

The Case for Effective Electricity Regulation

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This paper examines the case for independent and effective electricity regulation. After a brief background on the evolution of electricity regulation and common regulatory frameworks in existence today, key structural and financial requirements with respect to regulatory independence and effectiveness are discussed. Examples from existing global structures and best practice are used to understand the key components of an effective regulatory structure. There is a particular focus on independence and credibility, composition and staffing, oversight, budgetary independence, and transparent decision-making structures and processes. The paper concludes by discussing recommendations that should play a critical role in ensuring delivery of value to consumers in an affordable and environmentally responsible manner.

I. INTRODUCTION

In late November 2014, the United Kingdom's main gas and electricity regulator, the Office of Gas and Electricity Markets (Ofgem), rejected the business plans of five out of the six privately owned electricity network providers, citing that they could do more to "deliver value to customers" (Murray 2013). This decision by Ofgem will require these organizations to invest approximately £17 billion to maintain and improve the existing electricity network, which also guarantees a significant share for electricity generation from renewable sources. More significantly, Ofgem finalized price con-

trols, effective April 2015, that are expected to transfer approximately £900 million in cost savings to consumers over an eight year period (Warner 2014). This step by Ofgem sends a strong message to network providers and consumers and highlights how a strong and independent regulator can act to safeguard consumer welfare while ensuring much needed investment in public infrastructure without burdening the public exchequer and incurring related macroeconomic consequences.

One would think that measures such as Ofgem's should be quite common, but this is not

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the case. Across the world, there are few regulators that have Ofgem's long-term vision and purpose. The more common situation is one that was seen in Bulgaria in early 2013, when consumers received electricity bills that were two times higher than those of the previous month. The Bulgarian electricity market was similarly structured to that of the UK, with three privately owned electricity network providers overseen by the State Commission for Energy and Water Regulation (SCEWR) (*The Economist* 2013). Allegedly, the companies estimated electricity bills using complex and illegal formulas that contributed to a complete lack of accountability to the government and regulator. The situation reached a climax in January 2013 with widespread street protests across the country, and finally culminated in the fall of the government (*The New York Times* 2013).

What both the aforementioned examples emphasize is that provision of essential services such as electricity is a critical and emotive issue for consumers. Electricity is an important development resource as it facilitates the provision of energy services that can be used to further other development priorities such as healthcare and education. Electricity is also a key production input for agriculture and industry. The overall importance of electricity as an economic resource also lends it considerable political salience. Consequently, the electricity regulator plays a central role in the success or failure of the electricity market in any country. The purpose of this paper is to examine the case for independent and effective electricity regulation for markets that are dominated by either public or private sector electricity providers. After looking at several case studies, it appears that there are a few vital elements

that are necessary for an effective regulator to flourish. These revolve around ensuring independence and credibility and span across governance mechanisms such as composition and staffing, oversight, budgetary independence and steady sources of funding, and independence and transparency in decision-making structures and processes. These issues are particularly salient for countries that do not have a history of independent regulation or are considering the establishment of an independent electricity regulator to bring about vital and long-term improvements in their electricity utility industry.

This paper is structured in the following manner. In the next section, I provide a brief background and history of how regulation in the electricity sector has evolved since the late 1800s and compare common regulatory frameworks. In the third section, I discuss key structural and financial requirements that are related to regulatory independence and effectiveness. I also highlight some best practices as well as ineffective and counterproductive regulatory approaches found in developed and emerging markets. Section IV concludes by reiterating the criticality of effective regulation in ensuring delivery of value to consumers in an affordable and environmentally responsible manner.

II. REGULATORY REGIMES TODAY A BRIEF HISTORY OF THE EVOLUTION OF ELECTRICITY REGULATION

The origins of electricity regulation can be found in the early 20th century in the United States and Europe. The nascent electricity industry, founded in the final quarter of the 19th century, consisted of mostly urban private suppliers who required a special franchise issued

by the municipal corporation. These early days provided fertile ground for predatory behavior: there was no structure or process followed in issuing franchises, and municipal corporations, often in cahoots with corporations, exploited consumers and/or enriched themselves (Geddes 1992). Corporations also engaged in price discrimination, charging higher rates for rural and far-flung communities (Valentine 2011). The prevalent issues of the emerging industry had political salience, which laid the foundation for more centralized regulation, and also served to safeguard public interest by achieving the most efficient allocation of public resources (Valentine 2011). By 1907, the American states of Wisconsin and New York led the way by enacting far-reaching laws to establish powerful state commissions that superseded the authority of municipal corporations. Most states followed suit, and this structure has largely remained in place since then. Privately owned utilities are regulated by the government (Geddes 1992).

The UK followed a slightly different path. In the 1920s, central control of the electricity sector was enhanced through the creation of a “national gridiron” which later evolved into the National Grid (Horrocks and Lean 2011). By 1938, the entire industry for England, Wales, Scotland, and Northern Ireland had been nationalized and by 1947, the British Electricity Authority (BEA) was established with the responsibility for generation and transmission as well as policies and finance (Horrocks and Lean 2011). The US did not see nationalization at this level, though it did establish the Federal Power Commission (now the Federal Energy Regulatory Commission), whose role was to coordinate larger issues that transcended state borders (Geddes 1992). In 1989, the UK finally

moved to an industry structure more aligned with that of the US, shifting away from a state-owned vertically-integrated model to a market-driven model based on private suppliers. An independent regulatory system was set up, headed by the Director General of Electricity Supply who would be supported by the Office of Electricity Regulation (OFFER). A board, the Gas and Electricity Markets Authority, later replaced OFFER and a single regulatory office, the Office of Gas and Electricity Markets (Ofgem), for both the gas and electricity sectors was created.

The move to a more centralized state or national regulatory structure finds support and opposition. An argument in support refers to the “natural monopoly” nature of the electricity utility industry, which holds that one firm can serve the entire market more efficiently and cheaply than two or more firms. Thus, the government allows the firm a regional monopoly so that the firm can earn a “fair” rate of return on its cost and investment (Geddes 1992). The argument opposing a national regulatory structure holds that since municipal regulation encourages competition, state regulation is more able to protect producers and serve their own private interests. Producers could use regulations to insulate themselves from competition, and thus operate in a monopoly and realize monopoly profits (Geddes 1992). This view has its origins in the theory of regulatory capture, developed mainly by George Stigler (1971). Regardless of the advantages or disadvantages, this current model of state regulation has largely remained in place.

COMPARISONS OF VARIOUS REGULATORY APPROACHES

The regulatory structures found in developed nations dominate. Developing countries have typically modeled their organizations closely on different variations present in the developed world, specifically OECD countries (Eberhard 2006).

The following categorization is helpful in distinguishing the most prominent structures and dynamics, and for understanding why certain structures and features exist today.

ANGLO-AMERICAN MODEL

Countries with colonial ties to Great Britain share many elements of their regulatory regimes (Eberhard 2006). Characteristics of this framework include independent regulatory agencies that operate in a legal system based on common law. The regulator is responsible for tariffs and service standards. It has considerable, though bounded, discretion in its decisions, for which it can be held accountable (Eberhard 2006). However, there are significant distinguishing features between the UK and US systems in terms of how that discretion is bounded. In the US, the model of state regulation has always focused on providing producers and distributors with a significant amount of operational autonomy, whereas in the UK, incremental legislative change has been directed at strengthening the independence and oversight of the national regulatory bodies.

The US framework is characterized by a strong and well-established written constitution, an administrative legal code, and dispute and issue resolution traditionally through the legal system (Eberhard 2006). Other important features include financial, administrative, and

decision-making independence of regulators. However, even with this, US regulatory authorities do not enjoy a high degree of discretion. The judiciary plays an active role in interpreting regulatory statutes and does place limits on discretionary powers of US regulators (Brown et al. 2006). In contrast, the UK framework places more focus on achieving compromise between stakeholders, rather than resorting to the legal system and judiciary to resolve disputes and issues (Eberhard 2006). Systems based on the UK construct are generally bounded by legislation, case law, and evolving regulatory practices (Besant-Jones 2006). One key difference between the UK and the US regulatory regimes is the tariff-setting process, which is more informal in the UK (Brown et al. 2006). For example, in Australia (which closely follows the UK framework), independent electricity regulators in states employ workshops, roundtables, and forums to determine tariff changes (Brown et al. 2006). Federal and inter-provincial issues fall under the ambit of the national competition and consumer protection agency, the Australia Competition and Consumer Commission. This contrasts with US, which has instituted the Federal Energy Regulatory Commission to determine tariffs (Brown et al. 2006).

CONTINENTAL EUROPEAN MODEL

Traditionally found in countries with colonial links to continental Europe (especially France and Spain), these systems are dispersed systems that generally operate within civil law codes and have a tremendous focus on public service obligations (Eberhard 2006). While there is usually no separate regulator, regulatory contracts are the norm. For example, concession contracts transfer operating rights while also observing regulatory norms. In addition, there

are provisions for contract renegotiation and arbitration (Eberhard 2006). In the French system, the highest court, or Conseil d'Etat, can legally enforce the contract as well as develop legal doctrines that shape and constrain contracts (Brown et al. 2006).

This system relies heavily on a concession contract. The key aspect here is that the contract is not between a regulator and a utility provider as observed in Anglophone countries (Eberhard 2006). The contract is usually between the local or national administration (such as a municipality or national ministry) and the utility provider. The administration acts as a representative or agent for consumers and producers with the private operator. Utility operating rights are transferred to private enterprises for a fixed duration of time as stipulated in the contract. The administration acts as a regulator by imposing regulatory obligations on the operator such as maximum tariff levels, quality standards, requirements to serve certain segments of customers, and procedures for the transfer and disposal of assets. Thus, no separate independent regulator is envisaged in this system as regulatory functions are performed by the government or local administration. The government and private operator have freedom to design the contract, which is usually enforced by the highest court of the land. Some have suggested that the court plays the role of a “quasi-regulator” or “super-regulator” as it is responsible for the critical regulatory function of resolving disputes between customers (government and local administration) and suppliers (private operators) (Brown et al. 2006).

HYBRID MODELS

Hybrid models that combine features of the two aforementioned frameworks incorporate the existence of regulatory contracts along with independent regulators. For example, Uganda (a former British colony with an Anglo legal tradition) has an independent electricity regulator, known as the Electricity Regulatory Authority, which was established and functionally outlined in the Electricity Act of 1999 (Electricity Regulatory Authority of Uganda 2013). This body has recently enacted long-term concession contracts ranging from 10 to 30 years for the purpose of electricity generation, transmission, bulk supply, distribution, and sale (Electricity Regulatory Authority of Uganda 2013). Other examples from Africa are Mali and Cameroon, countries with ties to France that have put in place concession contracts and established independent regulators (Eberhard 2006). Brazil and Romania, civil law based countries, have also combined independent regulators with pre-specified tariff-setting regimes (Brown et al. 2006). Erstwhile British colonies in Africa such as Zambia and Kenya have independent regulators that are expected to act in the public interest (Brown et al. 2006). Francophone countries such as Gabon exercise concession contracts overseen and regulated by administrative law and a dedicated Ministerial Unit; no separate regulator is observed (Brown et al. 2006). Senegal also regulates its water supply via an affermage contract (where the private operator only has operational responsibilities, no investment responsibilities) rather than an independent agency (Brown et al. 2006).

COMPARING THE MODELS

The key philosophy of the Anglo-American approach is the depoliticization of economic

regulation: establishing an independent regulator in order to remove politics and government from the activities involved in regulation (Brown et al. 2006). This has elements of both public and private interest theories of regulation. A regulator is required to maximize public interest by ensuring that market failures do not arise, and the regulator needs to be independent and free from political interference to ensure that “regulatory capture” does not happen. Removing governments and politicians from the decision-making ambit of regulatory agencies is intended to minimize opportunities for vote maximization and to reduce wealth transfers between different interest groups (Eberhard 2006). Regulators can do more to balance competing interests between stakeholders such as producers and consumers, and therefore aim to maximize public interest (Eberhard 2006). Moreover, while it is the responsibility of the government to ensure that essential services such as electricity, water, and gas are provided continuously, it is not the responsibility of the government to provide these services. Private enterprises are free to provide these services (and own related assets) as long as they meet the aforementioned public interest considerations. In practice though, most regulated entities are subject to limits on what they can and cannot do (Brown et al. 2006).

The European approach stems from the belief that the concept of an independent regulator is naïve and unworkable, as evidenced in the theory of regulatory capture. This is in contrast to the Anglo-American model that advocates for a strong government role in regulation. The Continental European model addresses the pitfalls of political interference by specifying obligations and responsibilities and creating

a well-functioning backup dispute resolution system. A greater philosophical divergence from the Anglo-American model is reflected in the belief that the provision of a public service, such as electricity, is essentially a government responsibility. The government may choose to contract out the management of this responsibility, but it still retains ownership of the assets. In many countries, local and central governments are prohibited from selling utility assets to private companies, which demands the use of concession contracts. Even some countries like Uganda and Lesotho that permit full asset sales have chosen the concession contract model rather than full privatization, due to caution of the political repercussions of privatization.

III. ENSURING REGULATORY INDEPENDENCE AND EFFECTIVENESS

Regardless of philosophical orientation, any regulatory regime needs certain basic foundations to function effectively. Many structural decisions have a direct impact on the role, independence, and functions of electricity regulators. These decisions also have an impact on the state of the market, which itself affects the quality of services provided to consumers. Considerations about the mandate of the regulator, the scope of its activities and jurisdiction, and the extent to which it is autonomous with respect to financing all have implications for its independence, which, in turn, affect performance. These issues are particularly salient for countries that do not have a history of independent regulation or are considering the establishment of an independent electricity regulator to bring about required and long-term improvements in their electricity utility industry.

Based on an analysis of a number of international miniature case studies, four features are recommended in order to develop and to protect the independence and effectiveness of regulators. These recommendations are fundamental enough that they can work in either model. However, as they relate directly to an independent regulatory authority, perhaps they would be more synergistic with the Anglo-American framework where such bodies are found. The recommendations are:

1. An independent regulator should be statutorily empowered to independently set tariffs;
2. The credibility and independence of a regulator should be a central goal during its creation, supported by robust selection and staffing policies and utilization of external experts;
3. Board composition and structure should facilitate transparent, calculated, and sustainable decision-making procedures; and
4. There should be safeguards for funding sources and budgetary control independent of the government.

Regulatory effectiveness is deeply intertwined with the relationship between the government, independent regulator, and the utility service providers. Interactions that comprise a working relationship stem from the prescribed division of responsibilities enshrined in legislation. For example, in India, electricity is a “concurrent” subject under the Indian constitution and thus falls under the purview of both central and state governments (Dubash and Rao 2006). Generation, transmission, dis-

tribution, and sale are the responsibility of publicly owned State Electricity Boards (SEB), which are both commercial entities and instruments of development policy. No independent regulator existed prior to the turn of the twenty-first century. This mixing of roles of the SEBs resulted in tremendous political interference at both the central and state level, resulting in inefficiency, insolvency, incompetence, and widespread graft (Dubash and Rao 2006). There is thus an element of regulatory capture. However such a system also suffers from excessive “politicization”.

AN INDEPENDENT REGULATOR SHOULD BE STATUTORILY EMPOWERED TO INDEPENDENTLY SET TARIFFS

One way of addressing this issue is to set up an independent regulator that is statutorily empowered to independently set tariffs. Even in such a scenario, political involvement is unavoidable, but the regulator can minimize its impact by seeking to balance competing interests and ensure the financial health of utilities. Another Indian example from the southern state of Andhra Pradesh illustrates how this can be accomplished effectively. The regulator worked with the utility responsible for transmission to undertake management reforms such as the improvement of services to well-paying industrial customers by setting up dedicated lines and giving them preferential access to scarce power. This increased revenues significantly, which allowed the utility to keep tariffs fixed for subsidized consumer groups. These gains were consolidated by setting performance targets for utilities. The key pillars of this process were a significant amount of negotiation outside the formal regulatory process and the introduction of measures of transparency that restrict the postponing of

difficult decisions for the future (Dubash and Rao 2006).

Detailed agreements with performance targets may lead to a reduction in the power of the regulator. Reforms in the Indian state of Delhi had precisely this result, even though the preferred mode of reform was privatization of previously state owned utilities. The initial contract signed between the state government and the private operator stipulated performance targets, thus removing them from the control of the regulator. The government also further limited the authority and scope of the regulatory authority by setting the rate of return and mandating uniform tariffs for all privately owned utility operators in the state. Thus the regulator lost the ability to link tariff changes to economic performance and found it increasingly difficult to balance subsidy constraints and increase tariffs to protect the financial health of utilities. Consequently, the relationship between the government and the regulator was hampered from the outset (Dubash and Rao 2006).

What each of these Indian examples illustrates is that unless the regulator has won broad legitimacy with competing interests, it cannot provide an alternative space for resolution of conflicts between groups. While regulatory reform has occurred in the Indian context, resulting in promising changes – such as the availability of procedural safeguards that promote transparency and public debate – interactions between stakeholders in the system are still shaped by the political context. In both states, there was no independent regulator and reforms were primarily driven by the government. One of the outcomes of the reform process was the establishment of an independent

electricity regulator. Once the government had established the initial framework, it tried to take a step back. In Andhra Pradesh, it largely succeeded by driving internal management reforms that put the regulator in a position of never having to make difficult and politically sensitive decisions (Dubash and Rao 2006). In Delhi, the projected benefits of privatization simply did not take place. Services did not improve, and the regulator had limited ability to rectify the situation, further eroding its credibility as truly independent (Dubash and Rao 2006).

THE CREDIBILITY AND INDEPENDENCE OF A REGULATOR SHOULD BE A CENTRAL GOAL DURING ITS CREATION, SUPPORTED BY ROBUST SELECTION AND STAFFING POLICIES AND UTILIZATION OF EXTERNAL EXPERTS

The credibility and independence of a regulator from the outset is a key determinant of regulatory strength. This can be boosted by robust selection and staffing policies. Without independence, regulatory and even industry capture may occur, as illustrated by the cases mentioned below. Again, the Indian context provides examples of contrasting practice. In Andhra Pradesh, external experts played a significant role in setting up the regulatory organization. Consultants acted as important change agents by defining the intellectual approach and agenda and designing relevant implementation models. Over time, the staff of the regulator internalized the economics and intricacies of the model and could implement it effectively alone. Consultants also helped boost cooperation across government departments and brought an apolitical influence without any historical association with any particular department. Utilizing external experts facili-

tated the diffusion of technical and managerial expertise to the permanent staff of the regulator, who learned skills and techniques through association and interaction (Dubash and Rao 2006).

Neutral external experts also act as a bulwark against forces that erode the independence of the regulator. Indian civil servants belong to deep-seated networks and often work through backroom networks and consultations, which does not facilitate transparency (Dubash and Rao 2006). The presence of prior government employees curtails the space for the emergence of a new and distinct regulatory structure. Another source of recruitment in many regulatory bodies has been the technical fraternity of India's publicly owned electric utilities (Dubash and Rao 2006). This, however, impinges on the independence and image of the regulator since erstwhile employees of a regulator bring insider knowledge and have personal ties with the regulated company.

Further, a long history of working in a bundled setup without an independent regulator does not facilitate the learning of best regulatory practices or an understanding of new trends in competition and markets. The regulator's human resources procedures are typically also based on existing government pay scales and promotion criteria, which makes it more difficult to recruit capable staff from the private sector (Dubash and Rao 2006). There are examples of states attempting to overcome these trends: Andhra Pradesh has tried to work around this problem by hiring academic experts for senior and important positions like Director of Tariffs (Dubash and Rao 2006).

BOARD COMPOSITION AND STRUCTURE SHOULD FACILITATE TRANSPARENT, CALCULATED, AN SUSTAINABLE DECISION-MAKING PROCEDURES

With regard to decision-making structures, there may be two potential options that can be employed. Regulators can be led by a single Director who makes most decisions, such as the Director-General positions formerly seen in the UK. Single member commissions or Directors are susceptible to "idiosyncratic behavior," as observed in the actions of the sole regulator for the Indian state of Delhi. This gentleman reduced the auditing role of the regulator and halted attempts at pro-active scrutiny. In one case of outright fraud committed by a private utility operator, no action was taken (Dubash and Rao 2006).

An alternative to this single point of accountability model is to structure agencies with a commission of members who are responsible for making high-level decisions. Commissions can be flexible in size, such as in Ireland, where legislation provides for the ministerial appointment of an electricity regulatory body between one and three persons (Tremolet and Shah 2005). A commission structure may be preferable as it enables the airing of multiple perspectives. Some have recommended an ideal commission size of three to seven members for a developing country, as this will provide benefits of a commission structure while also not burdening the legislature or executive with cumbersome human resources requirements in selecting commission members (Tremolet and Shah 2005). Both the Electricity Regulatory Commission of Mongolia and the Armenian Public Services Regulatory Commission have five commissioners including the Chairman (Energy Regulators Regional Association 2013;

Mongolia: European Bank for Reconstruction and Development 2014).

Commissions may also have a mix of full-time and part-time members, but care should be taken that part-time commissioners do not have a conflict of interest due to other ties and responsibilities. A significant majority of regulators with commission-based structures are legally specified, and most commissions make decisions based on majority voting, with the President of the Commission casting a decisive tiebreaker vote when required (Tremolet and Shah 2005). In Mongolia, the Electricity Regulatory Commission has three permanent members (a Chairman and two commissioners) while the remaining two commissioners are appointed on a part-time basis (Energy Regulators Regional Association 2013b).

THERE SHOULD BE SAFEGUARDS FOR FUNDING SOURCES AND BUDGETARY CONTROL INDEPENDENT OF THE GOVERNMENT

A critical issue that governs the independent functioning of a regulator is its financial health. Funding must be adequate and reliable for a regulator to operate effectively and to be free from external influences and pressures. Commonly used funding sources are direct transfers from governments or national exchequers, fees or levies imposed on the regulated industry, or tariffs and taxes levied on the consumption of a particular good or commodity.

Typically, governments fund regulators during the initial stage of formation. For example, both the Russian Federal Tariff Service and the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies are fully funded from their respective national budgets (Energy

Regulators Regional Association 2013a; Energy Regulators Regional Association 2013c). However, reliance on government funds can impact political and administrative independence of the regulator. Many regulatory institutions prefer to move away from government sources after putting institutional structures and functions in place. For example, electricity and energy regulatory bodies in Gambia and Trinidad and Tobago transitioned to levying fees on users or firms (Tremolet and Shah 2005). Nepal raises 25 percent of its funds from the regulated industry, while 47 percent is raised by Canada and Rwanda (Tremolet and Shah 2005). The Mongolian Energy Regulatory Commission finances itself completely from fees collected from license holders, while the Armenian Public Services Regulatory Commission's budget is paid for through compulsory fees levied on regulated entities (Energy Regulators Regional Association 2013b; European Bank for Reconstruction and Development 2014). Some choose to operate with combinations of different funding sources. The Energy Commission of Ghana places separate levies on consumers and the regulated industry, as well as receiving some funding from the government. This strengthens the regulator by decreasing reliance on any one particular source of funding and reduces variations in annual budgets that may arise due to temporary financial shocks (Tremolet and Shah 2005).

One area where the government's involvement may be required is in the approval of the regulator's budget. This may be done by the executive (such as for the Public Utilities in the Bahamas and the water regulator in England and Wales), or the legislative branch (such as the Regulatory Commission for Energy in Mexico and the Energy Regulatory Office in Poland)

(Tremolet and Shah 2005). In either case, the process must be timely to ensure funding is available on time for critical functions and initiatives.

Cumbersome and unwieldy processes – like those of the energy regulatory commissions of Ghana and Bulgaria – can lead to the delayed availability of resources or reduced funds. In Ghana, the Energy Commission’s annual budget must first be approved by the Ministry of Finance. It then becomes part of the Finance Minister’s overall budget, which must obtain parliamentary approval. Only after these approvals are received can the funds be made available. In Bulgaria, the parliament approves the budget, but due to the amending powers of the Ministry of Finance, there are often reductions to the final budget versus what was originally requested (Tremolet and Shah 2005). There should also be safeguards to ensure that the government cannot divert funds to other departments and thus impair the functioning of the regulator.

In some systems, approval powers rest with the regulatory agency alone, with no need for approval from any higher institution: staff prepare the budget and the Board approves it. This happens in Zambia for the National Water Supply and Sanitation Council (Tremolet and Shah 2005). The advantage of such a process is that it is quick and finalized amounts may be in line with requirements since the process is internally controlled. However, the regulator may need to adhere to higher standards of accountability as there is no external monitor. This can be accomplished through periodic financial reviews, as well as ensuring total transparency through, for example, annual reports

detailing activities, income, and expenditures (Tremolet and Shah 2005).

IV. CONCLUSION

Regulation plays a central role in the electricity industry. It helps define a process for integrating new entrants into the market and serves two broad purposes. One is the protection of the public interest through a public organization, positing regulation as a public good. Regulation can also be conceived of as a private good, serving specific public or private sector organizations in the electricity industry, for example through the power market exchange, which defines a set of rules governing interactions in this space (Besant-Jones 2006).

Public regulation provides a broad legal framework that governs transactions and relationships between actors. Public regulation becomes even more important due to certain characteristics of electricity infrastructure. Developing assets requires a large amount of capital, which cannot be redeployed after investment. Investors face a considerable risk of expropriation and expect to be protected to ensure that investment continues in the sector. The “natural monopoly” nature of electricity transmission and distribution contributes to this imperative. Due to inefficiencies in a competitive market structure in this arena, the absence of competition signifies that external and independent regulation is required to protect consumers from exploitation and abuse by large monopolistic firms (Besant-Jones 2006).

Electricity is a critical building block of economic development and independence, and so the strength of the electricity utility sector should be one of the highest priorities on the development roadmap. But – as seen by Of-

gem's ruling to deliver value to consumers in the UK – this creates considerable stress on both the quality of electricity and the price at which it is provided to end-users, particularly within a development context. Effective and independent regulation is pivotal in balancing these priorities (Besant-Jones 2006). The mandate, structure, and function of the electricity regulator are of vital importance in ensuring the continued growth and sustainability of the electricity sector and play a major role in safeguarding economic development.

V. REFERENCES

- Baldwin, Robert, Martin Cave, and Martin Lodge. 2012. *Understanding regulation: theory, strategy, and practice*. Oxford: Oxford University Press.
- Besant-Jones, John E. 2006. *Reforming Power Markets in Developing Countries: What Have We Learned?* Washington, D.C.: The World Bank.
- Brown, Ashley C., Jon Stern, Bernard William Tenenbaum, and Defne Gencer. 2006. *Handbook for Evaluating Infrastructure Regulatory Systems*. Washington, D.C.: The World Bank.
- Brunwasser, Matthew and Dan Bilefsky. "After Bulgarian Protests, Prime Minister Resigns." *New York Times*. Accessed January 14, 2014. http://www.nytimes.com/2013/02/21/world/europe/bulgarian-government-is-reported-set-to-resign.html?_r=1
- den Hertog, Johan. 2010. *Review of Economic Theories of Regulation*. Utrecht: Tjalling C. Koopmans Research Institute.
- Dubash, Navroz K., and Narasimha Rao. 2006. "Emergent Regulatory Governance in India: Comparative Case Studies of Electricity Regulation." Paper presented at conference on "Frontiers of Regulation: Assessing Scholarly Debates and Policy Challenges," University of Bath, Bath, UK, September 7-8.
- Eberhard Anton. 2006. "Infrastructure Regulation in Developing Countries: An Exploration of Hybrid and Transitional Models." Paper presented at the 3rd Annual Conference of the African Forum of Utilities Regulators, Windhoek, Namibia, March 15-16.
- Economist. "Protesting about power prices." *Economist*. Accessed July 15, 2014. <http://www.economist.com/blogs/easternapproaches/2013/02/bulgarias-electricity-prices>
- Electricity Regulatory Authority of Uganda. 2013. "Electricity Regulatory Authority - Functions of ERA". Accessed July 15, 2014. <http://www.era.or.ug/index.php/about-us/2013-10-15-15-57-40/functions-of-era>
- Energy Regulators Regional Association. 2013a. "Membership Profiles: Kazakhstan." Accessed July 15, 2014. <http://www.erranet.org/AboutUs/Members/Profiles/Kazakhstan>
- Energy Regulators Regional Association. 2013b. "Membership Profiles: Mongolia." Accessed July 15, 2014. <http://www.erranet.org/AboutUs/Members/Profiles/Mongolia>
- Energy Regulators Regional Association. 2013c. "Membership Profiles: Russia." Accessed July 15, 2014. <http://www.erranet.org/AboutUs/Members/Profiles/Russia>
- European Bank for Reconstruction and Development. 2014. "Armenia Country Profile." Accessed July 15. <http://www.ebrd.com/downloads/legal/irc/countries/armenia.pdf>
- Geddes, R. Richard. 1992. "A Historical Perspective on Electric Utility Regulation." *Regulation*, Winter 1992. Accessed July 15, 2014. <http://object.cato.org/sites/cato.org/files/serials/files/regulation/1992/1/v15n1-8.pdf>.
- Horrocks, Sally, and Thomas Lean. 2011. *NLS Scoping Study: An Oral History of the Electricity Supply Industry in the UK*. London: National Life Stories.
- Joskow, Paul L. and Roger G. Noll. 1981. "Regulation in Theory and Practice: An Overview," in Gary Fromm (ed), *Studies in Public Regulation*, Boston: MIT Press, 1981, 1-65.
- Murray, James. 2013. "Ofgem bears down on network costs with help from smart grid investment." *BusinessGreen*. Accessed January 15, 2014. <http://www.businessgreen.com/bg/analysis/2308723/ofgem-bears-down-on-network-costs-with-help-from-smart-grid-investment>.
- Peltzman, Sam. 1983. "Toward a More General Theory of Regulation." *Journal of Law and Economics*, vol. 19 (August 1976), 211-40; and Gary Becker. "A Theory of Competition among Pressure Groups for Political Influence," *Quarterly Journal of Economics*, vol. 98 (August 1983), 371-400.
- Peltzman, Sam. 1989. "The Economic Theory of Regulation after a Decade of Deregulation." *Brookings Papers on Economic Activity: Microeconomics*, 1989. Accessed July 15, 2014, www.brookings.edu.
- Stigler, George J. 1971. "The Theory of Economic Regulation." *Bell Journal of Economics and Management Science*, vol. 2 (Spring 1971), 3-21.
- Regulation Body of Knowledge. 2014. "Theories of Regulation." Accessed July 15, 2014. <http://regulationbodyofknowledge.org/general-concepts/theories-of-regulation>.
- Tremolet, Sophie and Niraj Shah. 2005. *Wanted! Good Regulators for Good Regulation: An Evaluation of Human and Financial Resource Constraints for Utility Regulation*. Washington, D.C.: The World Bank, ERM, and Tremolet Consulting.

Valentine, Harry. 2011. "A Historical Perspective of Electric Power Regulation." EnergyBiz. Accessed July 15, 2014, <http://www.energybiz.com/article/11/10/historical-perspective-electric-power-regulation>.

Warner, Joshua. 2014. "Ofgem Implements Price Controls, Investment Plans for Energy Companies." London South East. Accessed January 15, 2014. http://www.lse.co.uk/AllNews.asp?code=ynj60-z8l&headline=Ofgem_Implements_Price_Controls_Investment_Plans_For_Energy_Companies.