, as well as to the public interest and social aspects. In order to evaluate these risks associated with the Hungarian energy sector the dissertation focuses on normativity connecting regulation (sometimes without erga omnes effect) and public administration (sometimes with erga omnes effect) *together* describing requirements towards energy market licensees, i.e. the umbrella under which business entities operate, and in which certain risks associated with their operation occur.

The issues identified with State intervention in the energy sector vis-à-vis risks are not only legal, public administrative, economic or theoretical, but real and very serious *business*

concerns too. These real, massive concerns requires a transdisciplinary approach in line with our doctoral school's fundamental principle based on Nicolescu's conceptual formulation, evaluating the complex relationship between society, normativity governing society and science, as transdisciplinarity looks the world more holistically. The complexitiy axiom of transdisciplinarity is especially taken seriously throughout the whole research as world is often and mistakenly considered "linear" and, therefore, it is assumed that it is conducted by very clear "causal relationships" whilst law is especially considered to be a field of binary logic, where transdisciplinarity has no impact yet nor on the way how we investigate issues connected to normativity, emerging risks included. The dissertation therefore deals with this problem and *intend to prove by in-depth research that the linear casuality of the binary logic how normativity is traditionally considered is not beyond criticism and complex systems-related non-binary, non-linear way of thinking can add a lot to the understanding of normativity.* The dissertation observes the different levels of reality through the investigation of the emergence of risks in the system, identifying several A, non-A, and T states tackling the multidimensional issue of the normativity-related risks in the energy sector crossing borders of disciplines.

This way, the three types of risks is investigated first how they emerged in the Hungarian energy sector in connection with its regulation, whilst also leading to exciting questions *for the de lege ferenda practice*. **Chapter 3 of the present dissertation will deal with these considering the emergence of these three types of risks of the Hungarian energy sector, especially investigating whether the risks in the energy sector can be identified via a transdisciplinary evaluation of its normativity, and whether the borders of the regulatory autonomy (thus the borders of State interventions) are tacitly recognizable through the investment protection test (and especially *legitimate expectation*) concerning the emergence of these risks.**

The dissertation automatically reaches its next stage via following the enactment path of the norms. The Hungarian energy normativity as a typical semi-autonomous industry-specific public law field where beyond the level of the 'obvious', i.e. laws and bylaws, the public administrative resolutions also matter, so do the network codes enacted by the transmission and the distribution system operators (who are market players) operating as 'quasi laws'. This is indeed complicated – but is it complex as well? **Chapter 4 of the dissertation intends to prove that Hungarian energy law is not only complicated but complex as well, with all consequences applicable to it deriving from complex system theories and being in line with**

the complexity axiom of transdisciplinarity. To demonstrate complex adaptive nature of the public administration normativity the dissertation analyses industry-specific examples concluding that Hungarian energy law, one of the absolute extremes of the rigid continental law is per se following complex adaptive system attributes as being implemented by the public administration, thus refuting any reductionist and linear concepts of 'classical' continental public law routines and prejudice.

As the dissertation alleges, approaching the normativity of the Hungarian energy sector as a complex system could lead us to novel considerations and provides us with useful tools in understanding the transdisciplinarity of risks occurred in the energy sector like emergence, the 'robust yet fragile' (RYF) dilemma and the issue of systemic risk that the dissertation also investigate covering unpublished case studies, letting us closer to identify risks within the law applied by public administration, i.e. normativity. Here the dissertation invents its final novum, the query of ***'implied systemic risks indicators in public administration'*** **as demonstrated in Chapter 5 of the dissertation** by coupling the frequency of references to law in public administrative resolutions of the Hungarian energy sector with the place of these referred laws in the legal hierarchy, analysing the identified "errors" in a legal hierarchy-based utilization from the viewpoint of expressed regulatory systemic bias or risk cases and quality concerns of public administration.

By these findings the dissertation intends to contribute to the abstract and to the concrete, to theoretical considerations of law and policy and to the practical public administrative operation via introducing the transdisciplinary approach and complex systems theories in three points: to understand the nature of normativity, to understand and handle risks (country risks, public administration-related risk and systemic risks), and connecting the two, in understanding the RYF dilemma, the *key dilemma of normativity*, providing a new approach to the legislator and of course also to the market players concerned.

Acknowledgements

As Ernst Jünger once wrote: "[…] *our labours were abundantly rewarded with the revelation that rule and measure are imbedded in the hazards and disorders of this earth. As we climb, we draw nearer to that secret whose final mysteries are hidden in the dust. So with every upward step the chance pattern of the horizon is lost among the mountains, but when we have climbed sufficiently it encircles us on every hand, whatever our point of vantage, with the pure ring that unites us to eternity. It is true that our achievements in this field remained prentice work and childish learning; yet we felt our joy increase, as it must in anyone whose goal is set beyond the common mark*" (Jünger, 1939).

This is what governed and still governs my footsteps and this is exactly what happened to me during the past years the clear imprint of which is the present thesis, too.

I am extremely thankful to Professor Gyula Vastag, Vice-Rector of Corvinus University, Founding Director of the SzEEDS^{M} doctoral school, my supervisor and friend, who guided and supported me from the very moment of inviting me to the programme through my studies and research till the submission of this thesis. I am highly appreciative of the support provided by the PADME foundation and extremely professional and dedicated work of the SzEEDS team: Professor László Komlósi and Professor Márta Konczosné Szombathelyi, Tihana Vasic and Dr. Katalin Feketéné Czakó as well as my fellow students László Buics, Zoltán Dobra, Attila Sóti and László Szendrői. Special thanks to Dr. András Herczeg for his precious help and supportiveness.

Table of contents

List of figures

Key to abbreviations

DSOs: distribution system operators for the electricity and for the natural gas

BIT: Bilateral investment treaty, bilateral agreement on the promotion and mutual protection of investments

ECT: Energy Charter Treaty, a multilateral treaty exclusively for the energy sector establishing a multi-partite co-operation framework for cross-border interaction regarding investment protection, trade, transit of energy, energy efficiency, environmental protection and dispute resolution. The ECT was opened for signing in 1994. For Hungary, Act XXXV of 1999 made the ECT part of Hungarian law promulgated on 31 March 1999.

ECJ: European Court of Justice

2007 Electricity Act or VET: Act LXXXVI on Electricity

FET: Fair and equitable treatment (under international investment protection standards)

2008 Gas Act or GET: Act XL of 2008 on Natural Gas

GDCs: vertically integrated gas supply and distribution companies responsible for each region established by the State-owned National Oil and Gas Trust and were later separated in line with EU unbundling rules. At present, their functional successors are the USPs and the DSOs.

HEA: Hungarian Energy and Public Utility Regulatory Authority (previously: HEO)

HEO: Hungarian Energy Office (later: HEA)

PPAs: Long-term electricity power purchase and capacity booking agreements concluded in 1995 and 1997 in order to mitigate country risk, granting fix profit and terminated by 31 December 2009 by the order of the European Commission's decision (4 June 2008).

RYF: Robust yet fragile dilemma

TSO: transmission system operator for the natural gas or for the electricity; in Hungary these are: FGSZ Zrt. (natural gas) and MAVIR Zrt. (electricity)

USPs: universal service providers for the electricity of for the natural gas, supplying eligible consumers (for electricity, low-voltage consumers with a total connection power not exceeding 3*63 A for all places of use, and for gas, users with a purchased capacity not exceeding 20 m3/h)

ÜKSZ: an industrial regulation or nework code for the operation and commercial relations of the natural gas system elaborated by FGSZ Zrt., the TSO for natural gas and approved by HEA in a form of public administration, though its effect is binding on all market players (in Hungarian: Üzemi és Kereskedelmi Szabályzat)

(*Abbreviations of laws* of only particular relevance in certain Chapters of the dissertation are only defined and referred where appropriate.)

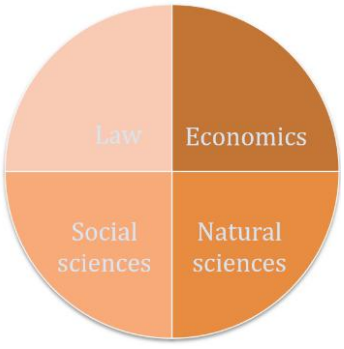
1. Introduction

1.1. Research focus and definitions

1.1.1. The Hungarian energy sector

There is a lot to be said about the market and regulation of the Hungarian energy sector in the last three decades, concerning both the historical evolvement as well as the present status. Though the topic may seem marginal or even inessential at first sight, in fact the gained experiences are valuable for at least three reasons. First, due to the investment protection queries and thus the question of *potential borders of state intervention in general* – the hot topics of today's and future policies, in each and every potential sector all around the world. Second, the energy *industry-specific focus* has its clear specialties compared to other industries, as the secured supply of cheap energy became an elementary need in modern times like general education or public security. Third, the *Hungarian* energy regulation with unique legal and economical solutions, the price setting mechanism etc. is to be evaluated in its special historical environment both in space and time for gaining local consequences that may guide both market players (investors) in Hungary and the legislation, including the regulatory authorities as well.

The history of the Hungarian energy sector was turbulent and even its present is indeed still thunderous; it is perhaps enough in this sense to refer to three occasions of state intervention: (i) the overhead charge reduction campaign ("*rezsicsökkentés*"), (ii) the reintroduction of regulated electricity production prices to the free market and the so-called luxury profit scandal and (iii) the forced termination of the long-term contracts of power generators. To understand the complexity of the energy sector is neither a task purely of natural sciences (i.e. energy as a physical phenomenon) nor purely legal (i.e. subject to sctrict and often cogent regulation) nor purely an economical as several disciplines are affected.



1.1.1-1. Figure: Disciplines concerned by the research

1.1.2. Risks generated by the normativity

These three specific types of state interventions deeply investigated later (see Chapter 3.2) as well as the turbulency of the considered sector in general are associated with and manifest in certain risks of transdisciplinary nature: *country risk*, *decreasing trust in (the quality of) public administration* and, beyond these, *systemic risk*. Though there are several possible collocations of possible risks, but from a regulatory-based approach, these three risks are the most relevant ones a market player would in fact encounter. Transdisciplinarity of the sector becomes apparent through these risks, where multiple levels of the same reality cross each other from legislation and public administration to the interest of the market players affected regarding their financial operation, making losses and, allegedly, fizzled out legitimate expectations, as well as to the public interest and social aspects. Risks are of course evident and inevitable consequences of any activity. According to Heiddeger, the essence of existence is being at risk (Heidegger 2006). Though risk is as old as the world itself, new way of thinking about risks is often claimed to be needed (e.g. Wang et al. 2020) However, as the world is getting more complex, systematic risk management approach, that may encourage a controlled, consistent and flexible decision-making process within the organization is especially called upon (Edwards and Bowen 2005). Thus, thinking about risks and re-shaping our thought about emerging risks and risk management is a *must, so it is in the emerging Hungarian energy sector*.

Country risk commonly refers to the risk of investing (or lending, accordingly) in a certain country, arising from possible business environment changes that may allegedly adversely affect the value of assets or the operating profits in the given country. In a purely economic definition it is often considered as the probability that a country will fail to produce the required foreign exchange in order to pay its obligation towards the foreign investors or creditors (Cosset et al., 1992). Others have defined country risk in a broader context to represent the multidimensional, even interdisciplinary character of country risk saying that a purely economic dimension of country risk only shows the capacity of a country to service its debt, but its willingness to service its debt should also be taken into account in the analysis through the investigation of the state's political environment defining its political risk (Mondt and Despontin 1986), whilst others employed this context to define country risk as the potential economic and financial losses due to the difficulties that are raised from the macroeconomic and/or political environment of a country (Calverley 1990). Though there is an extensive

criticism saying that established measures of country risk are unreliable predictors of actual volatility (Gregorio 2005), these critical voices do not affect the fact the country risk exists. Country risk is the biggest risk and concern for investors, especially investors in regulated markets, thus our focus in the dynamics of the energy sector cannot avoid to consider it.

The second, the **trust issue of the quality of public administration is less evident or defined whilst even the notion of the quality of public administration** is a harder thing to identify, and thus requires comparative, at least a multidisciplinary approach to tackle. While it is hard to dispute that expectations largely differ what is high quality public service, the assessment of quality in public administration is even more difficult. To achieve the new democratic, horizontal values and goals, in most Western countries it became quite common of contracting out pubic administrative tasks as a result of which the classical public-private sector dichotomy in fact does not exist anymore to the same extent as it did in the past. Stakeholder and citizen participation became a must for the West, and in order to permit such, deliberative democracy, e-democracy, public conversations, participatory budgeting, citizen juries, study circles, collaborative policy making, and alternative dispute resolutions are promoted (Bingham, Nabatchi and O'Leary 2005, 547-558). These democratization (egalitarian) tendencies are apparently driven by one articulated psychological fear: losing public trust. Some scholars expressly identify as a primary challenge confronted by public administrators to maintain broad-based support for an agency and its activities (Carpenter and Crause 2012, 26) whilst others warningly conclude that improving the quality of services may not necessarily increase trust in policy makers and the civil service (Löffler 2013, 12). All of the quality measures, i.e. the quality excellence models, the ISO 9000 series and the so-called *citizen's charters* are applied internally, i.e. within the hierarchy of public administration bodies, however, they alone do not made enforceability claims possible to clients. Finally, as remarkable scholars observe, in democratic settings, public administration cannot operate in an organizational vacuum and this is because government agencies both make and administer public policies in a richly textured political environment that is composed of diverse group of people, ultimately of ordinary citizens (Carpenter and Krause 2012, 26). The law in the West is in fact a prisoner of non-legal (mainly sociological and ideological) considerations of equality and democracy, valuating almost everything with the interest of people (Buchanan 1987, 246), even when some critical scholars would even reduce the meaning of the term 'democracy' only to the right of people to choose who will have a role over them (Schumpeter 1994, 284-285). Further, in the

West, the concept of public administration is not only a democratic business concept, but rather the mixture of the classical Weberian bureaucratic values and the democratization and business-like tendencies. In legal terms both distinct approaches of the authoritative public administration of the East and the democratic-business like public administration of the West belong to the cogent normative essence of law *de lege lata* as much as the regulation does. The cogent normative essence, being the utmost typical feature of public law, is the one being the most apparently linked to the issue of power and enforceability. This must be true even where tendencies are leading towards a democratic or market-oriented concept of quality which would like to see public agencies as catalysts of civic society and citizens as part of a responsible and active civic society rather than the conventional concept where public agencies as service providers and citizens as customers must be enriched by a which perceives. This essential nature makes the issue of the public administration's quality as well as robustness of law a public law question even in the era of democratic and business visions. In line with this, vast majority of public administrative organs does not operate in a (business-like) competitive environment neither in the West, nor in the East. This is the very reason why it is still a question whether the private sector's business concepts, and amongst these, quality concepts can properly be transferred to the public sector. Certain scolars say that the private and public sector operate under different framework conditions – and with very good reasons (Halachami 1995, 9-23). The business-oriented concepts fail in case of ministries and regulatory authorities with a strong policy-making function. Apart from policy-making public administration bodies the vast majority of public administrative organs does not operate in a (business-like) competitive environment, thus their structure is mainly stable, constant, linear-functional with clear responsibility hierarchy and command of chain. Expectations are therefore still attached to these functions.

The third, **systemic risk** is the risk of having not just statistically independent failures, but "*interdependent, so-called 'cascading' failures in a network of N interconnected system components. That is, systemic risks result from connections between risks ('networked risks')*" (Helbing, 2013). Whilst legal scholars have written about systemic risk occurring in financial systems as early as in the 1980s (Gruson 1983, 303), identifying systemic risk within the legal system is a quite recent field of investigation (Ruhl 2014). Law is a system among the multitude of social systems and subsystems and its aim is, expectedly and allegedly, to regulate constraints and failures the other social (sub)systems face; as being such, it is a fail-safe strategy for other

social systems. However, risks cannot only be caused *in other social systems* by the law, like it happened with the changing rule of the Hungarian energy regulator authority I will consider later *perhaps causing the increasing country risk and decreasing trust in public administration quality*. A certain degree of systemic risk is without doubt inherent *within* the legal system itself, as in case of any other complex adaptive systems. According to Helbing, it is exactly the potential for cascading that is so dangerous in case systemic risk is high. Ruhl asks the fundamental question: how is it that a robust complex adaptive system such as law, with all its fail-safe mechanisms guarding against failure, nonetheless fails? (Ruhl 2014, 583). The so-called 'robust yet fragile' (RYF) dilemma and the emergence of systemic risk are closely related, therefore, whilst investigating the common law system of the United States, Ruhl comes to the fundamental question that if we cannot effectively manage systemic risk within the legal system, how can we expect the legal system to manage systemic risk elsewhere? (Ruhl 2014, 563).

These three types of risks will be investigated first how they emerged in the Hungarian energy sector in connection with its regulation, whilst also leading to the following exciting questions *for the de lege ferenda practice*: what are the borders of State intervention? How deep can the energy market be regulated in the 21th century? What are the "legitimate expectations" of the market players associated with these risks?

1.1.3. Sharpening research focus: normativity as energy regulation (legislation) and public administration together

In order to evaluate these risks associated with the Hungarian energy sector it is of course necessary to precisely identify and sharpen the research focus, i.e. in what are we looking for these types of risks and their possible implications. For this purpose, a legal system in a *practical approach* is to be considered the collection of rules and regulations (that is, written law, which is the core of continental law, see the typical codes) the main product of the continental legal systems, accompanied by a collection of people and institutions, though with less relevance than in common law. Therefore law, in this sense, is mainly an emergent property of the legal system the same way prices are an emergent property of markets (Ruhl 2008, 897). Finally, as to regulation being just a part of a legal system and thus not regulation and purely regulation is to be considered the legal systems in question, it seems for us to be the right

approach from a practical viewpoint to focus on its normativity, with the *possibility of enforceability*. Given that public law is apparently the field of unequal connections with vertical enforceability relations, the focus on normativity (enforceability) and its core nucleus, the 'norm' is of utmost importance for understanding this complicated public sector field. Thus, in my view, normativity is the key identifying the operation (utilization), robustness and even the failures (fragility) of the legal system in question. Therefore, in order to dig deeper into the transdisciplinary reality of the risks emerging in the energy sector's regulation, I have decided **Hungarian energy law and public administration to be re-defined as 'normativity'** and take this as a presumption for the whole research.

Concerning normativity, there is a lack of clarity regarding the definition. Based on teleological interpretation with reference to Stammler (1922) Jhering (1898) and Szilágyi (1998), normativity can perhaps be defined as *regulated relationships by vertical means based on the capability of enforceability* thus being a matter of power (and thus law) (own definition). Of course, this approach focuses on norm and normativeness. We had to separate the phenomena of social normativeness from other, non-normative formations suitable for controlling behaviors: from the world of ideas, moral and other values, worldviews, and then we can specify what within the normativeness makes law to be law (Szigeti 2006, 206). A legal norm is the smallest, yet meaningful unit of law in itself (Szilágyi 1998, 221). Social norms are linguistic-mental objectivations, they contain a pattern of behavior, they express necessity, they are characterized by validity, sanction/coercion and hypothetical structure (Szilágyi 1998, 206-2011). Szigeti's theory of the norm continuum, which presents the normative nature of law as a specific part of the total norm system of society, provides very important clarifications for the understanding (Szigeti and Takács 1998). Genetically, normativity is a product of social life, but functionally we get to something else, distinguishing between norm (in Hungarian: '*norma*') and rule ('*szabály*') (Szigeti 2006, 204). The concept of a rule is used to describe repetition, while the concept of a *norm is used to describe a requirement*. Approaching the issue in this way shows why the legal norm should be placed in the overall norm system of society, pointing to common moments before moving towards a normative, philosophical, value or logical analysis of differences (Szigeti 2006, 205). Norm as the smallest and the biggest in the same time, i.e.being the "nucleus" and simultaneously being placed to the overall norm system of society is in fact a practical and also transdisciplinary approach.

In this way, and turning back to our research focus, normativity (in the energy industry) consists regulation and public administration together describing requirements (towars energy market licensees), i.e. the umbrella under which business entities operate, and in which certain risks associated with their operation occur (in the energy industry). To all this, I recommend to consider the regulation of the energy sector in order to present it as a robust, yet fragile, non-linearly interconnected system with the unity of different levels of reality resulting in systemic risks, where energy legislation and the public administration implementing it are to be treated in one large unit of normativity as the practical appearance of regulation in the sector.

1.1.4. Normativity as complex adaptive system

Sharpening the research focus to normativity, the clear direction of the present thesis should automatically reach its next stage via following the enactment path of the norms. The Hungarian energy normativity as a typical semi-autonomous industry-specific public law field is governed by laws and bylaws enacted by Parliament, by the Cabinet (Government), by certain ministries and by the Hungarian Energy and Public Utility Regulatory Authority (**HEA**), whilst there are also directly enforceable EU regulations. Though it is not 'law' as a piece of legislation, but as a sense of normativity, the public administrative resolutions of HEA and certain other bodies of the public administration also matter, so do the network codes enacted by the transmission and the distribution system operators (who are market players) operating as 'quasi laws'. This is indeed complicated – but is it complex as well? The application of the complex system theories in social sciences is still very limited or even rare (Baumol and Benhabib 1989). Complex networks and complex adaptive systems theories come from hard sciences, but some contemporary legal thinkers outlined the relevance of complex system theories concerning *law*, especially complex adaptive systems, "*in which large networks of components with no central control and simple rules of operation give rise to complex collective behavior, sophisticated information processing, and adaptation via learning or evolution*" (Mitchell 2009). However, to the extent one can get acquainted with the available literature, there is still a significant resistance to the application of complex system and complex adaptive system approaches, methods and theories in legal thinking. The question arises whether these viewpoints can add anything to the understanding of the operation and failures of continental normativity governing the public sector. Therefore I intend to demonstrate for the first time via industry-specific examples that Hungarian energy law, one of the absolute extremes of the rigid continental law

is per se following complex adaptive system attributes as being implemented by the public administration, thus refuting any reductionist and linear concepts of 'classical' continental public law routines and prejudice. The nature and essence of normativity is investigated as complex system based on sui generis premises (see Iwai Katsuhito in this sense) and premises deriving from natural science (see Jenő Szmodits, John Kekes, Alf Ross, Uwe Wesel). Normativity is unique in a sense that it aims to regulate other social (complex) systems; or as Szigeti puts it, the nature of the idea of jurisprudence is the 'approach to approach and its sociologicum' (Szigeti 2006, 168). As such, one would presume that normativity and the law should therefore take into account the very (complex) nature of those systems regulated by it. This means that, arguably, in order to regulate a complex social system, the law and normativity should act as a complex system as well, however, not forgetting the *sui generis* nature of law, in order to avoid certain pre-conceptual fallacy.

1.1.5. Useful tools and considerations to be gained

Considering the normativity of the Hungarian energy sector as a complex system in my view could lead us to novel considerations and provides us with useful tools in understanding the transdisciplinarity of risks occurred in the energy sector. This leads to such essential features of complex systems like emergence, the 'robust yet fragile' (RYF) dilemma and the issue of systemic risk that I also investigate covering unpublished case studies, letting us closer to identify risks within the law applied by public administration, i.e. normativity. This in my view can add a lot to the understanding and improvement of the quality of normativity (trust in quality of public administration and mitigating country risks) in order to mitigate systemic risks as well within law and public administration. Thus, as I intend to prove, complex systems theories, not yet investigated in full for continental law systems would likely add to this in my view in three points: to understand the nature of normativity, to understand and handle risks (country risks, public administration-related risk and systemic risks), and connecting the two, in understanding the RYF dilemma, the *key dilemma of normativity*, providing a new approach to the legislator and of course also to the market players concerned.

Finally, given that the very essence of normativity is the norm itself, it is worth looking for the systemic risk of potential failures there as well. In this sense there are justified grounds looking for the utilization of norms through the operation of *power-law event distribution*, a typical

effect of the existence of complex systems as well. It is considered as a complex system feature that overall behaviour characterized by mathematical "power-laws" that do not follow "familiar bell-curve" statistical distributions (Farber 2003, 152). Power-law is a typical product of scale-free network science patterns. Network science is not a firmly delineated discipline but a "*highly interdisciplinary research area*" (Borner et al., 2007) whose origin is disputed. For Borgatti et al. (2009), Network science emanates from the older and well-established field of social network analysis. For Barabási (2016) and Hidalgo (2016), the roots od network science are in the study of complex systems in the natural sciences, and for Brandes et al. (2013), in a transdisciplinary mathematical apparatus. However, one should not avoid taking into account serious critical voices against the unconditional applicability of network sciences and power-law distributions as well. Over the years, researchers have questioned both the real pervasiveness of the so-called scale-freeness and, perhaps more significantly, even the extent to which the paradigm illuminates the structure of specific networks and some of them with apparently valid grounds (Holme 2019, Jacomy 2020). For example, critics made the point that though the degree distribution is scale free, the actual networks are not (Tanaka 2005). They also called the attention that power-law degree distributions and the preferential attachment mechanism were already discovered (Newman 2003). Even more polarizing, however, was the claim that degree distributions rarely follow power laws. In "Scale-free networks are rare" (Broido 2009), Broido and Clauset took a more data-centric approach. They used a collection of 927 empirical networks and exploited the fact that information-rich network data may perhaps be successfully reduced to many simple networks. Broido and Clauset proceed to evaluate how close to power laws the degree distributions of different classes of networks are, using 5 categories of scale-freeness, ranging from the category of 'super-weak' to the 'strongest'. 57% of the data sets, they find, belong to at least some kind of scale-free class, while only 4% belong to the "strongest" category. Furthermore, while biological and technological networks can reach the "strongest" level, social networks can, at most, be "weakly" scale-free. Therefore, especially due to these data-centric considerations, we are critical with the unconditional use of power-law distributions and we remain sceptical throughout the whole research not trying to be mislead by preconcepts.

In energy law, the effective use of the different levels of legislation in operation would be an apparent field to recognize the operation of network connections in the complex and transdisciplinary system of normativity, thus perhaps, with the above critical considerations

maintained, also power-law. On the top of the legislative hierarchy the industrial codes are present (the electricity act and the gas act), followed by a huge amount of governmental decrees, even more ministerial decrees and decrees of the HEA (something like a hundred), and then with tens of thousands resolutions, either of individual or wider industrial effect, by the public administration authorities. In case we enumerate among an x axis the relevant laws and bylaws according to their hierarchy from the left to the right and then we collect references to the provisions (norms) of them in certain cases (e.g. total of HEA issued resolutions) we would in theory get a power-law graph, meaning that in general the degree of the nodes, i.e., the number of neighbors, follows a power-law distribution (a statistical distribution itself scale-free). Thus, in sum, we analyzed the possible pattern of the utilization of public administrative resolutions by the HEA (as the public administration body of the Hungarian energy sector) by coupling the frequency of references to law in these resolutions with the place of these referred laws in the legal hierarchy (as defined by law). This is a transdisciplinary experiment where we cross the borders of disciplines and connect natural science-based concepts with law and public administration as well as economical utilization and business consequences. Calculation of the goodness-of-fit between the data was done by a bootstrapping procedure and based on Clauset, Shalizi, and Newman (2009) considering whether the resulting p-value is greater than 0.1, showing that the power law is only theoretically a plausible hypothesis for the data. In this way we got our "ideal" distribution of the utilization of norms through the HEA resolutions. We expect this experiment let us closer to the failures of the legal and public administrative system by identifying regulatory systemic risk and quality concerns of public administration.

1.2. Literature review and gap

An extensive, four-year mapping of the available scientific literature and identification literature gaps preceded the present dissertation and its underlying research, whilst the legal scientific side of the transdisciplinar reality was kept continuously updated do to my profession and related activities (e.g. my own courses at univerisites).

As a result of this extensive literature reivew, literature gaps have been identified in four levels.

Transdisciplinarity as a concept has not yet been widely adapted by normativity-related considerations (not only legal thinking but beyond), neither its complexity axiom, nor its ontological axiom. The linearity of legal thinking, as well as the binary logic of norms largely

resisted so far the entry of any transdisciplinary consideration into the analysis of the operation of norms. The same is true to the application of the complex system and complex adaptive system theories in social sciences, being still very rare (Baumol and Benhabib, 1989), especially in legal thiking (Vermeule 2010). What is more, having considered hundreds of publications, public administration especially has not made extensive use of the concepts and ideas of complexity theorists, so that the latter have had little influence on theories of public administration (Kijn and Snellen 2009). The stunning exceptions are predominantly dealing with common law (see e.g. Kauffman 1995, Katz et al. 2011, Bommarito 2009, Sohn 2009, McEvily 2012, Ruhl and Salzman 2003, Ruhl 2008, Ruhl 2012 and so forth). I have either skimmed or scanned through the extensive literature to this point, and it is clear that academic thinking is focused on the 'common law systems' and from this term the emphasis is on 'common' above 'law' and 'systems' (the latter are both more genus proximum than the first), i.e. on the distinctive features of the Anglo-Saxon legal realms compared to European normative systems. Complex systems theories concerning common law advanced even to map the emergent federal judicial social structure with graphs as well (Ruhl 2015) as complex systems symptoms are relatively easily identifiable in case of legal systems based on common law, where the complex, multi-level case-law and legal theories are in a complex and clearly non-linear interaction with each other and where social structures of judges and courts matter, *the continental law systems in contrast are still endeavor linear normative chains in a binary, reductionist logic* based on the idea of Rechtstaat, where the regulatory and command chains are clearly defined, vertical, transparent and predictable, with as minimal horizontal interaction between the nods as possible. Thus, introducing transdisciplinary axioms and considerations into the investigation of normativity as well as the application of complex system and complex adaptive system approaches, methods and theories for such purpose clearly arrives to an apparent literature gap.

Second, Hungarian energy law is largely a field not considered in its complexity neither just for international scholars but nor for domestic scientific studies. The first book on the emergence of the Hungarian energy sector from a regulatory and market point of book is just under its way (written by me and being edited by Akadémiai Kiadó printing house), nor was the phenomenon of state intervention into the energy market ever thoroughly and comparatively analysed. In this sense, a huge number of unpublished cases and insider information are revealted for the first

time, also whilst searching for the borders of state intervention in connection with investment protection.

Third, a literature gap is apparent on risks related to normativity, i.e. systemic risk (within normativity), country risk and trust in (the quality of) public administration to be considered in the energy industry and from an energy industry viewpoint, especially connecting them, thus the *energy industry focus concerning risks and their correlations* is a novelty. Additionally, law and public administration to be considered together from a practical normative point of view is also a new approach at this point especially dealing with risks emerging. I accept Szigeti's axiom that legality is not to be based on itself but in its sociality (Szigeti 2006, 201), that for me leads to a rather practical approach how normativity materialises also concerning its negative effects (causing risks) or how it intends to remedy the already given negative effects (i.e., the risks) in this very specific and complex sector.

Fourth and finally, we are not aware of any similar exercise of coupling the legal hierarchy of norms (a qualitative term) with frequency of utilization through the public administration for risk identification purposes.

1.3. Governing methodology and the methods applied

1.3.1. Governing methodology: public administration transdisciplinarity

The dissertation is of economic and legal focus being thus governed by business and public administration methodology. Therefore, as to the governing and applied *methodology the dissertation is consequently of legal, business and public administration nature* and hence the research analysis is significantly based on the nomenclature of public administration itself. Under this conseqent governing methodology however, legal, economical, and, *partially*, also statistical and hard science-based (complex system) approaches, issues and considerations are intentionally crossed in this research, affecting the *methods* of the research as well, under and within the applied governing methodology (these are enumerated in 1.3.2-1.3.3 below).

These are however not only theoretical, but real concerns too. The issues identified with state intervention in the energy sector resulting in (i) country risk, (ii) quality concerns of public administration and (iii) systemic risk are not only legal, public administrative, economic or theoretical, but real and very serious *operational business concerns, too*. These real, massive concerns determined our research approach and fine-tuned the chosen methodology. As each

and every real problem, the resolution of the identified problem areas of our research expressly resist any monodisciplinary frameworks. Therefore and in line with our doctoral school's fundamental principle I chose a transdisciplinary approach in line with Nicolescu's (2014a) conceptual formulation. *Transdisciplinarity is the ideal approach evaluating the complex relationship between society, normativity governing society and science*. In this way, it is better to consider it to be more than a simple research approach used to deal with complex problems like the emergence of risks of the Hungarian energy sector's normativity in the present case, thus transdisciplinarity looks the world more holistically (Max-Neef 2005). Therefore I based the whole research especially on Nicolescu's transdisciplinary methodology concept with its three axioms. The first is the ontological axiom: there are, in nature and society and in our knowledge of nature and society, different levels of reality of the object and, correspondingly, different levels of reality of the subject. The second one is a logical axiom: the passage from one level of reality to another is ensured by the logic of the included middle. Finally, the third one is a complexity axiom: the structure of the totality of levels of reality or perception is a complex structure, every level is what it is because all the levels exist at the same time (Nicolescu 2014b, p. 21).

This complexitiy axiom is taken seriously throughout the whole research as world is often and mistakenly considered "linear" and, therefore, it is assumed that it is conducted by very clear "causal relationships" (Alagidede, Panagiotidis and Zhang 2011). Majority of studies of economic science are based idea of equilibrium systems: for example, the symmetry between supply and requirement (Wu et al. 2017), risk and benefit (Levin and Smith 1994) price and quantity (Kelly 2005). The law is especially a field of binary logic: legal/illegal, either/or, right/wrong, enforcebvle/unenforceable. The classical type of norm is hypothesis – disposition – sanction, even if certain norms do not necessarily contain all the three. However, all the three operates with an exclusive binary logic identifying whether a hypothesis is met, a disposition is to be applied and/or sanction to be imposed. The purely binary logic of law clearly belongs to the Aristotelian galaxy, reaching its peak with Carl Schmitt (Schmitt 2007, p. 5). The transdisciplinary theory is an ambitious experiment to go beyond the binary logic.

Especially the logical axiom of transdisciplinarity leaves the binary logic behind whilst for the passage from one level of reality to another is ensured by the logic of the included middle. *I therefore intend to prove by this research that the linear casuality of the binary logic how normativity is traditionally considered is not beyond criticism and complex systems-related*

non-binary, non-linear way of thinking can add a lot to the understanding of normativity. Whilst the included middle theory of transdisciplinarity introduces a ternary dynamics with the third term 'T', where 'T' is at the same time A and non-A, a legal norm through all of its components (hypothesis, disposition, sanction) can only deal with the binary code of A or non-A. This contrast might be relevant for the legal logic as well given that the ternary logic is a quantum logic, whilst reality rather to be described by the ternary logic (actualization, potentialization, T-state) compared to a binary logic. Thus, the logic of a legal norm seems deriving from the tri-dialectics of reality, requiring a re-shaping of the very essence of a legal norm, and this is what I am doing methodologically, based on transdisciplinarity.

The second reason while and also how I have based my research on the transdisciplinary methodology is that the strict binary logic of a norm is not the only contrast with the inspiring theory of transdisciplinarity. The world is filled with roughly 8000 academic disciplines one of the most dogmatic of which is jurisprudence. Whilst transdisciplinarity calls for a complex understanding of the challenges of the 21st century, law and studying normativity is still stuck to its very rigorous jurisprudential dogmas of scientific purity, mainly on the fields of cogency/dispositivity, interpretation methods, public law/private law distinction, classical legal branches. This rigorous dogmatism is incapable to understand the complex phenomena of reality and to react on them calling for the dynamism of freeing law from its academic disciplinary nature. This obviously not means only pluri(multi)disciplinarity, neither only interdisciplinarity (i.e. a transfer of a method from one disciplinary to another), but an opening towards transdisciplinarity in its entirety, finding the connection points between regulatory demands and necessities and transdisciplinarity as a complex method, especially dealing with the emergence of risks in the Hungarian energy sector that is, beyond doubt, not just purely legal nor purely economic query.

As transdisciplinarity arrives to the ontological axiom, a logical axiom and a complexity axiom, the third one (complexity axiom) expressly expands towards a number of human and exact sciences. These axioms forming the methodology for transdisciplinarity are relevant to the normativity-related queries, e.g. the emergence of certain risks identified or to be identified for transdisciplinary considerations, thus the applied methodology is basically the methodology of transdisciplinarity with which the normativity-related (legal) principles and issues should be measured. Transdisciplinarity as a concept and way of thinking aims the understanding of the present world through the consequent unity of knowledge as well as the unity of knowledge

with the unity of being. This derives from the concept that 'reality' does not only exist as a one single level but possibly on an endless number of levels. This concept leads to transdisciplinarity as theoretically speaking only a transdisciplinary way of thinking is able to touch the parallel complexity of multiple 'reality' levels simultaneously, which is in my view the case with the multiple-nature risks emerged in the normativity of the energy sector. Whilst in this sense transdisciplinarity is a revolutionary idea, it has no impact yet on our rather conservative legal systems and on how we investigate issues connected to normativity, emerging risks included. This is clearly a mistake as the cornerstones of law are theoretically put into question either by the revolutionary transdisciplinarity or by the complexity of new phenomena to which even transdisciplinarity may be an answer. Thus, the driving force of the present research and thesis is that the revolutionary way of thinking called transdisciplinarity is putting into question the very foundation of the legal systems of the West, whilst it is again transdisciplinarity that may add outstanding points to a re-evaluation and rethinking of the legal foundations of our Western societies *already* being questioned.

Third, the transdisciplinary theory of the levels of reality appears to successfully conciliate reductionism with anti-reductionism. The legal logic is clearly reductionist up till now, where the core nucleus of action, act, moment, capability or anything else appointed by the legislator operates as a base unit and a target to a *norm*. Teleology of a norm always focuses of one such single base unit with the generous assumption that all phenomena being capable to be measured, regulated or sanctioned by law should be divisible by that single base unit, irrespective of whether it is a transaction, a wrongdoing or anything else. The reductionist logic of law leads to an approach where all complex phenomena of modern societies are to be considered as being capable to such divisible nature and the complex society is nothing more than the arithmetical product of the legal base unit and a multiplier. This is apparently wrong, that is proven by the fact that the law operates with certain corrective measures where the legislator considers it arbitrarily necessary. The criminal law operates with aggravating and soothing (mitigating) conditions, partially incorporating them into the criminal codes, partially leaving it to the judges to evaluate. For civil law (especially contractual law) the situation is less clear, as in the Western World the previous paternalism of law is overridden by the competitive aim of civil law, with less intervention into dispositive connections (see e.g. the legal principle of *pacta sunt servanda*), though there are certain grounds for possible correcting measures of the harsh reductionist logic of law granted by case law, but rather for extreme unjust situations.

Transdisciplinarity in contrast is a clear call to understand complexity of the world, articulating complexity as its epistemiological axiom, where the structure of the totality of levels of reality or perception is a complex structure, meaning that every level is what it is because all the levels exist at the same time. The law nowadays is still incapable to meet the complexity of reality, to properly understand and handle different levels of reality simultaneously, calling for a re-thinking of the reductionist legal structure in its entirety; and *the present thesis with its transdisciplinarity-based method, approach and transdisciplinarity based hypotheses inends to contribute to such re-thinking.*

With Nicolescu's methodological guidelines of transdisciplinarity, I observed the different levels of reality through the investigation of the emergence of risks in the system. Nicolescu (2014a) argues that transdisciplinarity means the transgression of duality, the opposing binary pairs like subject-object, simplicity-complexity, diversity-unity, and so on. In line with the logical axiom of non-contradiction (Nicolescu, 2014a), throughout my research I identified several A, non-A, and T states. These logical connections leaded to and manifested in the robust yet fragile (RYF) dilemma, discussed later in details.

As to the public administration-based transdisciplinary methodology applied to problem identification and evaluation of the chapter on energy sector (Chapter 3), the followings should be added to the above considerations. Transdisciplinary knowledge production is described by a constant flow between fundamental and applied, theoretical and practical, where the disciplinary boundaries and distinctions between applied and pure research become less relevant; the focus rather shifts to the problem area (Gibbons et al, 2010). This is in my view in line with that as Szigeti highlights, Max Weber did not differentiate either between theoretical and practical in his *Legal sociology*, therefore also Szigeti speaks about applied jurisprudence (Szigeti 2006, 172).This is the required approach to tackle the multidimensional issue of the normativity-related risks in the energy sector crossing borders of disciplines. Therefore, for the Hungarian energy normativity evaluation (3.1-3.2) and testing its borders (3.2.5-3.2.67) I used this transdisciplinary approach crossing the border of disciplines, escpecially law and economy through the simultaneous analysis of a huge number of case studies. Thus, a comparative analysis of case studies was used in chapter 3.2 in this sense, with a constant flow of considerations between practical and theoretical. For the framework of a part of the study (3.2.4.3) a tentative problem solving was applied, meaning a trial and error elimination process as defined by Popper (1992).

1.3.2. Complex system considerations

In order to prove the hypothesis connected to the appalicability of complex system theories into the normativity of the energy sector, I especially used complex system findings and considerations, namely investigation of the question heterogenety, removing elements and non-linearity through outstanding and partially unpublished case studies (4.3) as well as evolvability (4.4) RYF dilemma (4.5) and complex constraints (4.6).

1.3.3. Statistical considerations

For the identification of error in the utilization of norms as a possible indicator of implied systemic risks or bias we used statistical distributions (Farber 2003) and mapping based on a transdiciplinary coordinate system developed by us, uniting legal hierarchy (i.e. a legal term) with utilization via public administration. Here we follows the recipe for analysing power-law distributed data: (1) Estimation of the parameters x-min and α of the power-law model; (2) Calculation of the K-S value (goodness-of-fit) between the data and the power law using the method. Bootstrapping procedure can be used to calculate the p-value from a K-S value. Based on Clauset, Shalizi, and Newman (2009) if the resulting p-value is greater than 0.1, the power law is a plausible hypothesis for the data, otherwise it is rejected and (3) to confirm the results of the comparison of the power law with alternative hypotheses carried out via a likelihood ratio test based on Clauset, Shalizi, and Newman.

2. Proposition and hypotheses

2.1. Proposition: in order to grab the transdisciplinary reality of the risks emerging in the energy sector's regulation it is justified in a practical approach to threat Hungarian energy law and public administration together as '*normativity*' based on their enforceability and to have them re-defined as such unity of reality (transdisciplinarity axiom).

2.2. Hypothesis 1: certain economical risks in the energy sector can be identified via a transdisciplinary investigation of its *normativity*, whilst the borders of the normativity's autonomy are tacitly recognizeable through the investment protection test (and legitimate expectation) concerning the emergence of these risks.

2.3. **Hypothesis 2:** Hungarian energy law is not only complicated but complex as well; the complexity axiom and the criteria of complex systems can be used to describe the behavioural patterns of normativity being robust yet fragile and to describe the phenomena of the three risks whilst also refuting linear casualities of classical leal thinking.

2.4. **Hypothesis 3:** by coupling the frequency of references to law in public administrative resolutions by the HEA (as the public administration body of the Hungarian energy sector) with the place of these referred laws in the legal hierarchy (as defined by law) we can see the utilization of public administrative resolutions by the HEA as expected from complex adaptive systems and by the complexity axiom of transdisciplinarity, and ideally this should follow a scale-free power-law distribution.

3. Normativity of the Hungarian energy sector and the risks emerged from the perspective of transdisciplinarity

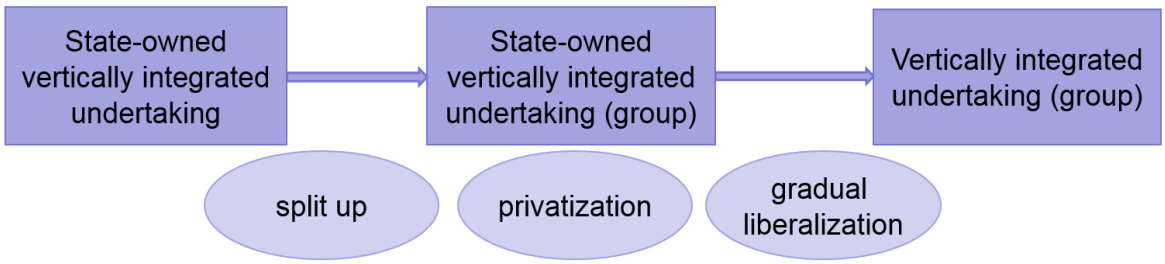
3.1. Normativity of the Hungarian energy sector

Hungary and its citizens are reliant on natural gas for the production of heat and energy. By the end of the 1990s nearly 80% of Hungarian households were connected to natural gas networks.[1] Natural gas is also the predominant source of energy for Hungary's industrial use, including electricity generation. Hungarian electricity production largely relies on nuclear (Paks power plant) and gas: in the 1990s, the gas-fired power plants (some of which were just retrofitted from heavy fuel oil to gas around 2000) had a stake from the total electricity production roughly equal to nuclear. This history of dependence is closely tied to Hungary's historical relationship with the Soviet Union, and later Russia, and a deliberate promotion of natural gas as a primary energy source for residential and industrial use. That issue became concrete when Russia first cut gas supply to Ukraine in March 1994,[2] and several times later on.

This dependence on Russian gas with the infrastructural bottlenecks was always one determinative factor for the Hungarian energy sector thus also to its normativity (regulation and public administration) too. However, another determinative factor was the clear, firm and steadfast intention of the Hungarian legislator from 1990 to get closer to the European Communities. This early transition period also marked Hungary's pursuit of membership in the European Union (**EU**). On 15 December 1991, Hungary was among the first post-Communist nations to sign an Association Agreement with the European Economic Community, the precursor to the European Union. The aim of such agreements was to begin the process of harmonizing Hungarian laws and outlining broader economic and political requirements for Hungary's eventual accession. To that end, Article 77 of the Association Agreement specifically provided that "*cooperation shall take place within the framework of the principles of the market economy and develop against a background of progressive integration of the energy markets in Europe*". The Agreement called for increased cooperation in "*the electricity, oil and gas sectors, including consideration of the possibility of interconnection of European*

[1]. Just over a decade earlier, the number was 70%. *Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan*, World Bank Technical Paper No. 451, p. 44 (Dec. 1999)
[2]. N.Y. Times, *Russia Cutting Fuel to Neighbours* (4 Mar. 1994), available online at http://www.nytimes.com/1994/03/04/world/russia-cutting-fuel-to-neighbors.html.

supply networks."[3] The the European Economic Community (the later EU) that time acknowledged that "*Member States will always have the right to set tariffs for all captive consumers*"[4] whilst also provided that "*Member States may, in accordance with Community law, impose public service obligations on undertakings operating in the natural gas sector as regards the security, regularity, quality and price of supplies*."[5] However, the Commission made clear its opposition to the supply monopoly of vertically integrated distribution companies and the early intention that large consumers, such as industrial and commercial users (or any other consumer with a consumption above 25 million m³/year), should be able to purchase gas on a free market.[6] The same conception emerged for electricity regulation as well. The so-called transit- and transparency directives (90/547/EEC, 91/296/EEC, 90/377/EEC) pawed the way for a cautious EEC-wide reform. However, a common understanding was reached only as a result of serious compromises and trade-offs, becoming the nucleus of the latter regulatory package (96/92/EC directive for electricity, 98/20/EC directive for gas). This aimed a gradually restructured electricity and gas market as follows:



3.1-1. Figure Restructuration of the energy industry

3. Europe Agreement establishing an association between the European Communities and their Member States, of the one part, and the Republic of Hungary, of the other part, Art. 77(2), (16 Dec. 1991). As early as 1988, the European Commission issued a report outlining aspirations for integrating and liberalizing European energy markets, particularly for the purpose of increased competition. *See* Commission of the European Communities, *The Internal Energy Market*, Working Document, COM(88):238 final (2 May 1988).

4. Amended Proposals for a European Parliament and Council Directive concerning common rules for the internal market in electricity and concerning common rules for the internal market in natural gas (COD384, COD385), para. 12 (7 Dec. 1993).

5. Amended Proposals for a European Parliament and Council Directive concerning common rules for the internal market in electricity and concerning common rules for the internal market in natural gas (COD384, COD385), p. 23 (7 Dec. 1993).

6. Amended Proposals for a European Parliament and Council Directive concerning common rules for the internal market in electricity and concerning common rules for the internal market in natural gas (COD384, COD385), p. 95 (7 Dec. 1993).

As this European energy policy was emerging, Hungary was deepening its relationship with the European Union. In December 1992, Hungary and three other emerging post-Communist markets (Poland, Czech Republic, and Slovakia, together with Hungary the so-called "Visegrad Four") signed a Central European Free Trade Agreement, with the aim of strengthening economic alignment and furthering European integration.[7] Moreover, when Hungary's Parliament articulated guidance for its future energy policy, it instructed the Government to propose "*an outline agreement for the energy industry that is harmonized with the acquis of the European Community*."[8] The policy set forth additional policy initiatives with respect to the gas sector. In particular, it mandated "*the cost effective and at all times suitably secure satisfaction of energy needs the economy and population may have*" and further sought to "*gradually eliminate the country's unilateral energy import dependency*".[9] Meanwhile, by the end of 1993, Hungary's Association Agreement had been ratified by all twelve European Union Member States.[10]

Hungary's initial efforts to privatize its electricity and gas sectors initially floundered. Among other reasons, Hungary "*quickly realized that all the preconditions for a successful privatization were not in place, in particular, the proper regulatory and pricing regime was missing.*"[11] To that end, Hungary moved forward with the enactment of the 1994 Gas Act on 29 March 1994[12] and the 1994 Electricity Act on 7 May 1994.[13] Beyond doubt, all this was partly done at the suggestion of Western consulting firms, who were interested in privatization as quickly and as widely as possible; we have seen references to this circumstance in the privatization due diligence documents just a little later. Beyond that, however, code-type regulation was certainly the right and necessary step for reasons of rule of law, legal certainty, transparency, and mandatory, hierarchical regulation. Not just legally: **it proved essential in**

---

7. Central European Free Trade Agreement between Poland, Czech Republic, Hungary, and Slovakia (1992).
8. Parliamentary Resolution 21/1993 (IV.9) on the Hungarian energy policy, effective as of 9 April 1993, para. 6.
9. Parliamentary Resolution 21/1993 (IV.9) on the Hungarian energy policy, effective as of 9 April 1993, para. 2.
10. Europe Agreement establishing an association between the European Communities and their Member States, of the one part, and the Republic of Hungary, of the other part (16 Dec. 1991).
11. Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, World Bank Technical Paper No. 451, p. 32 (Dec. 1999).
12 Act XLI of 1994 on Natural Gas Supply, as published on 26 April 1994
13 Act XLVIII on Electricity Production, Distribution and Supply, as published on 7 May 1994

terms of country risk mitigation, whilst country risk was considered obviously to be very high in a country just recently changing its regime and liberated from military occupation.

The 1994 Gas Act also established the HEO, the Hungarian Energy Office as a semi-independent public administrative body responsible for the energy sector, i.e. both electricity and gas as well. The HEO had a "*national competence and independent tasks and scope of authority*" but was nevertheless under the supervision of a Ministry designated by the government.[14] That designation ultimately fell to the Ministry of Industry and Trade.[15]

The companies concerned, if they felt that they could no longer cover their costs, could apply to the HEO for a review of the pricing. Pursuant to Section 31 (3) the 1994 Gas Act, the HEO is obliged to "*review the price level and the price (fee) at the initiative of any interested party and publish the results of its proceedings*". All of this looked the same on the electricity side during the 1994 Electricity Act. **The establishment of HEO was indeed necessary in order to establish a trust in the public administration of the energy industry, as well as to cautiously set competences and procedures of the HEO in order set a quality standard of its operation**. This, of course, had to have its clear borders and subordination where applicable.

The HEO's subordinate role to the Ministry was evident in the process of tariff setting. Thus, while the HEO was required to "*elaborate*" on the "*detailed rules for the setting and application of prices,*" the prices themselves were to be "*set by the Minister, and published in his Decree.*"[16] The HEO's "elaborated" rules had no independent legal effect and only gained binding force upon the issuance of Ministerial decrees. Furthermore, pricing rules and resultant prices, once issued by Ministerial decree, could not be challenged in administrative courts. However, the practice of this - based on our litigation experience - later faltered a lot. Reviewing the framework under the 1994 Gas Act, a World Bank report summarized: "*Procedurally, the* [HEO] *proposes several alternative rate changes, and the Hungarian* [Ministry] *acts on the HEO proposals*. [The Ministry] *can accept an HEO proposal, announce its own rate decision, or remand the case to the HEO for further consideration. Any supplier or customer has*

14. 1994 Gas Act, Sec. 4(2).
15. The name of this Ministry changed several times during the relevant period. Between 1990 and 1996, it was known as the Ministry of Industry and Trade; between 1996 and 1998, the Ministry of Industry, Trade, and Tourism; between 1998 and 2000, the Ministry of Economy; between 2000 and 2008, the Ministry of Economy and Transport; between May 2008 to 2010, the Ministry of Transport, Telecommunications, and Energy; and, since 2010, the Ministry of National Development.
16. 1994 Gas Act, Sec. 31(3). 1994 Electricity Act, Sec 55(3)

standing to initiate the rate making process at the HEO. Typically it is initiated by the supplier that wants a rate increase. The decision of the [Ministry] is final. Judicial review is not available."[17]

This was similarly true under the 1994 Electricity Act. While interested parties could request that the HEO review its proposals, the 1994 Gas Act and the 1994 Electricity Act themselves did not specify whether HEO proposals themselves would be subject to judicial review. The HEO was instructed to "publish" the result of these reviews. However, under applicable Hungarian law, only "public administrative decisions" on the merits of "public administrative matters" were subject to review in the administrative courts. Since the HEO's rule and price proposals under the 1994 Gas Act and the 1994 Electricity Act carried no independent legal effect, whether "publication" of prices and calculations carried the force of reviewable public administrative decisions remained unresolved as a matter of law and practice for several years; also similarly in the electricity sector too.

A few months after the 1994 Gas Act was passed, Hungary laid further groundwork in support of the privatization process through Government Resolution 1113/1994 on the privatization of the GDCs. Among the Resolution's provisions, the Government instructed the Ministry to introduce and maintain "cost-proportional" prices until the effectuation of the 1994 Gas Act.[18] Indeed, throughout much of this transitional period, the "*Government kept adjusting controlled prices and tariff structures to improve cost recoveries and to eliminate distortions between different classes of customers. Nevertheless*[,] *lack of overall cost recovery and structural anomalies continued, although at a reducing scale.*"[19]

In the summer of 1995, Hungary transferred ownership of GDCs to a new holding company, APV, which in turn served as the vehicle for negotiation and sale GDCs stock to foreign investors. The same logic had taken place in the electricity sector. It was APV who issued the documentation (information memoranda) on the companies and infrastructure intended to be privatized, e.g. power plants.

---

17. *Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors*, World Bank Technical Paper No. 474, p. 40 (June 2000) (emphasis added).
18. Government Resolution No. 1113/1994 (XII.7.) on the privatization of gas supplier joint-stock companies, as published on 7 December 1994, para. 3.
19. Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, World Bank Technical Paper No. 451, p. 50 (Dec. 1999).

On 4 August 1995, the Government issued Resolution 1075/1995 "*on Price Regulation and Price Adjustment until 1 January 1997*" (**Interim Pricing Resolution**). Filling the interstices between the 1990 Gas Act and the 1994 Gas Act, which would not become effective until 1997, the Interim Pricing Resolution was submitted with tender invitations and reflected Hungary's ongoing effort to increase gas prices for eventual harmonization with pricing decrees to be issued pursuant to the 1994 Gas Act. The Interim Pricing Resolution called for a series of significant increases in natural gas prices: an 8% increase on 1 September 1995, a 25% increase on 1 March 1996, and a to-be-determined increase on 1 October 1996.[20]

The Interim Pricing Resolution also announced, for the first time, the Government's intention that prices under the 1994 Gas Act (*i.e.*, prices starting as of 1 January 1997) reflect an "8% rate of return on equity over the reasonable operating costs." An underlying basis or rationale for the 8% figure does not appear in the Interim Pricing Resolution.[21] In the Schedule appended to the Interim Pricing Resolution, it is further explained that the 8% figure is the recognized profit incorporated into the pricing formula, and is to be applied to the "*balance-sheet net value of tangible assets aimed at domestic gas supply, reduced by the net value of assets created from the network development contributions and by long-term liabilities related to domestic gas supply.*"[22] Thus, in the initial pricing methodology, a profit margin was calculated as a percentage return on equity related to gas supply, *i.e.*, the net book value of assets used for domestic gas supply.

In the autumn of 1995, APV ordered the elaboration of the information memoranda for the gas distribution companies to be sold. These memoranda referred to the Interim Price Decision and the 1994 Gas Act, along with its broad principle that gas prices should be cost reflective from 1 January 1997, but also its temporal limit of 31 December 2001. The memoranda further referenced a forthcoming decree, discussed below, which would elaborate on pricing. Moreover, the information memoranda specifically provided multiple disclaimers, stating at the outset: "*neither the Government of the Republic of Hungary ("the Government"), APV Rt., the GDCs, nor the Financial Adviser* [Rothschild] *makes any express or implied*

20. Government Resolution No. 1075/1995 (VIII.4.), para. 2.
21. Government Resolution No. 1075/1995 (VIII.4.), para. 1.
22. Government Resolution No. 1075/1995 (VIII.4.), Schedule p. 3.

representation or warranty as to the accuracy, reliability, or completeness of the information contained herein or made available in connection with any further investigation."[23]

With respect to the Interim Pricing Resolution and the representation that it reflected Hungary's "*commitment that gas prices will reach cost-reflective levels by 1 January 1997*," the memoranda further specified that "[n]*o reliance can be placed on the Financial Adviser's interpretation of Government Resolution 1075/95 which is also subject to the general disclaimer at the front of this Information Memorandum*."[24]

The privatisation memoranda and Interim Pricing Resolution permitted investors to make appropriate assessments and ***risk evaluations about bidding***. Some investors concluded that the **regulatory risk** presented by the 1994 Gas Act and Interim Price Resolution outweighed any anticipated benefits. For example, "*potential investors from the UK withdrew from the bidding as they felt uncomfortable with the pricing regulation and with the political will to adjust prices to economic cost recovery levels*."[25] However, several continental European utilities saw Hungary as a "*long-term marketing proposition, an extension of their existing market*." In particular, these investors "*were mostly interested in the distribution part of the business and for them the country's geographical position and the targeted companies' market potential was the dominant factor*."[26] **The risks associated with normativity became apparent elements on different levels of reality by the investors inquiring to enter the Hungarian energy sector** as for the first time in the deeply regulated and until that time fully state-owned energy sector (which state was also not independent from the Soviet Union until recently) risks became detectable on an ontological stage (see the ontologic axiom of transdisciplinarity, 1.3.1 above). The passage from one level of the country risk business reality to another, namely the reality of the state-owned, incumbent operation of the sector was ensured by the logic of the included middle, that was the reflecting and developing normativity (see the logical axiom of transdisciplinarity). *This lifted the veil from a complexity axiom of the structure of the totality of levels of reality encountered as the very same normativity of the energy sector*

23. E.g. Information Memorandum for ÉGÁZ, p. i (Oct. 1995).
24. ibid, p. 26 (Oct. 1995).
25. Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, World Bank Technical Paper No. 451, p. 63 (Dec. 1999).
26. Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, World Bank Technical Paper No. 451, p. 63 (Dec. 1999).

defined all levels of the system, whilst the perception of risks was indeed different, defining the system as a complex structure.

This reflecting and developing normativity manifested in turbulent legislation. On 14 November 1995, with the tender process underway, the Ministry promulgated Decree No. 59/1995 (**1995 Pricing Decree**), setting forth the tariff-setting framework as called for by the 1994 Gas Act. The intention clearly was to **increase predictability decreasing risks associated with Hungary, its energy sector and normativity**. The 1995 Pricing Decree elaborated on the Interim Price Resolution's Schedule on pricing, including the 8% return on equity to be applied based on the book value of assets related to the gas supply business. The Decree also required the GDCs' justified costs to be taken into account, but did not specifically or exhaustively define what constituted such costs. The price formula included "*average recognized justified costs of gas supplier companies*."[27] "Justified cost" was in turn broadly defined to refer to the 1994 Gas Act's least-cost principle but otherwise left to the discretion of the HEO and the Ministry. Moreover, the justified cost was based on the *average* among the GDCs subject to the regulation, and thus tariffs did not reflect individualized cost assessments. This was a deliberate implementation of so-called "yardstick competition," a "mechanism" through which "*no individual GDC can expect to obtain a significant advantage in the ratemaking process by incurring high costs*."[28] However, this approach also entailed **an implicit risk that individual firms would be subject to less than cost-reflective rates**, including due to "*uncontrollable differences among the firms whose costs are used as the basis for rate making*."[29] As explained by the World Bank, "because of the 'yardstick competition' incorporated in the rate-making formula, *no individual GDC is assured that it will earn an 8 percent rate of return.*"[30]

As with the Interim Pricing Resolution, the 1995 Pricing Decree made clear that its provisions only applied until 31 December 2001. Observers of the Hungarian privatization remarked on this temporal limit. The World Bank summarized: "[t]*he regulation as per the 1994 Act, was*

27. Decree No. 59/1995 (XI.14.) IKM on the regulation of the natural gas prices, as published on 14 November 1995, p. 7
28. Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors, World Bank Technical Paper No. 474, p. 41 (June 2000).
29. Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors, World Bank Technical Paper No. 474, p. 42 (June 2000).
30. Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors, World Bank Technical Paper No. 474, p. 44 (June 2000) (emphasis added).

based on the following main considerations: (I) the time frame is from the year 1997 to the year 2000 (no legal provision beyond that)."[31] Indeed, the 1995 Price Decree was understood as an experiment, or "try-out," for Hungary's first market-sensitive tariff regulation system. Over the following years, the HEO continued developing the applicable regulations by trying new methods to resolve structural and economic challenges in the gas sector. Thus, the regulations the HEO developed were iterative and self-corrective with the ultimate goal of developing an efficient system for the benefit of Hungary's energy consumers. What we can observe this time is the continuous effort from the HEO to increase the quality and reliability of public administration and to decrease country risks associated with the young normative system. Thus, from now on, HEO (public administration) and legislation together formed the emerging environment for the energy sector. Both, namely the requirements towards legislation and requirements towards public administration are interrelated as in a functional approach their normative nature connects them; and *normativity* is a valid and useful term in my view to demonstrate the non-linear interconnectedness of the energy sector regulation as a complex network and complex adaptive system. However, also from this moment on, *possible country risk and public administration trust issues* are intertwinted – till now.

A later World Bank study also commented: "*the process of devising a good incentive rate-making formula is extraordinarily difficult. Every method that has been tried so far has been shown to have one or more serious drawbacks. Thus,* [the Ministry] *was prudent when it provided that the new formula would apply only until December 31, 2001. Presumably,* [the Ministry] *will then revise the formula in light of its effects.*"[32] The report went on to state: "*it is impossible to make an informed judgment about the soundness of the formula until it has been used for several years.* [The Ministry] *wisely committed to use the formula only through 2001, so that it can modify it in light of experience for the next several-year period.*"[33] Some months after the 1995 Price Decree was issued, the foreign investors completed their acquisition of a controlling interest in the target companies.[34] As a part of the acquisition, the foreign investors entered into shareholders' agreements with APV: the different levels of reality met in

31. Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, World Bank Technical Paper No. 451, p. 69 (Dec. 1999).
32. Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors, World Bank Technical Paper No. 474, p. 41 (June 2000).
33. Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors, World Bank Technical Paper No. 474, p. 43 (June 2000).
34. Decree No. 59/1995 (XI.14.) IKM on the regulation of the natural gas prices, as published on 14 November 1995.

the "T-state" of transdisciplinarity, as they were connected by these pivatisation agreements. Anyway, **risks associated with normativity were not affected by this passing through on this "T-state", as neither of these contained a "*stabilization clause*."** The GDCs were also issued licenses for the operations of the public utility. The licenses dealt solely with obligations pertaining to public utility provisioning, and likewise did not contain any type of "*stabilization clause*" or similar promise or guarantee.

As a result of all these preparations, the public utility and distribution service was privatized in 1994-1995 and foreign ownership appeared in the natural gas service. French, German and Italian companies acquired ownership in domestic utilities. The French Gaz de France International (GdFI) bought the majority stake in DÉGÁZ Rt and ÉGÁZ.[35] DGÁZ Rt was purchased by the German Ruhrgas and Vereinigte Elektrizitätswerke Westfalen Energie AG (Vew) consortium.[36] In KÖGÁZ Rt the German Bayernwerk AG – EVN AG consortium became the majority owner, whilst the majority shareholder of TIGÁZ Rt became the Italian Italgas-SNAM consortium. In FŐGÁZ Rt., The Budapest Municipality remained the majority owner, but the German Ruhrgas AG acquired ownership and was also responsible for its operation.[37]

In the electricity sector, very similar regulatory steps have been taken as in the natural gas sector. Preparations for the privatization of the electricity sector, like natural gas, began in the early 1990s. A tender for the sale of electricity suppliers was first announced in 1993, but the long-term operating conditions were still so unclear that there was not really any interest in the companies.[38] The 1994 Electricity Act pawed the way for the privatization in the electricity sector as the Gas Act did for the natural gas sector. In the 1994 Electricity Act, the legal bases of domestic electricity were laid. In addition, Government Resolution 1114/1994 (XII.7) on the preparation for privatization was published. The resolution essentially provided for a competition model, the implementation of which took several years. The aim was to separate producers, suppliers and distributors and to cooperate on a contractual basis. By defining a long-term operating model, the State wanted to ensure market predictability. Subsequently, the detailed rules of privatization were laid down, the essence of which was the implementation of

[35] A bajai gázszolgáltatás története: bajaiipartortenet.hu
[36] Haffner Tamás: A dél-dunántúli gázellátás története 1869-től napjainkig
[37] Horánszki Beáta: Vállalati struktúrák változásai a földgázellátó szektorban; Vezetéstudomány XXXVII. évf. 2006. 4. szám
[38] Századvég Gazdaságkutató Zrt.: Energetikai monitor 2017. szeptember

multi-round privatization. In the first round, minority ownership could be acquired in MVM Rt. (24%), in power plants (with the exception of Paks Nuclear Power Plant, 34-49% could be acquired) and in electricity supply companies (48% could be acquired) for professional investors. The acquisition of the majority (50% + 1) ownership had to be ensured in the second phase, by the end of 1997. The stated goal of privatization was "*to achieve rapid structural change in the electricity industry, thus ensuring the appropriate level of supply for consumers in the long run, modern service so that consumer prices to be afforded on developments in the long run and, as a result,* [consumer prices] *to remain at an acceptable level for the society too*."[39] In order to prevent an investor from acquiring entire market segments, individual professional investors could win a maximum of 2 electricity suppliers, consortia could win a maximum of 3 companies. At the time when the power plants were privatized, the official price had already been set by ministerial decree dated 13 October 1995 by Decree no. 63/1995, establishing a pricing methodology for the period beginning 1 January 1997 and ending 31 December 2000. The electricity utility (distribution) companies were also subject to first a trial, and then a periodic price regulation like the GDCs. The privatization first targeted the sale of these companies, but the first round of privatization tendering was a total failure.

However, on the electricity side, there was one element often forgotten but being outstandingly important from our risk-based viewpoint. In 1995, just on the brink of privatization, Hungary caused big power plants owned by the State and MVM (that time Hungary's sole wholesale electricity buyer also owned by the State) to enter into long-term power purchase agreements (**PPA**), so as to make possible the privatization of the power plants by rendering these companies attractive to international investors to purchase and, to the extent possible, to secure substantial investment to improve the power stations and reliable long-term electricity supply in Hungary. The PPA provided that the power station would make available on demand to the state-owned wholesale buyer MVM a minimum capacity from its units. For example, the PPA of Dunamenti rendered the six F Units (each 215 MW) and the G2 Unit (240 MW) in return for payment of a capacity fee. The effective terms of the PPAs were 15 to 20 years, e.g. the Dunamenti PPA prescribed fifteen years, expiring in December 2010. The law applicable to the PPAs were, by its terms, Hungarian law. **PPAs were, beyond doubt, a T-state of normativity connecting the levels of the business reality of potential investors (with**

[39] Dr.Suchmann Tamás: Tájékoztató az Országgyűlés 1995. november 1-i ülésnapjára "Az energiagazdálkodás privatizációja" tárgyában Budapest, 1995. október

high country risk) with the state's intention to privatize and stabilizing its economy, and, ultimately, also with the normativity, which consumed the PPAs as a contractual "T-state" of state-owned and non-state owned (A and non-A), regulated and non-regulated, robust and fragile (RYF) and thus, ultimately, law and contract. PPA was a contract, but of public law nature, where the price component came from law, the PPA itself came from the regulator (normativity) and originally both parties were state-owned. The PPAs were one of the regulatory inventions with the most transdisciplinary nature, with an implied intention to mitigate country risk associated with the fragile normative environment from an economical-business perspective; thus intended to correct economical-business fragility with legal robustness.

In addition to the privatization of large power plant (production) capacities, electricity GDCs were also sold. As a result of the privatization, by 1997 ELMŰ and ÉMÁSZ were transferred to the German consortium RWE Power AG - EnBW Energie Baden-Württemberg AG. DÉMÁSZ's shareholding was transferred to the French EdF group. TITÁSZ's stock was bought by the German Isar Amperwerke, while DÉDÁSZ was transferred to the German Bayernwerk. EdD and Bayernwerk received shares in ÉDÁSZ.[40]

Similar to the natural gas sector, electricity suppliers in the electricity sector were also provided with an 8% return on capital during the official price-setting, **providing normativity robustness through official prices administered by public administration whilst mitigating country risk**. Prior to the first price regulation cycle, by 1997 there had been a price increase of almost 25%. While the 8% profit of the investors was taken into account during the pricing, MVM Rt., as the sole wholesaler, was not provided with this during the price-setting. By the end of the first price regulation cycle in 2000, service providers had already achieved a profit of almost 15% by improving their efficiency. From 1997 to 2003, under the principles applying under the 1994 Electricity Act and the 1990 Price Act, both PPA price components (electricity fee and capacity fee) were determined in a price decree issued by the competent Ministry for a four-year cycle (1997-2000) and a three-year cycle (2001-2003). The price decree was based on HEO's assessment of the power plants' justified costs, *i.e. a public administrative process*. The 1995 and 1999 Price Decrees here, thus in case of the electricity generators too, recognized an 8% return on equity. The utility service provider and distribution companies were

[40] Vince Péter: Tulajdonosi koncentráció, vállalati összefonódás, Versenyfelügyeleti döntések és az energiaszektor vállalati szerkezetének alakulása

subject to cyclical pricing the same logic. A second period of administrative pricing commenced with the adoption of Decree No. 45 of 2000. This decree employed a somewhat different methodology for price setting, which resulted in a target return on assets of 9.8%. This pricing period was preceded by a detailed cost audit by the HEO.

Both the 8% return on equity and the 9.8% return on assets were the minimum the generators had to receive, as these rates of return did not set a cap on the generators' profits, which could realize a greater return by operating more In this period the price was set by using the Domestic Sales Price Index for Industry excluding the food industry (DSPI) which was the inflation index provided in the PPA.

Several practices emerged during this period where there were no expressed legal provisions. Neither the 1994 Gas Act nor the 1995 Price Decree made any provision for so-called "demand risk," *i.e.*, volume risk, or the probability that consumption would drop beneath or increase above the forecasted levels used to set the tariff. In practice, therefore, the HEO fixed the expected consumption volume used to calculate tariffs based on actual metrics at the beginning of the 1997 price period. These volumes were not subsequently adjusted throughout the course of the HEO's tariff setting under the 1994 Gas Act framework. Accordingly, **all of the risk and all of the reward of potential changes in demand were allocated to the GDCs**. This means that apart from the country risk-mitigating official pricing, an imminent risk of demand risk remained within the system, i.e. as systemic risk, *potentially affecting all levels of reality connected by the official pricing as a T-state itself*. If demand were to decrease below the forecasted level, gas distributors' margins would drop because there would be a lower-than-forecasted volume of gas on which they could charge the approved tariff. If, on the other hand, demand were to increase, gas distributors' margins would increase because they would be able to charge the approved tariff on a greater-than-forecast volume of gas. As it turned out, this system was a boon to the distributors, because demand, and volumes of gas sold, increased throughout the 1997 price period. With their profits benefitting from increased natural gas consumption in Hungary, GDCs did not object to this allocation of demand risk.

This was not the only imminent risk. Other challenges, however, came from external events and highlighted Hungary's *exposure to single-source supply risk*. Changes were also introduced in response to external shocks. For example, between 2000 and 2002, Hungary was subject to gas import supply shortages. At the time, the Ministry was unwilling to pass on the

impact of the resulting cost spikes in the gas tariff paid by consumers. This policy forced the wholesale trader, MOL Rt., the substantially state-owned gas company that was, at the time, responsible for nearly all gas wholesale, transmission, storage, and domestic production, to suffer massive losses. MOL unsuccessfully sued the government claiming a breach of the 1994 Gas Act. While the HEO coordinated with the Ministry of Economy, Ministry of Finance, and MOL itself to propose regulations to spread the risk of import price shocks in the future, MOL remained by and large a loss-making operation for much of this regulatory period.

Furthermore, while the first regulatory period was supposed to last until the end of 2001, the Government unexpectedly extended the application of the 1995 Pricing Resolution up through the end of mid-2002. When the 1995 Pricing Resolution then expired, however, the Government did not issue a new framework, leading the HEO to continue applying the previous regulatory structure, with some ongoing adjustments and modifications. Here it is also worth noting that in developing its natural gas as well as electricity regulations, the HEO struggled in each regulatory period to address the challenges posed by *HUF/USD exchange rate risk*. When the Government resolved to restrain, then reduce, household end-user tariffs, utilizing a fixed exchange rate was a logical method to protect consumers from further tariff increases, particularly in light of the forint's volatility during the relevant period. The Ministry's rates largely tracked the actual exchange rate, albeit with a sometimes delayed correction period. Notwithstanding any protests regarding the timing of the Ministry's publication of exchange rates, Hungary's fixed exchange rate methodology sufficiently enabled the affected market players, thus the investors to *manage exchange risk*. Thus, exchange risk was finally managed again by normativity itself. At the same time, the price of gas entering the system from Gazprom, indexed as it was to the price of a barrel of oil, suddenly started to go up in 2002 as the first effects of the events of September 11, 2001 began to reverberate.

Notwithstanding the above difficulties and uncertainties, however, Hungary's transition proved profitable for the investors owning the GDCs, as their investments yielded steady profits and dividends. Neither GDCs suffered a single year of operating losses before the end of the 1997 and 2003 price period.[41]

Around 2001-2003, as the prospect of Hungary's accession to the European Union neared, that Hungary took measures to intensify the harmonization of its legislation with

41. The annual financial statements of the GDCs are all enclosed to the public by force of law.

European Union law, including directives relating to the structure of the electricity and gas markets. To that end, on 24 December 2001, the Hungarian Parliament passed Act CX of 2001 on Electricity (**2001 Electricity Act**, applicable from 1 January 2003, and then on 25 June 2003, Act LXII of 2003 on Natural Gas (**2003 Gas Act**), which incorporated the EU's directives 96/92/EC (electricity) and 98/30/EC (gas) on accounting unbundling.[42] This step introduced EU-requirements into the disequilibrum of energy normativity, which **resulted in a different "T-state" of the pairs of opposites, and also to the biggest contradiction, robustness ("A") and fragility ("non-A") of the system**. The new regime created a dual market model allowing certain categories of non-residential consumers to move to a newly created free market segment, i.e. a hybrid market, where residential (household) consumers remained in the public utility sector with regulated prices. Like the 1994 acts, the 2001 Electricity Act and the 2003 Gas Act set forth broad pricing principles that would inform subsequent decrees proposed by the HEO and issued by the Ministry. Specifically, the 2003 Gas Act stated that the "*official price or tariff shall allow a return on the investment of assets within reason and the operating expenses of an authorized operator who functions effectively, and a profit for sustainable operation over the long term.*" It additionally mandated that the "*price control regime shall be based on requirements and criteria set out in line with economic and energy policies, the safety of supply. . . and international business relations.*" Further, the "*price control regime shall be designed to promote – taking into consideration the special characteristics of the interconnected natural gas system – the supply of gas under the principle of minimum cost*."[43] Similarly, the 2003 Gas Act called for "*prices and tariffs, the framework of price regulations and the terms of applications" to be "determined and decreed by the Minister upon the recommendation of the* [HEO]."[44] A few months after the 2003 Gas Act was promulgated, on 29 October 2003, the HEO and Ministry issued Decree No. 69/2003 (**2003 Pricing Decree**) elaborating on the price regulations contained in the 2003 Gas Act. This decree set forth the applicable pricing framework from 1 January 2004 until 31 December 2005.[45]

In conformity with the planned unbundling of gas supply and distribution, the 2003 Pricing Decree established separate rates for "public utility supply" (*i.e.*, non-free-market

42. Act CX of 2001 on Electricity applicable from 1 January 2003; Act XLII of 2003 on Natural Gas, in force as of 1 January 2004.
43. Act XLII of 2003 on Natural Gas, in force as of 1 January 2009, Sec. 48(2-4).
44. Act XLII of 2003 on Natural Gas, in force as of 1 January 2009, Sec. 49(5).
45. Decree No. 69/2003 (X.28.) GKM on the framework of the price regulation of natural gas, in force as of 17 December 2004.

customers) and distribution. Unlike the 1995 Pricing Decree, the 2003 Pricing Decree's pricing formula set an 8.5% "yield factor for the cost of capital," applied to both natural gas distribution and supply. In contrast to the HEO's previous approach under the 1994 Gas Act, the profit margin under the 2003 Decree was to be calculated based on the GDC's regulatory asset base. The HEO implemented this new formula by creating a "re-valued asset base" for the GDC. In other words, the HEO inflated the book value of the GDC's assets, then depreciated various segments of the pipeline depending on the date of their construction. This approach resulted in an asset base that significantly exceeded the book value of the assets, which had been the basis for the return on equity method used to calculate the 8% profit margin until 2003.

Hungary then adopted Decree No. 183/2002[46] implementing the two parallel "solutions" mandated by the 2001 Electricity Act. For the purposes of compensating MVM for its losses at public auctions, this Decree provided for special assessment on electricity consumers. This solution was not viable in the long term, as it perpetuated an imbalance created by the non-competitive and inflexible pricing regime of the PPAs in an increasingly liberalized market. **Imminent systemic risks were increasing behind the scenes**. Essentially, consumers were being required to subsidize the generators' above-market pricing for electricity destined to the free market segment but which generators were unwilling to sell directly to it at free market prices. This was the price of the privatization-PPA package and the clear consequence of the governmental decisions in 1994-95. As a more long-term solution intended to decrease the distortive effects of the PPAs, the Decree provided for MVM to initiate annual renegotiations with each generator, with the goal of reducing the scope of PPA obligations and encouraging the generators to sell at least part of their electricity at market prices. Under the terms of their operating license, generators were required to participate in these negotiations in good faith but not for more. Thus, these forced negotiations remained ineffective, and the mechanism therefore remained restricted in it effect to the indirect subsidy of the generators through *MVM's compensation for its losses*: i.e. half of its original intention. Indeed, **systemic risks was manifested** then: losses of MVM as a result of PPAs granting profit to the big power plants was indeed a deficit of normativity, being passed through the whole supply chain and ultimately financed by taxpayers.

[46] Government Decree 183/2002 (VIII.23) on determination of stranded costs

At the start of 2006, a new pricing decree went into effect, starting yet a third regulatory period that fully reflected the separate pricing structure for the public utility and distribution segments. First, whereas the 2003 Tariff Calculation Decree utilized a single 8.5% cost of capital component as a proxy for the entire GDCs' profit margin, because of the unbundling, Hungary now introduced two separate profit components for the distribution and supply segments of each GDC. For the supply business, a 0.5% profit margin was calculated on the supply business' cost of goods sold (**COGS**). For the distribution segment, the applicable cost was lowered of capital from 8.5% to 6.63%, and continued applying it to the re-valued asset base. The HEO's practice of accepting network losses became more stringent at 1.7%.

In May 2004, Hungary formally joined the European Union.[47] Subsequently, Hungary's accession to the European Union became the basis for the regulation of the natural gas market and the electricity market, although apparently from 1994 onwards compliance with EU law was one of the most important engines of domestic regulation. On 2 July 2007, the Hungarian Parliament enacted the Act LXXXVI on Electricity (the **2007 Electricity Act**), which came into force on 1 January 2008. This enabled the total opening of the market from 2008. It abolished (inter alia) regulated pricing for generators (the 2007 Price Decree having expired) and implemented in full the liberalisation of the Hungarian electricity market, as from 2008 onwards. Under the 2007 Electricity Act, GDCs now served as a Distribution System Operator (**DSO**), responsible for operating and maintaining the regional pipeline networks, whilst previous public utility providers served as "universal service providers" (**USP**) under the Act. The USP was customer-facing, essentially serving a sales function for consumers. The 2007 Electricity Act bifurcated consumers into "universal service" customers, and free-market customers. Upon the 2007 electricity Act's promulgation, the USP tariffs were *not* set by the Ministry, as had been prior practice. Instead, the regulation provided for an entirely new practice whereby the USP itself would set its own prices using fair, clearing comparable and transparent pricing techniques. The HEO and the Ministry prepared and issued price-setting rules and established the USP margin through decrees. On 25 June 2008, Hungary's Parliament passed Act XL of 2008 on Natural Gas (the **2008 Gas Act**). The 2008 Gas Act marked another shift in the natural gas regulatory framework.[48] To the latter end, 2008 Gas Act transposed and

47. European Commission, European Union Enlargement Day Celebrations, Press Release IP/04/559 (29 Apr. 2004), available online at http://europa.eu/rapid/press-release_IP-04-559_en.htm
48. Act XL of 2008 on Natural Gas, in force as of 1 July 2009, p. 1.

implemented European Union legislation, specifically Directive 2003/55/EC, requiring the operational unbundling of supply and distribution operations. under the 2008 Gas Act, GDCs also became DSOs, responsible for operating and maintaining the regional pipeline networks, whilst previous public utility providers became USPs. Similar to the concept of electricity regulation, the 2008 Gas Act bifurcated consumers into "universal service" customers (primarily residential customers consuming less than 20 m^3/hour who were permitted to purchase gas either at regulated rates (hereinafter, "USP prices") or on the free market), and free-market customers (largely commercial or industrial customers that consumed more than 20 m^3/hour) who were obligated to purchase natural gas at free-market rates.[49] Upon the 2008 Gas Act's promulgation, the USP tariffs would set its by the USPs themselves using "*fair, clearing comparable and transparent pricing techniques*," and those prices could be modified once in a calendar quarter.[50]

3.2. Relationship between risks and the borders of state intervention

3.2.1. Emerging risks from the viewpoint of investors' reality

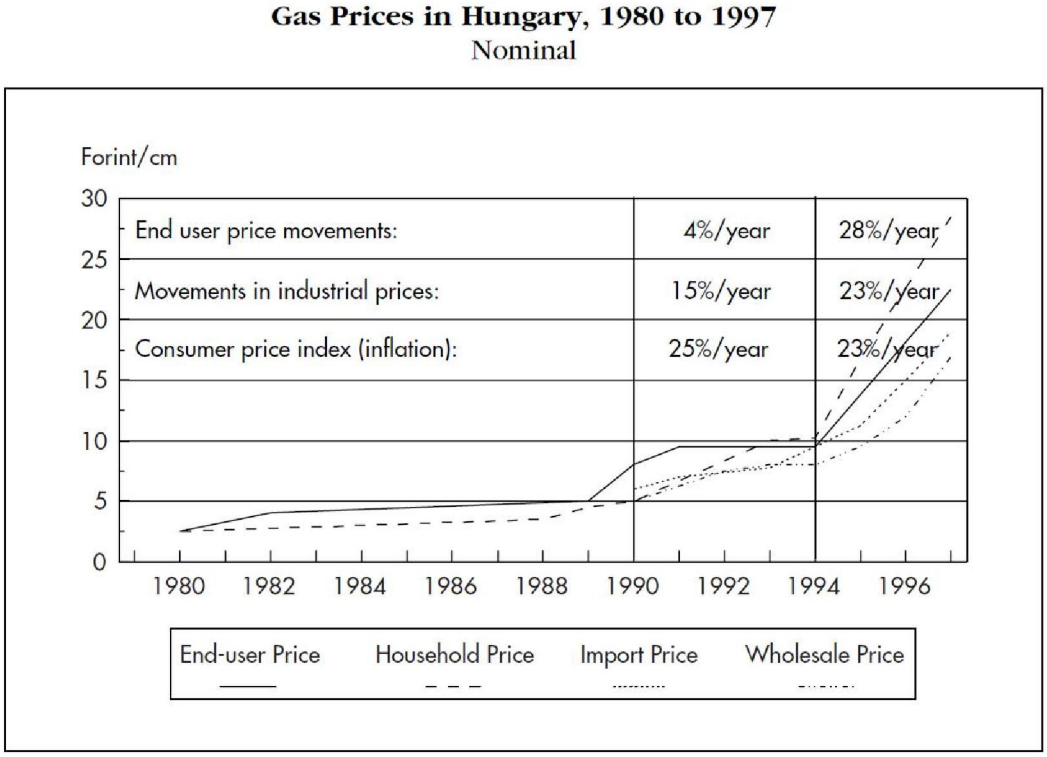
Thus, as sown, the regulatory governance of the Hungarian energy sector evolved in 15 years in all levels of the normative hierarchy: in the legal hierarchy having the gas and electricity acts as network codes on top, followed downwards by government decrees, ministerial decrees etc., whilst leaving the legal hierarchy accompanied by the resolutions and other tools of public administration (together: normativity). These evolvements intended to buttress the regulation's robustness, but on the other hands also added to its imminent fragility through the hidden increase of systemic risk that became apparent with the following three events. What is a systemic risk? Whilst legal scholars have written about systemic risk occurring in financial systems as early as in the 1980s,[51] identifying systemic risk within the legal system is a quite recent field of investigation.[52] Obviously not all system failures are the result of systemic risk and not all risk is systemic: systemic risk is the risk of having not just statistically independent failures, but "*interdependent, so-called 'cascading' failures in a network of N interconnected system components. That is, systemic risks result from connections*

49. Act XL of 2008 on Natural Gas, in force as of 1 July 2009, Secs. 32, 139(5).
50. Act XL of 2008 on Natural Gas, in force as of 1 July 2009, Sec. 107(1), 107(6).
51 M Gruson, 'The Global Securities Market: Introductory Remarks', *Columbus Law Review* (1987), 303.
52 Ruhl, 'Managing Systemic Risk in Legal Systems'.

between risks ('networked risks')" (Helbing 2013, 497). Thus, emerging systemic risk is the misterious phenomenon that can only be undestand in its entirety with complex system viewpoints and in accordance with transdisciplinarity's complexity axiom as the potential of systemic risk for cascading is non-linear, nor monodisciplinary. If we cannot effectively manage systemic risk within the legal system, how can we expect the legal system to manage systemic risk elsewhere? (Ruhl 2012, 583)

Foreign investors made their first investments in the Hungarian energy sector in 1995, as a result of privatisation. This time, the investments were undoubtedly risky – contemporaneous documents prepared by the investors show that all parties involved understood that Hungary's post-Communist regulatory system was still emerging and that multiple shifts in approach were likely as the state worked to develop a system appropriate to the specific characteristics of the Hungarian market. This was country risk, something the investors took into account. Indeed, a number of investors from the United Kingdom and the United States bowed out of contemplated investments in the Hungarian electricity and gas sectors because of the uncertainty about the specific contours of the emerging regulatory system. However, with great risks come great rewards. Market players, and thus investors, who were brave enough to invest here, made a considerably high rate of return until the temporary crisis measures instituted by Hungary later (2006, 2010). By the time foreign investors began operations in Hungary, i.e. the privatization, the price increases called for by the Interim Pricing Resolution were already underway. As demonstrated in a graphic analysis by the International Energy Agency, these increases were significant:[53]

[53]. International Energy Agency & Organisation for Economic Co-operation and Development, *Energy Policies of IEA Countries: Hungary 1999 Review*, pp. 70-71 (1999).



3.2.1-1. Figure gas price increase (source: IEA)

Within ten years of the end of the Communist regime, Hungarian consumers saw an 800% rise in the price of residential natural gas,[54] thus on the different levels of reality this ten years time was perceived differently, especially profit of gas supply companies and cost of users connected by *the T-state, that was pricing regime (normativity)*.

The electricity sector faced with similar conditions like the gas sector, with one further specialty: the above mentioned PPAs. In 1995, Hungary caused big power plants owned by the State and the energy incumbent company Magyar Villamos Művek Rt (**MVM**, that time Hungary's sole wholesale electricity buyer owned by the State) to enter into these long-term power purchase agreements, so as to make possible the privatization of the power plants by rendering these companies attractive to international investors and to secure substantial investment to improve the power stations and reliable long-term electricity supply in Hungary. These PPAs became a burden on the state budget (through cross-financing the losses of the off-taker of the electricity, the state-owned wholesale trader) and also were against EU-expectations

54. International Energy Agency & Organisation for Economic Co-operation and Development, *Energy Policies of IEA Countries: Hungary 1999 Review*, p. 71 (1999).

whilst profits were granted to the owners by the legislation until market opening, following which the high profits still remained as 'taken for granted' expectations of the power plants. Shortly after Hungary's accession to the EU, Hungary was pressured by the European Commission to take austerity measures in order to reach a deficit under 3% as provided by the EU requirements and the Accession Treaty.[55] Despite several prosperous years, Hungary's economic situation soon deteriorated sharply beginning in 2006. In particular, deficit ballooned to 9.2% of GDP while output growth stagnated at 3.9%, the lowest increase in the past ten years.[56] At the same time, the wholesale price of gas under the contract with Gazprom was beginning to spike due to the radical increase in the price of oil following the onset of the Second Gulf War.

From the earliest years of the investors' investments, generators understood that PPAs created difficulties for the liberalization of Hungary's electricity market. Notably in 1998, Hungarian generators together with regulators, officials and industry participants, took part in working groups discussing the evolution of Hungary's electricity market in view of Hungary's alleged future accession to the European Union. Starting in 1997, generators and MVM entered into a series of meetings, agreements and PPA amendments which reflected the possibility that PPAs could become impossible to enforce. These agreements understood that the Government no longer supported the establishment of new PPAs. For example, 2001 agreement between Dunamenti and MVM was a bilateral transaction in which HEO (i.e. the "State") did not participate: it provided for good faith renegotiation of the PPA within one year following the expiration of regulatory pricing "*in order to be able to fulfill their obligations in the changed regulatory environment*" (paragraph 5(d)).[57] This tendency gave ground to those narratives which, according to our experience, began treating these further bilateral agreements, PPA amendments together with the original PPAs and the regulatory framework as one, connected, even coherent document or bunch of documents, a kind of "historical PPA". This approach admittedly was not unjustified and appeared during later investment disputes and related argumentations, however, on the other hand, **became systemic risk within the complex system of normativity**, including regulation (the 2001 Electricity Act and the Government

[55]. Council of the European Union, Council Decision of 5 July 2004 on the existence of an excessive deficit in Hungary, L 389 (2004/918/EC), Official Journal of the European Union (30 Dec. 2004).
[56]. Organisation for Economic Co-operation and Development, *Hungary*, *in* OECD Economic Outlook, p. 2 (2007).
[57] Electrabel v. Hungary ICSID case, Decision on Jurisdiction, Part VII, Section 7.33 (page 70) available at: https://www.italaw.com/sites/default/files/case-documents/italaw1071clean.pdf

decree on stranded costs), public administration (HEO initiating re-negotiations) and the state-owned wholesale trader, who, undoubtedly, was bounded by state interest more than foreign-owned power plants. This makes it apparent that it is indeed justified Hungarian energy law and public administration to be *re-defined as 'normativity', i.e. public administration (HEO) acting in order to expel systemic risk from the regulation*. Anyway, this systemic risk with treatening cascade of failures in the form of EU investigation, obstacles of market opening and high enduser prices required intervention.

On one hand and to cease the grant of this profit, legislation reintroduced regulated prices in 2006-2007 and cut off high electricity and capacity fees. Hungary considered that the profits of electricity generators in the regulated market segment were excessive and that there was a need to revert back to "reasonable" profits, based on a reasonable rate of return. After regulated pricing for generators was abolished in 2004, generator profits rose substantially above the levels originally considered reasonable by regulators for protected public utility sales, with the costs of these extra profits being increasingly borne by consumers (with the surcharge for stranded costs). In the case of Dunamenti, its profits increased steadily during the life of the PPA from 10.7% in 1997 to 39% in 2005, greatly exceeding regulatory targets.[58] A series of meetings with the electricity generators started at the end of 2005.[59] Ultimately, after a final unsuccessful round of negotiations, the Hungarian Parliament adopted administrative pricing at the end of 2006 to reduce generators profits to a reasonable level, in part to provide a real incentive for generators to consider more market-based contractual arrangements. Preceding this, in several occasions early in 2006, MVM suggested price reductions based on HEO's letter. In the absence of an agreement for 2006, disputing power plants issued invoices on the basis of their position; and MVM paid part of them on the basis of its own contrary position, as it was entitled to do under the PPA. This situation changed with the reintroduction in 2007 of regulated pricing by Hungary's 2006 Price Regulation Act, which amended the 2001 Electricity Act. The 2006 Price Decree was issued on 24 November 2006 (Decree 80/2006); and it came into force on 9 December 2006. The 2007 Price Decree (Decree 14/2007) was issued on 26 January 2007, which was effective from 1 February 2007 to 31 December 2007. This period was then followed by a brief return to deregulated pricing in 2008, resulting in a decrease in MVM's payments under the PPA. On 2 July 2007, the Hungarian Parliament enacted the

[58] Electrabel award ibid Part VII – 7.38
[59] Electrabel award ibid Part VII – 7.36

Electricity Act 2007, which came into force on 1 January 2008. It abolished (inter alia) regulated pricing for generators (the 2007 Price Decree having expired) and implemented in full the liberalisation of the Hungarian electricity market, as from 2008 onwards.

On the other hand, soon after Hungary's accession to the EU the state aid rules of the European Union were also triggered by the PPAs. The European Commission started its investigation in 2004 and finally concluded (4 June 2008) that they contained illegal state aids. Thus, the golden era for investors and owners of the big power plants lasted until the PPAs were terminated by Hungary by the request of the European Union (2008-2010) due to their identified illegal state aid content. The European Commission's formal investigation eventually resulted in its final decision of 4 June 2008 issued to Hungary. In this final decision's dispositif (or operative part), the European Commission determined (inter alia): that MVM's purchasing obligations under the Hungarian PPAs contained state aid to the generators incompatible with EU law, requiring Hungary to recover such unlawful state aid calculated as the difference between each generator's actual revenues under their respective PPA and the revenues obtainable on the spot market, without any PPA, under a simulated counterfactual scenario. Hungary terminated the PPAs accordingly, making an end to the golden era for the affected electricity producers. According to the concrete PPA termination package elaborated by Hungary,[60] Hungary's compensation scheme for stranded costs was to be calculated in two stages. At stage one, any stranded costs calculated as at the compensation date would be set off by the recovery of unlawful State aid. If the State aid exceeded the stranded costs as at that date, a payment would be made by the generator to the State, but the reverse would not occur. Accordingly, if the stranded costs exceeded the State aid, those losses would be borne by the generator. At stage two, also known as the "claw-back mechanism", each generator's revenues and costs would be finally calculated at the expiry of the relevant PPA's original term. If the balance of State aid and stranded costs had benefitted the generator at stage one, a final payment would be required by the generator to be made to the State; but, again, the reverse would not occur. Accordingly, no payment would be made by Hungary to the generator if at stage one the State had recovered a higher sum than it was in fact owed, or otherwise (e.g. if there remained net stranded costs). Thus, **Hungary intended to eliminate a systemic risk (the PPAs) from**

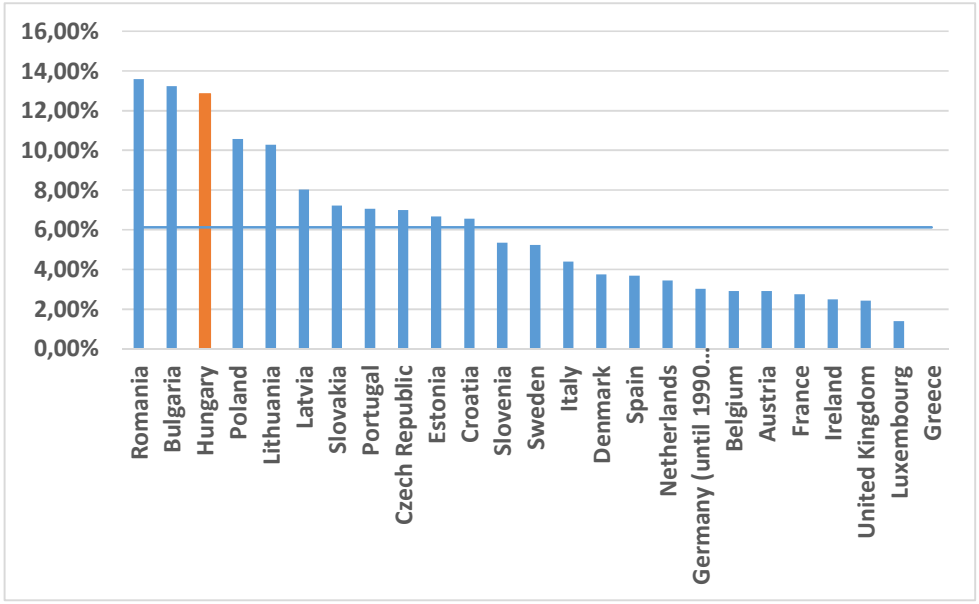
[60] (i) Act LXX of 2008 on PPA termination (ii) the Government Decree 149/2010 (IV. 29) on the calculation of repayable state aid and stranded costs of power plants and (iii) the respective resolutions of the HEO per power plant affected

its complex system in all levels of reality, adding to the robustness of the system of normativity, however, with a two-step intervention first violating the pacta sunt servanda principle, and then second not paying net strainded costs to generators, at the end of the day increasing again country risk, decreasing trust in public administration and thus adding to the fragility of the system.

Almost at the same time, the golden era in the gas market (and the whole electricity sector accompanying it) also ended, here with the Global Financial Crisis, thus a risk coming from outside of the system of normativity. This crisis, which began when homeowners in the United States defaulted on sub-prime mortgages, eventually caused real GDP in Hungary to decline precipitously in 2009 and 2010. At the same time, technological breakthroughs and new discoveries were causing the price of natural gas to plummet in most of Europe. But not in Hungary. In Hungary, natural gas prices were skyrocketing. One reason for the high prices was Hungary's lack of access to substantial quantities of natural gas from sources other than a very steep "take or pay" contract with Gazprom that was indexed to the price of oil. Oil prices, with one brief exception in early 2009, had risen more than 500 percent between 1999 and 2010. The problem created by the Gazprom contract was real and required time to fix. Thus**, Gazprom contract was the "T-state", where different and normally unconnected levels of reality crossed and the crisis hit Hungary.** The government was working on new interconnectors needed to allow cheaper gas to enter the system. At the same time, the Gazprom contract itself was scheduled to through the end of 2015. In other words, the problem engendered by the Gazprom contract was real, but temporary. However, there was another reason for the high prices facing Hungarian consumers: the formulas being used to calculate gas tariffs were designed to consider only the costs of the gas companies – the producers, the storage facilities, the distributors and the final delivery companies – and not the impact of the tariffs on the general public. Thanks to these formulas, energy market players enjoyed considerable profits in 2009 and 2010 – in the teeth of the darkest moments of the Global Financial Crisis and Hungarian recession. Hungarians rioted when they discovered that the deficit was higher than anticipated and that they would be subjected to additional austerity measures.[61] In the context of a spiraling budget deficit, the Government withdrew the remainder of its five-year tax cut program, because the tax cuts would have further decreased revenues by 3% of GDP. Instead, the

[61]. Judy Dempsey, *Hungarian Leader Defies Calls to Resign*, N.Y. Times (19 Sept. 2006), available online at http://www.nytimes.com/2006/09/19/world/europe/20hungarycnd.html.

Government adopted a corrective fiscal package that included tax increases, cuts in health-care, public administration and gas price subsidies expenditures.[62] In short, the system was in crisis (the **Gas Tariff Crisis**) and the people could not wait for the market to fix the problem in 2016. By 2010, approximately 13% of Hungarian household income was devoted to paying energy bills, just behind Romania and Bulgaria:[63]



3.2.1-2. Figure household energy expenditures (Rod Jansen 2014)

In late 2010, the Hungarian government recognized that the system was incapable of addressing the Gas Tariff Crisis quickly enough to avoid a public health crisis and stepped in:

---

62. Council of the European Union, Council Opinion of 10 October 2006 on the adjusted convergence programme update of Hungary, 2005-2009 (2006/C 260/01), Official Journal of the European Union, para. 6 (28 Oct. 2006) ("In June, facing a spiralling budget deficit, the Government — re-appointed following the April 2006 general elections — withdrew the remainder of its five-year tax cut programme which would have further lowered revenues by around 3 % of GDP by 2010 and adopted a corrective fiscal package. A number of the corrective measures, including all those on the revenue side, have already been adopted by Parliament. The tax increases, together with some immediate cuts in health-care expenditure, gas price subsidies, public administration expenditure and the full withdrawal of the 0,3 % of GDP general reserve of the budget, are expected by the Government to reduce the deficit overrun in 2006 by 1,5 % of GDP, in order to achieve the new deficit objective of 10,1 % of GDP. These measures are also expected to produce important effects over the future years.").

63. In 2012, 70% of the total population in Bulgaria could not keep their home warm enough and 25% of Romanians faced the same issue. Rod Janssen, *Chilling statistics on fuel poverty*, European Council for an Energy Efficient Economy (21 Nov. 2014), http://www.eceee.org/all-news/columns/Rod_Janssen/rod-janssen-chilling-statistics/. In 2013, demonstrations took place in Bulgaria against the rise in utility prices due to strict austerity measures, which included public sector budget cuts and refusals to nationalize foreign utility companies to offset the rising costs. Stratfor, *In Bulgaria, High Energy Prices Bring Down the Government* (20 Feb. 2013), available online at https://www.stratfor.com/analysis/bulgaria-high-energy-prices-bring-down-government.

it ordered a moratorium on increases to the final tariff applicable to consumers (the tariffs for USPs); later it ordered three successive temporary cuts in the USP tariffs both for the electricity and natural gas sectors. These temporary tariff cuts were implemented by the Hungarian regulator, the HEO and relevant Ministries, also followed by the electricity USP tariff cuts. The temporary tariff cuts had a short-term impact on electricity and gas companies, among other things, the profit margin that DSOs, the gas distribution companies were allowed to receive on sales to regulated USP consumers was temporarily reduced on three occasions – from 8.29% to 4.5% to 2.29% to 0%, while the profit margin allowed on free market distribution remained at 8.29% throughout. As a result of the Government's temporary interventions, the market in Hungary stabilized between 2011 and 2016, consequently, many of the measures were lifted in 2017. For example, the allowed profit margin for the gas distribution companies was increased on the USP side to 4.62%.

On 26 December 2012, the Ministry promulgated a new USP Tariff Decree reflecting a decreased end-user tariff effective as of 1 January 2013.[64] However, the USP margin itself remained unchanged. Instead, the decrease in the end-user price was partly attributable to a decrease in the cost of domestically produced gas provided by MOL under the Mandatory Offering Decree.[65] Another contributor was the decreased DSO tariff as a result of the Ministry's revision to the DSO's Tariff Calculation Decree's profit margin component. Specifically, the Ministry reduced the DSO's recognized profit margin for the USP distribution business, fixed in the DSO Tariff Calculation Decree, from 4.5% to 2.28%. The recognized profit margin on free-market activity remained unchanged.[66] Finally, residential users were no longer obligated to pay a fee related to Hungary's strategic storage stockpile, further enabling a reduction in the end-user price.[67] On 28 December 2012, HEO issued new resolutions computing DSO tariffs in line with the revised DSO Tariff Calculation Decree. As before, the HEO applied the new 2.28% profit margin on the portion of the DSO cost base allocated to the service of USP customers. The DSO tariff attributable to USP services was accordingly decreased. The volumetric tariff for free-market consumption remained unchanged.[68] It should

64. Decree No. 28/2009. (VI. 25.) KHEM, effective 1 January 2013.
65. Decree No. 19/2010 (XII. 3.) NFM, effective 4 July 2012, *with* Decree No. 19/2010 (XII. 3.) NFM, effective 1 January 2013.
66. Decree No. 74/2009 (XII.7.) KHEM, in force as of 26 December 2012, p. 7, Annex 4, Sec. 1.1.4, "THESZ" component.
67. Decree No. 29/2009 (VI.25.) KHEM, effective 4 April 2013, Secs. 3(1); 5(2), effective 1 January 2013
68. e.g. HEO Resolution No. 1175/2012 (28 Dec. 2012)

be underlined that the HEO's resolutions did not recognize costs associated with the special taxes, including the Robin Hood Tax and the Pipeline Tax because passing through such costs would not only have undermined the policy of directing such taxes at sectors of the economy that had profited during the crisis, but would have also neutralized the Government's policy goal of cost reductions. This then was subject to excessive criticism from the affected companies. This was exactly the case in the electricity sector too, where electricity DSOs and electricity USPs were affected by the State measures to the same extent as their natural gas counterparts.

As a result of the HEO's refusal to pass Special Tax costs through to consumers in its December Resolution, DSOs filed lawsuits shortly after the start of the new year. We have been approached for legal ammunition in several such lawsuits, but given that the refusal to pass on costs was formally decided in a form of (public administrative) resolutions and not based on law, it was not difficult to find a catch on them from here. An administrative resolution is already subject to judicial review, the right to sue is automatic, and the *legitimatio ad causam* (in Hungarian: "*kereshetőség*"), that is the right of action developed by the court requiring a material connection to the subject of the litigation, which so often (indeed sometimes abusively) protects the decisions of the HEO, was not an obstacle in this case. In addition, there were several precedents and previous administrative court decisions that could be called upon with regard to the substantive requirements related to the clarification of the facts and the statement of reasons. Although the HEO's decisions in December left an extremely short appeal window open and the legal teams of the DSOs concerned did not always find the right arguments, several strong lawsuits were filed everywhere (improved through informal inquiries) and DSOs won lawsuits against the HEO before the courts which are otherwise far more insensitive or even hostile to governmental goals than required by and result from judicial independence. **A systemic risk hidden throughout the complex system of normativity became apparent and started to cause a cascade of failures, the first stage of which was the level of HEO-resolutions**. Whilst these events approved the hypothesis that ordinary cause of systemic risk is the complexity in highly organised systems that arises primarily from design strategies intended to create robustness, we can also observe that the HEO/HEA's role in these events of Hungarian energy law and public administration clearly justifies the concept of 'normativity'.

On 12 March 2013, Parliament again amended the 2008 Gas Act to protect the price decrease that had been accomplished. Section 129(3a) of the 2008 Gas Act was amended to

permit any HEO resolution successfully challenged in court to remain valid until the HEO issued a new, conforming resolution.[69] Under the previous framework, invalidation of the HEO's resolution would have resulted in a reversion to the previously set DSO tariff, in turn compromising the USP Price Decree and ultimately increasing end-user prices.

With the new amendments, Parliament additionally codified the HEO's previous determination that special taxes, *e.g.*, the Robin Hood Tax, Pipeline Tax, and financial transaction tax, were not to be passed through to the end-user in the form of tariffs.[70] In other words, these taxes would continue to be paid by the economic sectors at which they were directed, not by the consumers the Government was trying to protect from further austerity.

Further, the Parliament formally **revised the HEO's status in the 2013 HEO Act[71] in order to stop the cascade of failures of the systemic risk event and with the intention to add to the robustness of the system**. The European Union Directives on the common market for electricity and natural gas required regulatory entities to be formally independent from other government organs.[72] In presenting the Act to Parliament, the Government therefore explained that it would render the HEO "*an independent, centrally financed regulatory body operated and managed independently*," and that the independence of the HEO would be ensured because, in "*line with Section 23(3) of the Fundamental Law, it is laid down that the Authority reports to the Parliament only*."[73] Indeed, Section 26 of the HEO Act clarified that "[t]*his Act ensures compliance with the following legal acts of the European Union* […] *Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the*

[69] Act XL of 2008 on Natural Gas, in force as of 14 March 2013, Sec. 129(3a).
[70]. Act XL of 2008 on Natural Gas, in force as of 14 March 2013, Sec. 103(4)
[71]. Act XXII of 2013 on the Hungarian Energy and Public Utility Regulatory Authority, as published on 27 March 2013, p. 6, Sec. 23(1).
[72]. Directive 2009/73/EC of the European Parliament and of the Council concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, Art. 39(4) (13 July 2009) ("Member States shall guarantee the independence of the regulatory authority and shall ensure that it exercises its powers impartially and transparently. For this purpose, Member States shall ensure that, when carrying out the regulatory tasks conferred upon it by this Directive and related legislation, the regulatory authority: (a) is legally distinct and functionally independent from any other public or private entity; [and] (b) ensures that its staff and the persons responsible for its management: (i) act independently from any market interest; and (ii) do not seek or take direct instructions from any government or other public or private entity when carrying out the regulatory tasks. That requirement is without prejudice to close cooperation, as appropriate, with other relevant national authorities or to general policy guidelines issued by the government not related to the regulatory powers and duties under Article 41.").
[73]. Proposed Act No. T/10331 XXII 2013 on the Hungarian Energy and Public Utility Regulatory Authority, Sec. 2 (27 Mar. 2013).

internal market in natural gas and repealing Directive 2003/55/EC."[74] The 2013 HEO Act therefore elevated the status of the HEO to an independent organ, equivalent to a Ministry the name of which also changed from Hungarian Energy Office to Hungarian Energy and Public Utility Regulatory Authority. This, in turn, enabled the HEO President, instead of the Ministry, to issue USP and DSO pricing decrees,[75] and, what is more important, to issue decrees, i.e. law instead of (public administration) resolutions. **The cascade of the failures caused by the systemic risk seemed to be stopped here, stabilizing the robustness of price mechanism and thus normativity, but fragility of the same system was also increasing on a different level of reality.** This change is indeed one of the most important ones, certain consequences of which coming from *complex system theories*. The HEO was re-designed in 2013 (as HEA) so thoroughly that it became even a legislator concerning price setting, besides its public administrative tasks. In order to avoid successful judicial reviews of the public administrative resolutions of HEA with the artificial and arbitrary price reduction, Parliament even passed a law changing the Constitution. This amendment prescribed that HEA should carry out its price settings not in the form of individual public administrative resolutions, against which judicial review is open, but through decrees, that is, bylaws instead with erga omnes binding force, against which no judicial control is available.

In our view, the above is a very important and powerful example to understand *the potential, but linearly unpredictable twofold consequences of emergence and evolvability*. In our above example, that is, the changing rule of HEO/HEA as a public administrative body in Hungarian energy law, even becoming a legislator (thus making law) is clearly a self-explanatory case study of legal emergence, both being in connection with the increase of country risk and the decrease of quality expectations towards (that is, trust in) public administration. A public administrative body becoming a lawmaker for price setting unprecedentedly indeed a phenomenon affecting investment and regulatory stability and thus country risk (and trust) in the energy sector in general. At the same time, quality expectations and trust in public administration are also being affected by narrowing available legal remedies against decisions of the public administration. This is not just a theory. We have seen dozens of big energy investors increasing the used country risk factor in their future investment

74. Act XXII of 2013 on the Hungarian Energy and Public Utility Regulatory Authority, as published on 27 March 2013, Sec. 26.
75. Máté Tóth, The Question of regulated prices in the 21st century's Hungarian energy sector in Magyar Energetika, 2013

decisions due to the arbitral and unpredictable change of the price setting back in 2013, whilst decreasing their reliance on public administration in the same time, by clearly avoiding further possible contact with public administrative bodies.

As our example warns, emergence in the legal system is something that may be causing risk in the market, either increasing country risk or reducing quality of public administration – sometimes both. From this viewpoint we can summarise the consequence of the changing role of HEO/HEA in the following way. This emergence (evolvability) in the legal system intended to add (and definitely managed to do so) to the robustness of the legal system with strengthening the legal position of official price setting and defending 'rezsicsökkentés' from judicial review, also increased the fragility of it as well: increasing country risk, decreasing trust in quality of public administration in the same time. This turns all the above to a more normative (and de lege ferenda) viewpoint, that is, to the 'robust yet fragile' (RYF) dilemma. The RYF dilemma is generally about the phenomenon that a legal system is both robust and fragile in the same time, and any effort to reduce fragility by reducing organisation would also reduce robustness, but increasing organisation to increase robustness also increases fragility. According to Alderson and Doyle, the core criterion for the RYF dilemma model is "*large and/or diverse number of components, the complexity of their interconnections and interactions, and the complexity of the behaviors that result*,"[76] that is, the very essence we identified.

The RYF dilemma and the emergence of *systemic risk* are closely related. The emergent properties and the relatively autonomous character of the agents cause systems to have unpredictable and complex dynamics. Seemingly stable equilibriums can be suddenly disrupted by unexpected events[77] activating and making visible imminent systemic risks. Hence, complexity connects emergence, RYF and systemic risks, and the HEO/HEA issue is an operative example for this. Where the RYF dilemma comes into play, and complex systems with emergencies (e.g. the domestic energy law and public administration) are conceptually such, we need to pay attention to systemic risks. Anyway, buttressing HEO/HEA's position in the legal system was unavoidable in the course of tariff cut, with all of its consequences in a complex system viewpoint. Law as normativity is a system among the multitude of social

[76] D L Alderson and J C Doyle, 'Contrasting Views of Complexity and Their Implications For Network-Centric Infrastructures', *IEEE Transactions on Systems, Man, and Cybernetics – Part A: Systems and Humans* 40, no 4 (2010), 840.
[77] Klijn and Snellen, 'Complexity Theory and Public Administration', 4.

systems and subsystems and its aim is, expectedly and allegedly, to regulate constraints and failures the other social (sub)systems face; as being such, it is a fail-safe strategy for other social systems. However, risks cannot only be caused *in other complex social systems* by the law, like it happened with the changing rule of the HEA perhaps causing the increasing country risk and decreasing trust in public administration quality. A certain degree of systemic risk is without doubt inherent *within* the legal system itself, as in case of any other complex adaptive systems.

To add to the sytem robustness was a continuous effort in normativity. On 14 October 2013, Parliament passed the amendment to the Utility Cost Reduction Act, requiring an 11.1% cut to USP tariffs going into effect on 1 November 2013.[78] As a result of the 2013 LIV Act on the implementation of overhead reductions, electricity prices decreased in 3 stages, similarly to natural gas. As in the first phase, between 1 January and 31 October 2013, electricity prices could not exceed 90% of the charges applied on 1 December 2012; as a result of the second ESA tariff reduction, the USP prices was further reduced after 31 October 2013: they could not exceed 88.9% of the charge on 31 October 2013.

In February 2014, Parliament again acted to amend the Utility Cost Reduction Act, requiring a final 6.5% reduction in end-user prices for electricity and natural gas[79], tha was the third, final tariff cut. To accomplish this goal, the Ministry made two revisions to the USP Tariff Calculation Decree. First, the recognized cost was again modified, now just to consider the natural gas, to weight the TFF/Baumgarten market prices at 75%, as opposed to 70%, again making the cost of natural gas cheaper.[80] Second, the USP margin was revised downward for the second time. Effective in April 2014, the resulting USP tariff for low-consumption residential users would thus fall from 2.2455 to 2.295 HUF/MJ; the USP tariffs for non-residential users, however, were not to change. The third tariff cut marked the final intervention of the Hungarian government's effort to bring gas prices to sustainable levels.

78. Act CLXVII of 2013 on the amendment of certain acts in connection with the utility cost reduction, as published on 21 October 2013, p. 3, Sec. 5.
79. Act LIV of 2013 on the implementation of utility cost reductions, in force as of 1 April 2014, Sec. 1(1); Act LIV of 2013 on the implementation of utility cost reductions, in force as of 7 October 2014, Sec. 1(1). On 1 January 2014, the HEO also issued a decree removing metering losses as a covered cost in the DSO Price Decree. HEO Decree No. 1/2013 (VII.11.) MEKH, in force as of 1 January 2014.
80. Decree 29/2009. (VI.25.) KHEM, effective 1 April 2014, Annex 1., p.1.

This was the end of the Government interventions. The new four-year cycle of regulatory prices started on January 1, 2017.[81] The assets and costs reviewed were based on 2015 data. The justified costs of operation were assessed per the methodological guidelines published by the HEA.[82] The changes in DSO tariff-setting from January 2017 were:

	December 2016	January 2017
WACC	2.04*	4.62
Inflation indexation	above 5%	above 1.5%
Recognized network loss	0%**	1.5%
*The effective WACC for DSOs: the free-market rate (8.29%) and the Universal Service rate (0%) is weighted according to the distributed volumes in these segments. ** In November 2013, network loss was removed from the recognized operating costs of DSOs. The actual reduction of the cost base, however, was smaller than the value of the network loss, thus DSOs were able to recover some of their related costs.		

3.2.2. An outlook: a more holistic approach

The more holistic approach of the energy industry together with other fields and industries is largely becoming an apparent consideration of policy making in energy law. The National Energy Strategy of Hungary adopted by the Hungarian Parliament in 2012 gives the framework policy and aim of holistic energy approach of Hungary until 2030. The Strategy expressly states that "[t]*he Energy Strategy contains detailed proposals for the Hungarian energy sector and the decision-makers for a time horizon until 2030, including a roadmap until 2050, which puts the measures proposed for the period until 2030 into a more comprehensive and longer-term perspective*." The National Energy Strategy, based on new foundations, will ensure the long-term sustainability, security and economic competitiveness of energy supply in Hungary. The objective of the Hungarian government is to reconcile its energy and climate policies while

81. Hungarian Energy and Public Utility Regulatory Authority, Decree No 8/2016 (X.13.), MEKH on a framework for determining the natural gas system usage fees, extra charges and connection fees, applicable 21 December 2016 - 31 December 2020.
82. HEO, Methodology Guidelines on the system of establishing annual natural gas network access fees in the 2017-2020 price regulation cycle (16 November 2016); HEO, Methodology Guidelines for Establishing the Eligible Costs of Natural Gas Network Operators (for the asset and cost review prior to establishing the opening prices of the price regulation cycle) (16 November 2016).

keeping economic development and environmental sustainability in mind.'[83] The concept of the strategy requires the integration of five fundamental pillars: boosting energy savings and energy efficiency, increasing the share of renewables in the energy mix, integration of Central European pipeline infrastructure with building new cross-border pipelines, presenting the existing capacity of the national nuclear sector and the eco-friendly and sustainable using of coal and lignite stocks for electricity generation.[84] One of the key elements of the document is seeking ways out of energy dependency, which could be one of our most important challenges in the near future. The major actions listed in the Parliamentary Decision in consideration of the objectives of the Energy Strategy are: framing the Act on sustainable energy management, improving energy efficiency, increasing the utilisation of renewable energies, transport development, utilisation of domestic fuel resources, environment awareness-raising, achieving industry development objectives and ensuring the competitiveness of the district heating service.[85]

3.2.3. An absolute extreme: nuclear energy

There is one semi-autonomous field of the Hungarian energy industry which certainly represents the absolute highest standard and thus the extreme of State control and public administrative governance, namely the nuclear energy sector. Hungarian energy policies and also law put notable emphasize and relevance on nuclear energy. From a normativity point of view, here the special role of public administration, the risk analysis and the safety/security priority of nuclear energy regulation are the key characteristics. The fundamental objective of the Act No. CXVI of 1996 on Nuclear Energy is to protect the health and safety of the public and the environment. It has established a modern, multi-stage legal and regulatory frame. It is in conformity with international standards and implements European Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety for the protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom,

[83] Nemzeti Energia Stratégia 2030. > http://2010-2014.kormany.hu/download/b/87/70000/ESTRAT%20r%C3%B6vid%C3%ADtett%20magyar%20verzi%C3%B3.pdf < accessed 22 February 2019.
[84] Nemzeti Energia Stratégia 2030. > http://www.terport.hu/teruletfejlesztes/orszagos-szint/fejlesztesi-dokumentumok/agazati-tervek/nemzeti-energiastrategia < accessed 22 February 2019.
[85] Nemzeti Energia Stratégia 2030. > http://2010-2014.kormany.hu/download/b/87/70000/ESTRAT%20r%C3%B6vid%C3%ADtett%20magyar%20verzi%C3%B3.pdf < accessed 22 February 2019.

96/29/Euratom and 2003/122/Euratom.[86] The detailed regulations are included in government and ministerial decrees issued based on the empowerment ensured by the Act on Nuclear Energy.

Concerning nuclear liability legislation, the abovementioned Act on Nuclear Energy provides a basis for, in terms of the nuclear activities, facilities and radioactive waste management. In conclusion, the primer liability is assumed by the licence holder of the nuclear power plant operator to the extent and in accordance with its authorisation/permission issued by the Hungarian Atomic Energy Authority (HAEA). As last resort, liability is covered by the Hungarian State. In case of third-party damage, the liability must be borne regardless of fault by the licence holder of the nuclear power plant. The financial coverage of the operator's liability is mandatory. The specific rules regard civil nuclear liability laid down in the Government Decree No. 227/1997. (XII.10.) on the type, conditions and sum of the liability insurance or other liability financial coverage concerning atomic damage. It is the competence of HAEA to ensure the fulfilment of international obligations concerning liability for nuclear damage, based on Article 1 (1) d) df) of Government Decree No. 112/2011. (VII. 4.) on the scope of authority of HAEA in relation to European Union obligations and international obligations in connection with atomic energy, on the designation of co-authorities contributing to the regulatory proceeding of HAEA, and on the scientific council assisting the work of HAEA.

Due the absolute State control, the very high regulative presence (also with the HAEA role), as well as the very special standard of liability with the ultimate liability of the State, country risk, quality concerns of public administration and systemic risk/bias issues are not present to the same extent in the semi-autonomous nuclear energy scene as in the above investigated (general) segments of the Hungarian energy sector. Therefore, the specialties of nuclear energy from these business-normative type of risk concerns, even the exclusion of them are definitely a subject for further, separate studies.

3.2.4. External impulses

[86] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32013L0059

Of course, Hungary is not fully independent in establishing its energy policies, it has to comply with external sources too. Hungary became a Member of the EU on 1 May 2004 as a part of the Treaty of Accession 2003, therefore, EU legislation applies in Hungary as it does in other Member States. Article 288 of Treaty on the Functioning of the European Union (TFEU) lists five legal acts adopted by the institutions of the EU, namely regulations, directives, decisions, recommendations and opinions. According to the Article 4(2)(e) of the TFEU, EU and the Member States have shared competence in the fields of energy and environmental protection. The so-called Clean Energy for all Europeans legislative package (CEP) as enacted and promulgated gives the legal framework for EU energy law in the field of electricity and certain other aspects (the CEP did not dealt with natural gas-related legislation of the EU previously enacted). These are: Energy Performance in Buildings (Directive (EU) 2018/844), Renewable Energy (Directive (EU) 2018/2001), Energy Efficiency (Directive (EU) 2018/2002), Governance of the Energy Union (Regulation (EU) 2018/1999) Electricity Regulation (Regulation (EU) 2019/943) Electricity Directive (Directive (EU) 2019/944) Risk Preparedness (Regulation (EU) 2019/941 and ACER (Regulation (EU) 2019/942). As it can be seen, energy efficiency is also in the focus from the regulatory side. Directive (EU) 2018/2002 of the European Parliament and of the Council of 1 December 2018 amending Directive 2012/27/EU on energy efficiency clearly highlights the importance of regulatory considerations expected from the national legislators. Considering that buildings account for a major part of the energy consumption, the EU aims to improve energy performance of the buildings by setting out the rules for calculation of energy performance and their minimum requirements, application of these requirements and the energy certificate.[87] The relevant Directive 2010/31/EU was also amended as the part of the Clean Energy for all Europeans package by the Directive (EU) 2018/844. Such external expectations are not only coming from the EU but also beyond: the Sustainable Development Goals of the United Nations (2015-2030) as general goals and the related targets provides the policy frames for states worldwide.

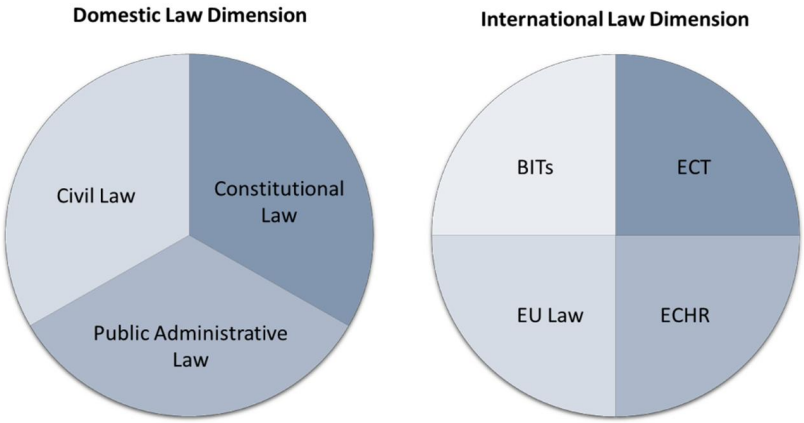
3.2.5. Where are the borders of state intervention?

All of these phenomena have raised many exciting regulatory dilemmas, gave grounds to specific resolution mechanisms, market and investor issues, investor protection concerns and

[87] Article 1 Directive 2010/31/EU

even investor protection litigation over the relevant long decades, not to mention their social impact in an industry where safe and cheap energy has become as much of a social expectation today as bread for two hundred years or public education and social security for a hundred years.

In theory, a violation may make the following legal remedies available:



3.2.5-1. Figure The complex system of available legal remedies

As it can be seen, there are different domestic and international law remedies available, sometimes in parallel, though with different premises to be fulfilled. This is also true if we are explicitly seeking possible remedy against state intervention, for example in the energy sector, with reference to the events of an intense period such as the last two decades. International law remedies, especially those available to investors as well in case of damages occurred are in theory competing with domestic civil law remedies, the latter to be achieved via ordinary civil courts or domestic arbitral tribunals. However, this is only a theoretical competition in a number of cases. As Hungarian civil law applied by domestic forums has historically its expressed constraints in terms of damages as a result of State intervention (damage caused by the State) as well as in terms of State attributability, this is not a real alternative.

Thus, investment protection is the *only* real border of state interventions, thus to those interventions too enumerated above (i.e. (i) luxury profit and reintroduction of regulated pries for generators, (ii) PPA-termination and (iii) overhead charge tariff cuts). Considering official pricing, price-setting by the state, nationalization, takings and similar possible instruments allegedly representing state intervention appearing in the energy industry, the practice of international arbitral tribunals are firmly affecting or even determining the playing fields of

national legislations, especially the borders of such state interventions or regulations in the energy sector. On the other side, these dynamical borders represent the *actio radius* for the investors as owners of certain market players how far they can go against a State intervention instrument.

Practically speaking, both due to so-called bilateral investment treaties (**BIT**s), as well as to the Energy Charter Treaty (**ECT**) investors are generally entitled to seek legal remedies against state interventions or against other unfair measures. BITs are bilateral agreements on the promotion and mutual protection of investments. In case of Hungary these were concluded with most states typically before 1990 and become part of Hungarian law in a form of "MT decrees", a legally unique and often disputed type of legislative act by a Council of Ministers existing before 1990. The first BITs were very useful and even powerful tools to attract foreign investors, to increase trust in the national legislation around the regime change in 1989/1990 and also to *mitigate country risk*. Further BITs were also concluded in the 1990s and later.

In accordance with international practice, the BITs are operating with two different level of protection in the form of two different kind of protective instruments: fair and equitable treatment (**FET**) and expropriation.

3.2.6. Normativity, risks and expropriation in the Hungarian energy sector

The examination of any alleged expropriation may be based on the core understanding of that concept under modern international investment law. In *S.D. Myers v. Canada*, the Tribunal explained that: "*in general, the term 'expropriation' carries with it the connotation of a 'taking' by a governmental-type authority of a person's 'property' with a view to transferring ownership of that property to another person, usually the authority that exercised its de [sic] jure or de facto power to do the 'taking'*".[88] The PPA-contracted power plant capacities were owned and controlled by the same owners as before, during and after the PPA-s were taken, not restricting the capacities factually nor taking any power plant units whatsoever. Similarly, the DSO businesses were unquestionably owned and controlled by the same owners before, during and after the state intervention measures of overhead costs reduction. In case of power plants, DSO

88. *S.D. Myers, Inc. v. Canada*, UNCITRAL, Partial Award, para. 280 (13 Nov. 2000) (noting that "[t]he term 'expropriation' . . . must be interpreted in light of the whole body of state practice, treaties and judicial interpretations of that term in international law cases").

businesses sold later, or in case of the USP businesses sold the purchase price that counts. Statements by politicians that allegedly caused fear that new measures would replace the temporary measures and those measures also would have destroyed the future profitability of this historically unprofitable business alone will not suffice. Nor even factual changes in historical profitability trends, like life for power plants after PPA-termination or for DSOs and USPs with no profit guarantee from the State! A defense of duress is usually reserved for the powerless and the infirm – hardly a fair characterization of large energy companies in the world. Here in case of the biggest Hungarian power plants, the USPs and DSOs, faced with measures that were facially temporary, such a burden cannot be met. To losses, it is also relevant if the record shows that the returns during the crisis were roughly analogous to its returns before the crisis, whilst for purchase price in case of a sale cannot be a market price or even above (like in case of an USP sale). Put simply, in such cases where there were no duress there were no expropriation.

In case of the PPA-takings, the power plants, the "irons" remained untouched, therefore finally excluding the possibility of expropriation. A possible claim for expropriation in case of the Hungarian electricity and gas sector intervention measures in connection with the overhead charge reduction may likely be even more tenuous when we are talking about direct taking. If DSOs are not nationalized and the tariff regime in place will not remain (i.e. the government replacing it) only the "indirect" and "creeping" expropriation processes remain open questions. However, these are significant queries indeed. The clear and undisputed economic impact of Hungary's various measures to address the country's gas crisis on the investment of foreign investors – past and anticipated – should then be evaluated even if would not linearly result in the permanent deprivation of the use or reasonably-to-be-expected economic benefit of their investment. Similarly, future prosperity of power plants without PPAs should be evaluated in this way.

As the *Total* tribunal explained, *"a measure which does not have all the features of a formal expropriation could be equivalent to an expropriation if an effective deprivation of the investment is thereby caused.*" To qualify as an expropriation, however, such a deprivation must entail the "*total loss of value of the property such as when the property affected is rendered worthless by the measure, as in case of direct expropriation, even if formal title continues to be*

held."[89] The *Total* tribunal found that Argentina's freezing of gas tariffs implied "*neither a deprivation of the investment nor a total loss of its value*."[90] As in *Total*, such a theory must be rejected for the Hungarian overhead charges reduction, where investors in the Hungarian electricity or gas infrastructure (DSO) market cannot show "*that the negative economic negative impact of the measures has been such as to deprive its investment of all or substantially all its value."*[91] The same was true for the actual and real investor needs of the PPA-contracted power plants in the Dunamenti case and in the AES-Tisza case, where it was not possible to present this standard of Total in terms of the temporary (2006-2007) reversal of the official price and the termination of the PPA.

In case of the overhead charges reduction measures in Hungary, DSO owners retained their investment during the measures being in place. The companies thus retain significant value, had been historically profitable, and will still likely enjoy significant future returns after that Hungary has successfully stabilized its electricity and gas sectors. The regulatory period that started on 1 January 2017 has seen the lifting of almost all of the measures previously adopted to reduce and bring gas tariffs in line with average European rates, including the application of a DSO profit margin, a recognition of 1.6% network loss, and an inflation efficiency factor of 1.5%. Thus, the 2017 tariff resolution addressed all alleged breaches (if any) in a way consistent with the 2010 regulation. As a consequence no future damages with respect to the DSOs should be calculated under such a logic. The same is true for the electricity tariffs.

Thus, possible allegations that Hungary's measures to stabilize the electricity and gas pricing crisis to support an expropriation claim under Article 13(2) should be assessed in light

---

89. *Total v. Argentina*, ICSID Case No. ARB/04/1, Decision on Liability, para. 195 (27 Dec. 2010) (emphasis added); *see also LG&E v. Argentina*, ICSID Case No. ARB/02/1, Decision on Liability, para. 191 (3 Oct. 2006) ("Interference with the investment's ability to carry on its business is not satisfied where the investment continues to operate, even if profits are diminished. The impact must be substantial in order that compensation may be claimed for the expropriation").

90. The *Total* tribunal found that Argentina's freezing of gas tariffs implied "neither a deprivation of the investment nor a total loss of its value." *See Total v. Argentina*, ICSID Case No. ARB/04/1, Decision on Liability, para. 198 (27 Dec. 2010).

91. *Total v. Argentina*, ICSID Case No. ARB/04/1, Decision on Liability, para. 196 (27 Dec. 2010) ("The Tribunal considers that Total has not shown that the negative economic negative impact of the Measures has been such as to deprive its investment of all or substantially all its value. Therefore the Tribunal rejects Total's claim of indirect expropriation in breach of Article 5(2) of the BIT. We note that this conclusion is consistent with all of the previous arbitral precedents dealing with indirect expropriation claims brought by foreign investors in the utility sector under various BITs in respect of the same or similar measures of Argentina in 2001-2002.").

of practice, to the same extent as in case of the temporary re-establishment of regulated capacity and energy fees for the power plants in 2006-2007. Measures that are ephemeral or temporary are not a valid basis for claims of expropriation. Rather, settled international law requires that measures be "*irreversible and permanent*" to give rise to an expropriation.[92] Setting aside that Hungary's measures were valid regulatory actions in the public interest or not, the measures were also neither "permanent" nor "irreversible" both in case of the 2006-2007 reintroduction of power generators' regulates prices and in case of overhead charges reduction measures. Instead, these measures were temporary expedients adopted to respond to a destabilizing economic crisis or, in case of the 2006-2007 measures, the luxury profits resulting from monopolistic relations were temporarily adjusted to the market. By their nature, such regulations, like utility tariffs and regulated prices more generally, were subject to adjustment and thus lacked the "permanent" or "irreversible" qualities needed to give rise to an expropriation claim.[93] Thus, in my evaluation, risks alleged with the Hungarian energy sector (country risk, reduction of trust in and quality of public administration, systemic risk) cannot be capped by the expropriation standard of investment protection.

3.2.7. Normativity, risks and FET in the Hungarian energy sector

3.2.7.1. FET and risk handling

FET prohibits unjustified and discriminatory measures. This is generally expected to be granted by the hosting State and intends to cover rather different, and therefore not previously and exhaustively enumerated actions or omissions. As to the nature of the elements of the standars, Wälde (2004) underlines that the FET standard is particularly high in the context of Article 10(1) of the ECT and a simple breach of a rule is not enough: "*the 'fair and equitable' standard* [of the ECT] *is only then breached if there is an accumulation of breaches of relevant standards of sufficient severity, weight and impact to justify the intervention of the treaty in domestic governance. Both the accumulation of breaches and the impact on the investor must therefore reach a minimum threshold of intensity.*"[94] Thus, whilst expropriation is a taking, a

92. *Plama v. Bulgaria*, ICSID Case No. ARB/03/24, Award, para. 193
93. *See, e.g.*, *Ulysseas, Inc. v. Ecuador*, UNCITRAL, Final Award, para. 189 (12 June 2012) ("evolutionary character" of regulations deprived them of the "required permanent character" to support an expropriation claim).
94 Wälde (2004) at 15.

yes/no binary logic, FET is a harmful intervention not reaching the level of taking, leaving more space for interpretation and manoeuvres.

With regard to FET, which has been left rather flexible and theoretically open to different interpretations by both BITs and ECTs, it is first of all apparent that the practice is quite uniform concerning the nature of the FET, requiring a balanced interpretive approach compared to possible extreme interpretations and explanations.

In a classic decision concerning FET, the arbitral tribunal in Saluka Investments BV v. Czech Republic categorically rejected a subjective pro-investor interpretation of investment treaty standards. It stated that "*the protection of foreign investments is not the sole aim of the Treaty, but rather a necessary element alongside the overall aim of encouraging foreign investment and extending and intensifying the parties' economic relations*."[95] In line with this principle, the Saluka tribunal then advocated a more "*balanced approach to the interpretation of the Treaty's substantive provisions for the protection of investments, since an interpretation which exaggerates the protection to be accorded to foreign investments may serve to dissuade host States from admitting foreign investments and so undermine the overall aim of extending and intensifying the parties' mutual economic relations*."[96]

Exactly the same approach was identified by the arbitral tribunal in the El Paso Energy International Company v. The Argentine Republic, in which the tribunal expressly criticized the position taken by other tribunals, that the interpretation of an investment treaty should favour investor's protection.[97] The El Paso tribunal pointed out "*that a balanced interpretation is needed, taking into account both State sovereignty and the State's responsibility to create an adapted and evolutionary framework for the development of economic activities, and the necessity to protect foreign investment and its continuing flow*."[98] In another classic decision the Ventures Inc. v. Romania the arbitral tribunal expressly considered that it is "*not permissible, as is too often done regarding BITs, to interpret clauses exclusively in favour of investors*.[99]

[95] Saluka Investments BV v. Czech Republic, UNCITRAL Case, Partial Award ¶ 300 (17 March 2006)
[96] Id.
[97] El Paso Energy International Company v. The Argentine Republic, ICSID Case No. ARB/03/15, Decision on Jurisdiction ¶ 69 (27 April 2006)
[98] Id. ¶ 70.
[99] Noble Ventures, Inc. v. Romania, ICSID Case No. ARB/01/11, Award ¶ 52 (12 October 2005)

Besides the balanced approach, the legitimate expectation question is the really important aspect that should be considered in case of a FET-based claim. **The issue of legitimate expectation leads to questions of country risk, stable business, change of law and regulatory autonomy (i.e. sovereignty).** As a general remark, it is widely accepted that the most important function of the FET standard is the protection of the investor's reasonable and legitimate expectations, not the protection of any kind allegations. The legitimate expectations should be considered at the time the investment was made. In one of its classics, in Enron Corporation and Ponderosa Assets, L.P. v. Argentine Republic the arbitral tribunal found that "*[w]hat seems to be essential …is that* [the investor's] *expectations derived from the conditions that were offered by the State to the investor at the time of the investment and that such conditions were relied upon by the investor when deciding to invest."*[100] In our view, the tribunal in Duke Energy Electroquil Partners & Electroquil S.A. v. Republic of Ecuador noted more or less to the same extent that a limitation to the notion of "legitimate expectations" is that *"[t]o be protected, the investor's expectations must be legitimate and reasonable at the time when the investor makes the investment," and that "such expectations must arise from the conditions that the State offered the investor and the latter must have relied upon them when deciding to invest.*"[101]

Fairness and consistency must be assessed against the background of information that the investor knew and should reasonably have known at the time of the investment and of the conduct of the host State. While specific assurances given by the host State may reinforce the investor's expectations, such an assurance is not always indispensable as underlined in MTD v Chile.[102] In line with that is also worth noting that the legitimate expectation should be an explicit promise rather than an intangible presumption in connection with claims based on or connected to legitimate expectations. Therefore, arbitral tribunals do not take lightly the investor's requirement to show that government assurances were made. In the Parkerings-Compagniet AS v. Lithuania decision, the arbitral tribunal expressed that the investor's "*expectation is legitimate if the investor received an explicit promise or guaranty from the host-State, or if implicitly, the host-State made assurances or representation that the investor took*

[100] Enron Corporation and Ponderosa Assets, L.P. v. Argentine Republic, ICSID Case No. ARB/01/3, Award ¶ 262
[101] Duke Energy Electroquil Partners & Electroquil S.A. v. Republic of Ecuador, ICSID Case No. ARB/04/19, Award ¶ 340 (18 August 2008)
[102] MTD v Chile, ICSID Case No. ARB/01/7)

into account in making the investment."[103] Furthermore, expressly recognizing that each State has an "*undeniable right and privilege to exercise its sovereign legislative power,"* as long as in a reasonable and fair manner, the tribunal noted that an investor *"must anticipate that the circumstances could change, and thus structure its investment in order to adapt it to the potential changes of legal environment.*"[104]

The already referred Duke Energy Electroquil Partners & Electroquil S.A. v. Republic of Ecuador case concluded exactly the same. Here, the Duke tribunal held that the claimant's expectation "*could only have been deemed reasonable if it had been based on clear assurances from the Government*,"[105] and concluded that, in view of "*contradictory declarations*" and of the "*lack of contemporaneous written evidence*," it was compelled to conclude that "*the existence of assurances is not established.*"[106] The same issue is touched from another aspect of the Duke tribunal when saying that, when seeking to determine whether the investor's expectations were reasonable, a tribunal should ask "*whether an experienced investor* […] *should not have paid closer attention"* to the terms of the agreement to make sure it clearly satisfies the investor's alleged expectations.[107] Thus, it is on the investor's side to seek these explicit and clear assurances from the State.

It would therefore seldom classify as legitimate expectation that an electricity or natural gas distributor alleged no profit caps or decrease in justified costs if no such was promised by the State at the time of investment, nor an electricity producer's such allegation for a fix and undisturbed luxury profit in lack of such promise. Even less being the case if, considering four-year pricing cycles, such profit losses are only temporary, or a profit maximum is temporarily reintroduced to the pricing regulation, but this goes beyond the question of clear assurances of legitimate expectation. What is to be observed that an investor's legitimate expectations must be based on affirmative Government assurances or other State promises, in reliance on which the investor decided to invest at the time of the investment, rather than on indirect and hazy dreams and false forecasts of the investor, especially occurring later.

Country risk, stable business, change of law and the issue of regulatory autonomy, the "robust yet fragile dilemma" are relevant and have weight in FET. These are the by-

[103] Parkerings-Compagniet, Id., ¶ 331.
[104] Id. ¶¶ 332–333
[105] Duke, Id., ¶ 351
[106] Id. ¶ 352.
[107] Id. ¶ 353.

products of an elementary feature of the legal system: evolvability. Evolvability is of course necessary for a vital legal environment. It is far less evident that emergence and evolvability in the legal system both in legislation and legal execution (public administration) may represent useful flexibility as adaption (reflection) indeed, but also risk. Concerning the latter, it is clear that evolvability and emergence may also be associated with country risk (that is, a country changing its legal norms too often producing less stability) and public administration operation (that is, the quality of public administration). Such observation may also be relevant as it seems scholars do consider emergence only as a positive characteristic of complex legal systems.[108] Regulatory stability is indeed a very outstanding issue from an investor's viewpoint, and as practicing lawyers we do observe with its relevance from a market viewpoint. Especially the economical term country risk has much to do with the question how the State regulates, though country risk and international arbitral remedy do not go hand in hand. For example, the ICSID arbitral tribunal in Plama Consortium v. Republic of Bulgaria noted that the general requirement to provide a stable legal framework does not interfere with State's "*legitimate right to regulate*," and that "*this right should also be considered when assessing the compliance with the standard of fair and equitable treatment*."[109] Again, the balanced approach. What is more, the Plama ICSID tribunal also noted that "*the ECT does not protect investors against any and all changes in the host country's laws,*" and that "[*e*]*ven accepting the approach that* [the fair and equitable treatment] *standard includes an obligation to provide legal security,*" the obligation was not violated on the facts of the case.[110] This award does not stand alone. The tribunal in Continental Casualty v. The Argentine Republic noted that, although stability of the legal framework is undoubtedly conducive to attract foreign investments, it does not represent a promise by host States never to change their laws.[111] Hence, the tribunal considered that "*it would be unconscionable for a country to promise not to change its legislation as time and needs change, or even more to tie its hands by such kind of stipulation in case a crisis of any type or origin arose.*" Such an implication, according to the tribunal, "*would be contrary to an effective interpretation of the Treaty*" and "*reliance on such an implication by a foreign investor would be misplaced and, indeed, unreasonable*."[112] This means in practical (and Hungarian) terms that

[108] For example Ruhl, 'Managing Systemic Risk in Legal Systems'.
[109] Plama Consortium v. Republic of Bulgaria, ICSID Case No. ARB/03/24, Award ¶ 177
[110] Id. ¶ 222.
[111] Continental Casualty Company v. Argentine Republic, ICSID Case No. ARB/03/9, Final Award ¶ 258
[112] Id.

though a long-term PPA was an immanent element of the regulatory environment once, it would not mean, in lack of an explicit State promise, guarantee or assurance, that it would remain part of the regulatory element forever. Similarly, liberalized gas prices once does not mean *per se* in lack of an explicit State promise, guarantee or assurance that the State cannot regulate gas price ever more. Nor price elements of the gas distribution companies once accepted as justified costs means that these elements should remain forever as justified costs, again in lack of an explicit State promise, guarantee or assurance.

With no doubt this argumentation has its cons and thus should have its clear borders as well. Something like this was articulated in ADC Affiliate Limited v. Hungary case where the tribunal held that "*it is the Tribunal's understanding of the basic international law principles that while a sovereign State possesses the inherent right to regulate its domestic affairs, the exercise of such right is not unlimited and must have its boundaries*". As pointed out by the claimants of this case successfully, the rule of law, which includes the BIT and ECT obligations too, provides such boundaries. Hence, "*when a state enters into a bilateral investment treaty like the one in this case, it becomes bound by it and the investment-protection obligations it undertook therein must be honoured rather than ignored by a later argument of the State's right to regulate.*"[113]

With these remarks it is clear that the general right to a stable business and legal framework does not imply a freedom from all regulatory change and the State has a high grade of regulatory autonomy, though this is of course not without limitation. The Saluka tribunal also concluded that an investor may only legitimately expect that the State "*implements its policies bona fide by conduct that is, as far as it affects the investors' investment, reasonably justifiable by public policies and that such conduct does not manifestly violate the requirements of consistency, transparency, evenhandedness and nondiscrimination.*"[114] In the decision in S.D. Myers v. Canada, the arbitral tribunal similarly held that the determination of whether or not there has been a breach of fair and equitable treatment "*must be made in light of the high measure of deference that international law generally extends to the right of domestic authorities to regulate matters within their own borders.*"[115]

[113] ADC'Affiliate Ltd and ADC & ADMC Management Ltd v The Republic of Hungary, Award, ICSID Case No. ARB/03/16, ¶ 423.
[114] Saluka, Id., ¶ 309
[115] S.D. Myers v. Government of Canada, Ad Hoc UNCITRAL Case, Final Award ¶ 263 (30 December 2002)

The AES Tisza v. Hungary case as well as the Electrabel v. Hungary case (the latter concerning the Dunamenti power plant) reinforced these where both AES and Electrabel remained unsuccessful claiming that the temporary reintroduction of regulated pricing in 2006 - 2007, though indeed caused damages to the claimants, was a violation of ECT. This was not enough to win these FET claims not even with respect to the loss of profit occurred.

In my view, all the above can also go far beyond of a pure investment protection viewpoint, leading to a more normative question, that is the already mentioned RYF, the 'robust yet fragile' dilemma (see before in connection with the changing role of HEO/HEA). The RYF dilemma is generally about the phenomenon that a legal system is both robust and fragile in the same time, and any effort to reduce fragility by reducing organisation would also reduce robustness, but increasing organisation to increase robustness also increases fragility. The core criterion is "*large and/or diverse number of components, the complexity of their interconnections and interactions, and the complexity of the behaviors that result*."[116] I am firmly on the opinion that the RYF dilemma and the emergence of *systemic risk* are closely related especially when we are considering these FET-borders of State autonomy in its normativity. The ordinary cause of systemic risk is the complexity in highly organised systems that arises primarily from design strategies intended to create robustness.[117] The emergent properties and the relatively autonomous character of the agents cause systems to have unpredictable and complex dynamics. Seemingly stable equilibriums can be suddenly disrupted by unexpected events[118] activating and making visible imminent systemic risks.

One more thing to clarify here. Ruhl identifies qualities of robustness as modularity, scalability and evolvability[119] over reliability and efficiency. Since this verdict is based on common law experiences, this might not be an automatically correct standpoint concerning continental public administrative law, like Hungarian energy regulation. Since reliability (stability) is the very essence of continental law systems and also something reflected in country risk, expectations towards regulation (reliability, hierarchy, non-negotiability, vertical expectations) thus may easily be confronted with quality expectations towards public

[116] D L Alderson and J C Doyle, 'Contrasting Views of Complexity and Their Implications For Network-Centric Infrastructures', *IEEE Transactions on Systems, Man, and Cybernetics – Part A: Systems and Humans* 40, no 4 (2010), 840.
[117] Ibid.
[118] Klijn and Snellen, 'Complexity Theory and Public Administration', 4.
[119] Ibid. 594.

administration (flexibility, reflexibility, democratisation, horizontal expectations). *This confrontation or collision is a problem especially when we take the position that normativity comprises both: public administration (with its quality issues) and regulation (with its country risks concerning stability requirements)*. Adding to these that normativity, the product of complex legal systems contains an inherent fragility in a form of systemic risk, we have to deal with this risk matrix when addressing the robust yet fragile dilemma of complexity. This is relevant for de lege ferenda thinking, also mitigating negative effect of possible investment protection issues. Such RYF dilemmas of the legislation or the public administration related to systemic risks, as we see, can easily lead to investor protection disputes.

3.2.7.2. What were the concrete legitimate expectations of the Hungarian energy sector concerning risks?

If actually expected in 1995 that Hungary could never take the measures adopted in 2010 to address the Hungarian Gas Tariff Crisis, would have been such expectations legitimate? Would it have been a legitimate expectation in 1995 that Hungary, once it had liberalized its producer prices (2004), could not make it again, temporarily, a regulated price (2006)? Finally, would it have been a legitimate expectation in 1995 that if Hungary joined the EU and the PPAs became incompatible with EU rules, Hungary will be able to protect the PPAs against those rules?

In the absence of a direct contract or quasi-contractual relationship, the reasonableness of a claimed expectation will always be a highly contextual inquiry. Any inquiry into "*the reasonableness or legitimacy of an investor's expectations 'must take into account all circumstances, including not only the facts surrounding the investment, but also the political, socioeconomic, cultural and historical conditions prevailing in the host State.*'"[120] Tribunals have warned that "[l]*egitimate expectations*" will be "*seriously reduced if there is general*

[120]. Duke Energy Electroquil Partners and Electroquil S.A. v. Republic of Ecuador, ICSID Case No. ARB/04/19, Award, para. 340 (18 Aug. 2008) (citing Técnicas Medioambientales Tecmed, S.A. v. The United Mexican States, ICSID Case No. ARB (AF)/00/02, para. 154, (29 May 2003). Cf. also Joseph C. Lemire v. Ukraine, ICSID Case No. ARB/06/18, Decision on Jurisdiction and Liability, para. 285 (21 Jan. 2010) ("The evaluation of the State's action cannot be performed in the abstract and only with a view of protecting the investor's rights. The Tribunal must also balance other legally relevant interests, and take into consideration a number of countervailing factors, before it can establish that a violation of the FET standard, which merits compensation, has actually occurred: - the State's sovereign right to pass legislation and to adopt decisions for the protection of its public interests, especially if they do not provoke a disproportionate impact on foreign investors; - the legitimate expectations of the investor, at the time he made his investment; - the investor's duty to perform an investigation before effecting the investment; - the investor's conduct in the host country.").

instability in the political conditions of the country concerned."[121] Legitimate expectations must be informed by a realistic appraisal of economic conditions in a host state. Investors cannot have reasonable or legitimate expectations that they will be immune from "*the ups and downs of the country*" in which they have invested.[122] International investment law thus makes investors – rather than taxpayers in host states – **primarily responsible for managing the risks of their own investments**. Although an "*investor will have a right of protection of its legitimate expectations provided it exercised due diligence and that its legitimate expectations were reasonable in light of the circumstances*," the investor "*must anticipate that the circumstances could change, and thus structure its investment in order to adapt it to the potential changes of legal environment*."[123]

In short, expectations built on one vague sentence in the 1994 Gas Act, Electricity Act, the 2001 Electricity Act or similar ones cannot constitute legitimate expectations under FET, i.e. under the only valid and enforceable border of state intervention, suvereignity and room for normativity. Tribunals expect an investor, especially sophisticated investors like the ones active in gas and electricity markets, claiming violation of its legitimate expectations to have done its due diligence when forming those expectations. A tribunal may safely assume that investors knew that they were investing in the natural gas and electricity sectors, aware of the important role that natural gas and electricity plays in daily life and likewise aware that gas and electricity utilities are heavily regulated in most jurisdictions. This is because, as explained in *Electrabel v. Hungary,* the reasonableness of the investors' expectations "must be assessed against the

---

121. *See* R. Dolzer, C. Schreuer, *Principles of International Investment law*, p. 148 (2d ed. OUP 2012) (citing *Bayindir v. Pakistan*, ICSID Case No. ARB/03/29, Award, paras. 192-197 (27 Aug. 2009).

122. *See e.g.*, *Metalpar S.A. and Buen Aire S.A. v. Argentine Republic*, ICSID Case No. ARB/03/5, Award, para. 187 (6 June 2008) ("Therefore, the Tribunal considers that it is unlikely that claimants legitimately expected that their investments would not be subject to the ups and downs of the country in which they were made or that the crisis that could already be foreseen would not make it necessary to issue legal measures to cope with it.").

123. *Parkerings-Compagniet AS v. Republic of Lithuania*, ICSID Case No. ARB/05/8, Award, para. 333, 11 Sept. 2007). There any many ways that an investor may do so, most obviously, perhaps through a stabilization clause. *Parkerings-Compagniet AS v. Republic of Lithuania*, ICSID Case No. ARB/05/8, Award, para. 336, 11 Sept. 2007. *See also Philip Morris Brands Sarl, Philip Morris Products S.A. and Abal Hermanos S.A. v. Oriental Republic of Uruguay*, ICSID Case No. ARB/10/7, para. 426 (8 July 2016) ("Given the State's regulatory powers, in order to rely on legitimate expectations the investor should inquire in advance regarding the prospects of a change in the regulatory framework in light of the then prevailing or reasonably to be expected changes in the economic and social conditions of the host State."). *See also Mobil Investments Canada Inc. and Murphy Oil Corporation v. Government of Canada*, ICSID Case No. ARB(AF)/07/4, Decision on Liability and on Principles of Quantum, para. 169 (22 May 2012) ("If the Claimants identified ambiguities in relation to the regulatory framework established by the Atlantic Accord and the Federal Accord and Provincial Accord Acts, provisions with which they were clearly familiar, then it was for them to seek clarifications and obtain specific assurances.").

background of information that the investor knew *and should reasonably have known* at the time of the investment and of the conduct of the host State."[124]

It is also may be safely assumed that the investors knew they were investing in a transitioning economy undergoing massive transformations of its entire economic and political system and in a regulatory environment that had never previously utilized market-sensitive pricing regulation. Thus, in my evaluation of international case law, **risks emerging from normativity are generally to be borne by the investors**. It may also be assumed for the sake of that the investors conducted basic due diligence while considering an investment in Hungary.[125] If so, it may further be assumed that where the investors would allude to such legal materials as *inter alia* the 1994 Gas Act and Electricity Act, the 1995 Price Resolution, and the privatization memoranda for target companies, that the sophisticated investors exercising due diligence, actually read these materials contemporaneously, such that their contents informed the investors' expectations.[126]

Again assuming that the investors acted as sophisticated investors and conducted proper due diligence, an arbitral Tribunal may infer that the investors would have studied Hungary's then-existing regulatory architecture with due diligence and understood that the regulatory framework in place at the time of the investment *itself* did not guarantee any single foreign

---

124. *Electrabel S.A. v. The Republic of Hungary*, ICSID Case No. ARB/07/19, Decision on Jurisdiction, Applicable Law and Liability, para. 7.78 (30 Nov. 2012) (emphasis added). *See also AES Corporation and Tau Power B.V. v. Republic of Kazakhstan*, ICSID Case No. ARB/10/16, Award, para. 292 (1 Nov. 2013) (reasoning that "[i]n view of the stage of the development of the Kazakh economy and the stage of legislative development in the field of electricity and competition," general references to undefined concepts such as 'market rates' and 'competitive market' did "not suffice to establish a 'legitimate expectation' protected and enforceable under the FET standard."). *See also Saluka v. Czech Republic*, Partial Award, para. 304 (17 Mar. 2006) ("the scope of the Treaty's protection of foreign investment against unfair and inequitable treatment cannot exclusively be determined by foreign investors' subjective motivations and considerations. Their expectations, in order for them to be protected, must rise to the level of legitimacy and reasonableness *in light of the circumstances.*") (emphasis in original); *Invesmart, B.V. v. Czech Republic*, UNCITRAL, Award (Redacted), 26 June 2009, para 254.

125 *See*, *e.g.*, *Invesmart, B.V. v. Czech Republic*, UNCITRAL, Award (Redacted), 26 June 2009, para 254 ("[T]he due diligence performed when the investor made its investment plays an important role in evaluating its expectation. A putative investor, especially one making an investment in a highly regulated sector . . . has the burden of performing its own due diligence in vetting the investment within the context of the operative legal regime.")

126 *Invesmart, B.V. v. Czech Republic*, UNCITRAL, Award (Redacted), 26 June 2009, para 277 ("In the Tribunal's view, Invesmart should have sought legal advice on the EU and Czech law so that it understood precisely what the requirements were for making out the case for the granting of an exemption to the restrictions on granting state aid. Had it done so, it could have determined for itself that the law imposed strict guidelines on what information would be required to be submitted to the relevant authorities in order to maximise its chances of obtaining the requested aid to be granted.").

investor a profit.[127] If so, the investors would also have been aware that at the time of their investment, the regulatory framework in place did not even provide for profit-enabling and cost-reflective tariffs. In other words, far from reflecting a guaranteed pricing framework, Hungary's initial regulatory structure was *aspirational* with respect to the concept of cost-reflective tariffs.[128] An arbitral Tribunal – or now us, being in a theoretical investigator's position of the present analysis – may also safely assume that sophisticated investors would have been aware of the terms of their particular investment in Hungary, and that it was not structured in such a manner as to include a stabilization clause or similar guarantee. Even setting aside Hungary's crisis, "any reasonably informed business person or investor" would or should have anticipated significant regulatory change in a sector of such essential public concern as gas utilities[129] and, obviously, of electricity utilities. The large power plant due diligence documentation prepared at the time of privatization (1995) – as we saw – included this circumstance as an expectation on the investor side (country risk), the investors obviously priced it in, and then – as also seen – they keep on calculating with the change of regulatory environment in later documents and agreements up to 1999-2003.

These factors cumulatively preclude a finding that the investors reasonably could have expected that the laws and regulations governing their investment in the transitioning Hungarian natural gas or electricity sectors would endure unmodified beyond 2001, let alone that they were assured of 8% or better returns, inclusive of costs, forever after or the long-term old-time PPA would remain forever with its magic return. As noted in *AES v. Hungary*, "*any reasonably informed business person or investor knows that laws can evolve in accordance with the perceived political or policy dictates of the times*."[130]

A similar finding was made by the arbitral tribunal in a case involving Mongolia, finding that "[F]*oreign investors are acutely aware that significant modification of taxation levels represents* ***a serious risk****, especially when investing in a country at an early stage of economic*

---

127. As discussed elsewhere and summarized by the World Bank, "because of the 'yardstick competition' incorporated in the rate-making formula, ***no individual GDC is assured that it will earn an 8 percent rate of return***." *Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors*, World Bank Technical Paper No. 474, p. 44 (June 2000).

128. Several foreign investors "withdrew from the bidding as they felt uncomfortable with the pricing regulation and with the political will to adjust prices to economic recovery levels." *See Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan*, World Bank Technical Paper No. 451, p. 63 (Dec. 1999).

129 *See e.g.*, *AES Summit Generation Limited and AES-Tisza Erömü Kft. v. Republic of Hungary*, ICSID Case No. ARB/07/22, Award, para. 9.3.34, 23 Sept. 2010; *Parkerings v. Lithuania*, para. 332 (17 Aug. 2012).

130. *AES Summit Generation Limited and AES-Tisza Erömü Kft. v. Republic of Hungary*, ICSID Case No. ARB/07/22, Award, para. 9.3.34, 23 Sept. 2010.

and institutional development. In many instances, they will obtain the appropriate guarantees in that regard in the form of, for example, stability agreements which limit or prohibit the possibility of tax increases."[131] Another award came to the same conclusion noting that a state's law "is by definition subject to change as it adapts to new circumstances day by day and a state has a sovereign right to exercise its powers which include legislative acts.".[132] In *Parkerings v. Lithuania* it was held that claimed expectations cannot displace "*each State's undeniable right and privilege to exercise its sovereign legislative power* […] *to enact, modify or cancel*" a provision of its own law "*at its own discretion*".[133]

These considerations apply with added force when an investor enters an economy that is undergoing a period of transition. In *Parkerings v. Lithuania*, for example, the tribunal reasoned that by choosing, "*notwithstanding this possible instability*," to invest in an economy that was "*in transition from its past being part of the Soviet Union to candidate for the European Union membership*," the investor "***took the business risk to be faced with changes of laws*** *possibly or even likely to be detrimental to its investment*" and lacked "*any legitimate expectation that the Government of the Republic of Lithuania would not pass legislation and regulatory measures which could harm its investment.*"[134] In a case related to Estonia, the award stated that "*the Tribunal considers it imperative to recall the particular context in which the dispute arose, namely, that of a renascent independent state, coming rapidly to grips with the reality of modern financial, commercial and banking practices and the emergence of state institutions responsible for overseeing and regulating areas of activity perhaps previously unknown. This is the context in which Claimants knowingly chose to invest in an Estonian financial institution, EIB*."[135] In the Electrabel v Hungary case, the tribunal similarly ruled that the claimant "***bore the commercial risks of its operations*** *in Hungary under the PPA in a*

[131] *See also Sergei Paushok, CJSC Golden East Company and CJSC Vostokneftegaz Company v. Government of Mongolia*, Award on Jurisdiction and Liability, para. 302 (28 Apr. 2011)
[132] *See also AES Summit Generation Limited and AES-Tisza Erömü Kft. v. Republic of Hungary*, ICSID Case No. ARB/07/22, Award, para. 9.3.29 (23 Sept. 2010)
[133] *Parkerings v. Lithuania*, Award ibid para. 332 (17 Aug. 2012)
[134]. *See Parkerings-Compagniet AS v. Republic of Lithuania*, ICSID Case No. ARB/05/8, Award, paras. 335-338, (11 Sept. 2007). The *Parkerings* tribunal noted that "[t]he Claimant could (and with hindsight should) have sought to protect its legitimate expectations by introducing into the investment agreement a stabilisation clause or some other provision protecting it against unexpected and unwelcome changes." *See Parkerings-Compagniet AS v. Republic of Lithuania*, ICSID Case No. ARB/05/8, Award, para. 336 (11 Sept. 2007). *See also Electrabel v. Hungary*, Award, para. 156 (14 July 2006) (finding that claimant "bore the commercial risks of its operations in Hungary under the PPA in a difficult transitional period towards market liberalisation and membership of the European Union, including the application of EU law and the role of the Commission.");
[135] *Alex Genin, Eastern Credit Ltd., Inc. and A.S. Baltoil v. The Republic of Estonia*, ICSID Case No. ARB/99/2, Award, para. 348 (25 June 2001)

difficult transitional period towards market liberalisation and membership of the European Union."[136]

Here, Hungary's laws and regulations at the time of the electricity and gas market investments, i.e. 1994-1996 cannot ground a protected legitimate expectation that those laws would never change, where the investors should have considered that the Hungarian regulatory framework was young and would likely evolve further. As such, it is a statement easy to conclude that the investors deliberately took **the business risk of investing in Hungary and lacked any legitimate expectation that Hungary would never pass legislation or regulatory measures which might harm its investment**.[137] In my view, this is the *county risk* itself, and behind it is emergence, evolvability (scalability), RYF and systemic risk, which are inherent in complex systems. Thus, whether a foreign investor may have a legitimate expectation to reach the FET standard of investor protection schemes in the changing industrial environment of a given country, **in the absence of a specific state (privatization) guarantee, in the context of the stability of the regulatory environment or country risk, the answer should be no**. In our view, such an economically priced circumstance (country risk) also legally relieves the host state in liability terms, of course provided no expressed/implied guarantee, the long-term investment nature and the temporary measures for public interest. Anyway, here we see an interdisciplinary relationship between economy and law.

3.2.7.3. A special case of tentative problem solving: transparency

Transdisciplinary knowledge realization is mainly described by a constant flow between fundamental and applied, theoretical and practical, where the disciplinary boundaries and distinctions between applied and pure research become less relevant; the focus rather shifts to the problem area (Gibbons et al, 2010). To this very point this is exactly what I have been constantly doing methodoligally with the comparative analysis of case studies for the Hungarian energy normativity evaluation and testing its borders, crossing legal, economical, public administrative, business-oriented and even social disciplines and considerations both

136 *Electrabel v. Hungary*, Award, para. 156 (14 July 2016).

137. *See Parkerings-Compagniet AS v. Republic of Lithuania*, ICSID Case No. ARB/05/8, Award, paras. 335-338, (11 Sept. 2007); *Electrabel v. Hungary*, Award, para. 156 (14 July 2006). *See also Alex Genin, Eastern Credit Ltd., Inc. and A.S. Baltoil v. The Republic of Estonia*, ICSID Case No. ARB/99/2, Award, para. 348 (25 June 2001).

theoretical and practical. Till this point, case studies, where the theoretical and the practical met, were a helpful and willing data base, but not further. However, in order to explore all levels of the same reality a **tentative problem solving is unavoidable as a next step a trial and error elimination process** as defined by Popper (1992). Experiential learning theory made such experimenting and investigating (i.e. learning) process cyclical (Kolb and Fry 1974).

For this tentative problem solving of a simulated experimental learning cycle for a trial and error elimination, I need allegations, first in connection with transparency of the normativity being questioned by the emerging risks. In a tentative view, lack of transparency could, at least in theory, can lead to the experiment of failures, recognizing of which can, in a cyclical approach, lead to liability for risks to be shifted from investors of the market players to states, i.e. the normativity itself as the errror elimination, compared to the previously considered legitimate expectations experiences. For this, a tentative problem-solving should focus on the question whether transparency was granted to normativity actions in the energy industry because presumably in case not, the elimination of this error would lead to state liability. In connection with the happenings in the industry one cannot allege that laws, regulations, judicial decisions and administrative rulings of general application applicable to the investments of the investors in the Hungarian energy sector were not published promptly or in a manner that did not allow the market players to become acquainted with them. Nor one can say that Hungary of failing to designate one or more “enquiry points” to which information requests may be directed. Hungary continuously complied with its laws on transparency and promulgation with each and every regulatory step or intervention, including enactment, promulgation and enforcement of law. This is entirely true and unquestionable to the whole PPA issue with the temporary reintroduction of regulated prices for electricity producers in 2006 in connection with the luxury profit debate and the termination of the PPAs is 2009 by the force of law and requested by the EU, as well as to the computation and management of identified state aid and calculated stranded costs of the terminated PPAs. Similarly, this statement is also entirely true and unquestionable to the whole overhead charge reduction campaign starting with the price moratorium and then to the three USP tariff cuts for the DSOs and then partially to the USPs themselves. All legal and regulatory measures followed the due process of the law on legal enactment. All laws and bylaws were promulgated in the Official Gazette, where even the temporary ones repealed long ago can still be found and read. This is indeed *required for the transparency and also for the trust in legislation, also being part of a country risk evaluation*.

Likewise, the HEO/HEA decisions as public administrative resolutions were made public in accordance with article 168 of the 2007 Electricity Act (applicable to both natural gas and electricity-related resolutions). Again, this is required for the transparency and also for the trust in public administration, being in connection with the quality requirements towards public administration.

As a result of this tentative problem solving experiment, it seems that the energy sector's normativity fulfilled the criteria of transparency and due process, keeping the imminent systemic risks of normativity as a complex system visible to the extent normativity should do so, and the RYF (robust yet fragile) balance on its safe side. This makes the theoretical chances of investors, in our tentative experiment very low to challenge the transparency and due process of energy normativity, one of the key components of both the ECT investor protection requirements and the rule of law. When and where the systemic risk increased in the Hungarian energy sector, such occasions are clearly identified, but these were generally not the result of concerns of the transparency and due process requirements. The three most important regulatory events in the Hungarian energy industry from a possible investor protection point of view we investigated thoroughly, namely the ones related to the PPA, the luxury profit and the overhead price reduction aims during Gas Tariff Crisis, have their own lessons to learn. It is beyond doubt that reintroduction of regulated prices for the PPA-generators in 2006 was harmful to the electricity producers affected, but the transparency and due process of energy normativity (enactment of law and the process of issuing public administrative resolutions) were not violated at all, thus they did not add to systemic risk, if any. The 2009-2010 PPA termination and Hungary's refusal to pay stranded costs exceeding identified state aid can of course be a playfield for complaints by investors and market players even triggering rule of law / country risk or even systemic risk concerns (especially the violation of the '*pacta sunt servanda*' principle), but not the transparency and due process of energy normativity would be questioned, neither the enactment of law nor the process of issuing public administrative resolutions.

This is generally true for the overhead price reduction events as well, with one common remark concerning both the overhead price reduction and the 2006 reintroduction of electricity producers' regulated prices (perhaps, but with less similarity due to the EU-command, accompanied by the calculation of state aid and stranded costs for PPA termination). This is the price revision and calculation by HEO/HEA which was and had always been a neuralgic point

of the Hungarian energy normativity in operation. Obviously, this became one of the key issues of overhead price reduction from a legal point of view when HEO's role as a public administrative body changed to a regulator enacting law (as HEA) in connection with price setting, having its *possible country risk and public administration trust issues*. But it is worth noting that HEO's role in the price setting was problematic even long before these intervention measures came into play. We as authors clearly remember price review revision issues from 2000-2006 too where the prices set by the ministry (i.e.: law), but based on the calculations and advice of the HEO (i.e.: some kind of public administrative acts, but not formally a resolution) caused a headache not only to affected market players, but also to the courts. In legal (or more accurately): in normative terms a similar problem arises in the industry with the network codes enacted by the transmission and the distribution system operators (that is, market players) operating as 'quasi laws', and acquiring normative status via HEA resolutions in which they are approved by the authority. Its legal nature becomes questionable in case of a legal dispute, especially as a standing (*legitimatio ad causam*) issue in litigation due to some provision of an industrial network code since such a procedure is initiated against HEA given the public administrative resolution approving the network code, but the court was confronted with the fact that the rules adopted in the form of an administrative decision were elaborated by market participants and have *erga omnes*, i.e. quasi-legal effect. Immediately **three levels with one act as a potential systemic risk**; the previous complex division of pricing competences between the Ministry of the HEO presented the same on two levels, where this systemic risk also became perceptible in the form of difficulty in litigation. Such legal characters should be thoroughly investigated and carefully specified in order to ensure stability and robustness of normativity as a complex system and at the end of the day to reduce imminent systemic risks. However, *this has nothing to do with the transparency standards* of the investor protection, even if it looks interconnected at first sight.

3.2.7.4. Another special case for tentative problem solving: the guarantee of "effective means"?

A second tentative problem solving experiment is worth to be conducted with the guarantee under Article 10(12) of the ECT, namely denying effective means to assert claims and protect investors' rights with respect to their investments. Again, in a tentative view, as far as the reintroduction of regulated prices related to the luxury profit issue of electricity

generators is concerned, measures were taken here in line with the previous price review and pricing practice, i.e. the temporary, barely one and a half year reintroduction of the official price was only a reversal of the previous schemes. Prices, as between 1995 and 2003, were set by decree, i.e. legislation against which there is no ordinary remedy, only possibly a constitutional court remedy. So this has been the case before. According to the previous, then almost 10-year practice, the review and specific examination of the cost and profit elements was carried out by the HEO, i.e. it was taken place through an administrative authority process. It is true that, due to the nature of the exceptional measure of the reintroduction of the regulated prices, the HEO did not carry out a formal cost review in 2006, but it did use the producers' own cost data from their financial statements as in earlier stages of price regulation; and Hungary also took into account the producers' written comments on the 2006 draft regulation regarding the requirement for a refund. However, and this is important here, even against the formal review of the costs by HEO there was no judicial review available, as it had previously not taken the form of a (formal) administrative resolution. Thus, although this was a practice that could be criticized in the past as well, in any case, the remedy situation for the 2006 temporary episode was in no way more onerous then any time before. With regard to the effective remedies required by the ECT in relation to the state measures taken in connection with the luxury profit, we therefore consider that the main aspect is that there has been no change compared to the previous practice. That the emphasis on this aspect is not arbitrary by me is also shown by the fact that the issue of an effective remedy did not arise as an argument in the relevant cases of AES and Dunamenti, nor did the applicants attempt to base any argument on it (and that is why we need a tentative problem solving experiment here).

Compared to this, the abolition of PPAs is, in my view, indeed a subject of legal theory concerns in terms of effective remedies, as are relevant issues for the systemic risk of complex networks. Mainly (i) because of the principle of *pacta sunt servanda*, and because the damage caused by legislation in Hungary before 2013 was essentially incomprehensible except for a very narrow dimension. The PPAs were terminated by an act by the Parliament, i.e. by law, so that in principle (ii) a constitutional court review could have arisen, but we do not aware whether the power plants concerned may have carried out such constitutional complaints, although we know that the possibility in principle was considered. This may have been due to the fact that they focused on investor protection and EU annulment proceedings, or that the constitutional court remedy was considered ineffective because it was not much promising formally due to

the practice of state sovereignty. (iii) It should be noted, however, that the fact that the statutory abolition of PPAs was formally law (erga omnes), but in substance only a limited number of addressees up to seven producers in total was concerned, hence not "everyone" was addressed (what is the essence of law), but only some large power plants who can be listed accurately and item by item. Instead of a law, this would in principle have justified a specific, individual (mainly: public administrative) instrument, the recognition of what, in turn, could already be the basis for substantive constitutional proposals. However, a test of this by such submissions is missing. Finally, (iv) in connection with the termination of the PPA, it is worth mentioning from the point of view of effective means of remedy that specific HEO decisions, i.e. formal administrative resolutions, were also made on the stranded cost below the levels of the law and the government decree on termination, against which judicial review was open. Of course, the question how effective it is should be another matter, as the HEO was only in an executive position under the framework of the law and the government decree, without any decision autonomy, i.e. a possible challenge to the relevant HEO decisions would have failed due to a formal legal compliance, most certainly. However, in our opinion, all these findings ((i) - (iv)) are one by one only theoretical, as the entire PPA was terminated on the order and instructions of the European Commission, thus making it fundamentally meaningless to look for an effective *domestic* remedy as requested under the ECT. Such would only have made sense if the European Court of Justice had annulled the Commission Decision terminating the PPAs, but this has not happened. In this hypothetical case, it would have probably followed a repeated EU Commission investigation and decision, which Hungary would have had to implement and execute again, so a completely different domestic legal environment would have been created.

Based on the historical background concerning the Hungarian overhead charges reduction, three things might occur in theory in this respect: (*a*) that by modifying its legal framework concerning DSO and USP tariffs, Hungary insulated tariff setting decisions from any review by the Hungarian administrative courts; (*b*) that Hungary modified the jurisdiction of its Constitutional Court such that Hungarian courts have been unable to review the legality of the allegedly adverse measures that caused losses to the affected investments including the constitutionality of the crisis tax; and (*c*) that Hungary's Parliament directly interfered with the administration of justice by passing legislation in response to judicial decisions concerning the pipeline tax.

As a preliminary matter, the jurisdiction of Hungary's Constitutional Court to consider the constitutionality of the crisis tax; and the alleged legislative interference with litigation concerning the pipeline tax should likely be disregarded. We already discussed that an international arbitration tribunal has no jurisdiction over claims to the extent that they relate to taxation measures. Article 21 of the Treaty provides that "nothing in this treaty shall create rights or impose obligations with respect to Taxation Measures of the Contracting Parties."[138] Claims for breach of Article 10(12) are not within the exclusive enumerated exceptions to Article 21's placing of issues with respect to Taxation Measures outside of the Treaty's scope. Matters with respect to Taxation Measures therefore cannot be a proper basis for allegations of a breach of Article 10(12).

Jurisdiction aside, to treat Article 10(12) as a source of causes of action may also be questionable, when it is properly understood as a guarantee of "effective" judicial procedures, agnostic as to the *content* of the legal framework governing gas and electricity tariffs or any other substantive matter. To simultaneously exaggerate a supposed injury by ignoring the fact that judicial review of USP tariffs in administrative courts was only ever very briefly available, while misleadingly minimizing the range of remedies available to them under Hungarian law also present an inaccurate picture of Hungarian law. A potential accusation that the Hungarian Parliament directly interfered with the administration of justice is also entirely unfounded. In fact, Hungary's Parliament did no more than amend legislation in response to a judicial decision that it considered bad policy which, as discussed, seriously jeopardized the enforcement of the overhead reduction. *Of course, all this raises country risk, RYF and other issues deriving from complex systems, but these have already been discussed in detail previously. However, irrespective of these concerns, this was not a direct interference in judicial proceedings, but the legislative branch of the Hungarian government acting within the scope of its constitutional responsibilities*.[139]

---

138 Treaty Art. 21(1): "Except as otherwise provided in this Article, nothing in this Treaty shall create rights or impose obligations with respect to Taxation Measures of the Contracting Parties. In the event of any inconsistency between this Article and any other provision of the Treaty, this Article shall prevail to the extent of the inconsistency.

139 *See also* Treaty Article 21.

4. Hungarian Energy Law as an Example of Using Complex System Viewpoints to Understand Risks in Public Administration Normativity

(*This chapter was published as Máté Tóth – Gyula Vastag (2020): Hungarian Energy Law as an Example of Using Complex System Viewpoints to Understand Risks in Public Administration Normativity in: Pro Publico Bono, 2020/2.*)

4.1. Introduction: Complex systems and law

There is still a significant gap between 'hard sciences' and 'human sciences'. Whilst hard sciences are progressively advancing with empirically justified novelties, the latter domain is rather addicted to old habits, to Aristotelian binary logic, ontological-political motifs and expectations that are mainly egalitarian-behaviourist in nature. First, human sciences, especially legal thinking, seems to be stuck into linear and reductionist concepts. As such, institutions and norms of human-made law, especially public law and public administration are widely considered to be parts that sum exactly the whole and where one institution, public authority or norm in a legal hierarchy follows another in a unidirectional linear pattern. Second and beyond all, legal thinking cannot get rid of the myth that humanity is somehow exempt from the universal laws of nature. As such, we lawyers tend to believe that human-made law, states and other superstructures of humankind have nothing in common with hierarchy in animal groups, dominance (matter of power), fight, evolution, altruism, lineage and other phenomena of nature. This moralist and thus, unscientific approach in legal thinking is well-criticised by a minority of scholars, underlining the speculative,[140] arbitrary[141] and politically governed[142] motifs resulting in the expressed omission of the findings of modern natural sciences.[143] However, these voices cannot be considered well-recognised.

A stunning experiment to strike this reductionist, moralist and unscientific hegemony in legal thinking is the extension of *complex systems* theories to law. Complex systems theories came from hard sciences, especially from physics, mathematics and biology; partially deriving from chaos theory in deterministic systems, game theory (very apparent in nature), dynamical

[140] J Kekes, *Az egalitarizmus illúziói* (Gödöllő: Attraktor, 2004).
[141] A Ross, *On Law and Justice* (Los Angeles: University of California Press, 1958), 259.
[142] U Wesel, *Juristische Weltkunde. Eine Einführung in das Recht* (Frankfurt am Main: Suhrkamp, 1984), 72.
[143] J Szmodis, 'A jog multidiszciplináris megközelítéséről', *Magyar Tudomány* 172, no 1 (2011), 15.

systems of nonlinearity, non-equilibrium thermodynamics and so on. Common examples of complex systems are the human brain, the internet, cancer, the entire universe and so on; however, complex system-related approaches are recently getting closer to sociology[144] and economics[145] as well. Such social constructs as the financial system are also well-connected to these approaches in scientific debates.[146] Some contemporary legal thinkers outlined the relevance of complex system theories concerning *law*,[147] especially complex adaptive systems, "*in which large networks of components with no central control and simple rules of operation give rise to complex collective behavior, sophisticated information processing, and adaptation via learning or evolution*".[148] However, to the extent one can be acquainted with the available literature, there is still a significant resistance to the application of complex system and complex adaptive system approaches, methods and theories in legal thinking.[149] What is more, public administration especially has not made extensive use of the concepts and ideas of complexity theorists, so that the latter have had little influence on theories of public administration.[150] We cannot avoid a certain level of suspicion that resistance is also motivated by theoretic or even political arguments. It is indeed hard to realise that similar methodology is to be used to the 'sacrosanct' humanity and to the gliding of vast flocks of English starling gathering over the roost at dusk in a spatial coherence[151] or that complex systems' development and evolution can be described as the ecosystem;[152] thus, if legal systems are complex systems, their archetype *should be* the ecosystem, too.

Law as implied by public administration, whether being a complex system or not, is unique in a sense that it aims, in a normative way, to regulate *other* social (complex) systems. As such, one may presume that the law should therefore take into account the very (complex) nature of those systems regulated by it. This means that, arguably, in order to regulate a complex social

[144] J H Miller and S E Page, *Complex Adaptive Systems: An Introduction to Computational Models of Social Life* (Princeton University Press, 2007).
[145] R K Sawyer, *Social Emergence: Societies as Complex Systems* (New York: Cambridge University Press, 2005).
[146] I Anabtawi and S L Schwarcz, 'Regulating Systemic Risk: Towards an Analytical Framework', *Notre Dame Law Review* 86, no 4 (2011).
[147] For example J B Ruhl, D M Katz and M J Bommarito, 'Harnessing legal complexity', *Science* 355, no 6332 (2017), 1377–1378.
[148] M Mitchell, *Complexity: A Guided Tour* (New York: Oxford University Press, 2009), 13.
[149] For example A Vermeule, 'Second Opinions'. *Harvard Public Law Working Paper* no 10–38 (2010). http://ssrn.com/abstract =1646414 (accessed 26 November 2020).
[150] E H Klijn and I Snellen, 'Complexity Theory and Public Administration: A critical appraisal', in *Managing Complex Governance Systems*, ed. by G R Teisman, M W van Buuren and L M Gerrits (Routledge, 2009), 2.
[151] Klijn and Snellen, 'Complexity Theory and Public Administration'.
[152] P K Yu, 'Intellectual Property and the Information Ecosystem', *Michigan State Law Review* no 1 (2005). https://ssrn.com/abstract=578575 (accessed 26 November 2020).

system, the law should act as a complex system as well; however, given the *sui generis*[153] nature of law, this might lead to a certain pre-conceptual fallacy. If legal systems are complex systems, frank confessions may also occur, such as that regulation just does not *always work*, many times it is part of what causes a failure cascade, within and beyond the legal system.[154]

4.2. Do continental laws and public administration classify as complex systems?

Just putting aside these general remarks for the time being, we can make one significant observation in this topic in connection with the available scientific publications concerning law as a complex system. Namely, that surprisingly, these publications deal *almost exclusively* with common law systems.[155] The emphasis is on 'common' rather than on 'law' and 'systems' (the latter are both more genus proximum than the first), that is, the focus is on the *distinctive features* of the Anglo–Saxon legal realm, compared to European normative systems. This common law-related literature has achieved remarkable findings. Complex systems theories concerning common law have advanced even to map the emergent federal judicial social structure with graphs as well.[156]

It is beyond doubt that common law systems and continental law systems are very distinct in nature, and these differences may extend to the criteria of complex system classification. Complex systems symptoms are relatively easily identifiable in case of legal systems based on common law: where the complex, multi-level case law and legal theories are in a complex and clearly non-linear interaction with each other and where social structures of judges and courts matter (see the above graph as an example taken from Ruhl). Compared to this, *the continental*

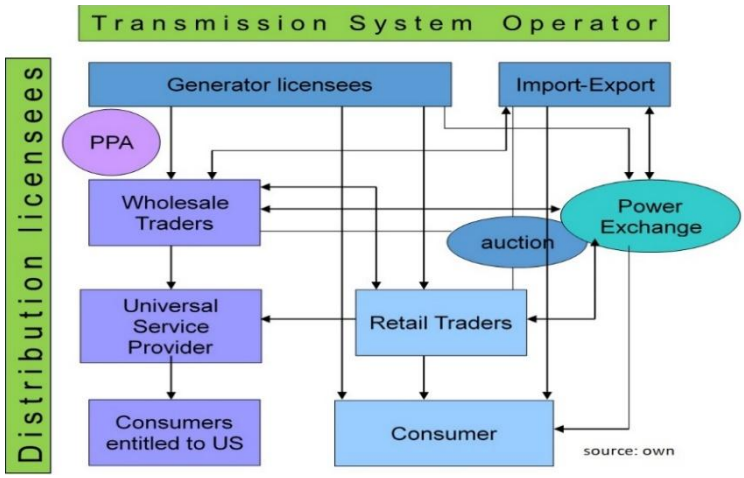
[153] I Katsuhito, *The Foundation for a Unified Theory of Fiduciary Relationships: 'One May Not Contract with Oneself'*, August 5, 2016, https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2424098 (accessed 26 November 2020).
[154] J B Ruhl, 'Managing Systemic Risk in Legal Systems', *Indiana Law Journal* 89, no 2 (2014). www.repository.law.indiana.edu/ilj/vol89/iss2/2 (accessed 26 November 2020).
[155] See for example S A Kauffman, *At Home in the Universe: The Search for Laws of Self-organization and Complexity* (New York: Oxford University Press, 1995); Katz et al., 'Reproduction of Hierarchy? A Social Network Analysis of the American Law Professoriate', *Journal of Legal Education* 61, no 1 (2011); M J Bommarito, *Exploring Relationships between Legal Concepts in the United States Supreme Court*. Unpublished manuscript, 2009. http://ssrn.com/abstract=1814169; J L Sohn, 'The Case for Prudential Standing', *University of Memphis Law Review* 39 (2009); C P McEvily, 'Vested Interests: The Federal Felon Body-Armor Ban and the Continuing Vitality of Scarborough v. United States', *Georgetown Law Journal* 100, no 4 (2012), 1341, 1398; J B Ruhl and J Salzman, 'Mozart and the Red Queen: The Problem of Regulatory Accretion in the Administrative State', *Georgetown Law Journal* 91 (2003); J B Ruhl, 'Law's Complexity – A Primer', *Georgia State University Law Review Symposium Issue, Forthcoming FSU College of Law, Public Law Research Paper* no 313 (2008), https://ssrn.com/abstract=1153514 (accessed 26 November 2020).
[156] J B Ruhl and D M Katz, 'Measuring, Monitoring, and Managing Legal Complexity', *Iowa Law Review* 101, no 1 (2015), 191–244; *Vanderbilt Public Law Research Paper* no 15–1. https://ssrn.com/abstract=2566535 (accessed 26 November 2020).

law systems still endeavour linear normative chains in a binary, reductionist logic. Cases, judges, law schools, and law reviews are less relevant in continental law, especially in public law: that is, those features are marginal compared to which complex systems criteria are ordinarily demonstrated in common law. The relevance, nature and inner logic of public administration is clearly a field exhibiting deep differences between common law and continental law systems. Thus, the question whether recent academic findings on the nature of (common) law as complex system are valid and applicable to a similar extent to continental law as well, is not that evident. The concept of continental law is based on the idea of 'Rechtstaat', where the regulatory and command chains are expressly expected to be clearly defined, linear, vertical, transparent and predictable, with as minimal horizontal interaction between the reductionist nods as possible – at least in theory. What is more, continental law is considered (with more or less ground) to be more rigid than common law, and also more predictable, based on written codes – against which the main requirement is still their persistence, permanence, invariability and unchangeable nature to the bitter end. But do they manage to do so? Do these prescriptive expectations maintain the good-old concepts of law and normativity in continental law?

4.3. Example: The nature of Hungarian energy law and the public administration in charge

In order to answer these questions, as well as to determine whether continental law systems are worth to be considered complex systems like their common law counterparts overseas, we have chosen a very rigid and proudly linear continental law system, the law of Hungary. To be consequent, we have obviously chosen public (administrative) law for the purpose of analysis, and within the realm of public law, the over-regulated energy law, one of the absolute extremes of rigid continental law still in force, as a field of investigation.

Perhaps not surprisingly, though the energy law of Hungary tries to be linear, the market it regulates is full of different level participants (all of them are highly regulated, as well as licensed apart from the consumer) being highly interconnected to each other. The *types* of market players in the electricity market are:



4.3-1. Figure Interconnections of the main types of licensed market players in the electricity market

The basic relationships are presented here, though of course, in reality the hundreds or thousands of market players create a more sophisticated structure of operation. One key "player" is missing from this graph, as it is not a market player: the regulatory authority and deconcentrated public administrative body in charge, the Hungarian Energy and Public Utility Regulatory Authority ("HEA"). The HEA is in connection with all these market players, and it is the only (one-stop-shop) public administrative body in the industry in charge of energy regulatory matters (environmental and construction licensing, as well as nuclear, belong to the competence of other authorities) and due to recent changes, has certain legislative power as well. Thus, as a matter of normativity, HEA is a non-market player representing public law for the energy sector.

So what about the law (legal system) governing the relationships of these entities? Of course, it is necessary to clarify what the term *legal system* practically means, just setting aside semantic, philosophical and even teleological aspects. A legal system in a *practical approach* is to be considered the collection of rules and regulations (that is, written law, which is the core of continental law, see the typical codes) the main product of the continental legal systems, accompanied by a collection of people and institutions, though with less relevance than in common law. Therefore law, in this sense, is mainly an emergent property of the *legal system* the same way prices are an emergent property of markets.[157] Finally, as to regulation being just a part of a legal system and thus not regulation and purely regulation is to be considered the

[157] Ruhl, 'Law's Complexity'.

legal systems in question, it seems to be the right approach from a practical viewpoint to focus on its normativity, with the possibility of enforceability. Given that public law is apparently the field of unequal connections with vertical enforceability relations, the focus on normativity (enforceability) and its core nucleus, the 'norm' is of utmost importance for understanding this complicated public sector field. Thus, in our view, normativity is the key identifying the legal system in question.

Hungarian energy law as a typical semi-autonomous industry-specific public law field is governed by laws and bylaws enacted by Parliament, by the Cabinet, by certain ministries and by the HEA, whilst there are also directly enforceable EU regulations. Though it is not 'law' as a piece of legislation, but as a sense of normativity, the public administrative resolutions of HEA and certain other bodies of the public administration also matter, so do the network codes enacted by the transmission and the distribution system operators (that is, market players) operating as 'quasi laws'. This is indeed complicated – but is it complex as well? According to Watkins, a system is complicated when the various elements that comprise the system still maintain a certain independence from each another, meaning that the removal of one element will not fundamentally change the system's behaviour, all in all. Compared to this, in case of complexity, the clear dependencies among the elements are unavoidable where removing one element will alter the system behaviour "*to an extent that goes well beyond what is embodied by the particular element that is removed*".[158]

4.4. Heterogeneity, removing elements and non-linearity

In order to assess this, we should consider *heterogeneity and agents* in Hungarian energy law (normativity), looking for whether it consists of a system with a number of different classes of autonomous agents. Just as a basic starting point, Hungarian public law is undoubtedly a system composed of many components that obviously highly interact with each other in tremendous amounts of links. The main nodes are the acts, decrees, regulations, then soft law and administrative decisions and finally, with a considerably weaker extent, courts and case law. *Energy law* with its norms is a subsection of this system, also being interconnected with other fields of public law externally, and its sources (acts, decrees, regulations, case law and so

[158] N W Watkins and M P Freeman, 'Natural Complexity', *Science,* 320, no 5874 (2008), 324.

on) internally. What is more, public law is in interaction with private (contractual) law in many cases.

Consider the following case. When two gas traders in the wholesale scene agree to the prices in a contract (thus under private law), first they do so in compliance with their licenses (thus public law, issued by HEA), incorporating general provisions of Act XL of 2008 on natural gas and its implementation decree [Government Decree no. 19/2009 (I.30.)]. Then they incorporate into the agreed contractual (!) prices the so-called system usage fees set by a decree of the HEA [Decree 13/2016 (XII.20.) HEA], also taking into account the pricing principles under Decree 14/2016 (XII.20.) HEA, that is, instruments of public law. Of course, they should also comply with industrial codes regarding physical delivery. If any of these elements, that is, compliance with licenses, incorporating system usage price, or any of the provisions of the listed laws and bylaws above is removed, *it will fundamentally alter the system behaviour*. We have the proper legal counterpart for this "fundamental alteration of system behaviour". In legal terms, this would definitely render the agreed price, therefore the whole contract between the gas traders in our example *null and void*.

Another useful case is issuing license for electricity production exceeding 0.5MW in-build capacity. Act LXXXVI of 2007 on electricity (a law) as well as Government Decree no. 273/2007 (X.19.) on its implementation (a bylaw) specify the HEA as a public administrative body whose task is to issue the licence. Doing this, the law and bylaw prescribe that the HEA should consider *all elements* of taxative lists (requirements to issue licenses) when making a decision to issue such a license, including business plans, certain technical and company law documents and so on. This might of course be a complicated decision-making process, however, removing one element from the list and thus making the licensing process less complicated *would not result in the less complex nature of the system*. What would affect the complexity and not (only) complicatedness in such a process? If the Hungarian electricity act or its implementation decree prescribed that the HEA must consider and evaluate all relevant factors and discretionally balance them in order to grant a license to an electricity producer, then the elements and factors would no longer be independent from each other, and removing one could significantly alter the result.[159] However, and that is the key here: as a matter of normativity, such "if" scenario is not just unlikely, but simply unimaginable in energy law; licensing

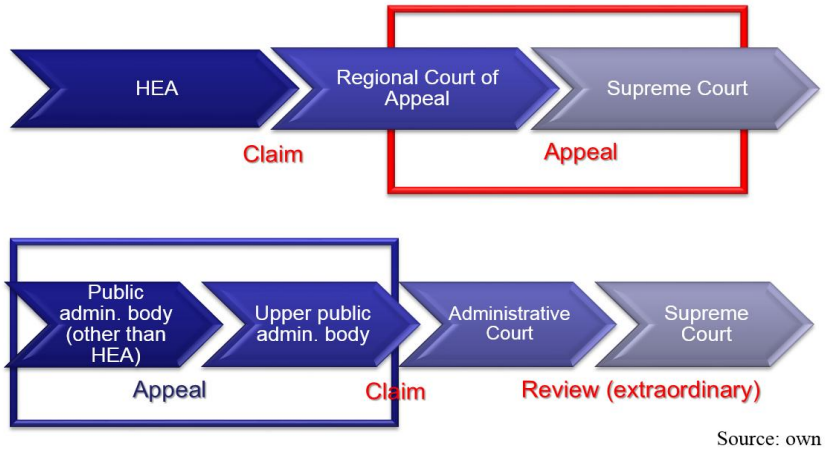
[159] Ruhl and Salzman, 'Mozart and the Red Queen', 796–806.

requirements are always taxative, due to the electricity balancing, security of supply and other evident industrial (both legal and not legal) considerations! Thus, the scientific difference between complexity and complicatedness is an expressed legal issue of taxativity/normativity. What is more, the legal system is more than just purely energy law, even just considering our licensing example. Therefore, licensing of a power plant would imply environmental and building licensing processes as well, in parallel with energy regulatory licensing. The cross-reference provisions internally and from other laws and bylaws (also in the electricity act and vis-à-vis environmental and building regulation) as well as the assignment of responsibilities to multiple public administrative agencies (environmental, building, energy) will result in the express interconnectedness of the whole licensing system.

Instruments are interconnected, hence institutions are also interconnected. What is more, agencies and public administrative bodies involved in the licensing will also further involve special authorities for special professional queries, such as fire protection, public defence and so on. These latter professional bodies do not connect directly vis-à-vis the power plant as a client in the production licensing process, only through the process of the leading licensing authority. For example, the fire protection authority or the public defence special authority is contacted only by the building authority in the licensing process. What is more, the decision of the special authorities, either positive or negative, cannot be appealed directly; only through an appeal against the decision of the leading licensing authority. Thus, we are now entering a complex system with *different levels of edges* between the nodes. In an important case, where we represented the claimant, a wind park operator, this claimant was rejected to prolong its building permit just because a special authority, the Ministry of Defence refused to grant consent to the permit renewal, because of a NATO locator radar that was started to be built nearby, but later then the claimant was originally granted by the building permit. The claimant was then forced to appeal against the resolution of the building authority, the latter becoming the defendant in a lawsuit where in fact they had nothing to do with the matter of fact at all: the law as an edge interconnected the nodes.[160] Just for the record: finally and before the claimant could win the case, the Government passed a decree prohibiting the building of wind parks close to military objects. The Gordian knot was cut then.

[160] Kúria [Supreme Court] case no. Pfv. V.14.180/2016.

It is also worth mentioning that against the decision of the HEA there is a different chain of legal remedies available than against decisions of other public administrative authorities (for example building authority, environmental authority and so on). However, usually both are applicable in case of energy law matters:



Source: own

4.4-1. Figure Public administrative law remedy chains of the Hungarian energy market

Though at first sight the two remedy chains appear to be linear, in fact these legal remedy-chains are also interconnected and are further complicated with the involvement of the special authorities mentioned above, whose decisions cannot be appealed directly. These patterns of legal remedies introduce the unpredicted, interconnected deterministic rules into the system as upper public administration bodies (agents) interpret or overrule both legislative acts and the acts of the lower public administrative bodies (agents) or courts *creating connections and feedbacks in a multiple level*. The elements investigated so far are 1. the various sources of written law like the electricity act and its implementation decree, then 2. the various interconnections between agencies and public administrative bodies, as well as 3. the interconnected remedy chains available should be then also connected to and multiplied by 4. the different market player licensees. The latter licensees are the subjects of the system like distribution companies, transmission system operator, wholesale traders, universal service providers and so on, see the second chart above with their different position in the system, also being interconnected. Lawyers know that the above (public administrative) remedy chains have a high interconnectedness with civil law (that is, not public administrative) remedy chains as well. A public administrative claim is often rejected due to the lack of standing (*legitimatio ad*

causam), rendering the whole case a purely commercial dispute on damages belonging to civil law courts, or in other cases the (positive) public administrative judgment is a prerequisite for damage claims (that is, civil law remedies). In a recent case at the Supreme Court, where I represented MAVIR, the electricity transmission system operator, the Supreme Court finally said in a commercial dispute that the claimed counterclaim of damages of the defendant lacked legal grounds because of the public law nature of the case and dismissed all the previous judgments of the lower civil courts.[161]

This high network connectivity and feedback between the agents, licensees and legislative acts creates a network of nodes and channels of information flow. Even just considering one flow of interactions, the legal remedy chain as charted above, the *path dependence* is obvious and transparent. Though less transparent, the same is true of the enactment of laws and bylaws of the energy sector, often retained from the previous and repealed legislature, whilst courts base their evolving interpretation on prior cases and interpretations. It is beyond doubt that it is far easier to identify complex nature concerning heterogeneity and agents in common law through the judiciary's hierarchical structure and practice of stare decisis that "*fundamentally link courts with courts and opinions with opinions in ways that produce complicated and complex (as defined herein) institutional and instrumental connections*".[162] However, as seen above, it is also beyond doubt that the most rigid, declaredly linear field of continental law produces the same essential features of heterogeneity and the interconnectedness of agents in the complex system of Hungarian energy law.

Furthermore and contrary to the declared intention of continental law, the *relationships between the above investigated particles are non-linear*. The agent interaction does not produce something like a one-way, linear, predictable behaviour in a kind of continuous proportionate relationship. First, in the above examples of energy law relationships, contractual connections of gas traders or licensing procedures of the parallel authorities (HEA, environmental authority, building authority as leading authorities, accompanied by the lower level special authorities) are neither providing proportionate relationships and patterns nor are constant in time. During our practice, we have seen totally different outcomes of the very same gas trade contractual relationships: one fulfilled, one litigated. We have seen totally different outcomes of the very same licensing situation (a wind park receiving production license, whilst an identical one

[161] Kúria [Supreme Court] case no. Pfv. V.21.296/2017.
[162] Ruhl, 'Managing Systemic Risk in Legal Systems'.

rejected), and also a totally different outcome of the very same litigation (standing granted in one litigation case against an industrial network code, whilst not granted in another case, against the very same network code). The complexity arises in nonlinear relationships, especially when we connect the above levels of reality: contracting, licensing and litigation – like life does.

4.5. Evolvability: The double-edged sword

These nonlinear relationships are further made more sophisticated by the often changing legislature, having the highest relevance in continental law countries. Just continuing the example of electricity licensing, only the licensing rules have been amended more than 100 (!) times during the last 25 years. Considering the electricity act, being the top of the regulatory pyramid governing licensing (and thus, expectedly, being the most stable piece of legislation governing electricity-related legal relationships), we see that the present one[163] is the third being in force since 2001 (the 1994 energy act[164] repealed in 2003 by the 2001 electricity act[165] that was also repealed in 2007).

However, this is just the surface. Non-linear dynamics, where increases in a certain incentive or factor can lead to varying effects, due to contextual changes, with new effects occurring when certain time thresholds are crossed.[166] While tides are considered to be complex yet predictable in the same time, weather systems are complex and often unpredictable, as the fascinating work of *Edward Lorenz* demonstrated.[167] There are voices saying that legal systems exhibit properties that make them behave more like weather and less like tides,[168] and, in light of the above examples, they are likely right, when considering Hungarian energy law as well. This leads to another essential feature of complex systems that is *emergence and evolvability*. These are very relevant, as with these we enter the most controversial, most disputed aspects of the legal system, hence the most vulnerable parts as well, as related to certain types of risks. Neither legal systems, nor public administrations are static phenomena. Even a robust complex

[163] Act LXXVI of 2007 on Electricity.
[164] Act XLVIII of 2007 on Electricity.
[165] Act CX of 2001 on Electricity.
[166] E Mitleton-Kelly, *Ten principles of complexity and enabling infrastructures. Complex systems and evolutionary perspectives of organisations: the application of complexity theory to organisations* (Amsterdam: Elsevier, 2003); G R Teisman, 'Models for research into decision-making processes: on phases, streams and decision-making rounds', *Public Administration* 78 (2000), 937–956.
[167] E Lorenz, 'The nature and theory of the general circulation of atmosphere', *World Meteorological Organization* no 218 (1967).
[168] Ruhl and Katz, 'Measuring, Monitoring, and Managing Legal Complexity'.

adaptive system is not something immune to emergence, thus emergence is not a judgment nor a quality issue. Emergence is commonly defined as "*a process that leads to the appearance of structure not directly described by the defining constraints and instantaneous forces that control a system*"[169] or in more technical terms, as "*complicated global patterns emerging from local or individual interaction rules between parts of a system*".[170] In fact, emergence is a crucial phenomenon for law and legal systems as well, also including continental law systems and thus our example of Hungarian energy law.

The emergence of jurisprudence, that is, the essence of common law is thoroughly investigated by scholars. There it is well-established that reductionist approaches fail to understand the jurisprudence in emergence.[171] What is really interesting in these findings is that while mapping masses of judicial opinions and broad and narrow concepts in common law jurisprudence, the combinations exhibit patterns of connections that are not inherently obvious and neither explicitly built into or otherwise obvious from the hierarchy itself.[172] Indeed, it is easier to identify such phenomena concerning case law and judicial opinions. Many have observed that the common law is a "*complex adaptive system in which an array of agents, institutions, and social contexts together act to produce its substantive jurisprudence*".[173] The gradual development of jurisprudence, the 'stare decisis' and the evolution of legal doctrines accordingly in common law systems are apparent and easy to follow, having limited relevance in continental legal systems and in our special example of Hungarian energy law.

What can be said then about the emergence of continental law systems and public administration? Being complex systems like common law or the ecosystem, the above should be true for these as well, though the expectedly more robust complex legal systems, the continental law systems are less transparent in their emergent behaviour. As in the ecology dynamic equilibrium models are widely accepted with a premise that alteration in ecologic systems is inherent even though such alteration is bounded within predictable confines,[174] this is indeed true in our legal example of the rigid Hungarian public administrative (energy) law as

[169] J P Crutchfield, 'Is Anything Ever New? Considering Emergence', in *Complexity: Metaphors, Models, and Reality*, ed. by G A Cowan, D Pines and D Meltzer. Berkeley, California, University of California, 1994.
[170] P-M Binder, 'Frustration in Complexity', *Science* 320, 5874 (2008).
[171] Bommarito, *Exploring Relationships*; Ruhl, 'Managing Systemic Risk in Legal Systems'.
[172] Bommarito, *Exploring Relationships*.
[173] Katz et al., 'Reproduction of Hierarchy?', 97.
[174] R F Noss, 'Some Principles of Conservation Biology, as They Apply to Environmental Law', *Chicago-Kent Law Review* 69, no. 4 (1994), 893.

well. Emergence is inherent, Hungarian energy law evolves: the laws and bylaws are amended and repealed, the "nodes": the licensees and even the agents change as well. Just to the latter, public authorities are dissolved, created or re-defined.

It is far less evident that emergence and evolvability in the legal system both in legislation and legal execution (public administration) may represent useful flexibility as adaption (reflection) indeed, but also risk, thus evolvability is a double-handed sword. Concerning the latter, that is risk, it is clear that emergence may also be associated with country risk (that is, a country changing its legal norms too often producing less stability) and public administration operation (that is, the quality of public administration). Such observation may also be relevant as it seems scholars do consider emergence only as a positive characteristic of complex legal systems.[175] Consider the following case. The HEA was re-designed in 2013 so thoroughly that it became even a legislator concerning price setting, besides its public administrative tasks. This emergence happened due to the Hungarian Government's so-called '*rezsicsökkentés*' (overhead reduction) campaign, expecting to keep end-consumer energy prices at a low level, not only regulating the potential profit of certain market players (the distribution system operators) but also their justified costs as well. In order to avoid successful judicial reviews of the public administrative resolutions of HEA with the artificial and arbitrary price reduction, Parliament even passed a law changing the Constitution. This amendment prescribed that HEA should carry out its price settings not in the form of individual public administrative resolutions, against which judicial review is open, but through decrees, that is, bylaws instead with erga omnes binding force, against which no judicial control is available.

In our view, the above is a very important and powerful example to understand *the potential, but linearly unpredictable twofold consequences of emergence and evolvability*. In our above example, that is, the changing rule of HEA as a public administrative body in Hungarian energy law, even becoming a legislator (thus making law) is clearly a self-explanatory case study of legal emergence, both being in connection with the increase of country risk and the decrease of quality expectations towards (that is, trust in) public administration. A public administrative body becoming a lawmaker for price setting unprecedentedly indeed a phenomenon affecting investment and regulatory stability and thus country risk (and trust) in the energy sector in general. At the same time, quality expectations and trust in public administration are also being

[175] For example Ruhl, 'Managing Systemic Risk in Legal Systems'.

affected by narrowing available legal remedies against decisions of the public administration. This is not just a theory. We have seen dozens of big energy investors increasing the used country risk factor in their future investment decisions due to the arbitral and unpredictable change of the price setting back in 2013, whilst decreasing their reliance on public administration in the same time, by clearly avoiding further possible contact with public administrative bodies.

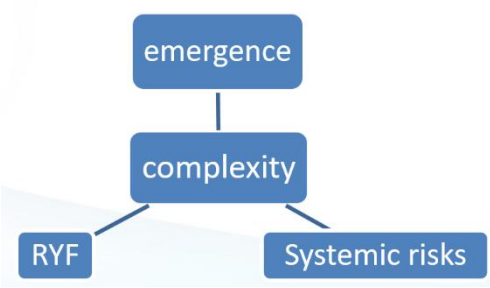
As our example warns, emergence in the legal system is something that may be causing risk in the market, either increasing country risk or reducing quality of public administration – sometimes both. It is also clear that emergence is rather an issue in connection with complex *behaviour* rather than complex *systems*. This emergent legal system behaviour however, while being a product of the legal system's structural interconnectedness as seen above previously, cannot be predicted in its complexity from a reductionist study of the interconnected components. This anti-reductionist and non-linear nature is something lawyers definitely tend to deny without cause.

4.6. The RYF dilemma and systemic risks

We can summarise the consequence of the changing role of HEA in the following way. This emergence (evolvability) in the legal system intended to add (and definitely managed to do so) to the robustness of the legal system with strengthening the legal position of official price setting and defending 'rezsicsökkentés' from judicial review, also increased the fragility of it as well: increasing country risk, decreasing trust in quality of public administration in the same time. This turns all the above to a more normative (and de lege ferenda) viewpoint, that is, to the 'robust yet fragile' (RYF) dilemma. The RYF dilemma is generally about the phenomenon that a legal system is both robust and fragile in the same time, and any effort to reduce fragility by reducing organisation would also reduce robustness, but increasing organisation to increase robustness also increases fragility. According to Alderson and Doyle, the core criterion for the RYF dilemma model is "*large and/or diverse number of components, the complexity of their*

interconnections and interactions, and the complexity of the behaviors that result,"[176] that is, the very essence we identified.

The RYF dilemma and the emergence of *systemic risk* are closely related. Alderson and Doyle argue that the ordinary cause of systemic risk is the complexity in highly organised systems that arises primarily from design strategies intended to create robustness.[177] Thus, understanding the complex system nature of our very rigid continental law example, namely the Hungarian energy sector regulation and the involved public administration implementing should necessarily draw our attention to this RYF dilemma in understanding *systemic risks*. The emergent properties and the relatively autonomous character of the agents cause systems to have unpredictable and complex dynamics. Seemingly stable equilibriums can be suddenly disrupted by unexpected events[178] activating and making visible imminent systemic risks. Hence, complexity connects emergence, RYF and systemic risks in the following way:



4.6-1. Figure Complexity-centred phenomena

What is a systemic risk? Whilst legal scholars have written about systemic risk occurring in financial systems as early as in the 1980s,[179] identifying systemic risk within the legal system is a quite recent field of investigation.[180] Law as normativity is a system among the multitude of social systems and subsystems and its aim is, expectedly and allegedly, to regulate constraints and failures the other social systems face; as being such, it is a fail-safe strategy for other social systems. However, risks cannot only be caused *in other complex social systems* by the law, like it happened with the changing rule of the HEA causing the increasing country risk and

[176] D L Alderson and J C Doyle, 'Contrasting Views of Complexity and Their Implications For Network-Centric Infrastructures', *IEEE Transactions on Systems, Man, and Cybernetics – Part A: Systems and Humans* 40, no 4 (2010), 840.
[177] Ibid.
[178] Klijn and Snellen, 'Complexity Theory and Public Administration', 4.
[179] M Gruson, 'The Global Securities Market: Introductory Remarks', *Columbus Law Review* (1987), 303.
[180] Ruhl, 'Managing Systemic Risk in Legal Systems'.

decreasing trust in public administration quality. A certain degree of systemic risk is without doubt inherent *within* the legal system itself, as in case of any other complex adaptive systems. Obviously not all system failures are the result of systemic risk and not all risk is systemic. According to Helbing, systemic risk is the risk of having not just statistically independent failures, but "*interdependent, so-called 'cascading' failures in a network of N interconnected system components. That is, systemic risks result from connections between risks ('networked risks')*".[181] According to Helbing, it is exactly the potential for cascading that is so dangerous in case systemic risk is high. Ruhl asks the fundamental question: how is it that a robust complex adaptive system such as law, with all its fail-safe mechanisms guarding against failure, nonetheless fails?[182] The RYF dilemma and the emergence of systemic risk are closely related, therefore, whilst investigating the common law system of the United States, Ruhl comes to the fundamental question that if we cannot effectively manage systemic risk within the legal system, how can we expect the legal system to manage systemic risk elsewhere?[183]

One more thing to clarify here. Ruhl identifies qualities of robustness as modularity, scalability and evolvability[184] over reliability and efficiency. Since this verdict is based on common law experiences, this might not be an automatically correct standpoint concerning continental public administrative law, like Hungarian energy regulation. Since reliability (stability) is the very essence of continental law systems and also something reflected in country risk, expectations towards regulation (reliability, hierarchy, non-negotiability, vertical expectations) thus may easily be confronted with quality expectations towards public administration (flexibility, reflexibility, democratisation, horizontal expectations). *This confrontation or collision is a problem especially when we take the position that normativity comprises both: public administration (with its quality issues) and regulation (with its country risks concerning stability requirements)*. Adding to these that normativity, the product of complex legal systems contains an inherent fragility in a form of systemic risk, we have to deal with this three-component risk matrix when addressing the robust yet fragile dilemma of complexity.

[181] D Helbing, 'Globally networked risks and how to respond', *Nature* 497 (2013).
[182] Ruhl, 'Managing Systemic Risk in Legal Systems', 583.
[183] Ibid. 563.
[184] Ibid. 594.

4.7. Identifying systemic risk through complex constraints

Where and how can we identify the systemic risks, that is, the frontline of the RYF and the most dangerous consequence of emergence in law being a complex system? Though different types of constraints and risks may arise on the level of components, the most important ones are complex constraints. The reason is simple: constraints that occur on the component level can be realised much easier. A constraint is complex on the system as a whole that is not a consequence of those on the components.[185] It means that it is much harder to realise them then constraints occurring on the component level, as they do not exist on the component level. Those procedural norms creating an environment for the operation, for example licensing rules in Hungarian energy law could be relevant to such complex constraints for example. Different constraints may combine in their effect and interact with each other, creating emergent situations that might not have arisen in the absence of this combination, that is, would not occur at component level.

Let us take another case study, the issue of licensing wind power plants in Hungary. Following Hungary's accession to the European Union (2004), the green energy goals of the EU became binding targets for Hungary, as well. In order to comply with these, the Hungarian energy law regulation intended to solve the issue of promoting power plant investments producing electricity from renewable energy sources (RES) by introducing a so-called mandatory off-take system, accompanied by a feed-in tariff. In this off-take system, the wholesale electricity trader, then later the transmission system operator was obliged to off-take the electricity produced from RES. The expected return of investments with the profit as well was inbuilt in the tariffs of electricity produced that were officially set by law, whilst eligibility to participate in the mandatory off-take system was checked and criteria (for example, the amount of electricity to be sold, time of eligibility for the off-take) were set by HEA in public administrative resolutions. Risks or apparent constraints were not present on the component level, the logic was clear and straight-forward, and tasks were well-balanced between the legislator, the affected market players (producer, off-taker) and the public administration (HEA). However, in 2006, given that the guaranteed return (mandatory off-take and feed-in tariffs) made RES investments a very attractive business, countless applications for licenses were submitted to the HEA, in sum exceeding 1,000 MW new wind capacity in total, more than

[185] Alderson and Doyle, 'Contrasting Views of Complexity', 841.

three times higher than what the electricity system could manage. The problem was simple. Given the volatility of wind energy (the wind is not always blowing, not always from the same direction and so on), each megawatt electricity produced from wind requires a certain level of electricity production from different sources as a 'back up', in case the production of the wind park stops (storage possibilities were almost null at that time). This 'back up' is provided through so-called system-level services, provided by old 'conventional', mainly gas-fuelled power plants in the system. That time, the maximum amount of wind energy that could be handled by system-level services was around 300 MW, whilst the total requested new wind capacity in the submitted license requests was the said 1,000 MW. A cascade of failures occurred. As Alderson and Doyle argues, when system organisation becomes more complex, even slight perturbations could have cascading and ultimately catastrophic consequences through the tightly interconnected system.[186] Here in our case the complexity increased by the introduction of the green energy subsidy, that is, with the mandatory off-take and feed-in tariffs. This new element brought in the perturbation event to the complex system – new wind energy production licence applications of a total 1,000 MW that the electricity system was physically unable to handle – and even the originally well-functioning particles failed in an unforeseen way. Again, as Alderson and Doyle explain the theory: the emergence of complexity can often be seen as a spiral of new challenges and opportunities that organisms and/or technologies exploit, but "*which also lead to new fragilities, often from novel perturbations. When successful, fragilities are met with increasing complexity and robustness, which, in turn, creates not only new opportunities but also new fragilities, and so on*".[187] What happened in the wind power plant licensing issue then is worth considering to understand the RYF dilemma and the cascade of failures. Given that the Hungarian electricity system was physically incapable to handle 1,000 MW wind power plant capacity, HEA arbitrarily decided which license application to accept and which to reject, though legally (concerning criteria set by law) all had to be accepted. HEA thus manifestly violated the law – though for a very good reason. HEA issued a so-called 'prospectus' with the arbitrarily set criteria – the problem with this doubtful paper was that as 'prospectus' it did not appear in the law concerning legislation, thus it could not have binding force at all. In terms of normativity, it was simply not law, but the HEA considered it necessary in order to *defend the robustness of law*. The investors whose license

[186] Ibid. 843.
[187] Ibid.

applications were rejected turned to the courts in a form of public administrative litigation. Thus, the perturbation manifesting in the HEA's dilemma was passed to a different branch of power: the judiciary. The court, measuring the interest of formal legality (stability) and the interest of the electricity system as a whole (though not manifested in law), decided in favour of the latter. The consequence was that dozens of investors left the country. The legislator also reacted in its slow way: the electricity act was amended saying that licensing of wind power parks should be subject to special rules in the future. However, the special law regulating such was enacted only one and a half year later, causing an unconstitutional omission. So far, the cascade of legal failures included the failure of the existing regulation, then the failure of the public administration (HEA), the failure of the courts, the failure of the legislation. Complex constraints lead to a cascade of failures: the imminent systemic risk became express.

4.8. Handling systemic risks

In our view, mitigating systemic risk is the field where complex system theories can add a lot to the improvement of the public sector. Understanding normativity failures and errors to handle RYF complexity spiral in law as a complex system, like in the above wind park licensing case study, should indeed be a central issue for *de lege ferenda* thinking.

Some scholars suggest fail-safe strategies, improving the quality of the system components, redundancy of components, building in sensors and feedback.[188] Improving the quality of the system components in order to strengthen robustness of the legal system is closely connected to the issue of quality in public administration, concerning the executive branch of power and to the issue of country risk, through stability and reliability of legislation, whilst also being a rational response to the issue of systemic risk within the executive branch of law. Such quality improvement may address institutions, procedures, people, technology (digitalisation) and so on. The *quality excellence models* used nowadays originally elaborated for the private (business) sector are capable as a tool to grab the issue for the public administration. There are two widely accepted models, by law in Western Europe: the Speyer Quality Award and the European Excellence Model.[189] The first is a 1998 document and mainly used by German-speaking countries, whilst the latter is a successor of the Business Excellence Model from 1999.

[188] Ibid. 841–842; Ruhl, 'Managing Systemic Risk in Legal Systems', 579.
[189] EFQM, 'Driving organisational change and performance improvement', s. a. www.efqm.org (accessed 26 November 2020).

National quality awards in Western European public service organisations under both models do operate with the following criteria: leadership, policy and strategy, people, resources, processes and finally, different categories of 'objective' and 'subjective' results, with obvious differences in weightings from country to country.[190] These are mainly indirectly forced by law from a client perspective, as these should be applied (and often self-assessed, especially in case of the European Excellence Model) by public administrative organs, not necessarily (though in some cases still) forming part of classical public administrative codes. It is also worth noting that the Common Assessment Framework ('CAF') based on complex realisation of challenges in public administration was elaborated in 2000[191] and had started to compete with the previous European Excellence Model, due to its more flexible and more public administration tailored nature.[192] *The ISO 9000 series* are also good-old standards (often refreshed) for quality assurance purposes. It is apparent that the main focus of the ISO-system is the contracting-out of public services, whilst ISO 9004 standards are the most suitable for TQM developments and ISO 9000-9003 for organisations without their own (normative, legal) rules of operation.[193] Instead of ISO standards, the EU came to prefer the public administration tailored quality assurance system mentioned (in a form of a recommendation), namely CAF. Finally, it should also be observed that the quality in public administration is often considered in a broader sense by the European Union, for example, in the toolbox (a non-legal document) on quality in public administration, also counting on governance, policy making, embedding anticorruption practices, the quality of judicial systems and managing public funds.[194] Concepts go so far that legislative and judicial branches of power are also affected by the promotion of quasi-legislative and quasi-judicial tools and instruments are encouraged. Quasi-legislative processes are deliberative democracy, e-democracy, public conversations, participatory budgeting, citizen juries, study circles, collaborative policy making, and other forms of deliberation and dialogue

[190] E Löffler, 'Quality Awards as a Public Sector Benchmarking Concept in OECD Countries. Some Guidelines for Quality Award Organisers', *Public Administration and Development* 21, no 1 (2001), 27–40.
[191] S Geldof, P Staes, A Stoffels and N Thijs, *Five years of CAF 2006: From Adolescence to Maturity – What next?* (Maastricht: European Institute of Public Administration, 2011).
[192] G Bouckaert and C Pollit, *Public Management Reform* (New York: Oxford University Press, 2011).
[193] S Russel, 'ISO 9000:2000 and the EFQM Excellence Model: competition or co-operation?' *Total Quality Management and Business Excellence* 11, no 4–6 (2010).
[194] European Union, *Quality in Public Administration – A Toolbox for Practitioners*, 2015, file:///C:/Users/M%C3%A1t%C3%A9/Downloads/eu_publicadmin_toolbox_full_en.pdf (accessed 26 November 2020).

among groups of stakeholders or citizens. Quasi-judicial processes include alternative dispute resolution such as mediation, facilitation, early neutral assessment, and arbitration.

Redundancy of components is also a reasonable tool. Contrary to typical two-stage public administration, two-stage judicial review and separation of competence and power within the public administration, for example amongst different authorities, such redundancy is worth considering in order to mitigate risks. In western countries, deliberative democracy, e-democracy, public conversations, participatory budgeting, citizen juries, study circles, collaborative policy making, and alternative dispute resolutions are promoted[195] that may also result in redundancy of regulatory and public administrative components, however, also reducing the control of power, that is, the very essence of normativity. These considerations are closely connected to the "New Public Management" ("NPM") that exactly aims at decentralisation, privatisation, competition and so on.[196]

The NPM and the privatisation, democratisation and outsourcing tendencies of public administration and public management are also considered real-world exemplars of complex systems by certain authors, having thus effect on systemic risks. For example, the argument is advanced by Meek, De Ladurantey and Newell that administrative networks, shared governance, and co-production of public services developed in the conjunctive state are real-world exemplars of the emergent properties of complex adaptive systems (CAS). According to them, as the production of social capital and public trust of government decline in response to the increasing inability of hierarchical, topdown, command-and-control institutions to solve complex societal problems, the fundamental nature of associations and relations among citizens, policy makers, civic leaders, and government is changing in metropolitan areas as government slowly shifts toward governance.[197]

In our view, however, we should also be able to find certain other possible tools without, this side-effect of losing the very essence of normativity, and fitting better to the regulatory

[195] L Blomgren Bingham, T Nabatchi and R O'Leary, 'The New Governance: Practices and Processes for Stakeholder and Citizen Participation in the Work of Government', *Public Administration Review* 65, no 5 (2005), 547–558.
[196] G Gruening, *Origin and theoretical basis of the New Public Management (NPM). Draft for the IPMN conference in Salem/Oregon*, 1998.
[197] J W Meek, J De Ladurantey and W H Newell, 'Complex systems, governance and policy administration consequences', *Emergence: Complexity and Organization* 9, no's 1–2 (2007), 24.

tendencies of the Hungarian energy sector[198] (Herczeg and Vastag 2019) and thus similar complex systems of normativity elsewhere, too. In regulated markets, one-stop-shop public administration prescribed by legislation can be such an effective tool in energy law (for example, in licensing) not only because it reduces the number of nodes but also because it would concentrate all relevant aspects in one hand, enabling the recognition of correlations and coupling effects. Building sensor protocols into the system in order to provide relevant information about system failure potentials as well as strengthening feedback may also likely improve quality in public administration, trust in legislation and mitigating systemic risk. It may also be a useful tool to compare the frequency of how norms utilised by the public administration body and the place of these norms in the legal hierarchy: the derivations from the ideal power-law distribution of the utilisation of norms might be relevant indicators concerning regulatory systemic risks too.

4.9. Conclusion

As it can be seen from the examples of Hungarian energy (public administrative) law, heterogeneity (wholesale gas pricing), complexity above complicatedness (electricity production licensing) and system interconnectedness (on component level: Novenergia case, on level of legal branches: MAVIR case) show complex adaptive system features. Thus, even though there are significant differences compared to common law where such approaches are well-received, there are valid grounds to consider continental law and the public administration administering it as a complex system. Based on these findings, there are also valid grounds to investigate Hungarian energy (public administrative) law dynamics through such complex system phenomena like evolvability and the RYF dilemma (HEO changing role, the 'rezsicsökkentés' case) as well as complex constraints and systemic risks (the wind park licensing case). These are the aspects where complex system approaches may add a lot to the understanding of normativity and the operation of public administration, as well as to the identifying of systemic risk within the law. This should be applicable to other jurisdictions as well, especially in other countries with similar regulatory and public administration structures, both in CEE/SEE and beyond. Hence it is a promising new field for further interdisciplinary

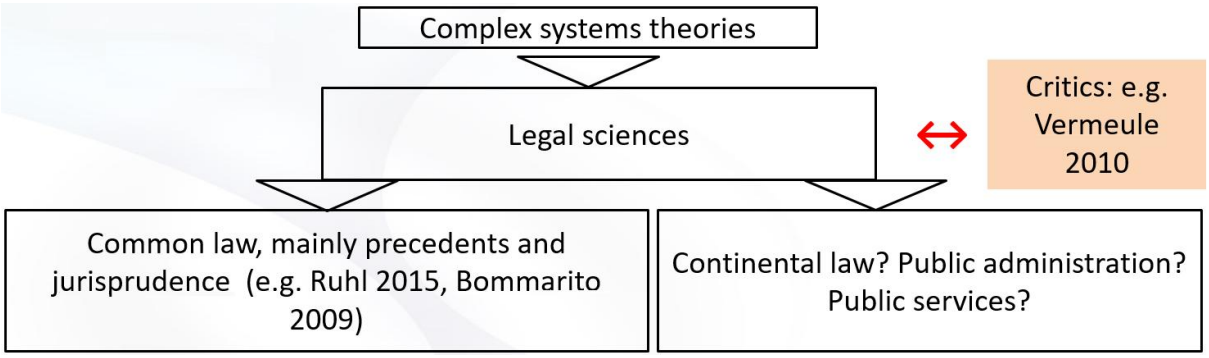
[198] A Herczeg and Gy Vastag, 'New directions in the Hungarian energy market: Transformation of the national public utility', *Pro Publico Bono – Magyar Közigazgatás* 7, no 2 (2019), 110-121.

studies concerning public administration. In our belief, this should be a new direction of scientific and practical investigation in all regulated industries like energy, pharma, health care and financial institutions and in all jurisdictions with similar regulatory logic.

5. Errors in the utilization of norms as a possible indicator for implied systemic biases (risks)

5.1. Moving further: new working hypothesis

As proven above in case of Hungarian energy normativity being the subject of our investigation, the operation of public administration in continental law systems is per se following complex system attributes refuting reductionist and linear concepts and rather showing a harmony with the complexity axiom of transdisciplinarity. These lead to other essential features of complex systems like emergence, to the "robust yet fragile" (RYF) dilemma and to the issue of systemic risk/bias considered and defined above. In this way we have proven that legal sciences, especially "rigid" continental law and public administration (i.e. normativity) are also a valid playfield for complex system methods and findings.



5.1-1. Figure Main dilemmas of complex system theories and normativity

The lessons learned from the case studies with which we proved the complex system nature of the Hungarian energy regulation in Chapter 4 are:

(i) heterogeneity and removing elements by case study of gas wholesale pricing and case study of power plant licensing;

(ii) interconnectedness by the case study of the involvement of so-called "special authorities" (Novenergia Supreme Court case) and case study of public law/civil law interconnectedness (MAVIR Supreme Court case);

(iii) emergence by the case study of the Hungarian overhead price reduction ("rezsicsökkentés");

(iv) (iv) RYF dilemma by the case study of wind park licensing in Hungary 2006-2019.

The novelty and practical relevance of these findings in these fields would become transparent if we use complex system methodology in practice concerning normativity. In order to get some practical tool out of the theory requested by the very essence of transdisciplinarity of an alleged constant flow between the theoretical and practical (Gibbons et al, 2010), we looked into normativity's utilization as the third and final topic of our research. Here I would like also to remind that as Szigeti outlines, Max Weber did not differentiate either between theoretical and practical (Szigeti 2006, 172) nor do we in the followings to identify practical utilization.

Given that the very essence of normativity is the operation of norm itself, it is worth looking for the systemic biases or precursors of risk of potential failures there as well.

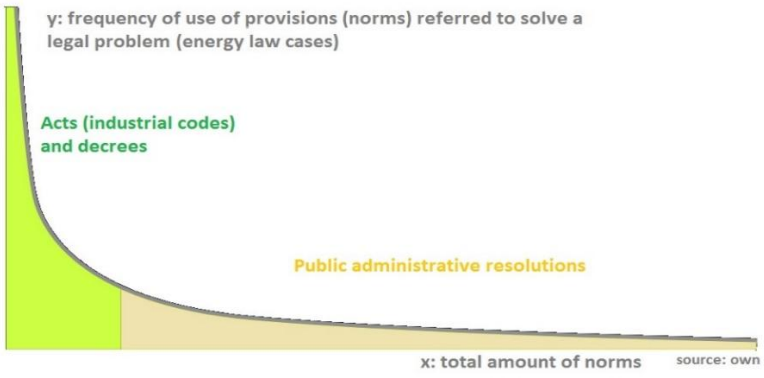
First, in this sense there we assumed that there might be valid grounds recognizing the proliferation of norms through the operation of *power-law event distribution*, a typical effect of the existence of complex systems as well. It is considered as a complex system feature that overall behaviour characterized by mathematical "power laws" that do not follow "familiar bell-curve" statistical distributions (Farber 2003, 152). Power-law distribution identified in areas such as the populations of cities, the intensities of earthquakes, and the sizes of power outages. For example Hungary has 3155 settlements in 2017 (346 cities and 2809 villages) with a population of 9.797.561, meaning that the average population of a city, town or village in Hungary would be 3.105. However, that information cannot be useful for most purposes as significant fraction of the total population lives in Budapest (1.752.704, ~17,9%) or in other large cities (Debrecen, Szeged, Miskolc, Pécs, Győr, etc.).[199] These settlements population is larger compared to the other by several orders of magnitude. Power-law distribution is a widely experienced distribution pattern in case of complex systems and power-law statistics is the most common description of complex dynamics (Lopes and Machado 2018), and the recent

[199] Source of data:
http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_wdsd005.html
http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_wdsd001.html

researches widely prove this in different fields (e.g. Klakattawi and Vinciotti 2018, Tarasov and Tarasova 2018, Fuentes 2018, Arshad et al., 2018, Golmankhaneh et al., 2018).

I any case, we also had some concerns against this network science-related scale-free statistical pattern taking into account the criticism against the unconditional applicability of network sciences and power-law distributions as well given that some scolars questioned both the real pervasiveness of the scale-freeness and the extent to which the paradigm illuminates the structure of specific networks and some of them with apparently valid grounds (Holme 2019, Jacomy 2020). Scolars argue that though the degree distribution is scale free, the actual networks are not (Tanaka 2005) some even claiming that degree distributions rarely follow power laws (Broido 2009). Broido compared 927 empirical networks and used 5 categories of scale-freeness, ultimately finding 57% of the data sets belonging to at least some kind of scale-free class, while only 4% belonging to the "strongest" category (Broido 2009).

In energy law, the effective use of the different levels of legislation in operation would be an apparent field to recognize some patterns of utilization through the daily operation of public adnministration whether of power-law nature or not. On the top of the legislative hierarchy the industrial codes are present (the 2007 Electricity Act or VET and the 2008 Gas Act or GET), followed by a huge amount of governmental decrees, even more ministerial decrees and decrees of the HEA (something like a hundred), and then with tens of thousands resolutions, either of individual or wider industrial effect, by the public administration authorities. In case we enumerate among an x axis the relevant laws and bylaws according to their hierarchy from the left to the right and then we collect references to the provisions (norms) of them in certain cases (e.g. total of HEA issued resolutions) we would ideally get a power law graph assuming proportional utilization (i.e. references) to the norms by HEA in its resolutions:



5.1-2. Figure experted ideal distribution pattern of norm utilization

Thus, the starting points to the evaluation were: on the top of the legislative hierarchy the industrial codes are present (the VET and GET), followed by a huge amount of governmental decrees, even more ministerial decrees and decrees of the HEA (something like a hundred), and then with tens of thousands resolutions, either of individual or wider industrial effect, by the public administration authorities, all of which are norm in a practical sense and where all of them *used to describe a requirement* (Szigeti 2006, 205). In case we enumerate among an x axis the number of references to the relevant laws and bylaws (norms) in the HEA issued resolutions then we would get a graph showing the frequency (relevance) of laws used by the authority to solve a legal issue. Therefore we elaborated a new hypothesis no. 3 that by coupling the frequency of references to law in public administrative resolutions by the HEA (as the public administration body of the Hungarian energy sector) with the place of these referred laws in the legal hierarchy (as defined by law) we should get a power-law model of the utilization of public administrative resolutions by the HEA as expected from complex adaptive systems and by the complexity axiom of transdisciplinarity.

This hypothesis aims to identify whether with this complex (adaptive) system-based approach an implied systemic bias/risks indicator may be achieved in public administration and regulation, i.e. as we called it, normativity. The theoretical purpose is the assistance in legislation and government decision making. For normativity (considering legislation and public administration together) systemic biases or risks are of the highest concern. The reason is, that as a result of the cascading nature of systemic risk, the so-called country risk increases, whilst trust in public administration decreases, system became more fragile (see 4.6-4.8 above). So, is there a way to point out (regulatory) systemic bias or risk through the utilization of public administration?

5.2. The alleged “Y axis”: the hierarchy of norms

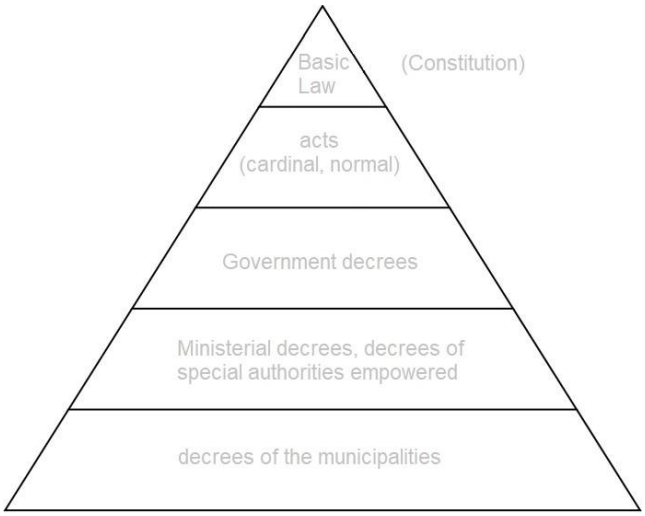
Norms take their places through thelegal hierarchy. Each piece of legislation occupies a sequence defined in the so-called hierarchy of sources of law, which also affects the relationship between the legislation applicable to each legal relationship. According to the essence of the hierarchy, the legislation “at a lower level” in the hierarchy cannot be in conflict with the legislation at the “higher level” in the hierarchy, and the legislation at a lower level regulates certain relations in accordance with the legislation at a higher level. With regard to legislation

at the same level, if the legal provisions governing the same relationship conflict, it is necessary to examine their relationship: if one of the conflicting laws is specific to the other, the specific legal provisions always apply, not the general provisions.

Article T) of the Basic Law lists the legislative bodies and the legal sources they may issue, and Act CXXX of 2010 on Legislation further details the guarantee rules related to the hierarchy of legal sources. According to them, legislation is:

1) an act passed by the National Assembly,
2) the government decree,
3) decrees of the Prime Minister and ministers,
4) a decree of the Governor of the Magyar Nemzeti Bank,
5) a decree of the head of the independent regulatory body,
6) a decree of the local government, and
7) a decree of the Defense Council issued during a state of emergency and the President of the Republic during a state of emergency.

(Independent regulatory body is the National Media and Communications Authority (NMHH) and the HEA). Based on this, with the necessary corrections (Basic Law on the top, different source but same level decrees of 3-5 and 7 merged):



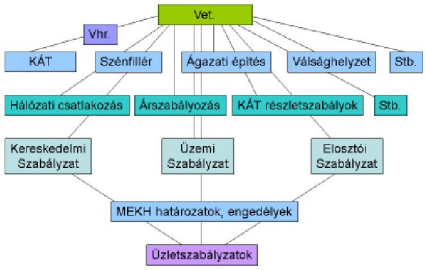
5.2-1. Figure Hungarian legal hierarchy derived from Basic Law

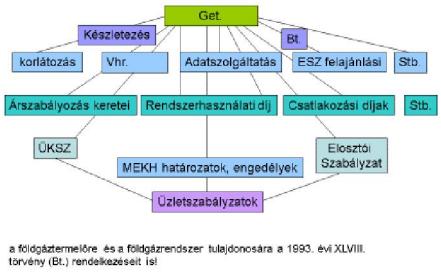
From the point of view of our research, the above needs to be supplemented and clarified in a more practical way.

a) The Basic Law will practically not be relevant in the public administrative practice of the HEA on a daily basis, rather only in an exceptional or competence-designating

manner, but we will leave it in place for the coherence of the hierarchy of sources of law.

b) More relevant, that there are so-called codes or codes of law (in Hungarian: '*kódexek*' or '*törvénykönyvek*'), (in addition to the distinction between cardinal ('*sarkalatos*') and "normal" laws), which seek to regulate the completeness of life in a particular law or area of law, in a comprehensive manner, like a framework. Such is the Civil Code, or in the energy sector, the 2007 Electricity Act (VET) and the Act the 2009 Gas Act (GET), the provisions of which are further broken down by other legislation, including other laws ('*törvények*'). Therefore, in the level of laws in the legal hierarchy and amongst other laws, these codes are in fact are ranked higher in terms of a particular law or area of law, they also appear with greater weight in the application of judicial and administrative law, at a quasi "higher level". A court judgment typically extracts the legal facts from the direction of a code to apply to a given historical fact. Therefore, code-type peak legislation as an independent source level should be interpreted from the point of view of industry normativeness, where, moreover, the code-type peak legislation will always be one piece in the certain case (either VET or GET or, in the case of untested district heating, the District Heating Act). Example: in the electricity and natural gas sectors, such a structure will be experienced practically in the layout of the source hierarchy (exemplary, the codes on the top with green):





5.2-2. Figure natural gas-related legal hierarchy 5.2-3. Figure Electricity-related legal hierarchy

c) As for the level of laws or acts („*törvények*"), it is also advisable to clear it of procedural references that do not point to substantive provisions. The resolutions of the HEA obviously contain information on the available legal remedy in all cases, which is not a substantive provision of material law. In essence, it is an of-the-self, instant template of textual cliché or topos in all resolutions, which can be found in all cases, but does not belong to the material facts of a particular life situation settled by the resolution. These

are: Act CL of 2016 on General Administrative Procedure (Ákr.) and Act I of 2017 on Administrative Procedure (Kp.). These both were therefore disregarded for the above considerations.

d) It is also relevant that, in reality, the so-called „other sources" of law (*'jog egyéb kútfői'*) are an important part of law enforcement.
    a. This also includes regulatory instruments of public law, which, although they contain normative provisions, do not qualify as legislation. The law on legislation defines two types of regulatory tools for public bodies: normative decision and normative instruction. These are not generally binding rules of conduct, they are not binding on everyone (i.e. not erga omnes), only internal provisions, organizational and operational rules, which apply only to the issuer and its subordinate bodies and persons.
    b. These include decisions of the Constitutional Court.
    c. These also include judgments and court decisions made and published by the supreme judicial forum, the Curia, called the Supreme Court before 1 January 2012. This includes a decision on legal unity made in order to ensure the unity of the application of judicial law and the so-called principal court decisions. In addition, the Supreme Court has previously issued directives and a decisions in principle. These decisions also influence the jurisprudence of the lower courts, and thus have an impact on the interpretation of the individual legal acts affected by the decisions, as well as on the emerging law enforcement practice.
    d. However, in the public administration dimension, the range of resolutions made by the administrative authority is even more important. These are not legislation, but are as binding on the clients concerned as the legislation, so these public administrative resolutions essentially act as an extension of the hierarchy of sources of law in practice. Moreover, some industry players themselves consider the administrative resolutions concerning them as "quasi-legislation" and, in essence, public authorities consider them as such too, which is no longer unfounded simply because administrative resolutions are also normative (regulatory) tools in a given life situation, which are hierarchical and arise unequally, in a relationship of subordination. The conflicts resulting from this phenomenon are also common, as exemplified by the regulatory system of

distribution price review for a decade. Finally, there is also a thin line between legislation and an administrative decision: there are laws, i.e. pieces of legislation which lacks the general ('erga omnes') subject-matter generally expected from laws as pieces of legislation, even if its scope appears to be theoretically general.

i. An example of this is, on one hand, Act LXX of 2008, which, although formally the highest law, an act (’*törvény*’), its subject is only the termination of the PPA contracts between seven power plants and MVM, and in practice even only three out of the seven (the other four power plants are state-owned, as well as MVM, and there the contracts in question had by that time been terminated and re-concluded by themselves) - so here, in fact, mandatory provisions were in fact laid down in law for some named addressees, as is customary in the administrative decision. An example to the same at the level of a government decrees is the Government Decree 149/2010 (IV.29).

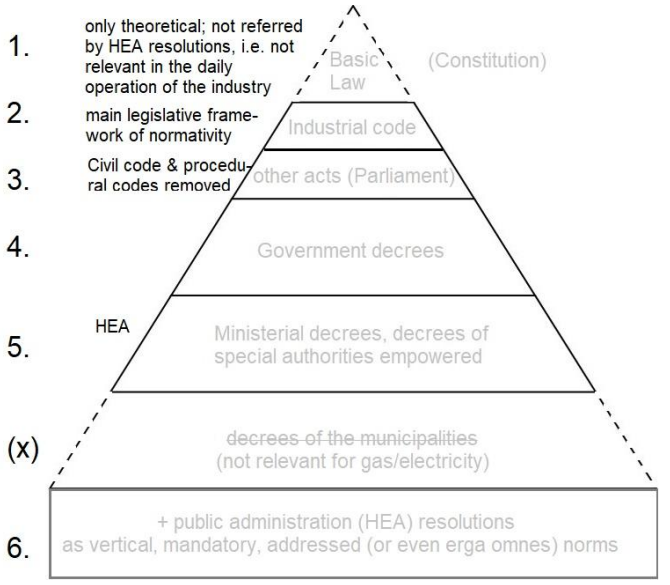
ii. An example from the other side (and this is also relevant for the study) is the scope of the so-called industry regulations or ”codes”: the MAVIR electricity TSO’s, transmission system operator's so-called Operating Regulation or Operation Network Code (*Üzemi Szabályzat*, ÜSZ) and Commercial Regulation or Commercial Network Code (*Kereskedelmi Szabályzat*, KSZ), the natural gas TSO FGSZ’s Operating and Commercial Regulations (*Üzemi és Kereskedelmi Szabályzat*, ÜKSZ), the DSOs’ Distribution Regulations or Distribution Network Codes and, in general, all licensees draw up Business Regulations or Businecc Codes (*üzletszabályzatok*), which are approved by HEA’s resolotions as an administrative authority. Formally, therefore, we see public administrative resolutions, but from the point of view of practical applicability, these essentially operate as legislation, as, e.g., all licensees operating in a DSO’s territory are obliged to comply with the Distribution Regulation or Network Code, while all actors in the country have to comply with the ÜSZ, KSZ: both licensees and non-licensees. Though they are thus formally, public administrative resolutions, in

practice they are having erga omnes effect, acting as quasi-legislation, and are applied essentially as such by the administrative authority as well as the courts. There is a serious problem with this ambiguous level of normativity anyway, as it has been dealt with in court decisions and in the case of 6.K.31.491/2010 (GSEM v MEKH) even by the European Court of Justice. Therefore, in accordance with our concept of normativity, we consider that public administrative resolutions should be examined in the same way from the point of view of industry normativeness as laws and bylaws, acts anf decrees, with special regard to the erga omnes, quasi-legislative resolutions.

iii. Finally, thirdly, due to the overhead reduction (‘*rezsicsökkentés*’), the HEO has been given legislative power (became HEA), so as a result it is both a public administrative authority, which makes resolutions and a regulator/legislator, which issues decrees, further eroding the boundary between legislation and non-legislation, now also from a subjective point of view.

Based on the above, we made the necessary corrections, thus the hierarchy of sources of normativity to be examined and enforced in relation to the industry appears in reality as follows:

1) The Basic Law of Hungary and some of its amendments being the source of the entire legal system, thus the Basic Law is at the top of the hierarchy of legal sources (it will not be directly relevant, but we will leave it in place);
2) there is a "second level" for each of the industry codes defining the whole area of law, VET and GET (always only one);
3) at the third level, laws (acts) in general, which are not comprehensive industry framework codes;
4) the fourth level is the stage of government decrees;
5) at the fifth level, the ministerial decrees and the decrees of the HEA;
6) at the sixth level, the administrative resolutions (including and with special attention to industrial regulations or network codes).



5.2-4. Figure Corrected scheme of normativity in the energy sector based on applied utilization

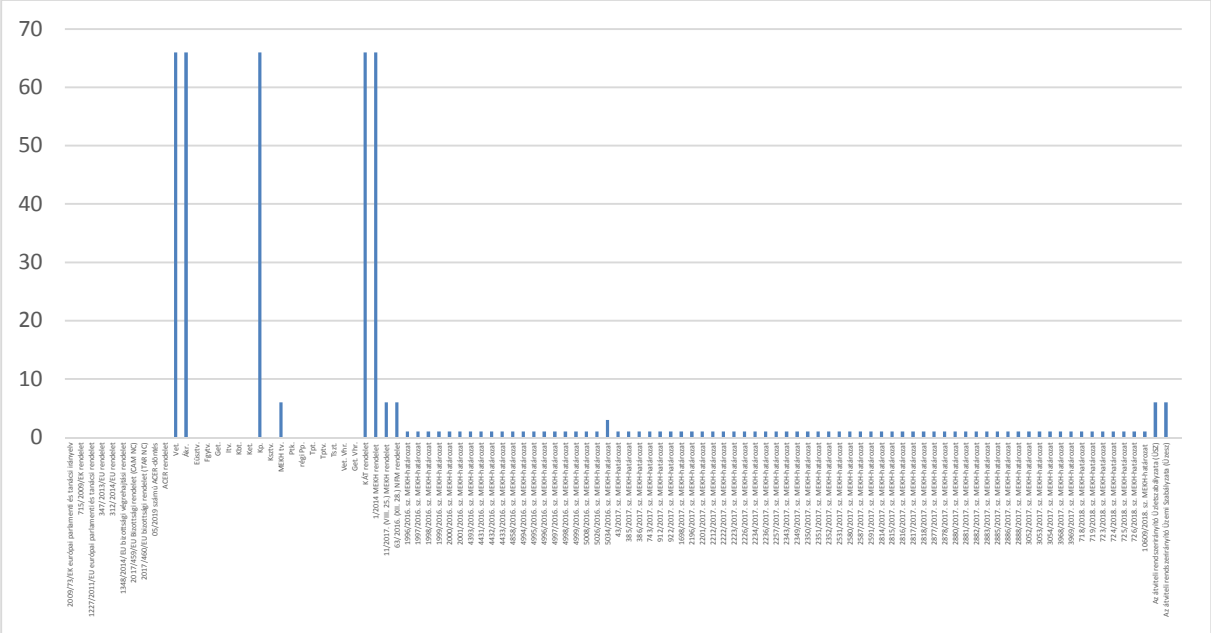
5.3. Test drilling: a sampling pilot project

As in the oil and gas industry test drilling is essential for any future exploitation, hence we made a sampling pilot project in the same sense. Thus, given that the very essence of normativity is the norm itself, I considered the utilization of norms via sampling of random 68 *electricity-related* resolutions of the HEA issued in 2019 available at the HEA webpage and collected the references from these (x axis), and whilst there were acts and even bylaws (the Government decree on implementing VET) being referred in more than 65 occasions (the maximum was 68), there were complete government decrees never referred at all. The operation of power-law event distribution is a typical effect of the existence of complex systems as well, thus, not surprisingly, what we first expected was a kind of power-law pattern. I followed the recipe for analysing power-law distributed data:

The empirical data collection took place in the following way. The resolutions of the regulatory authority and one-stop-shop deconcentrated public administrative body in charge, the HEA were the data used for the pilot investigation. We have chosen HEA resolutions from 1 January 2019 to 30 June 2019, and in order not to duplicate power-law distributions by object, I narrowed down resolutions to the electricity industry, excluding gas, water and district heating here: http://mekh.hu/kereso. This still resulted in 3628 resolutions in pdf format, thus I only took a random 68 resolutions out of this 3628.

Then it became necessary to remove distortion circumstances. The danger of distorting the results is imminent if the data collection does not handle regulatory tendencies (periods) of the public administration body with which I am dealing. Namely certain activities, e.g. price setting for distribution companies or licensing photovoltaic power plants at the time of renewable boom my distort data collection so much that certain sampling falling into such periods may result in misleading conclusions. This is something we had to handle with careful premises in sampling and collecting data.

Then came the analysis of the public administrative decisions which should follow a scientifically proven method. The valuable work of Clauset, Shalizi, and Newman (2009) on this topic dealing with power-law distribution methods and proof guided our analysis. In line with the instructions I made the determination of the K-S value (goodness-of-fit) between the data and the power law using the method. Via likelihood ratio test it seems currently that there is no alternative found that significantly different from zero, therefore no other alternative is favoured over the power-law model. This means that the p-value is greater than 0.1 > in our case the power law seems a plausible hypothesis for the data. In case we enumerate among an x axis the number of references to the relevant laws and bylaws (norms) in the HEA issued resolutions then we would get a graph showing the frequency (relevance) of laws used by the authority to solve a legal issue:



5.3-1. Figure references in electricity-related HEA resolutions (fragment)

The graph we received, even though it is just fragmentary, is still informative on the frequency of certain types of norms specified compared to the total, but *did not seem to underpin our original hypothesis3*. As expected as an the ideal case, whilst certain provisions of VET as the industry code (level 2) is and should always be highly referred in the HEA resolutions (head), certain level 4 and level 5 bylaws should have less frequency (body), whilst other public administrative resolutions (level 6) should be referred on very rare occasions or even never (long tail). However, even after the necessary cleansing (i.e. the issue of EU law with direct effect and setting aside procedural references) there were still deviations from this ideal state, meaning both norms low-ranked in the legal hierarchy but referred (used) by the HEA quite frequently, and norms high-ranked in the legal hierarchy not used in the expected frequency. Surprisingly or not, the two significant "errors" remained were exactly those norms which are challenged and highly debated by the EU or by market players, i.e. those having the highest correlation with risks in the system, especially the risks of amendment. Hence I considered these two 'errors' closer.

The first 'error' in the distribution was a HEA resolution (no. 8334/2018) referred to 9 times (out of 42), thus quite frequently, though it is just a public administrative resolution and not a law. This phenomenon can perhaps be called as the 'proliferation of norms': a norm requiring high legal status but in fact issued in a low-ranked, proliferated form, in fact reducing the level of normativity. The resolution in question is the Operational Code of MAVIR, the Hungarian transmission system operator (TSO). In fact, the TSO's Operational and Commercial Codes are something that all market player should obtain erga omnes, thus it works in fact as a law. It means it should be a law, but given it is not, legal remedies are formally possible against it. But only formally: the court practice does not allow market players to get effective judicial review against it, recognizing its erga omnes nature. A huge number of market players tried to attack its provisions allegedly harmful for them, but the courts rejected despite the formal right for review. This, however, became in fact a serious legal problem: the European Court indicated in a preliminary ruling (initiated by a market player) that the present status of the Commercial Code, that is formally just a public administration resolution against which no legal remedy is available, is a clear legal error. Knowing the market players' serious concerns against it, the present form of the Operationan Code and Commercial Code acceptance (i.e. in a form of a public administrative resolution) is a systemic bias, even systemic risk. Thus, **here the**

European Court also identified the systemic risk made expressed by the underlying Hungarian court cases and being impliedly present for long on multiple levels of the energy supply chain, the energy regulatory (normativity) hierarchy and perhaps on different levels of reality. As discussed in details, whilst legal scholars have written about systemic risk occurring in financial systems as early as in the 1980s (Gruson 1987, 303), identifying systemic risk within the legal system is a quite recent field of investigation (Ruhl 2014). Law and normativity is a system among the multitude of social systems and subsystems and its aim is expectedly and allegedly to regulate constraints and failures the other social systems face, and as being such, it is a fail-safe strategy for other social systems. However, risks cannot only be caused *in other complex social systems* by the law, like it happened with the changing rule of the HEA causing the increasing country risk and decreasing trust in public administration quality.

The second type of 'error' was a level 5 decree, i.e. a law issued by the HEA (no. 15/2016) but with a very low frequency: 1 out of 68, an utilization rate normal and expected of public administrative resolutions, but not laws. We may call it a 'sleeping norm', i.e. a law that is not utilized in accordance with its rank in the legal hierarchy. This is a price decree of HEA, the background of which already discussed in details in Chapter 3.2.1 and, as RYF issue in Chapter 4.7: the changing role of HEO/HEA to defend so-called "*rezsicsökkentés*" (overhead reduction). As seen, the HEA was re-designed in 2013 so thoroughly that it became even a legislator concerning price setting besides its public administrative tasks. This emergence happened due to the Hungarian Government's tariff cut campaign, expecting to keep end-consumer energy prices in an artificially low level in Hungary, not only regulating the potential profit of certain market players (the distribution system operators), because it was already around zero, but also their justified costs as well. In order to avoid successful judicial reviews of the public administrative resolutions of HEA with the artificial and arbitrary price reduction, the Parliament passed a law even changing the Constitution. This amendment prescribed that HEA should carry out its price settings not in the form of individual public administrative resolutions, against which judicial review is open, but through decrees, i.e. bylaws instead with erga omnes binding force, against which no judicial control is available. A public administrative body becoming a lawmaker for price setting out of blue is indeed a thing affecting investment and regulatory stability and thus country risk (and trust) in the energy sector in general, whilst quality expectations and trust in public administration is also being affected by narrowing

available legal remedies against decisions of the public administration. This change, i.e. consequently **HEA's role as a lawmaker was outstandingly concerned by an EU infringement proceeding initiated against Hungary[200] as well as investment protection arbitral case too.[201] This means practically that the "error" identified in the ideal (expected) pattern of utilization is indeed a systemic bias, especially the biggest one of the last decade**, as thoroughly investigated in Chapter 3.

In sum, we can say we see the errors to the ideal state in two directions in this fragmentary sampling exercise:

(i) proliferation of norms: too low status in the legal hierarchy but high utilization (e.g. HEA resolution on the Operational Code or the Commercial Code of the TSO)
(ii) sleeping norms: too high status in legal hierarchy, not used proportionally (e.g. 15/2016 HEA Decree on price setting).

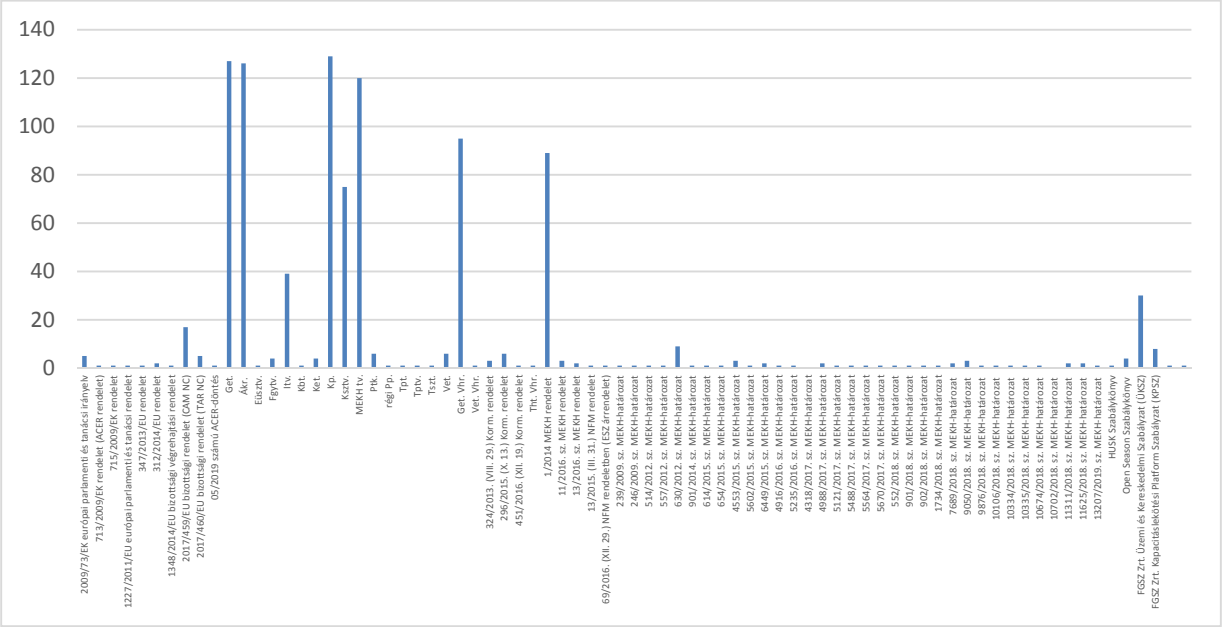
Both errors identified (and due to which our hypothesis of a power-law correlation is flawed) are not only legal errors but norms *especially being in connection with the RYF problem and systemic biases or risks*, representing complex constraints in the public administration. Anyway, this was just a sampling exercise we consider neither complete nor undisputable.

5.4. A thorough project: gas-related HEA resolutions of a full-year

Based on the findings of the sampling pilot project, we conducted a thorough investigation of a full year natural gas-related HEA resolutions with the same approach and same method.

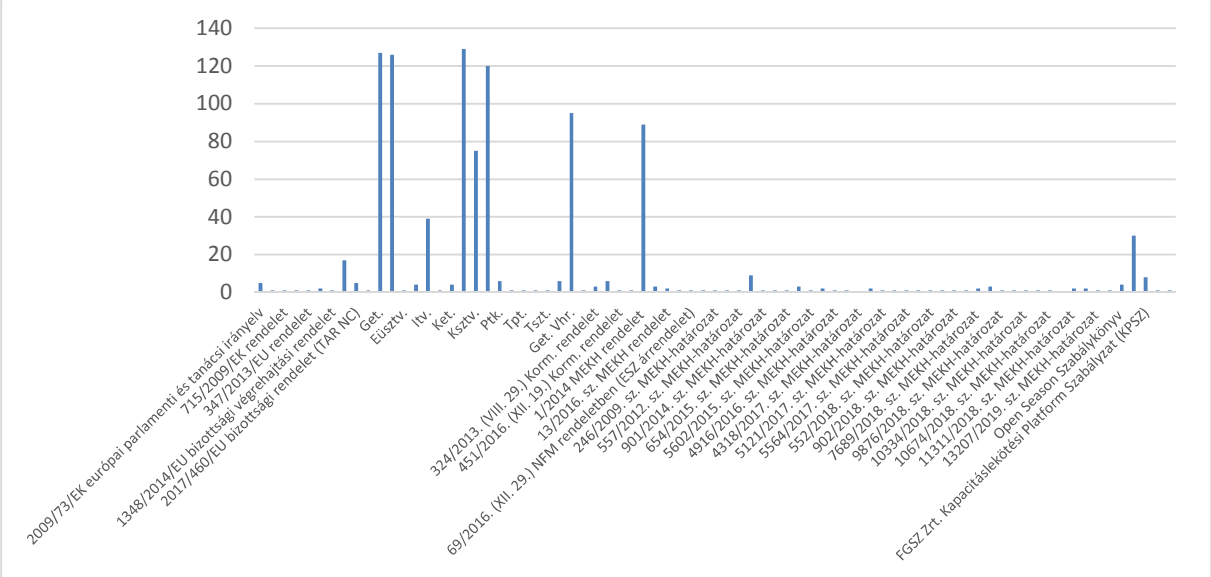
This meant 139 resolutions issued by HEA for the year of 2019; the source was the HEA webpage www.mekh.hu/kereso. This examination is to be considered as complete as a full year is investigated in a well-defined narrowed industrial segment (natural gas). Natural gas was a better choice than electricity also because we were not aware of any such conceptually distortive circumstance like the huge number of affirmative template-resolutions were for our electricity-based pilot project above due to the solar power plant establishment boom. Without repetition of the method described above, the results received are shown in the following graph:

[200] http://abouthungary.hu/news-in-brief/ecj-rules-that-hungarys-law-on-utility-fees-does-not-violate-eu-regulations/ (last access: 30 January 2021)
[201] https://investmentpolicy.unctad.org/investment-dispute-settlement/cases/712/engie-and-others-v-hungary (last access: 30 January 2021)



5.4-1. Figure Norm utilization in total (natural gas)

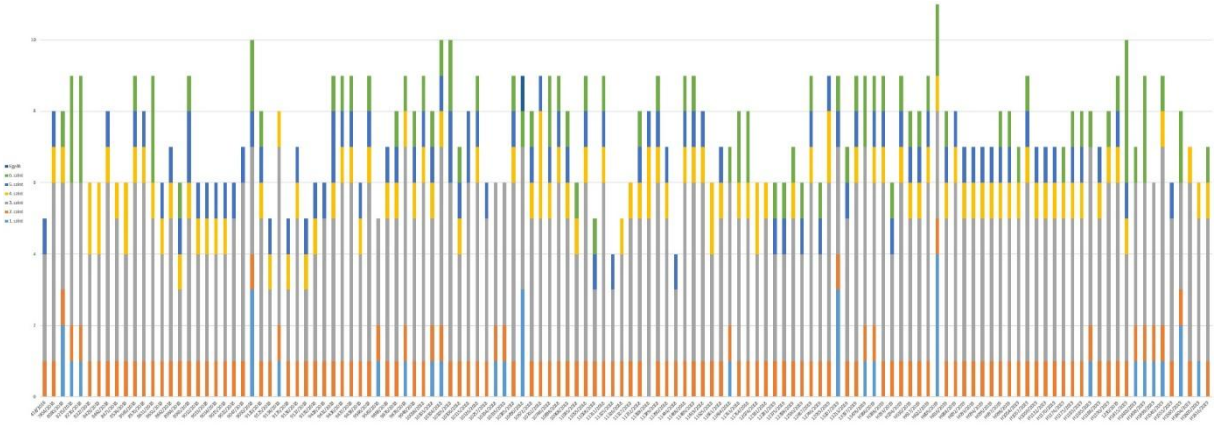
Of course, the cleansing is necessary concerning the legal remedy-related clauses of the HEA resolutions, i.e. the Kp. and Ákr. references having no material effect in the resolutions. In the standard information clauses on remedies (i.e., in Hungarian "*jogorvoslati kioktatás*") of optional judicial review or even just confirming where no legal remedies were available in the considered HEA resolutions there were 126 references to Ákr. and 129 to Kp., these were thus removed from our graph. After this correction, we receive the following results:



5.4-2. Figure Norm utilization 2 differentiated

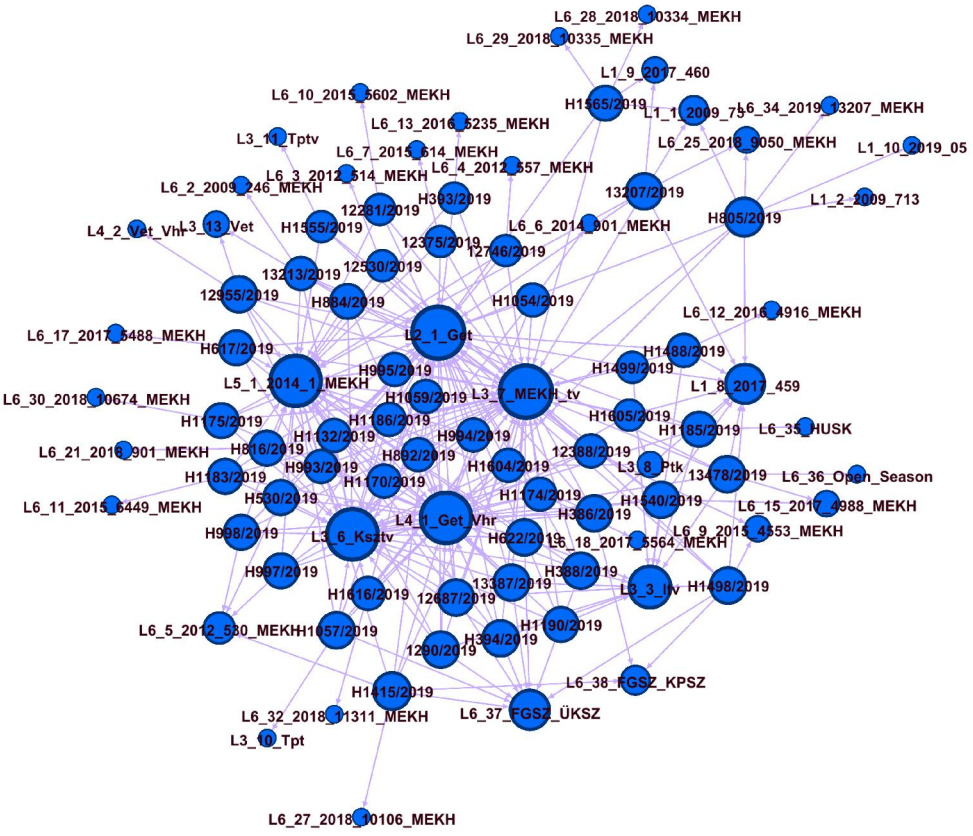
As a general observation, the distribution largely follows expectations, meaning that GET (level 2) and other acts (level 3) plus one level 4 Governmen decree, the implementation decree of GET are the most cited pieces of norms, thus of higher rank in legal and normative hierarchy. GET (level 2) is cited in 127 resolutions, Ákr. (level 2) in 126 cases, Itv. (an act, level 3 in 39 occasions, Kp. (level 2) in 129, Ksztv. (act, level 3) in 75 resolutions, MEKH tv. (act, level 3) in 120, Get Vhr (i.e. Government decree no. 19/2019 (I.30) on the implementation of GET) in95, whilst 1/2014 MEHR. (a decree of level 5) in 89.

It is also worth having a quick look on the comparison of the simultaneous normativity references in the single separate HEA resolutions by level of normativity:



5.4-3. Figure Referred level of normativity compared

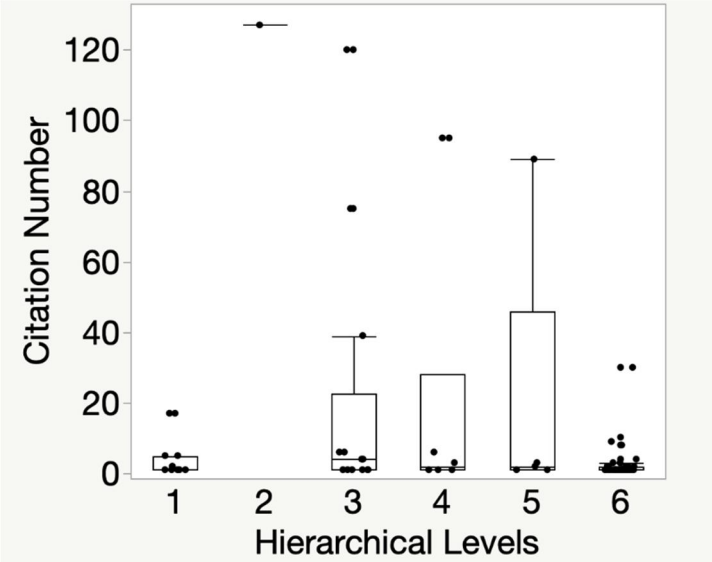
Based on these, we prepared a network mapping on utilization too, showing the nodes and connections of norms in a way where the bigger the node the more reference is made by the HEA reolutions to it. We took into account the lessons learned from the pilot project, too.



5.4-4. Figure network of norms through HEA "gas" resolutions

The graph is very informative on the network of norms, on their connections and even on frequencies (size of the circles). On the one hand, out of the 139 examined decisions, 33 refer directly to the ÜKSZ, in addition, there are indirect references in some places too (like “natural gas market regulations”). On the other hand, the Capacity Allocation Platform Rules appear in a few decisions, which are in fact the same erga omnes rules, so it is worth considering them in the references. Finally, various international rulebooks and market regulations also appear in some places. References to business rules – because they do not fulfill the erga omnes effect - have not been included in the table. On the other hand, resolutions on natural gas refer in many places to the EU CAM Network Code called CAM NC, which is in fact an EU Commission Regulation. The EU Commission Regulation is not part of the Hungarian hierarchy of sources of law, nor does the Basic Law name it, but in fact it is directly applicable, even with Hungarian legislation with the opposite content. Maintainaing our practical approach of application, it is worth considering to put these kind of EU regulations into the

top of the normativity hierarchy, as level 1. However, direct utilization of EU-norms in the energy industry is negligible, as shown by the dispersion of references grouped by the levels of norms, where we indicated EU law references as level 1 (constitutional level):



5.4-5. Figure Dispersion by hierarchy levels, EU law re-labelled as level 1

On the other hand, decrees, thus laws we would expect with frequent citations HEA Decreee 11/2016 is referred in 3 resolutions, whilst HEA Decree 13/2006 twice. These decrees are price decrees as a result of the changed role of HEO/HEA in order to defend the Government tariff cuts during Gass Tariff Crisis, i.e. the overhead price reduction.

5.4.1.1. "Error"1 compared expectations: systemic bias (risk)

These findings and all the above graphs together articulate a clear distortion in any expected (ideal) pattern, as *ÜKSZ is overrepresented compared to its place in the normative hierarchy* (ony level 6!). Pointing to ÜKSZ as an issue by us is not arbitrary, as this is the only highly referred HEA resolution amongst the frequently cited norms.

Again, this, i.e. the normativity nature of ÜKSZ is a serious problem othervise too, as it has been dealt with in court decisions and in the case of 6.K.31.491/2010 (GSEM v HEA) even by the European Court of Justice (ECJ). In the referred litigation case, the Hungarian court in charge suspended its procedure and initiated the preliminary ruling process of ECJ especially asking what is the normative nature of ÜKSZ, because it was brought into question by the

court practice whether claimants in similar cases, and also the claimant in the concrete Hungarian litigation had a standing in front of the courts. Of course, at least formally speaking, an administrative resolution is subject to judicial review in general, the right to sue is automatic, and the *legitimatio ad causam* (in Hungarian: "*kereshetőség*"), that is the right of action developed by the courts requiring a material connection to the subject of the litigation, is often (indeed sometimes abusively) protects the decisions of the public administrative body from effective judicial review. The legal logic is that in case that there is no real material connection between the claimant and the subject of the public administrative resolution, then irrespecive of the wide-range (almost limitless) *procedural* right of initiating a judicial review of such a resolution, a *material* right for a real judicial consideration of the merits will not be granted. As the ÜKSZ is elaborated by FGSZ, the natural gas TSO, approved by the HEA and then is having a quasi-erga omnes power, the court practice is that public administrative resolutions in this sense comprise public administrative relationship between HEA and the TSO, not by any other parties, who are therefore excluded from material judicial review and remedies on the merits. This court practice is well-settled, EBH2004.1100 2/2004 provides that economic interest cannot be classified as a direct legitimate interest. 2/2004. KJE further provides: "*in administrative proceedings, the right to bring an action is subject to the legal capacity of the party and to the fact that the case on which the proceedings are based affects the party's own right or legitimate interest*." Further, in 2.Kf.27/722/2008/6 the court held that there is no legitimatio ad causam in respect of a HEO resolution approving a power plant's own electricity production schedules submitted by a wloesale trader to the TSO (i.e. how much electricity the power plant will produce). This practice was however ambiguous, often disputed by the affected market players of the industry and adding to the fragility of the normativity system and it was a common understanding in the energy industry that such practice is a highly disputable obstacle in administrative lawsuits. This is exactly the reason of the ECJ's proceedings in connection with case 6.K.31.491/2010 (GSEM v HEA) and its decision reverting back the whole Hungarian court practice concerning the ÜKSZ.

Therefore here, without doubt, our analysis of coupling references of norms in HEA resolutions with their alleged place in the legal hierarchy was accurate in pointing out to **a significant systemic bias (risk) in form of a deviation from the expected pattern of references**, identifying ÜKSZ as an overrepresented (level 6) public administrative resolution

operating in practice as a quasi-law, in relation to which serious EU-investigation was conducted.

Further, this ÜKSZ-issue overlaps with one „error" in utilization identifyed by the pilot project (5.3 above), namely with MAVIR's Operational Code. MAVIR as the electricity TSO's Operational Code is an industrial regulation with the very same nature as the ÜKSZ in the gas sector elaborated by FGSZ, the gas TSO, the only difference is that here an industrial regulation of the electricity sector's TSO is concerned. This fact reinforces the applicability of our analysis.

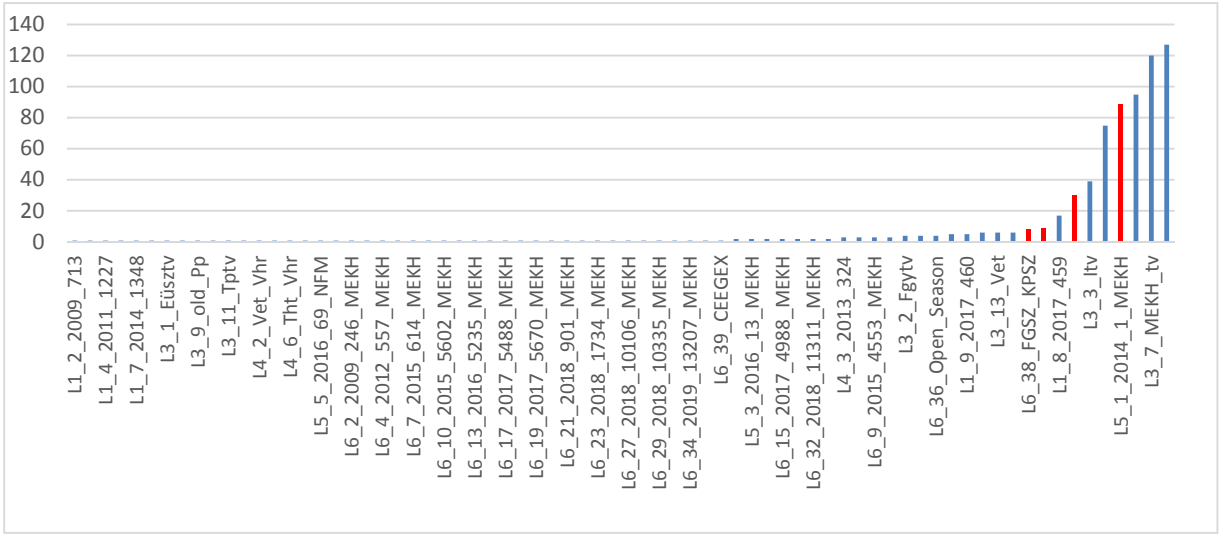
5.4.1.2. "Error"2 compared to expectations: systemic bias (risk)

There are "negative" deviations from the expected utilization graph, too. In the expected "long tail" of the values received, where references are below four (4>), there are only three decrees, i.e. laws: one of which is not electricity-, nor industry- but only administration-related, i.e. no material relevance.[202] The remaining two laws in the long tail amongst HEA resolutions are pricing decrees of the HEA: HEA Decree 11/2016 (XI.14) on the rules of application natural gas network usage fees, separate fees and network connection fees, and HEA Decree 13/2016 on the amount of natural gas network usage fees, separate fees and network connection fees. Both are the result of the changing role of HEO/HEA to defend so-called "*rezsicsökkentés*" (overhead reduction) from possible court review of prices by becoming a lawmaker the background of which discussed in details in Chapter 3.2.1 and, as RYF issue in Chapter 4.7. Without the intention of any repetition, it has already been proven that this change resulted in one of the most outstanding and articualated cases of systemic risk in the last three decades of the Hungarian energy industry, also being in connection with one of the three biggest State intervention occasions into the energy sector. Thus, our analysis of coupling references of norms in HEA resolutions with their alleged place in the legal hierarchy was accurate in this ("negative") direction too in pointing out to **a significant systemic bias/risk in form of a deviation from the expected pattern of references** in a form of sleeping norms.

5.4.1.3. Power-law flawed in fact, not in theory

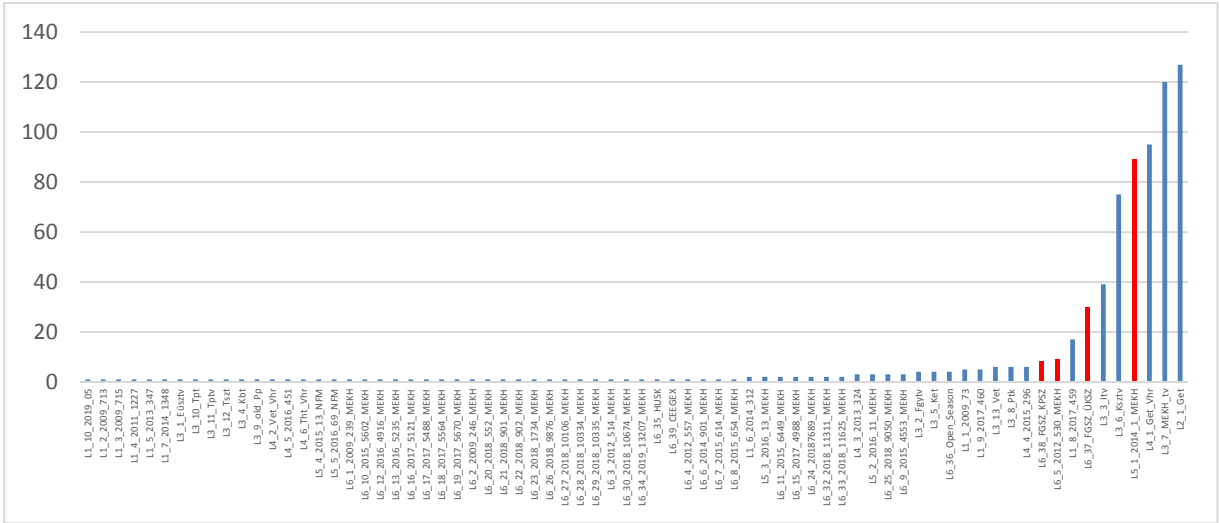
[202] Gov. decree 324/2013 (VIII.29) on the electronic utility registry

It is also worth noting, and this is a significant statement that if we took the data and enumerate them based on the frequency first, overwriting the expected order of legal hierarchy, i.e. thus letting the graph correcting automatically the ”errors” or deviations, *we of course would receive the power-law graph*, a long-tail distribution, but, as marked with red, low-ranked norms appearing in the head (L1_n – L6_n refer to the level of the norm in question, e.g. a public administrative resolution with the code L5_1 norm in the head is in fact a low-ranked norm we would expect to be in the long-tail and not in the head):



5.4.1.3-1. Figure gas norms utilization, cleansed, ”passive”

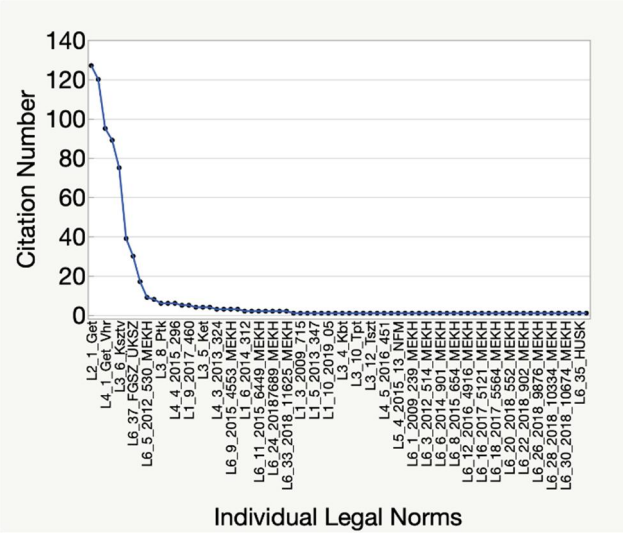
The above is just the significant part of the graph, i.e. where the frequencies begin to increase. The above chart in a more detailed version (the referred HEA resolutions are producing 1-1 frequencies, i.e. a ”long tail”):



5.4.1.3-2. Figure gas norms utilization, cleansed, "passive", detailed

The above means that in an ideal way, where the norm's place had been chosen by the legislator accurately or, in the other way around, if the the norm's utilization by the public administration has accurately mirrored its determined place of the legal hierarchy, the expected long-tail power-law distribution would materialize. Perhaps such ideal state of utilization through public administration can exist in reality or not is rather for a question reserved for legal perfectionsists, but considering the deviations by public administration from this expected utilization *always* correlating with systemic risks we perhaps reasonably assume that such "ideal" utilization, whether realistic or not, is the ideal status of normativity too. Thus, power-law is flawed in fact, but not in theory. However, what is important to us is not the pure theory, but the constant flow between the theory and the applied, in line with the transdisciplinary conceptualization and the practical utilization, i.e. the impact of findings. In this sense the deviations are more important than the flawed ideal state. These deviations or so-called errors identified (and due to which our hypothesis of a power-law correlation purely based on legal hierarchy is flawed) marked with red on the above graph 5.4-6 are not only some kind of legal errors (i.e. where the legislator has chosen an apparently inappropriate level to regulate) but norms being in connection with the RYF problem and systemic risks, representing complex constraints in the public administration.

Thus, putting only frequency of references we receive what we expected (i.e. a long-tail power-law graph), however, constraints of practical relations deviate from it. The following graph makes this more apparent, level 6 ÜKSZ can be seen in the head marked as L6, accompanying level 2, 3 and 4 laws:



5.4.1.3-3. Figure frequency first against legal hierarchy

The ÜKSZ issue is, as we demonstrated, a systemic bias/risk issue as well as the issue of price regulation by the HEA in the form of law. In my view, systemic bias/risk is the field where complex system theories can add a lot to the understanding of normativity failures and errors of the public sector and expressly where our experiments are guiding our attention to. Handling the RYF complexity spiral in energy normativity and in a broader sense, in law as a complex system should indeed be a central issue for de lege ferenda thinking. *The errors (diversions) in the "ideal" (flawed!) power-law distribution in our investigation point to real issues: EU infringement proceedings and international disputes.* This validates the starting implication that complex system theories as well as transdisciplinarity and its complexity axiom can add to understand normativity, whilst invites us to think differently about the issue at stake, perhaps letting us closer to complex constraints and risks within the system. As we seen, a constraint is complex on the system as a whole that is not a consequence of those on the components. It means that it is much harder to realise them then constraints occurring on the component level, as they do not exist on the component level. Different constraints may combine in their effect and interact with each other, creating emergent situations that might not have arisen in lack of this combination, i.e. would not occur in component level. Whilst the implied risk indicator exercise shows clear correlation between systemic risks and either highly referred low-ranked norms or rarely cited high-ranked norms, our approach might be a useful tool to identify complex constraints in advance, too.

6. Results/findings of research

6.1. Conclusions of chapter 3

The **proposition** is justified that in order to grab the transdisciplinary reality of the risks emerging in the energy sector's regulation there are valid grounds to threat Hungarian energy law and public administration together as 'normativity' in a practical approach, based on their enforceability and nature "to describe a requirement" (Szigeti 2006, 205) and to have them re-defined as such unity of reality in line with the transdisciplinarity axiom. With the HEO/HEA's role in the energy sector, utilization of legislation can only be properly observed through the investigation of public administration: all the tree thoroughly considered occasions of state inerventions proved this, though also connecting country risk(s) and public administration (quality)-related concerns together, especially as systemic risk. Concerning the evolvement of the energy normativity, it is observed that code-type regulation was not only a step for reasons of rule of law, but it proved essential in terms of country risk mitigation, whilst country risk was considered obviously to be very high in a country just recently changing its regime and liberated from military occupation. The 1995 Pricing Decree and similar acts also aimed to increase predictability decreasing risks associated with Hungary, its energy sector and normativity. Likewise, the establishment of HEO was indeed necessary in order to establish a trust in the public administration of the energy industry, as well as to cautiously set competences and procedures of the HEO in order set a quality standard of its operation. With all these, providing normativity robustness through official prices administered by public administration whilst mitigating country risk is generally observed, whilst introducing EU-requirements into the disequilibrum of energy normativity resulted in a different "T-state" of the pairs of opposites also to the biggest contradiction, robustness ("A") and fragility ("non-A") of the system.

The comparative analysis of case studies also proves **hypothesis 1** that certain economical risks in the energy sector can be identified via a transdisciplinary investigation of its normativity, whilst the borders of the normativity's autonomy are tacitly recognizeable through the investment protection test (and legitimate expectation) concerning the emergence of these risks.

First, the risks associated with normativity became apparent elements on different levels of reality by the investors inquiring to enter the Hungarian energy sector on an ontological stage (see the ontologic axiom of transdisciplinarity); the risk evaluations about bidding even resulted in certain investors' exit. As a part of the acquisition, the foreign investors entered into shareholders' agreements with APV: the different levels of reality met in the "T-state" of

transdisciplinarity, as they were connected by these pivatisation agreements. Anyway, risks associated with normativity were not affected by this passing through this "T-state", as neither of these contained a "stabilization clause."

Second, based on our proven observations, fragility perpetuated an imbalance created by the non-competitive and inflexible pricing regime of the PPAs in an increasingly liberalized market: imminent systemic risks were increasing, including regulation (the 2001 Electricity Act and the Government decree on stranded costs), public administration (HEO initiating re-negotiations) and the state-owned wholesale trader, who, undoubtedly, was bounded by state interest more than foreign-owned power plants. The treatening cascade of failures are identified in the form of EU investigation, obstacles of market opening and high enduser prices required intervention. To eliminate these, Hungary intervened in all levels of reality first with the reintroduction of regulated prices, and second with a two-step intervention violating the pacta sunt servanda principle and not paying net strainded costs to generators, at the and of the day increasing again country risk, decreasing trust in public administration and thus adding to the fragility of the system. Concerning the Gas Tariff Crisis, here Gazprom contract was the "T-state", where different and normally unconnected levels of reality crossed and the crisis hit Hungary. Here the systemic risk hidden throughout the complex system of normativity became apparent and started to cause a cascade of failures, the first stage of which was the level of HEO-resolutions on overhead charge reduction ("*rezsicsökkentés*"), where the Parliament intervined with formally revising HEO's status in order to stop the cascade of failures of the systemic risk event, but its long-term consequences are still inevitable.

Third, as to the borders of normativity's autonomy, the international investment protection was exclusively identified as such, with the observation that the expropriation standard of investment protection is ineffective due to its unattainably high practice. The other standard, FET is proven as a real border, as one component, the issue of legitimate expectation is capable in light of an extensive comparative case study of evaluating country risk, stable business, change of law and regulatory autonomy (i.e. sovereignty). Anyway, I finally concluded that international investment law makes investors – rather than taxpayers in host states – primarily responsible for managing the risks of their own investments in the absence of a specific state (privatization) guarantee, whilst through tentative problem analysis we can justifiedly state neither transparency requirements nor the guarantee of "effective means" was allegedly violated in a historical context of the normativity of Hungary's energy sector.

6.2. Conclusions of chapter 4

Hypothesis 2 is justified. Hungarian energy law is not only complicated but complex as well; the complexity axiom and the criteria of complex systems can be used to describe the behavioural patterns of normativity being robust yet fragile and to describe the phenomena of the three risks whilst also refuting linear casualities of classical leal thinking. As it can be seen from the examples of Hungarian energy (public administrative) law, heterogeneity (wholesale gas pricing), complexity above complicatedness (electricity production licensing) and system interconnectedness (on component level: Novenergia case, on level of legal branches: MAVIR case) show complex adaptive system features. Thus, even though there are significant differences compared to common law where such approaches are well-received, there are valid grounds to consider continental law and the public administration administering it as a complex system. Based on these findings, there are also valid grounds to investigate Hungarian energy (public administrative) law dynamics through such complex system phenomena like evolvability and the RYF dilemma (HEO changing role, the 'rezsicsökkentés' case) as well as complex constraints and systemic risks (the wind park licensing case). These are the aspects where complex system approaches may add a lot to the understanding of normativity and the operation of public administration, as well as to the identifying of systemic risk within the law. This should be applicable to other jurisdictions as well, especially in other countries with similar regulatory and public administration structures, both in CEE/SEE and beyond. Hence it is a promising new field for further interdisciplinary studies concerning public administration. In our belief, this should be a new direction of scientific and practical investigation in all regulated industries like energy, pharma, health care and financial institutions and in all jurisdictions with similar regulatory logic.

6.3. Conclusions of chapter 5

Hypothesis 3 is not justified in the sense that by coupling the frequency of references to law in public administrative resolutions by the HEA (as the public administration body of the Hungarian energy sector) with the place of these referred laws in the legal hierarchy (as defined by law) we will get a power-law model of the utilization of public administrative resolutions by the HEA as expected from complex adaptive systems and by the complexity axiom of transdisciplinarity in case we consequently remain bounded by the legal hierarchy. There were

deviations from or "errors" in this expected "ideal" power-law distribution in both directions, i.e. (i) law-ranked legal references frequently cited and (ii) high-ranked legal references seldom used. These justified the critical voices against unconditional applicability of scale-free power-law distributions in social sciences.

However, these identified "errors" let us closer to the failures of the legal and public administrative system by identifying regulatory systemic risk and quality concerns of public administration. Thus, our analysis of coupling references of norms in HEA resolutions with their alleged place in the legal hierarchy was accurate and successful in pointing out a significant systemic risk in form of a deviation from the expected (and flawed) pattern of references, identifying ÜKSZ as an overrepresented (level 6) public administrative resolution operating in practice as a quasi-law, in relation to which serious EU-investigation was conducted, and HEA pricing decrees (i.e. law) underrepresented, in connection to which even infringement proceeding and investor protection arbitral litigation were also initiated. Thus, this seems a promising kind of 'implied systemic risks indicator in public administration'. Though with the important reservation of the pilot samling project's fragmentary nature, the implied systemic systemic risk indicator was also effective in the sampling pilot project of electricity-related HEA resolutions too identifying a deviation again in two directions: a level 6 (i.e. law-ranked) norm approving MAVIR's Operational Code, that is exactly the same problem in nature than the ÜKSZ-related one; and a HEA decree (level 3) on price setting seldom referred that against points to a real systemic risk, the highly disputed change of role of the HEA discussed above in details.

In sum, we can say that the errors to the ideal state points to systemic risks in two directions:

(i) proliferation of norms: too low status in the legal hierarchy but high utilization

(ii) sleeping norms: too high status in legal hierarchy, not used/referred proportionally.

Both errors identified are not only legal errors, i.e. not only the problem of the level of regulation not accurately chosen but norms being in connection with the RYF problem and systemic risks, representing complex constraints in the public administration.

7. Discussion: outlook for further research and limitation of available research

7.1. Room for further research

There are still a lot to be said in these fields. Of course, further researches are highly necessary; we are also conducting a more extensive research project both for natural gas and electricity-related practice of the HEA with the very same model. However, our results so far even show that there is a clear room for identification of systemic risks via investigation of utilization patterns of norms through the HEA's public administrative practice. And also beyond: as it can be seen from the examples of Hungarian energy (public administrative) law, one of most rigid written continental public law regimes, there are valid grounds to investigate complex system approaches of understanding continental laws as complex systems even though there are significant differences between common law and continental legal systems. It is therefore beyond doubt that evolvability, RYF and systemic risk are clearly aspects of complex system investigations adding a lot to understand normativity per se. Complex system approaches and even the axioms of transdisciplinarity could therefore assist identifying and handling systemic risk within the law, also helping to understand and hopefully to mitigate country risk issues of the regulation and quality concerns of public administration. It is hence a promising new field for interdisciplinary experiences to use complex system approaches to tackle normativity governing the public sector as a complex system in three points: to understand the nature of normativity, to understand and handle risks (country risks, public administration-related risk and systemic risks), and connecting the two, in understanding the RYF dilemma, the *key dilemma of normativity*, providing a new approach to the legislator and of course also to the market players concerned.

As to the errors (diversions) in frequency of references during public administration utilization (by HEA) compared to the "expected" frequency based on the legal hierachy we observed that these pointed to real issues (manifested risks): preliminary ruling by the European Court of Justice, EU infringement proceeding and international investment protection dispute. This is indeed a very promising correlation. The findings can be generalized widely: (i) to other industries with single regulatory authorities in Hungary, e.g. pharma, monetary (ii) to other countries with regulated industries, especially with one-stop-shop public administration. Therefore, we see generalization possibilities in these two directions. For further researches, we recommend our aspects for investigation to consider, which are, in a unified form, expanding the summary points with which Chapter 5.1 started above:

	FACTORS
1.	Complexity in interconnectedness
2.	Reducing complicatedness → its effect on complexity
3.	Non-linearity and unpredictedness
4.	Issues of trust: country risk, quality of public administration
5.	Emergence
6.	Robust yet fragile dilemma
7.	Systemic risk
8.	**Proliferation of norms, sleeping norms**

7.1-1. Figure Unified considerations

Based on this, generalized utilization of our indicator is possible in the following method:

1.)	Ideal state of norm utilization	a clear power-law distribution graph
2.)	'Errors' in power-law graph	?
2a)	Too low utilization with too high status in legal hierarchy	Sleeping norms (like sleeping genes)
2b)	Too high utilization with too law status in legal hierarchy	Proliferation of norms (inflating normativity)
3	2a) and 2b) are both subject to emergence and RYF dilemma	Systemic risk
6.	Systemic risk → failure of cascades	Indicator to legislation

7.1-2**. Figure Scheme of method utilization**

7.2. My publications relating to the research topic

Books and publications:

Máté Tóth, Gyula Vastag: '**Hungarian Energy Law as an Example of Using Complex System Viewpoints to Understand Risks in Public Administration Normativity'** (Pro Publico Bono, English, 2020/2) https://folyoirat.ludovika.hu/index.php/ppbmk/article/view/648/4151

András Herczeg, Máté Tóth, Gyula Vastag: '**A megújuló villamosenergia-termelés térnyerésének hatása a magyarországi szénbányászat helyzetére, szabályozási kitekintéssel'** (The effect of the renewable energy production expansion on the Hungarian coal mining status with a regulatory outlook, magyar, Magyar Tudomány, 2020/3) Magyar Tudomány 2020/3 - A megújuló energia termelésének hatása a magyarországi szénbányászat helyzetére - MeRSZ

Fehér Alexandra, Máté Tóth: 'In whose interest? The Nord Stream 2 in an interdisciplinary approach' (**Kinek az érdeke? Az Északi Áramlat 2 interdiszciplináris megközelítésben**, magyar, in: Magyar Energetika, ISSN 1216-8599 2020/2, 22-32. p.

https://matarka.hu/cikk_list.php?fusz=170891

Máté Tóth: 'Watch out for Brussels: EU regulatory trends in the energy sector' (**Vigyázó szemetek Brüsszelre vessétek: az EU szabályozási tendenciái az energiaszektorban**, magyar) – Magyar Energetika ISSN 1216-8599; 2019/3, 33-43. pp

Miklós Rátky, Máté Tóth: 'Energy investment protection: is it worth?' (English) Almanac of the Hungarian Commercial Court of Arbitration by the Hungarian Chamber of Commerce and Industry and Hvg Orac, 2019 (406-430 pp.)
(book chapter, English)

András Herczeg, Máté Tóth: 'The status of the Hungarian coal mining is highly dependent on the international market trends and the regulatory policies' (**A magyarországi szénbányászat helyzete a megújuló energiatermelés térnyerésének tükrében**); XXI. International Mining, Metallurgical and Geology Conference, May 9-12, 2019, Baia Mare (Nagybánya), Romania, 6 pg.
(conference presentation + publication)

Máté Tóth, Gyula Vastag: 'Hungarian energy law as an example of using complex system viewpoints for the public sector', EUROMA conference issue, Budapest, 2018 June (conference presentation + publication, English)

Herczeg, András, Máté Tóth: 'Legal and financial challenges of PaksII and future power plants planned in the territory of the European Union' (**Jogi és finanszírozási kihívások Paks II és az Európai Unió területén tervezett jövőbeli atomerőművek előtt**); ENELKO Energy and Electrical Engineering Conference 2017, October 12-15, 2017, Oredea (Nagyvárad), Romania, 6 pg.
(conference presentation + publication)

Máté Tóth, Norbert Bálint, Andras Herczeg, Gábor Gebhardt: 'On certain regulatory aspects of the organisation of communal public utility services' (**A közösségi közműszolgáltatás megszervezésének egyes szabályozási kérdéseiről**, magyar) – Pro Publico Bono - Magyar Közigazgatás, April 2015, ISSN 2063-9058
http://uni-nke.hu/uploads/media_items/ppb-2015-1bel-0418.original.pdf

Herczeg, András, Máté Tóth: Observations and Lessons of the Long-Term Power Purchase Agreement Terminations in Hungary – MIC 2015: Managing Sustainable Growth, University of Primorska, Faculty of Management, Slovenia Eastern European Economics, USA, and Society for the Study of Emerging Markets, USA

Máté Tóth: The prospects of long-term contracts in the electricity market (**A hosszú-távú szerződések jövője a villamos energia piacán**) – Energiapolitikai Füzetek XXX., GKI Energiakutató, October 2014
OSZK catalogue identification number: 3561934, http://nektar.oszk.hu/peldinfo_spring/peldinfo.htm?id=3561934&language=hu&view=1

Herczeg, András, Máté Tóth: 'The Current Regulation Issues of the Hungarian Renewable Power Generation' (A magyarországi megújuló villamosenergia-termelés aktuális szabályozási kérdései, angol); ENELKO Energy and Electrical Engineering Conference 2014, October 9-12, 2014, Odorheiu Secuiesc (Székelyudvarhely), Romania, pp. 48-53.
(conference presentation + publication, English))

Máté Tóth, Andras Herczeg, Norbert Bálint, Gábor Gebhardt: 'Thoughts on the regulatory questions of the establishment and operation of the integrated, non-profit public utility' (**Gondolatok az integrált, nonprofit vezetékes közműszolgáltató létrehozásának és üzemeltetésének egyes szabályozási kérdéseiről**, magyar) – Hungarian Energy Association, Interdisciplinary Division,

September 2014 d www.e-met.hu/files/cikk1031_MET_hatteranyag_kozmu.pdf (in Hungarian)

Máté Tóth: 'The Question of regulated prices in the 21st century's Hungarian energy sector' (**A hatósági árak kérdőjele a XXI. század magyar energiaszektorában**) – Magyar Energetika, 2013/2 ISSN 1216-8599

Máté Tóth: 'The direction of and lessons learned from the Hungarian wind energy regulation at the dawn of the new promotion scheme (**A hazai szélenergia-szabályozás iránya és tanulságai az új támogatási séma hajnalán**, magyar) – Magyar Energetika, 2012/3 ISSN 1216-8599

Máté Tóth: Renewable energy – is law also renewable? Development of the regulatory framework for electricity produced from renewables (Megújuló energia – a jog is megújul? A megújuló energiaforrásokból termelt villamos energia szabályozási környezetének fejlődése) – 9th International Conference on Application of Natural-, Technological- and Economic Sciences, May 15, 2010, Szombathely, Hungary, 7 pg. (ISBN 9-639290-69-6)
(conference presentation + publication, English)

Máté Tóth: Blood is thicker than water… and than medicine?' (**A vér erősebb a víznél… és a gyógyszernél?**, magyar) – Focus Medicinae, 2008/3 ISSN: 1419-0478

Máté Tóth: 'Product liability and its sui generis characteristics' (**A termékfelelősség mint sui generis felelősségi alakzat specifikumai**, magyar) – ELTE ÁJK TDK Annual, 2008
(book chapter, Hungarian)

Máté Tóth: 'Product liability in Hungary and in the EU, reciprocity with product safety, in: Hungary in the EU' (**Termékfelelősség Magyarországon és az Európai Unióban, reciprocitás a termékbiztonsággal**, magyar) – book of the Hungarian National Assembly, 2007.
(book chapter, Hungarian)

Máté Tóth: 'The physicians' and the hospitals' liability for blood' (**Az orvos és a kórház termékfelelőssége a vérért**) – Focus Medicinae, 2007/1 ISSN: 1419-0478

Máté Tóth: 'Product liability of pharmacists' (**A gyógyszerész termékfelelőssége**, magyar), Gyógyszerészet, 2007/6 ISSN: 0017–6036

Interviews and press releases:

12 January 2020 888.hu interview
"Dr. Máté Tóth: overcoming the negative effects of climate change requires not sponsored prophets, but a change of attitude" (Dr. Tóth Máté: a klímaváltozás negatív hatásainak leküzdéséhez nem szponzorált prófétákra, hanem szemléletváltásra van szükség)
https://888.hu/okojobb/dr-toth-mate-a-klimavaltozas-negativ-hatasainak-lekuzdesehez-nem-szponzoralt-profetakra-hanem-szemleletvaltasra-van-szukseg-4222698/

14 November 2020 888.hu interview
"Dr. Máté Tóth: The real winner of the presidential election is not Biden, but high-tech cultural Marxism" („Dr. Tóth Máté: Az elnökválasztás valódi győztese nem Biden, hanem a high-techbe csomagolt kultúrmarxizmus")
https://888.hu/csak-neked-csak-most/dr-toth-mate-az-elnokvalasztas-valodi-gyoztese-nem-biden-hanem-a-a-high-techbe-csomagolt-kulturmarxizmus-4283658/

19 June 2020 888.hu interview
"Dr. Máté Tóth to 888: Seattle drowned in filth is the end product of lost focus" („Dr. Tóth Máté a 888-nak: a mocsokba fulladt Seattle a fókusztévesztés végterméke")
https://888.hu/csak-neked-csak-most/dr-toth-mate-a-888-nak-a-mocsokba-fulladt-seattle-a-fokusztevesztes-vegtermeke-4256707/

17 February 2020 888.hu interview
"Exclusive: the energy lawyer of the year first evaluated the Hungarian government's climate protection action plan to 888" („Exkluzív: az év energiajogásza először a 888-nak értékelte a magyar kormány klímavédelmi akciótervét")
https://888.hu/okojobb/exkluziv-az-ev-energiajogasza-eloszor-a-888-nak-ertekelte-a-magyar-kormany-klimavedelmi-akciotervet-4229479/

5 April 2020 Félegyházi Közlöny interview
”A Kiskunfélegyházian is awarded the Lawyer of the Year Award in the energy law category” („Kiskunfélegyházi Az Év Ügyvédje Díj kitüntetettje energiajog-kategóriában”)
https://felegyhazikozlony.eu/hirek/20104/kiskunfelegyhazi-az-ev-ugyvedje-dij-kituntetettje-energiajog-kategoriaban

26 March 2020 ORIGO interview
”According to the energy lawyer, this is what the epidemic means for the country’s energy sector” („Az energiajogász szerint ezt jelenti a járvány az ország energiaszektorára”)
https://www.origo.hu/jog/20200326-ratky-es-tarsa-ugyvedi-iroda-koronavirus-energiajogasz-energiaszektor-jarvany.html

18 February 2020 Wolters Kluwer interview
”Interview with the winner of the energy law category” („Interjú az energiajog kategória győztesével”)
https://jogaszvilag.hu/szakma/en-is-jogaszdijas-vagyok-interju-az-energiajog-kategoria-gyoztesevel/

30 January 2020 SzEEDSM interview
”SzEEDSM Student Dr. Máté Tóth LL.M became the Lawyer of the Year in the category of Energy Law on the Wolters Kluwer Lawyer Award 2019”
https://szeedsm.eu/szeedsm-student-dr-mate-toth-ll-m-became-the-lawyer-of-the-year-in-the-category-of-energy-law-on-the-wolters-kluwer-lawyer-award-2019/

21 January 2020 ORIGO interview
”The EU's growing investment protection conflict (Part 1)” („Az EU fokozódó befektetővédelmi konfliktusa (1. rész)”)
https://www.origo.hu/jog/20200121-ratky-es-tarsa-ugyvedi-iroda-energiajog-befektetovedelem-unios-jog.html

27 January 2020 ORIGO interview
”A serious question is how to initiate investment protection lawsuits (Part 2)” („Komoly kérdés, miképp lehet befektetővédelmi pereket indítani (2. rész)”)
https://www.origo.hu/jog/20200121-ratky-es-tarsa-ugyvedi-iroda-energiajog-befektetovedelem-unios-jog.html

13 December 2019 ORIGO interview
” Energy and law: a secure, accessible energy supply is a fundamental societal expectation” („Energia és jog: a biztonságos, elérhető energiaszolgáltatás alapvető társadalmi elvárás”)
https://www.origo.hu/jog/20191213-ratky-es-tarsa-ugyvedi-iroda-energia-jog-energiaszektor-tarsadalmi-elvaras.html

13 December 2019 ORIGO interview
”Energy and Law (Part 2): The Supreme Court's decision on the energy sector” („Energia és jog (2. rész): a Kúria döntése az energiaszektor kapcsán”)
https://www.origo.hu/jog/20191213-ratky-es-tarsa-ugyvedi-iroda-energiajog-energiaszektor-kuria-tarsadalmi-felelosseg.html

19 April 2019, 29 April 2019, ORIGO inerview
Relevant changes at the Nord Stream 2 project (fontos változások az Északi Áramlat 2 projektnél); Nord Stream 2: possible legal barriers from the EU (Északi Áramlat 2: lehetséges jogi korlátok az EU részéről)
1st part: https://www.origo.hu/jog/20190419-ratky-es-tarsa-ugyvedi-iroda-eszaki-aramlat-foldgaz-iranyelv-europai-unio.html
2nd part: https://www.origo.hu/jog/20190429-ratky-tarsai-ugyvedi-iroda-eszaki-aramlat-europai-unio-jogi-korlat.html

31 March 2019 ORIGO interview
The EU’s energy market structure is changing (átalakul az Európai Unió energiapiaci szerkezete) https://www.origo.hu/jog/20190331-ratky-es-tarsa-ugyvedi-iroda-energiapiac-atalakulas.html

22 March 2019 Magyar Nemzet interview
Brussels expands its competence – EU energy pipeline rules will be applicable to Gazprom (Brüsszel kiterjeszti a hatáskörét) https://magyarnemzet.hu/gazdasag/brusszel-kiterjeszti-a-hataskoret-6186470/

26 February 2019 Magyar Nemzet interview
The US is stepping on or just threatening? (Lép is vagy csak fenyeget az USA?), https://magyarnemzet.hu/gazdasag/lep-is-vagy-csak-fenyeget-az-usa-4947803/

28 December 2018, 30 Deceber 2018, ORIGO interview
EU legislative dumping during the holidays (EU-s energetikai jogalkotási dömping az ünnepek alatt)
1st part http://www.origo.hu/jog/lakossagi/20181228-ratky-es-tarsa-unios-energetikai-jogalkotas-domping.html?fbclid=IwAR1CLgk_jFd71LEEcI3_LFhGOVOPXfm5JK-nSt0gzhaXEeYbf9NoXnQpk4A;
2nd part http://www.origo.hu/jog/lakossagi/20181230-ratky-es-tarsa-ugyvedi-iroda-energia-europai-unio-jogalkotas.html?fbclid=IwAR2scSOqAViAseIiOHYcfwixvpSdaxxbSFmt1xXPq2hLExVfnSjakA6wn2Y

28 September 2018, 30 September 2018 ORIGO interview
The EU energy sector faces with significant changes (óriási változás előtt az európai energiaszektor szabályozása); New opportunities, newcomers in the European energy sector (új lehetőségek, új belépők az európai energiaszektorban)
1st part http://www.origo.hu/jog/lakossagi/20180930-ratky-es-tarsa-ugyvedi-iroda-europai-energiaszektor-valtozasok-uj-belepok.html?fbclid=IwAR3AmkUob3_f6_TuU_yUYrLoykrjrY5vhNFMiH9uydoHUUq1Bk4w57jtgVc
2nd part: http://www.origo.hu/jog/lakossagi/20180928-ratky-es-tarsa-uyvedi-iroda-europai-energiapiac-valtozas-jogszabaly.html?fbclid=IwAR0vPqfz5O0EAAa7yo6QQcq89gcfd6PPolBCX5kXaKzukQ0xd4UQVsosQMk

12 September 2018 ORIGO interview
The impact of the E.ON-RWE agreement on the Hungarian energy market (Az E.ON-RWE megállapodás hatásai a magyar energiapiacra)
http://www.origo.hu/jog/lakossagi/20180912-ratky-es-tarsa-ugyvedi-iroda-magyar-energiapiac-eon-rwe-megallapodas.html?fbclid=IwAR0URxXEis5kppYu5xI-vpj4wfaqwtJCoS1nMVUjkzKSGODJpDrDFnDzb20

3 April 2018, 4 April 2018 Piac&Profit interview
The new energy package ends overhead reduce (A rezsicsökkentésnek is véget vet az új energiacsomag)
1st part https://piacesprofit.hu/kkv_cegblog/a-rezsicsokkentesnek-is-veget-vet-az-uj-energiacsomag/
2nd part https://piacesprofit.hu/kkv_cegblog/uj-unios-energiacsomag-megeri-napelemet-venni/

10 June 2016 Piac&Profit interview
It's time to prepare to the green market revolution (már most készülni kell a zöld forradalomra)
http://1napelem.hu/hirek-erdekessegek/mar-keszulni-kell-zold-forradalomra/

April 2016 – Groundbreaking changes in the national green energy regulation
The press release resulted in 10 media appearances, 5 radio interviews and 1 speaking engagement in a professional conference. http://www.wolftheiss.com/press/press-releases/detail/groundbreaking-changes-in-the-national- green-energy-regulation/

January 2016 – First Meeting of Hungarian Energy Students
A press release was sent out on the First Meeting of Hungarian Energy Students
e.g.: http://www.news4business.hu/kozlemenyek/press_release.php?id=27973 (in Hungarian)

January 2015: The Paks investment may also be affected http://www.vg.hu/vallalatok/energia/arny-vetult-paks-ii-re-444794

September 2014: Public utility sector in Hungary to undergo drastic changes - foreign examples may lead the way
http://www.bbj.hu/economy/analysis-market-anxious-over-new-state-utility_86059

8. References

Aghion, P. and P. Bolton, 1987. Contracts as barrier to entry; American Economic Review, 77 (3), pp. 388-401.
Alagidede, P., Panagiotidis, T., and Zhang, X. 2011. Causal relationship between stock prices and exchange rates. Journal of International Trade and Economic Development. https://doi.org/10.1080/09638199.2011.538186
Alderson, David L. ad Doyle, John C. 2010. Contrasting Views of Complexity and Their Implications For Network-Centric Infrastructures, 40 IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans, Volume: 40, Issue: 4
Anabtawi, Iman and Schwarcz Steven L. 2011. Regulating Systemic Risk: Towards an Analytical Framework, Notre Dame Law Review
Arellano, M.S. and Serra, P. 2010. Long-term contract auctions and market power in regulated power industries; 38 (4), pp. 1759-1763.
Arshad, S.; Baleanu, D.; Huang, J.; Al Qurashi, M.M.; Tang, Y.; Zhao, Y. 2018. Finite Difference Method for Time-Space Fractional Advection-Diffusion Equations with Riesz Derivative. *Entropy*, *20*, 321.
Ashburner, L., Ferlie, E., Fitzgerald, L. and Pettigrew, A. 1996. The New Public Management in action. New York, Oxford University Press
Báez-Fernández, H.E. and Méndez-Piñero, M.I. 2013. A research on solar power purchasing agreements for small business; Proceedings of the 2013 Industrial and Systems Engineering Research Conference (Krishnamurthy, A. and W.K.V. Chan, eds.), pp. 296-305.
Bálint N, Herczeg A, Tóth M and Gebhardt G, 2015. 'A közösségi közműszolgáltatás megszervezésének egyes szabályozási kérdéseiről'. *Pro Publico Bono – Magyar Közigazgatás* 1, 4–18.
Barzelay, M. 2001. The new public management. New York, University of California Press
Binder, P.-M. 2008. Frustration in Complexity, Science, Vol. 320, Issue 5874, DOI: 10.1126/science.1156940
Biresselioglu, M.E., Yelkenci, T. and Oz, I.O. 2015. Investigating the natural gas supply security: A new perspective; Energy, 80, pp. 168-176.
B Bingham, B. Nabatchi L. T. and O'Leary, R. 2005. 'The New Governance: Practices and Processes for Stakeholder and Citizen Participation in the Work of Government'. *Public Administration Review* 65, no 5, 547–558.
Bommarito, Michael J. 2009. Exploring Relationships Between Legal Concepts in the United States Supreme Court 3 fig. 1 (Nov. 5, 2009) (unpublished manuscript), available at http://ssrn.com/abstract=1814169
Bouckaert, B. 1995. Measuring Quality, in Pollitt, C. and Bouckart, G. (eds.), Quality Improvement in European Public Services. Concepts, Cases and Commentary. Sage Publications: London et al.

Bouckaert, G. – Pollit, C. 2011. Public Management Reform. New York, Oxford University Press Inc.
Bouchet, M.H., Clark, E., Groslambert B. 2003. Country Risk Assessment. A Guide to Global Investment Strategy John Wiley&Sons, West Sussex
Buchanan, J. M. 1987. The Constitution of Economic Policy. The American Economic Review, Vol. 77. No. 3
Bunn, D.W. and E.R. Larsen 1999. Deregulation in electricity: Understanding strategic and regulatory risk; The Journal of the Operational Research Society, 50 (4), pp. 337-344.
Calverley, J. 1990. Country risk analysis, (2nd ed.), Butterworths, London
Canes, M.E. and D.A. Norman (1985): Long term contracts and market forces in the natural gas market; Journal of Energy and Development, 10, pp. 73-96.
Cao, H.; Ouyang, H.; Li, Y.; Li, X.; Chen, Y. 2018. The Power Law Characteristics of Stock Price Jump Intervals: An Empirical and Computational Experimental Study. *Entropy*, *20*, 304.
Chao, H.; Oren, S. and R. Wilson (2008): Reevaluation of vertical integration and unbundling in restructured electricity markets; In: Sioshansi, P. (ed.): Competitive electricity markets: design, implementation and performance, Elsevier Global Energy Policy and Economic Series, pp. 27-65.
Carpenter, D. P. and Krause, G. A. 2012. Reputation and Public Administration. Public Administration Review 72(1)
Chen, Y.; Jiang, B. 2018. Hierarchical Scaling in Systems of Natural Cities. *Entropy*, *20*, 432.
Clauset, A., Shalizi A. and Newman, C. R. 2009. Power-Law Distributions in Empirical Data Siam Review 51.
Contract on Compromise 1999. International Energy Agency & Organisation for Economic Co-operation and Development, Energy Policies of IEA Countries: Hungary 1999 Review, p. 72 (17 June 1999)
Coop, G. 2006. Long-term energy sale contracts and market liberalisation in new EU Member States – Are They Compatible?; International Energy Law and Taxation Review, 2, pp. 64-71.
Coop, G. 2009. Energy Charter Treaty and the European Union: Is Conflict Inevitable?", Journal of Energy & Natural Resources Law 27, pp. 404-419.
Cosset, J.C., Siskos, Y., Zopounidis C., 1992. Evaluating country risk: A decision sup-port approach, Global Finance Journal, 3 (1)
Creti, A. and B. Villeneuve 2004. Long-term contracts and take-or-pay clauses in natural gas markets, Energy Studies Review, 13 (1), pp. 75-94.
Crocker, K.J. and S.E. Masten 1985. Efficient adaptation in long-term contracts: Take-or-Pay Provisions for Natural Gas; American Economic Review, 75 (5) pp. 1083- 1093.
Crocker, K.J. and S.E. Masten 1988. Mitigating contractual hazards: unilateral options and contract length; Rand Journal of Economics, 19, pp. 327-343.
Crocker, K.J. and S.E. Masten 1991. Pretia Ex Machina? Prices and process in long- term contracts; Journal of Law and Economics, 34 (1), pp. 69-99.
Crocker, K.J. and S.E. Masten 1996. Regulation and administered contracts revisited: Lessons from transaction cost economics for public utility regulation; Journal of Regulatory Economics, 9, pp. 5-39.
Crutchfield, James P. 1994. Is Anything Ever New? Considering Emergence, in Complexity: Metaphors, Models, and Reality, University of California, Berkeley, California (George A. Cowan, David Pines & David Meltzer eds.).
Czékmann Zs. 2020. A gázpiaci modellváltás szabályozásának egyes lépései Magyarországon Agrár- és Környezetjog 2020. 28. szám
Dąborowski, T. 2011. Hungary: The state to have a greater stake in MOL, Analyses, The Center for Eastern Studies, https://www.osw.waw.pl/en/publikacje/analyses/2011-06-01/hungary-state-to-have-a-greater-stake-mol
Dębowski, Ł. 2018. Is Natural Language a Perigraphic Process? The Theorem about Facts and Words Revisited. *Entropy*, *20*, 85.
DG competition report on energy sector inquiry (2007): SEC (2006) 1724, January 10, 2007
Dobozi, I. 2004. Power Purchase Agreements and Competitive Power Markets: Irreconcilable Differences; 4th Annual Meeting of the Energy Regulators Regional Association Joint Meeting of the Tariff/Pricing and Licensing/Competition Committees, Budapest.
Dolzer, R. 2002. Indirect Expropriations: New Developments?11 N.Y.U. Envtl. L. J.
Dolzer, R. and C. Schreuer 2008. Principles of international investment law, Oxford, Oxford University Press, pp. 134.
Edwards, P. J., and Bowen, P. A. 1998. Risk and risk management in construction: A review and future directions for research. Engineering, Construction and Architectural Management. https://doi.org/10.1108/eb021087
EFQM, 'Driving organisational change and performance improvement', s. a. 2020. www.efqm.org (accessed 26 November 2020).
Eilmansberger, T. 2008. Bilateral Investment Treaties and EU Law; Stockholm International Arbitration Review, 2008/3.

European Union, *Quality in Public Administration – A Toolbox for Practitioners*, 2015. https://ec.europa.eu/digital-single-market/en/news/quality-public-administration-toolbox-practitioners (accessed 26 November 2020).
Eurostat 2019. Energy prices in 2019; Eurostat newsrelease: 79/2020 - 7 May 2020 https://ec.europa.eu/eurostat/documents/2995521/10826603/8-07052020-AP-EN.pdf/2c418ef5-7307-5217-43a6-4bd063bf7f44
Farber, Daniel A. 2003. Probabilities Behaving Badly: Complexity Theory and Environmental Uncertainty, 37 U.C. Davis Law Review
Finon, D. and Perez, Y. 2008. Investment risk allocation in restructured electricity markets, 2008 March, http://www.energy- regulators.eu/portal/page/portal/ICER_HOME/IERN_ARCHIV/Publications/Regulation%20-%20Deregulation/Finon_2008.pdf
Finon, D. and F. Roques 2008. Financing arrangement and industrial organization for new nucler build in electricity markets; Competition and Regulation in Network Industries, 9 (3), pp. 247-281.
FGSZ Zrt. 2019. Tízéves fejlesztési javaslat 2019 Nyilvános konzultáció, Budapest
Fuentes, M.A. 2018. Non-Linear Diffusion and Power Law Properties of Heterogeneous Systems: Application to Financial Time Series. *Entropy*, *20*, 649.
Fumagalli, C. and Motta, M. 2006. Exclusive dealing and entry, when buyers compete; American Economic Review, 96, pp. 785-795.
Geldof, S., Staes, P.,Stoffels, A. and Thijs, N. 2011. Five years of CAF 2006: From Adolescence to Maturity – What next?. Maastricht, European Institute of Public Administration
Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P. and Trow, M. 2010. The new production of knowledge: the dynamics of science and research in contemporary societies. London: SAGE Publications Ltd. doi: 10.4135/9781446221853
GKI Energiakutató és Tanácsadó Kft 2009. A piacnyitás tapasztalatai a villamosenergia-szektorban, Energiapolitikai füzetek XV.
Goldberg, V.P. and J.R. Erickson 1987. Quantity and price adjustment in long-term contracts: A case study of petroleum coke; Journal of Law and Economics, 30, pp. 369-398.
Golmankhaneh, A.K.; Fernandez, A.; Golmankhaneh, A.K.; Baleanu, D. 2018. Diffusion on Middle-ξ Cantor Sets. *Entropy 20*, 504.
Gregorio, D. D. 2005. Re-thinking country risk: insights from entrepreneurship theory, International Business Review, Volume 14, Issue 2, 2005
Gruening, G. 1998. Origin and theoretical basis of the New Public Management (NPM). Draft for the IPMN conference in Salem/Oregon
Gruson, Michael 1987.The Global Securities Market: Introductory Remarks, Columbus Law Rerview
György L. 2017. Egyensúlyteremtés, Századvég, p. 56.
Haffner T. 2016. A dél-dunántúli gázellátás története 1869-től napjainkig. In: Közép-európai közlemények, (9) 3. pp. 38-57.
Halachmi, A. 1995. Measure of Excellence, in Hill, H. ,Klages, H. and Löffler, E. (eds.), Quality, Innovation and Measurement in the Public Sector. Peter Lang Verlag, Frankfurt a.M
Hanson, R. J. 1992. The Legal Framework for Privatization in Hungary: Introduction and Overview of the Legislation, 23 Law & Policy in Int'l Bus. 441, 441
Harms, B.C. 2009. Change-in-law provisions in a carbon-constrained America: The impact of carbon regulation on long-term power purchase agreements; The Electricity Journal; 22 (5), pp. 19-28.
Harrison, T. 1994. Communication and interdependence in democratic organizations. In S. Deetz (Ed.), *Communication Yearbook* Thousand Oaks, CA: Sage.
Hauteclocque, A.de and Glachant, J.-M. 2009. Long-term energy supply contracts in European competition policy: Fuzzy not crazy, Energy Policy, 37 (12), pp. 5399-5407.
Hegedüs K. 2019. Földgázfüggőség, levegőszennyezés és energiaszegénység Magyarország példáján keresztül, PhD értekezés, Budapesti Corvinus Egyetem, Budapest, pp. 30-31., http://phd.lib.uni-corvinus.hu/1056/1/Hegedus_Krisztina_dhu.pdf
Hegedüs K., Endrődi-Kovács V. 2019. Energy poverty in Hungary, Köz-Gazdaság - Review of Economic Theory and Policy, 14(3)
Heidegger, M. 2006. Költők: mi végre? in: Rejtekutak, Osiris, Budapest
Helbing, Dirk. 2013. Globally networked risks and how to respond, Nature, volume 497 doi:10.1038/nature12047
Herczeg A and Vastag Gy, 'New directions in the Hungarian energy market: Transformation of the national public utility', *Pro Publico Bono – Magyar Közigazgatás* 7, no 2 (2019), 110-121. DOI: 10.32575/ppb.2019.2.7
Jhering, R. von 1877. Der Zweck im Recht (in German). I. Leipzig: Breitkopf und Härtel.

Herrero S. T. - Ürge-Vorsatz D. 2014. Energiaszegénység Magyarországon, első értékelés. Éghajlatváltozási és Fenntartható Energiapolitikai Központ (3CSEP), Közép-európai Egyetem (CEU), Budapest
Holme, P. 2019. Rare and everywhere: Perspectives on scale-free networks. *Nat Commun* 10, 1016. https://doi.org/10.1038/s41467-019-09038-8
Horánszki B. 2006. Vállalati struktúrák változásai a földgázellátó szektorban; Vezetéstudomány XXXVII. évf. 2006. 4.
Hortay O., Szőke T. 2019. Keresleti árrugalmasság becslése a magyar villamosenergia-piacon; Közgazdasági Szemle LXVI.
Hubbard, G. and R. Weiner 1986. Regulation and long-term contracting in US natural gas markets; Journal of Industrial Economics, 35, pp. 71-79.
Hubbard, G. and R. Weiner 1991. Efficient contracting and market power: Evidence from the US natural gas industry, Journal of Law and Economics, 34, pp. 25-67.
IAA International Energy Agency & Organisation for Economic Co-operation and Development (1999): Energy Policies of IEA Countries Hungary 1999 Review, p. 16.
Jacomy M. 2020. Epistemic clashes in network science: Mapping the tensions between idiographic and nomothetic subcultures. Big Data & Society. 7.
Janssen, R. 2014. Chilling statistics on fuel poverty, European Council for an Energy Efficient Economy, http://www.eceee.org/all-news/columns/Rod_Janssen/rod-janssen-chilling-statistics/
Jones, Gregory Todd. 2012. Dynamical Jurisprudence: Law as a Complex System, Georgia State University Law Review: Vol. 24, Iss. 4. Available at: http://readingroom.law.gsu.edu/gsulr/vol24/iss4
Joskow, P.R. 1985. Vertical integration and long-term contracts: The case of coal- burning electric generating plants; Journal of Law, Economics, & Organization, 1 (1), pp. 33-80.
Joskow, P.R. 1987. Contract duration and relationship-specific investments: Empirical evidence from coal markets; The American Economic Review, 77 (1), pp. 168-185.
Joskow, P.R. 1988. Price adjustment in long-term contracts: The case of coal; Journal of Law and Economics, 31(1), pp. 47-83.
Joskow, P.R. 1990. The performance of long-term contracts: further evidence from coal markets; The RAND Journal of Economics, 21 (2), pp. 251-274.
Karaboga, D., and Akay, B. 2009. A survey: Algorithms simulating bee swarm intelligence. Artificial Intelligence Review. https://doi.org/10.1007/s10462-009-9127-4
Katz, D., and Kahn, R. L. 1978. Organizations and the system concept. Classics of Organization Theory. Kelly, D. L. (2005). Price and quantity regulation in general equilibrium. Journal of Economic Theory. https://doi.org/10.1016/j.jet.2004.07.006
Katz, Daniel Martin, Gubler, Joshua R., Zelner, Jon, Bommarito, Michael J., Provins, Eric and Ingall, Eitan. 2011. Reproduction of Hierarchy? A Social Network Analysis of the American Law Professoriate, 61 J. Legal Educ.
Katsuhito, Iwai. 2016. The Foundation for a Unified Theory of Fiduciary Relationships: 'One May Not Contract with Oneself', Working Paper. Available at SSRN: https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2424098
Kauffman, Stuart A. 1995. At Home in the Universe: The Search for Laws of Self-organization and Complexity Oxford University Press, New York
Kekes, John. 2004. Az egalitarizmus illúziói, Attraktor
Kildegaard, A. 2008. Green certificate markets, the risk of over-investment, and the role of long-term contracts; 36 (9), pp. 3413-3421.
Kiss, T., and Strunk, J. 2006. Unsupervised multilingual sentence boundary detection. Computational Linguistics. https://doi.org/10.1162/coli.2006.32.4.485
Kiss T. 2014. A háztartások fűtési célú gázfogyasztásának rendszerdinamikai modellezése a földgáz árváltozásának függvényében. Marketing és Menedzsment, 2014. különszám. pp. 102-113.
Klabbers, J. 2009. Treaty Conflict and the European Union; Cambridge University Press, Cambridge.
Klakattawi, H.S.; Vinciotti, V.; Yu, K. 2018. A Simple and Adaptive Dispersion Regression Model for Count Data. *Entropy* , *20*, 142.
Klijn, E H and I Snellen, 'Complexity Theory and Public Administration: A Critical Appraisal', in *Managing Complex Governance Systems*, ed. by G R Teisman, M W van Buuren and L M Gerrits. Routledge, 2009.
Knittel, C.R. 2003. Market structure and the pricing of electricity and natural gas; The Journal of Industrial Economics, 51 (2), pp. 167-191.
Kolb, D. and Fry, R. 1974. 'Toward an Applied Theory of Experiential Learning', in Cooper, C. (ed.) Theories of group process. New York: Jon Wiley and Sons.
Kulish, N. 2008. Crisis Comes to Hungary in Loans of Francs and Euros, N.Y. Times (18 October 2008) http://www.nytimes.com/2008/10/19/world/europe/19hungary.html.

Labandeira et al. 2017. A meta-analysis on the price elasticity of energy demand, Energy Policy, 2017 Issue 102 pp. 549–568
Landon T. 2009. Politics Add to Economic Turmoil in Hungary, N.Y. Times (1 April 2009), http://www.nytimes.com/2009/04/02/business/global/02hungary.html.
Lee, Young-joo and Wilkins, Vicky M. 2011. More Similarities or More Differences? Comparing Public and Nonprofit Managers' Job Motivations. Public Administration Review 71(1)
Levin, D., and Smith, J. 1994. Equilibrium in auctions with entry. American Economic Review. https://doi.org/10.2307/2118069
Levin, S. A. 1998. Ecosystems and the biosphere as complex adaptive systems. Ecosystems. https://doi.org/10.1007/s100219900037
Li, X., and Clerc, M. 2019. Swarm Intelligence. In International Series in Operations Research and Management Science. https://doi.org/10.1007/978-3-319-91086-4_11
Li, Y., Zhou, X., Bruza, P., Xu, Y., and Lau, R. Y. K. 2008. A two-stage text mining model for information filtering. International Conference on Information and Knowledge Management, Proceedings. https://doi.org/10.1145/1458082.1458218
Lisa Blomgren Bingham, Tina Nabatchi, and Rosemary O'Leary. 2005. The New Governance: Practices and Processes for Stakeholder and Citizen Participation in the Work of Government. Public Administration Review 65(5)
Lopes, A.M.; Tenreiro Machado, J. 2018. Complexity Analysis of Global Temperature Time Series. *Entropy 20*, 437.
Löffler, Elke. 2001. Quality Awards as a Public Sector Benchmarking Concept in OECD Countries. Some Guidelines for Quality Award Organisers', Public Administration and Development, 21 (1)
Löffler, Elke. 2013. Defining Quality in Public Administration, NISPAcee Conference, Riga. http://unpan1.un.org/intradoc/groups/public/documents/nispacee/unpan005013.pdf
Lopes, A.M.; Machado, J.A.T. 2018. Power Law Behaviour in Complex Systems. Entropy 20, 671. https://doi.org/10.3390/e20090671
Lorenz, Edvard 1967 The nature and theory of the general circulation of atmosphere. World Meteorological Organization. No. 218
Lorenz, Konrad. 1966. *On Aggression*. New York: Harcourt, Brace & World
MacCarthaigh, M. 2008. Public Service Values, CPMR Discussion Paper 39, Institute of Public Administration, www.ipa.ie
Manuel, J. G. 1996. Common Contractual Risk Allocation in International Power Projects; Columbia Business Law Review, 1 (37), pp. 37-59
March, J. G. 1991. 'How Decisions Happen in Organizations', Human–Computer Interaction, 6(2), pp. 95–117. doi: 10.1207/s15327051hci0602_1.
March, J. G. and Simon, H. A. 1958. Organizations. Wiley.
Marron, S. T., Tyurin, E.N. Wile, J.H. and Trader G. 1997. Everyone wins: renegotiating purchase power agreements, 10 (3), pp. 76-82.
Marsick, V. J. and Watkins, K. E. 2001. 'Informal and Incidental Learning', New Directions for Adult and Continuing Education, 2001(89), p. 25. doi: 10.1002/ace.5.
Max-Neef, M. A. 2005 'Foundations of transdisciplinarity', Ecological Economics, 53(1), pp. 5–16. doi: 10.1016/j.ecolecon.2005.01.014.
McEvily, Conor P. 2012. Vested Interests: The Federal Felon Body-Armor Ban and the Continuing Vitality of Scarborough v. United States, 100 GEO. L.J. 1341, 1398
Meek, J W, J De Ladurantey and W H Newell, 'Complex systems, governance and policy administration consequences'. *Emergence: Complexity and Organization* 9, nos 1–2 (2007), 22–32.
Miller, John H and Page, Scott E. 2007. Complex Adaptive Systems: An Introduction to Computational Models of Social Life, Princeton University Press
Mitchell, Melanie. 2009. Complexity: A Guided Tour
Mitleton-Kelly, E, *Ten principles of complexity and enabling infrastructures. Complex systems and evolutionary perspectives of organisations: the application of complexity theory to organisations*. Amsterdam: Elsevier, 2003.
Molnár G. 2006. Magyarországi gázellátó társaságok 2005-ben https://www.vgfszaklap.hu/lapszamok/2006/szeptember/926-magyarorszagi-gazellato-tarsasagok-2005-ben
Mondt, K. and Despontin, M. 1986. Evaluation of country risk using multicriteria analysis", *Technical Report*, Vrije Universiteit Brussel.
Mulherin. H. 1986. Complexity in long-term contracts: An analysis of natural gas contractual provisions; Journal of Law, Economics and Organization, 2, pp. 105-117.

Nam, Y. W., Yoon, Y.T., Hur, D., Park, J.-K. and S.-S. Kim 2006. Effects of long- term contracts on firms exercising market power in transmission constrained electricity markets; Electric Power Systems Research; 76 (6-7), pp. 435-444.
Newman, M. E. J. 2005. Power laws, Pareto distributions and Zipf's law. Contemp. Phys. 46, 323–351.
Newman, M. E. J. 2003. The structure and function of complex networks. SIAM Rev. 45, 167–256.
Nicolescu, B. 2002. Manifesto of Transdisciplinarity (Translated by Karen-Claire Voss). Suny Series in Western Esoteric Traditions. 2002, New York: SUNY Press.
Nicolescu, B. 2005. 'Towards Transdisciplinary Education', The Journal for Transdisciplinary Research in Southern Africa. doi: 10.4102/td.v1i1.300.
Nicolescu, B. 2010. 'Methodology of Transdisciplinarity – Levels of Reality , Logic of the Included Middle and Complexity', Transdisciplinary Journal of Engineering and Science. doi: 10.1080/02604027.2014.934631.
Nicolescu, B. 2014a From Modernity to Cosmodernity: Science, Culture, and Spirituality. Albany, NY: State University of New York Press.
Nicolescu, B. 2014b. 'Multidisciplinarity, Interdisciplinarity, Indisciplinarity, and Transdisciplinarity: Similarities and Differences', RCC Perspectives. Rachel Carson Center, (2), pp. 19–26. Available at: http://www.jstor.org/stable/26241230.
Noss, Reed F. 1994. Some Principles of Conservation Biology, as They Apply to Environmental Law, Chicago-Kent Law Review 69, Chicago-Kent College of Law
Paardekooper, S., et al. .2018. Heat Roadmap Hungary: Quantifying the Impact of Low-Carbon Heating and Cooling Roadmaps.
Popper, K. R. 1992. Unended quest: An intellectual autobiography. New Editio. London, UK: Routledge.
Povstenko, Y.; Kyrylych, T. 2018. Time-Fractional Diffusion with Mass Absorption in a Half-Line Domain due to Boundary Value of Concentration Varying Harmonically in Time. *Entropy*, *20*, 346.
Rago, William V. 1994. Adapting Total Quality Management to Government: Another Point of View, Public Administration Review 54(1)
Ranganathan, V. 2003. Tanir Bavi: How Not to Sign PPAs; Economic and Political Weekly; 38 (27), pp. 2791-2794.
Rogers, C.D. 1986. Long term contracts and East-West trade in non-fuel minerals; Resources Policy, 12 (3), pp. 204-222.
Rogers, C.D. and K. Roberston 1987. Long term contracts and market stability: The case of iron ore; Resources Policy, 13 (1), pp. 3-18.
Ross, Alf. 1958. On Law and Justice. University of California Press, Los Angeles
Ruhl, J. B. 2008. Law's Complexity - A Primer, Georgia State University Law Review Symposium Issue, Forthcoming; FSU College of Law, Public Law Research Paper No. 313. Available at SSRN: https://ssrn.com/abstract=1153514
Ruhl, J. B. 2014. Managing Systemic Risk in Legal Systems, Indiana Law Journal: Vol. 89 : Iss. 2. Available at: https://www.repository.law.indiana.edu/ilj/vol89/iss2/2 603
Ruhl, J. B. and Salzman, James. 2003. Mozart and the Red Queen: The Problem of Regulatory Accretion in the Administrative State, 91 GEO. L.J. 757
Ruhl, J. B. and Katz, Daniel Martin. 2015. Measuring, Monitoring, and Managing Legal Complexity, Iowa Law Review, Vol. 101:191; Vanderbilt Public Law Research Paper No. 15-1. Available at SSRN: https://ssrn.com/abstract=2566535
Ruhl, J B, D M Katz, and M J Bommarito, 'Harnessing legal complexity'. 2017. *Science* 355, no 6332 (2017), 1377–1378.
Russel, S. 2010. ISO 9000:2000 and the EFQM Excellence Model: competition or co-operation?. In: Total Quality Management and Business Excellence
Sawyer, R. Keith. 2005. Social Emergence: Societies as Complex Systems, Cambridge University Press, New York
Schmitt, C. 2007. The Concept of the Political, University of Chicago Press, p 5
Schreuer C. 2006. The Concept of Expropriation under the ECT and other Investment Protection Treaties; In Ribeiro C. (ed.) 2006. Investment arbitration and the Energy Charter Treaty, pp. 144-145.
Schumpeter, J. A. 1994. Capitalism, Socialism and Democracy. Routledge, London
Sebestyénné Sz. T. 2018. A hatósági árcsökkentés lakossági energiafelhasználásra gyakorolt hatásának vizsgálata indexdekompozícióval Közgazdasági Szemle LXV.
Sohn, J. L. 2009. The Case for Prudential Standing, University of Memphis Law Review 39.
Stammler, R. 1922. Lehrbuch der Rechtsphilosophie. Berlin and Leipzig: de Gruyter
Suchmann T. 1995. Tájékoztató az Országgyűlés 1995. november 1-i ülésnapjára "Az energiagazdálkodás privatizációja" tárgyában Budapest, 1995. október

Századvég Gazdaságkutató Zrt. (2017): Energetikai monitor 2017. September
Szigeti, P. 2006. Norma és valóság. In: Válogatott tanulmányok a jogelmélet, az alkotmányjog és a politikaelmélet köréből, SZIE MTA
Szigeti, P. and Takács, P. 1998. A jogállamiság jogelmélete. Napvilág Kiadó, Budapest.
Szilágyi, P. 1998. Jogi alaptan, Nemzeti Takönyvkiadó
Szmodis Jenő. 2011. A jog multidiszciplináris megközelítéséről, Magyar Tudomány 2011/1
Vermeule, Adrian. 2010. Second Opinions 3–6, Harvard Law School Pub. Law & Legal Theory Working Paper Series, Paper No. 10–38, available at http://ssrn.com/abstract =1646414
Sztankó É. 2011. Miért összeegyeztethetetlenek a magyar hosszú távú villamosenergia-vásárlási megállapodások a közösségi vívmányokkal?; Közgazdasági Szemle; 58 (4); pp. 653-665.
Takácsné T. B., Kotek P. Selei A. 2019. A magyar gázpiaci liberalizáció 15 éve; Vezetéstudomány I. évf.
Talus, K. 2007. Long-term gas agreements and security of supply - between law and politics; European Law Review, 32 (4), pp. 535-548.
Talus, K. 2011. United States natural gas markets, contracts and risks: What lessons for the European Union and Asia-Pacific natural gas markets?; Energy Policy, 74, pp. 28-34.
Tanaka, R. 2005. Scale-rich metabolic networks. Phys. Rev. Lett. 94, 168101.
Tang, C. 1993. Structure and price adjustments in long-term contracts: The case of coking coal trade in the Asian-Pacific market; Energy Policy, 21 (9), pp. 944-952.
Tarasov, V.; Tarasova, V. 2018. Criterion of Existence of Power-Law Memory for Economic Processes. *Entropy 20*, 414.
Teisman, G R, 2000. 'Models for research into decision-making processes: on phases, streams and decision-making rounds'. *Public Administration* 78, 937–956.
Teisman, G. R. 2000. Models for research into decision-making processes: on phases, streams and decision-making rounds'. Public Administration 78, pp. 937–956.
Tietje, C. 2008. The Applicability of the Energy Charter Treaty in ICSID Arbitration of EU Nationals vs. EU Member States; Martin-Luther-University Halle-Wittenberg, Transnational Economic Law Research Centre
Tobi, E. 2012. How can the problem of insufficient demand as a risk be addressed in power purchase agreement (PPA)?; http://www.dundee.ac.uk/cepmlp/gateway/files.php?file=cepmlp_car16_68_929990408.pdf
Tóth M. and Vastag Gy. 2020. Hungarian Energy Law as an Example of Using Complex Systems Viewpoints to Understand Risks in Public Administration Normativity', Pro Publico Bono – Magyar Közigazgatás 8, no 2
Tóth M. 2013. The Question of Regulated Prices in the 21st Century's Hungarian Energy Sector – Magyar Energetika, 2013/2 ISSN 1216-8599
Verrill, C.O. 2011. Introductory note to the International Centre for Settlement of Investment Disputes: AES Summit Generation Ltd. v. Republic of Hungary (ICSID); International Legal Materials, 50 (2), pp. 181-225.
Vince P. 2009. Modellváltás a földgázellátásban. In: Verseny és szabályozás. (Szerk: Valentiny Pál – Kiss Ferenc). MTA KTI
Vince P. 2008. Tulajdonosi koncentráció, vállalati összefonódás. Versenyfelügyeleti döntések és az energiaszektor vállalati szerkezetének alakulása. In: Verseny és szabályozás. (Szerk.: Valentiny Pál – Kiss Ferenc) MTA KTI
Wang, C., Cheng, Z., Yue, X.-G., & McAleer, M. 2020. Risk Management of COVID-19 by Universities in China. Journal of Risk and Financial Management. https://doi.org/10.3390/jrfm13020036
Walls, W.D. 1998. Take-or-pay contracts and efficiency; Asian Economic Review, 40, pp. 30-39.
Wälde, T. 2004. Arbitration in the Oil, Gas and Energy Field: Emerging Energy Charter Treaty Practice; Transnational Dispute Management, 1 (2)
Wang, X., McCallum, A., & Wei, X. 2007. Topical N-grams: Phrase and topic discovery, with an application to information retrieval. Proceedings - IEEE International Conference on Data Mining, ICDM. https://doi.org/10.1109/ICDM.2007.86
Watkins, Nicholas W. and Freeman, Mervyn P. 2008. Natural Complexity, Science Vol. 320, Issue 5874, DOI: 10.1126/science.1151611
Weber, M. 2005. The protestant ethic and the spirit of capitalism. In The Protestant Ethic and the Spirit of Capitalism. https://doi.org/10.4324/9780203995808
Weiler, T. and Wälde, T. 2004. Investment Arbitration under the Energy Charter Treaty in the light of new NAFTA Precedents: Towards a Global Code of Conduct for Economic Regulation; Transnational Dispute Management, 1.
Wesel, Uwe. 1984. Juristische Weltkunde. Eine Einführung in das Recht. Suhrkamp, Frankfurt am M., 1984. 72
World Bank Technical Paper 2000. Hungary: A Regulatory and Structural Review of Selected Infrastructure Sectors, No. 474, p. 37.
World Bank Technical Paper 1999. Privatization of the Power and Natural Gas Industries in Hungary and Kazakhstan, No. 451, p. 44 .

Wu, Y., Li, H., Gou, Q., and Gu, J. 2017. Supply chain models with corporate social responsibility. International Journal of Production Research. https://doi.org/10.1080/00207543.2017.1346833
Yakubo, K., Saijo, Y., an d Korošak, D. 2014. Superlinear and sublinear urban scaling in geographical networks modeling cities. Physical Review E - Statistical, Nonlinear, and Soft Matter Physics. https://doi.org/10.1103/PhysRevE.90.022803
Yu, Peter K. 2005. Intellectual Property and the Information Ecosystem, Michigan State Law Review. 1. Available at SSRN: https://ssrn.com/abstract=578575
Zeithaml, V. A., Parasuraman, A. and Berry, L.L. 1990. Delivering Quality Service. Balancing Customer
Zou, X-Y. and Ren, Y-L. 2007. Auction mechanism design in wholesale electricity market considering impacts of long-term contract; Systems Engineering - Theory & Practice; 27 (8), pp. 118-126.