Water, Electricity, and Telecommunications in the Caribbean: Benchmarking Sectors and Systems

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Benchmarking represents one of the most valuable tools available to regulators. In island economies, the number of comparable infrastructure firms will be small—unless comparable data from other islands can be assembled. Of course, regulators must agree on data definitions and on procedures for sharing information for benchmarking to be a useful input in price reviews and in the development of incentive plans for state and privately owned enterprises. Furthermore, when benchmarking infrastructure sector performance, the analyst is implicitly (if not explicitly) benchmarking a nation's entire regulatory system (which goes beyond the actions of the regulatory agency). Regional cooperation in data collection and analysis can reduce information asymmetries associated with regulation; simultaneously, more transparency on utility performance invites comparisons of regulatory performance across countries.

1. Introduction

The purpose of this study is to briefly survey contributions to our understanding of performance-drivers in infrastructure sectors. Elsewhere, the author describes how information asymmetries limit pressures for reform and can contribute to dysfunctional social conflict. That study describes four sources of conflict in the design and implementation of water policies: authority conflicts (reflecting jurisdictional disputes over who has the last word), cognitive conflicts (based on technical disagreements regarding the analysis and interpretation of performance data), values conflicts (involving ideological differences or differential preferences for sector outcomes), and interest conflicts (where different groups—utilities, customers, unserved citizens, regions, and unions—benefit or lose, depending on the decision). Careful benchmarking can promote conflict resolution while improving infrastructure performance, particularly with regards to universal service, service quality, and cost containment.[1]

Here, particular attention is given to methodologies for evaluating regulatory agencies, since regulatory governance is one of the key factors influencing sector outcomes. First, we turn to recent efforts improving our understanding of benchmarking in three infrastructure sectors.[2]

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[1] Berg, Sanford (2008). "Water Utility Performance in Central America: The Political Economy of Coverage, Quality and Cost," PURC Working Paper presented at the Center for International Relations and Development Studies (CIDOB), March 2008, Barcelona, Spain.

[2] For a more comprehensive survey of studies, see Estache, Antonio, Sergio Perelman and Lourdes Trujillo (2007). "Infrastructure Reform in Developing Economies: Evidence from a Survey of Economic Performance Measures," in *Performance Measurement and Regulation of Network Utilities*, edited by Coelli T., and Lawrence, D., Edward Elgar Publishers, Northampton MA. The study contains six pages of references and comprehensive summaries.

2. Water

In the water area, the International Benchmarking Network for Water and Sanitation Utilities (IBNET, (http://www.ib-net.org/) has data from 85 nations, but the availability of information for Caribbean nations is noticeably weak. With funding from the Inter-American Development Bank, PURC prepared a study of water utilities in six Central American nations. The aim of the IADB was to gauge the impact of loans on network expansion (coverage) and on service quality. In addition, water professionals at international organizations must be able to understand what utilities (and nations) are doing as "best practice" so that incentives can be developed to enhance performance. The project involved conducting metric benchmarking analysis using data gathered from national regulators and utilities. Results of the research have been published in a number of studies which have implications for water/wastewater regulators and utility managers.[3]

Maria Luisa Corton helped identify the following key lessons from the Workshop (San Jose, Costa Rica, October 15-16, 2007) regarding data quality, data collection, benchmarking methodologies, and possible policy and regulatory implications of performance rankings. These are listed below:

1. The person (and the company) responsible for the data (collection, verification, storage, and processing) must be convinced about the importance of his (or her) role. Besides serving as a report to the regulator or to any external institution, data must be viewed as important and useful for the company – for strategic, operational, administrative and commercial purposes.
2. Duplication of data storage files inside the firm and data reports (in specialized formats) to external institutions must be avoided or reduced. Duplication raises administrative costs and opens up the possibility for little "Information Empires" where individuals exercise power by withholding data from those who should have access to information.
3. There needs to be a person responsible for data within the company; however, it is the position (rather than the person) that must have continuity over time within the company. This formalized role is needed to address internal turnover problems which limit data collection, causing gaps in time series and in cross-section observations.
4. Clear variable definitions allow outsiders to interpret information; consistency and clarity are fundamental to the management process.
5. Factors external to the company may have an impact on the collection and storage of data. For example, the existence of records and maps of the city; the frequency of the country census; municipal or city restrictions regarding the network design; number of connections per km, and type of users of the network.

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[3] Berg, Sanford, and Maria Luisa Corton (2008). "Water Utility Benchmarking for Managerial and Policy Decisions: Lessons from Developing Countries," in *Performance Assessment of Urban Infrastructure Services*, eds. Enrique A. Cabrera, Jr. and Miguel Angel Pardo, London: IWA Publishing, 2008, 307-320. Also, see Corton, Maria Luisa, and Sanford V. Berg. (2007). "Benchmarking Central American Water Utilities, Final Report." University of Florida, Department of Economics, PURC Working Paper.

6. Data disaggregation improves decision-making. Clear customer classification (residential, industrial, and commercial) allows for more accurate information regarding operation and performance of the company. In addition, maintaining data series on particular regions or divisions of a company allows top managers to develop strategies for rewarding strong performance. Disaggregated data allow managers to target areas of sub-standard performance and facilitates quantitative studies of cost and productivity.
7. Better operational data collection procedures are needed: timely reports that identify patterns mean that network repairs can be addressed in a comprehensive and cost-effective manner.
8. Information technology is necessary, but not sufficient, for sound management: information systems should link financial-commercial-operational data. Leaders can only manage what they measure.
9. The company information needs to be public to promote managerial accountability and citizen confidence in infrastructure services. Even rough comparisons can put pressure on political leaders to fulfill promises to provide funds for network expansion and on managers to deliver services at least-cost.
10. Overall, there is a need within the firm for more information regarding benchmarking methodologies and their application. Larger water utilities have engineers who are familiar with process benchmarking. There is also a need for capacity building in the area of metric benchmarking—starting with trends in Core Indicators, and moving to basic statistical reports and DEA studies.

The work complemented earlier work on water governance in Latin America and the Caribbean[4] and extended the Association of Water Regulators of the Americas' (ADERASA) recent empirical study on benchmarking Latin American water service providers.[5] The results of the six nation study will be of interest to OOCUR members, since it provides a template for expanding the work into the Caribbean. Recent studies in the two other sectors offer further insight into ways OOCUR might strengthen regulatory capacity in the region.

3. Electricity

A new resource should make a significant difference for future analysts of the electricity sector. The World Bank has created a web site that contains "Benchmarking Data of the Electricity Distribution Sector in the Latin American and Caribbean Region 1995-2005". This site allows users to conduct cross-country and cross-utility comparisons. The data are from 249 private and state-owned utilities (in 25 countries) with 26 variables indicating coverage, output, input, labor productivity, operating performance, quality and customer services, and prices. The time frame covers data as early as 1990 but focuses on the period of 1995-2005.[6] Countries in the sample include Belize, Dominican Republic, Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. Regional networks like the Asociación

[4] Rogers, Peter (2002). "Water Governance in Latin America and the Caribbean," Inter American Development Bank, ii-81.

[5] Romero, Carlos Adrian and Gustavo Ferro (2007). "Benchmarking de empresas de agua y saneimiento de Latinoamerica sobre la base de datos de ADERASA: 2003-2004, 2005."ADERASA Benchmarking Group Working Paper, revised February 2007.

[6] See http://info.worldbank.org/etools/lacelectricity/home.htm .

Iberoamericana de Entidades Reguladoras de Energía (ARIAE) also helped in the data collection effort. The study "*The Feasibility of Regional Cooperation in Regulation of the Electricity Sector of the Eastern Caribbean State*" was another source of information. Financial support for the project came from the Energy Sector Management Assistance Program (ESMAP) and the World Bank.

Outputs from the initiative are beginning to appear, including a study linking regulatory governance to electricity distribution utility performance. The number of electricity benchmarking studies exceeds sixty, at present, with Tooraj and Pollitt's work providing an early census of these studies.[7]

An early study of small island economies serves as a starting point for performance comparisons for electricity generation in the Caribbean.[8] However this study is showing its age, and deserves to be updated and extended. With the new World Bank initiative, resources are being devoted to collecting data on distribution utilities. Comparable effort needs to be applied to other stages of production. Electricity restructuring has been evaluated in the case of Jamaica and Trinidad and Tobago.[9]

One benchmarking study of electric distribution company performance underscores the difficulty to interpreting relative rankings of public vs. private utilities.[10] In the Ukraine, both types of firms faced the same regulatory incentives, but they responded differently. Privately-owned utilities appeared to inflate their costs of service (given the cost-plus nature of regulation adopted there) but they also significantly reduced technical and commercial losses (theft) relative to state-owned enterprises (again in response to incentives to do so). The results suggest that care must be taken when evaluating utility performance; regulatory rules can have different impacts on utilities with different types of ownership. Thus, regulatory systems can establish both good and bad incentives—which subsequently affect utility behavior and performance. Utility incentives and regulatory governance must be taken into account.

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[7] Tooraj, Jamasb, and Michael Pollitt (2002). "Benchmarking and Regulation: International Electricity Experience," *Utilities Policy*, Vol. 9, No. 3, 107-130.

[8] Domah, P. (2002). "Technical efficiency in electricity generation—the impact of smallness and isolation of island economies," Cambridge Working Papers in Economics, CMI WP14.

[9] Brewster, Ancile (2005). "Caribbean Electricity Restructuring: An Assessment," Public Administration and Development, 25, 175-184.

[10] Berg, Sanford, Chen Lin and Valeriy Tsaplin, "Regulation of State-Owned and Privatized Utilities: Ukraine Electricity Distribution Company Performance," *Journal of Regulatory Economics,* Vol. 28, No. 3, 2005, 259-287. Also see Burns, P., Jekins, C., Mikkers, M., and Reichmann, C. (2007). "The Role of the Policy Framework for the Effectiveness of Benchmarking in Regulatory Proceedings," in Coelli and Lawrence, op. cit.

4. Telecommunications

In telecommunications, regulators often share information on interconnection, consumer prices, and other performance indicators but more can be done. In the case of the Caribbean, a World Bank study compares cost of three minute local calls, cost of three minute off peak mobile calls, and cost of three minute calls to the U.S.[11] Many factors affect these prices to consumers: public policy towards cross-subsidies, extent of market liberalization, interconnection prices, cost containment, and innovation. National case studies require data from a number of years to identify trends. The many services and multiple dimensions of telecommunications services greatly complicate the analysis. Furthermore, cross-country comparisons require agreement on data definitions.

Regional comparisons are being developed using more sophisticated techniques in efficiency studies. For example, a recent study ranks the OECD nations in the area of telecommunications. The performance variables include number of access lines, total staff, number of internet hosts, total number of subscribers, and total telecom revenue.[12] The study utilizes two quantitative techniques: Analytic Hierarchy process (AHP) and data envelopment analysis (DEA).

Applications of performance benchmarking in the UK have been utilized by regulatory commissions in all the sectors, including telecommunications. One recent survey describes how the technique has been applied in telecommunications.[13] Studies of other nations document total factor productivity and its sources. For example, in a recent study of Australian telecommunications industry[14], Cooper and Madden are able to use data from 1924-1983 to measure productivity growth over time. Their measure of total factor productivity is two to three times higher by 1983 than traditional measures that do not account for quality changes. This result underscores the importance of incorporating quality explicitly into the analysis.

One study of universal service in Latin America omitted the Caribbean (but drew lessons for promoting improved services for this near-by region.[15]

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[11] Jha, Abhas Kumar, ed. (2005) *Institutions, Performance, and the Financing of Infrastructure Services of the Caribbean*, WB Working Paper No. 58.

[12] Giokas, D.I. and G. C. Pentzaropoulous (forthcoming, 2008). "Efficiency ranking of the OECD member states in the area of telecommunications: a composite AHP/DEA study," *Telecommunications Policy*.

[13] Dassler, Thoralf, David Parker, and David S. Saal (2006). "Methods and trends of performance benchmarking in UK utility regulation," *Utilities Policy*, 14, 166-174.

[14] Cooper, Russel and Gary Madden (2007). "Telecommunications Productivity Measurement for a Regulated Monopoly in an Era of Major Network Expansion," in Coelli and Lawrence, op. cit.

[15] Stern, Peter A. and David Townsend, "New models for universal access to telecommunications services in Latin America: lessons from the past and recommendations for a new generation of universal access programs for the 21st century," funding from Regulatel, the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and the Public-Private Infrastructure Advisory Facility (PPIAF) of the World Bank. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2007/09/11/000020953_20070911114401/Rendered/PDF/408290ENGLISH01rsal0Access01PUBLIC1.pdf

5. Systems of Regulatory Governance

A number of methodologies have been applied to regulatory systems. Seven are summarized below to illustrate the range of approaches and to direct attention to the fact that external groups will be evaluating agencies implementing national infrastructure policies. Extensive rankings of agency have been prepared for states in both Brazil and India. Thus, a number of groups have proposed regulatory assessment instruments that provide comparisons of legal systems and associated roles for regulation, regulatory autonomy, capacity-building, tariff design, financial sustainability of the agency, and regulatory strategies towards key stakeholders.[16] We can expect to see these methodologies utilized by international organizations and investors as they evaluate prospects in developing countries.

5.1 WRI *Good Governance Indicators: Transparency, Participation, Accountability, and Capacity*

This initiative funded by the World Resources Institute establishes a set of sixteen policy indicators and fifteen regulatory indicators, focusing on social and environmental implications of processes. A complete listing is provided later in this report. There are four to eight elements driving each indicator. For example, the "Effective functioning of the legislative committee" indicator is evaluated in terms of eight elements: (1) disclosure of interests, (2) active committee, (3) reasoned reports, (4) proactive committee, (5) public consultations, (6) transparency of submissions to committee, (7) transparency of committee reports, (8) reporting by executive. The emphasis on process is understandable, but the level of detail required for data collection seems excessive. Developed to evaluate Indian electricity regulatory commissions (and then extended to several nations), the framework provides a thorough set of indicators. However, assessing decisions and sector performance would seem to be crucial if one were to gauge the actual effectiveness of regulation. The WRI approach by itself could be viewed as elevating form over substance.[17]

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[16] New assessment tools keep emerging. The newly initiated Africa Infrastructure Country Diagnostic (www.infrastructureafrica.org) will conduct studies and collect data on infrastructure in East and Southern Africa—from Egypt to the Republic of South Africa. The budget is over $3 million for this initiative. Also, see *Getting Africa on Track to Meet the MDGs on Water and Sanitation: A Status Overview of Sixteen African Countries*, December 2006 (African Development Bank, EU Water Initiative, Water and Sanitation Program, UNDP). The report includes a quantitative and qualitative assessment of overall (water) sector and subsector sustainability, including institutional and financial sustainability for rural/small town WS and sanitation and urban WS and sanitation.

[17] Shantanu Dixit, Navroz K. Dubash, Crescencia Maurer, Smita Nakhooda (2007). *The Electricity Governance Toolkit: Benchmarking Best Practice and Promoting Accountability in the Electricity Sector*, June, World Resources Institute, National Institute of Public Finance and Policy, and Payas-Pune http://electricitygovernance.wri.org/files/EGI%20Toolkit%202007_0.pdf

5.2 *Regulatory Governance: Autonomy, Decision Making, Decision Tools, Accountability—Assessment and Measurement of Brazilian Regulators*

With support from the World Bank and PPIAF, a team of Brazilian researchers developed an assessment tool that was then applied to twenty-one regulatory agencies in that nation. Agencies were ranked based on agency design and regulatory processes. The tool evaluated four main categories (where the number of questions is shown in parentheses: I. Autonomy (26); II. Decision-making (22); III. Decision tools (27); and IV. Accountability/control (21). There are a total of 96 questions, but indicators are also based on subsets: a regulatory governance index (83), a more parsimonious index (43) and a de facto index (28). The entire set is very comprehensive. For example, IV-21 in the Accountability category asks the time it takes for the agency to make a decision: the interviewer seeks maximum, minimum, mean, and mode (within four categories): up to one month, one to six, six to twelve, more than twelve months). Similarly, Autonomy asks about ministerial interference (I-5 and I-7), the jobs directors held prior to appointments (I-21) and their post-term jobs (I-24). In the Decision-making area, the survey asks who makes ten different types of decisions (II-2), where different weights are given to the seven authorities listed. Thus, the survey is very comprehensive, providing a vast amount of information on processes. This assessment tool resembles the WRI approach. Determining the weights to be given the myriad of factors is a difficult task.[18]

5.3 WGA *World Governance Assessment--Surveying Local Stakeholders*

The World Governance Assessment started at the United Nations University in 1999 and has been operating as a project at the Overseas Development Institute in London since 2004: sixteen countries are evaluated in their large study, focusing on six principles in six areas. A book, reports results from a questionnaire that utilizes 41 questions and is divided into 7 parts.[19] The project involves a country reporter who interviews leaders from ten stakeholder groups: Government, Parliament Civil Service, Business Media, Religious Organizations, the Legal and judicial field, Institutions of higher education, Non-governmental Organizations, and International Organizations. As such, the compilations represent comprehensive evaluations of the policy process. There is no focus on performance: the research "examines rules rather than results." The six principles reflecting universal values inspired by the Universal Declaration of Human Rights are (1) participation, (2) fairness, (3) decency, (4) accountability, (5) transparency, and (6) efficiency. The Team created proxy indicators for these concepts. Field tested twice, the instrument continues to evolve. Thus, the framework is particularly useful for

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[18] Paulo Correa , Carlos Pereira , Bernardo Mueller, and Marcus Melo (2006). *Regulatory Governance in Infrastructure Industries: Assessment and Measurement of Brazilian Regulators* (April), PPIAF-World Bank. http://www.ppiaf.org/documents/recent_publications/RegulatorygovrpaperNo3.pdf

[19] Goran Hyden, Kenneth Mease, Marta Foresti and Verena Fritz (2008). *Governance Assessments for Local Stakeholders: What the World Governance Assessment Offers*, Overseas Development Institute Working Paper 287, p. 3. http://www.odi.org.uk/publications/working_papers/WP287.pdf

characterizing the divergent perspectives of different stakeholder groups, focusing on political morality rather than economic efficiency

Actors, Arenas and Policies

In an Inter-American Development Bank Research Department Working Paper, Murillo, Scartascini, and Tammasi (2008) examine the political economy of factors affecting sector productivity.[20] While the study applies to any sector, the framework offers valuable perspectives on performance. This approach to evaluating the performance of economic institutions focuses on "stories" that emerge from different perspectives. The research team proposes to gather information from participants representing key socioeconomic interests, using structured. Their multi-dimensional matrix includes (1) Political Actors (key socioeconomic interests), (2) Mechanisms utilized by socioeconomic actors in their political demands (including campaign contributions and media campaigns), (3) Venues: arenas of the policymaking process, (including political institutions), and (4) Policy domains (policy areas—time frames, institutions, and historical context). The framework will be utilized by the IADB for a project on "The Political Economy of Productivity." The focus is on developing an understanding of the political economy environment which affects both regulatory processes and sector performance. Another team has utilized an "actor-centered institutional perspective" as applied to the Caribbean.[21]

5.4 *Institutional Assessment: Sector Laws, Policies, Administration, and Performance*

A World Bank-funded study of the water sector by Saleth and Dinar contains a comprehensive questionnaire to be administered to country experts, specialists, and policymakers.[22] The questions are general enough to be applied to other infrastructure sectors. The purpose of the instrument was to obtain a cross section of information on national characteristics. The questions (listed in the Appendix) ask about Water Law, Water Policy, and Water Administration. The resulting indicators are then used to link institutions to actual sector performance. Here, performance is taken to be multidimensional: physical performance (supply and demand), operational performance (ease of making sector allocations and production efficiency), and financial performance (cost recovery and pricing efficiency). The approach

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[20] Maria Victoria Murillo, Carlos Scartascini, and Mariano Tammasi (2008). "The Political Economy of Productivity: Actors, Arenas, and Policies: A Framework of Analysis," Inter-American Development Bank Research Department Working Paper # 640 (June).

[21] Lodge, Martin and Lindsay Stirton (2006). "Withering in the Heat? In Search of the Regulatory State in the Commonwealth Caribbean," Governance: An International Journal of Policy, Administration, and Institutions, Vol. 9, No. 3, 465-495.

[22] R. Maria Saleth and Ariel Dinar (1999). "Evaluating Water Institutions and Water Performance," World Bank Technical Paper No. 447.
http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/1999/09/21/000094946_99090305381648/Rendered/PDF/multi_page.pdf

underscores the importance of moving beyond issues of accountability, transparency, and inter-agency conflict resolution to <u>outcomes</u>. Policies are based on the law, and the administration/implementation of those policies determines sector performance. The framework yielded a database that was used in subsequent empirical research. The approach illustrates the value of evaluating an entire regulatory system rather than focusing only on processes utilized by a sector regulator. It also demonstrates that qualitative information can be incorporated into econometric studies. Thus, it provides a useful basis for subsequent policy analyses.

5.5 *Drivers of Change*: Sector Governance and Political Economy

The UK Department for International Development funded the Overseas Development Institute to develop a framework for evaluating how donor groups can evaluate (and improve) governance in the water sector. The methodology applies to other infrastructure sectors as well. The project adopted an interdisciplinary approach to governance: emphasizing the changing role of government, the impacts of institutional complexity, and relationships among different levels of government, key actors, and civil society. The *Drivers of Change* approach asks six questions (outlined later in this Report). Besides considering process issues, the framework identifies sector drivers of change. It also acknowledges the importance of incentives in determining sector outcomes: (1) Who determines who gets what, where, and how? (2) What are the incentives that influence these actors? (3) What are the external factors that interact with these incentives? (4) How do these change over time? Key issues include government effectiveness, financial management, transparency, engagement of civil society, and pro-poor policies. Thus, the framework is emphasizes the "big picture."[23]

5.6 *Infrastructure Regulatory Systems*

This World Bank book by Brown, Stern, & Tenenbaum (BST) is the "gold standard" for assessing the effectiveness of infrastructure regulatory systems. The volume provides a comprehensive listing of critical standards, carefully defines terms, and provides numerous links to the literature. Three types of evaluations are included in the volume's appendices. The increasing level of detail provides insights into institutional design, the regulatory process, market structure, and other features of the electricity industry. The questions could be adapted to address issues in other infrastructure sectors as well. The purpose of the assessment tool is to extract background information and to highlight areas of concern. The approach incorporates

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[23] Janelle Plummer and Tom Slaymaker (2007). "Rethinking Governance in Water Services," Overseas Development Institute, Working Paper 284, October.
http://www.odi.org.uk/publications/working_papers/WP284.pdf See *Improving Governance and Fighting Corruption in the Electricity Sector: A Sourcebook*, World Bank: Energy Sector Board. Chapter 12 identifies a number of frameworks for evaluating governance.

regulatory governance/process indicators into the survey; however, the surveys include a number of questions about market structure as well. Furthermore, the volume emphasizes the importance regulatory decisions. Rules and incentives affect actual infrastructure performance. The emphasis on both substance and process gives the framework a balance that is lacking in some other survey instruments.   It is good to know the role of citizen participation or the clarity of regulatory responsibilities. However, if the analysis gives minimal attention to actual sector performance, the implications for reform are limited.[24]

For OOCUR, particular attention might be given to the recent World Bank study by Andres, Guasch, Diop, and Azumendi, (2007) that draws upon the BST framework. The focus of their index is political autonomy. Expanding the sample, keeping the data base up to date and gauging trends will be an important aspect of this initiative. In addition, more comprehensive studies can investigate links between components of the index and sector performance. For example, see the Working Paper by Andres, Guasch, and Azumendi (2008).[25] The authors develop a regulatory experience index that reflects the gradual impact of effective regulatory governance over time. Based on their econometric modeling effort, the authors conclude that the index has a strong positive impact on electricity distribution company performance. We can expect more comprehensive studies in the future, given the growing availability of time series data on regulatory governance and sector performance.

6. Concluding Observations

This paper argues that benchmarking can improve regulation both via helping regulators establish incentives and by providing a technique for identifying the impacts of those incentives (and for evaluating regulatory systems). Benchmarking allows regulators to document performance trends, to establish baseline comparisons, and to determine reasonable targets for utilities in comparable situations (based on best practice). Of course, using rankings or scores to reward (or punish) utilities requires robust comparisons if comparisons are to be credible and
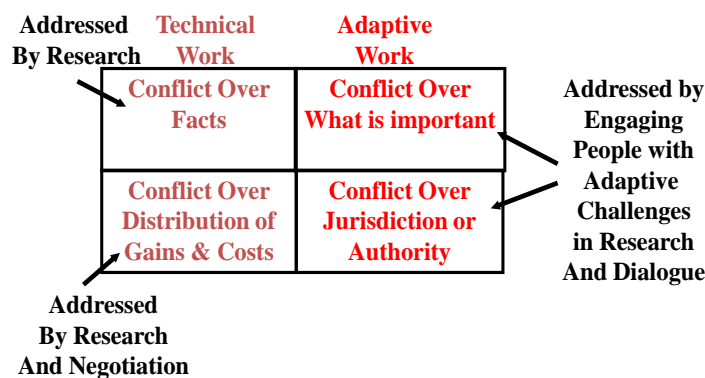
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[24] Ashley C. Brown, Jon Stern, and Bernard Tenenbaum (2006). *Handbook for Evaluating Infrastructure Regulatory Systems*, (The World Bank: Washington D.C.) xx-397. The South East Europe Benchmarking Report at http://ec.europa.eu/energy/gas/benchmarking/doc/2/sec_2003_448_en.pdf has many features identified in the Brown, Stern & Tenenbaum framework. It contains both regulatory process elements and sector performance elements. A questionnaire developed by Pierce Atwood is available at http://www.seerecon.org/infrastructure/sectors/energy/documents/benchmarking/questionnaire.pdf . Also see *Improving Governance and Fighting Corruption in the Electricity Sector: A Sourcebook*, World Bank: Energy Sector Board. Chapter 12 identifies a number of frameworks for evaluating governance. For factors affecting transparency, see *Regulatory Transparency: International Assessment and Emerging Lessons: A Final Report for the World Bank*, from NERA Economic Consulting, June 6, 2005.

[25] Andres, Luis; Jose Luis Guasch, Sebastian Lopez Azumendi (2008). "Regulatory governance and sector performance: methodology and evaluation for Electricity distribution in Latin America." Public Policy Working Paper WPS 4494. http://econ.worldbank.org/external/default/main?pagePK=64165259&theSitePK=469372&piPK=64165421&menuPK=64166093&entityID=000158349_20080128115512

decisions are to withstand appeals.[26] Information remains the core problem facing regulators. Thus, data collection and analysis is necessary for sound regulation. Figure 1 illustrates how different types of activities are necessary to resolve conflicts in the regulatory arena. Infrastructure stakeholders are entitled to having their own opinions, but not their own "facts". Agencies need the technical capabilities and legal authority to collect the data upon which judgments can then be made. Research can also contribute to an improved understanding of the impacts of proposed regulations (or to the evaluation of past decisions). However, conflicts over values (what is important) and jurisdictional authority (who has final say) involve adaptive work that engages stakeholders in open dialogues.[27]

Figure 1. Conflict Resolution Matrix

Addressed By Research	Technical Work	Adaptive Work	
	Conflict Over Facts	Conflict Over What is important	Addressed by Engaging People with Adaptive Challenges in Research And Dialogue
Addressed By Research And Negotiation	Conflict Over Distribution of Gains & Costs	Conflict Over Jurisdiction or Authority	

From Mark Jamison

Individual regulatory commissions conduct benchmarking exercises to various degrees. OOCUR can be a catalyst for the collection and analysis of benchmarking information, perhaps through the creation of a Benchmarking Task Force that would identify the needs of regulators in the region. OOCUR could serve as an initial repository of information. Information is a "public good" that increases in value as additional data are made available from more organizations and over longer time periods. Operators can only manage what they measure; regulators can only provide incentives for good performance if trends are understood, current performance has been quantified, and realistic targets are set (based on movements toward best practice). Benchmarking is necessary, but not sufficient, for sound regulatory decisions.

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[26] Rossi, Martin Antonio and Christian Alejandro Ruzzier (2000). "On the regulatory application of efficiency measures," *Utilities Policy*, 9 (2), pp. 81-92. For a critical evaluation of the application of benchmarking in the rate-making process, see Shuttleworth, G. (2005). "Benchmarking of Electricity Networks: Practical problems with its use for regulation. *Utilities Policy*, 13(4), 310-317.

[27] Berg, Sanford V. (2007). "Conflict Resolution: Benchmarking Water Utility Performance," *Public Administration and Development*, 27(1): 1-11.

Furthermore, national regulatory systems will be benchmarked more systematically as the methodologies described here are utilized by the financial community, international donor agencies, and citizen groups.[28] The number of survey studies seems to grow exponentially. Analysts seek to acquire of strategic information to characterize regulatory effectiveness. The Brown, Stern, and Tenenbaum (BST) framework is particularly useful for characterizing the elements of the regulatory system that are more easily quantifiable: the skeleton of the system. Stories (or narratives) are also needed to gauge the muscle that overlays the skeleton and of the health of the body's organs. Regulatory agencies in Brazil, India, and the U.S. have been subjected to critical evaluations, resulting in "rankings." Initiating a self-assessment is probably a good step for individual agencies who are members of OOCUR. In addition, regulatory agencies, researchers, and well-performing infrastructure firms have a shared interest in benchmarking that can identify the links between institutional constraints, regulatory policies and sector performance.

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[28] Nation-specific evaluations are beginning to appear. See Gustavo Gomez and Amy Mahan (2007), "An Institutional and Practical Evaluation of URSEC---Uruguay's Communication Regulator—and its Relationship with Citizens," WDR Dialogue Discussion Paper 0706 at www.regulateonline.org.