Networks in Infrastructure with Applications to Latin America and the Caribbean

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July 2018. Forthcoming in *Competition and Regulation in Network Industries Journal.*

Abstract

The primary drivers of the creation of infrastructure networks are the benefits that can be achieved by collective action. For example, global and regional networks of regulators enable agencies to obtain outputs that would otherwise be unavailable or very expensive. Such organizations act as intermediaries—providing forums for discussions, sharing data for benchmarking, producing public pronouncements, developing materials for stakeholders, providing capacity-building for professional staff, and evaluating best practice laws (and procedures and rules) that address institutional and policy issues. This article provides a census of such organizations. Although, there is some evidence that these activities influence regulations in Latin America and the Caribbean, quantifying those impacts is difficult. Organizations providing infrastructure services also collaborate within and across nations. These networks of regulators and operators can be across countries, within nations, or mixed in nature. Some are more ministerial in structure, while others were created to strengthen the autonomy of regulators. These networks strengthen the operational capacity of national regulators, provide opportunities (and resources) for improving staff expertise, promote the theme of greater independence of agencies, and reinforces their legitimacy as agencies that can improve infrastructure performance. Examples from Latin America and the Caribbean illustrate the emergence of networks that provide a wide range of "outputs" for those developing, implementing, and responding to public policy.

Keywords

Infrastructure, networks, regulation, electricity, telecommunications, water

Infrastructure sectors include electricity, gas, telecommunications, transportation, water and wastewater. These are all "network" industries in the sense that they are characterized by links and nodes, and involve significant (and generally, long-lasting) capital investments. In many cases a national, state, or municipal government owns

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and/or operates the assets required for the delivery of infrastructure services. Despite technological changes and demand growth for services, investments often have not kept pace with citizen expectations, particularly in low income nations where private investments have not been forthcoming (or where the state has the primary responsibility for investments).

The re-structuring and (often) liberalization of infrastructure sectors since the 1990s involved the creation of sector (and multi-sector) regulators in Latin America and the Caribbean. As Jordana and Levi-Faur (2005) noted in their analysis of patterns of establishing these agencies, "the number of prior regulatory authorities within a country determines the probability of the establishment of new authorities in the country," [but] the number of prior regulatory authority in the same sector in other countries determines the probability of the establishment of new regulatory authority in that sector." (p. 102). Thus, legislative and executive initiatives resulting in relatively autonomous infrastructure regulators were influenced by developments in the region (and arguably, the pace of technological change in particular sectors). The births of new national agencies led to the creation of organizational intermediaries that facilitated cross-border collaborations. Leaders of national agencies identified benefits from the sharing of experiences and expertise across national boundaries: the infusion of external funds often lead to regional and global networks of these agencies. In some cases, harmonization of regulations (for cross-border initiatives, such as transmission grids) served as catalysts for institution-building. In other cases, the development of shared platforms for gathering information (for benchmarking) shaped initial collaborative initiatives.

As would be expected, operators also found it in their interest to establish organizations that could facilitate conversations regarding policy developments in the region and technical issues facing organizations providing infrastructure services. For example, as information systems improved billing and operating characteristics of meters and other technologies became more sophisticated, operators within Latin America identified a need to exchange information via more formal platforms and meetings. The focus of this research is not on organizations such as Mercosur or NAFTA which have received substantial scholarly attention (see, Prado and Bertrand, 2015). Rather, this article examines relatively under-investigated infrastructure networks in the region.

An earlier study (Berg and Horrall, 2008) documented the growth of regulatory networks over time.[3] This paper brings the listing up to date, showing how new networks are filling the gaps that existed in 2007. In addition, this study identifies networks of *operator*s as another type of organizational intermediary that emerged in parallel to regulatory networks—often serving as a source of information to service providers in the region and as another focal point for technical discussions, data collection, public pronouncements, materials for stakeholders, and capacity-building for professional staff

[3] Berg and Horrall (2008) present a theoretical rationale for networks (or associations) that provided regional public goods (RPGs): the framework included the impact of non-rivalry of benefits, non-excludability of non-payers, and the aggregation technology (supply-side properties affecting RPG provision). Holzinger (2001) goes into greater detail on aggregation technology issues associated with clubs and the provision of full (or partial) public goods).

(Estevadeordal, et. al., 2004). Association meetings and publications provide opportunities for managers to share concerns regarding emerging issues in their service territories. This paper utilizes examples from Latin America and the Caribbean to illustrate the emergence of both types of networks. To some extent, both types of networks compete for the attention of those developing, implementing, and responding to national public policy.

Regional and international cooperation between regulatory agencies (and operators, NGOs, and other professionals) can be used to leverage the expertise of key stakeholders. Studies in other areas of interaction between different types of institutions illustrate the benefits of this type of cooperation. For example, De Silva (2017) studies how the International Criminal Court (ICC) through NGO intermediaries, has been able to improve its abilities, amplify its influence, and improve the regulation (and prosecution) of international crimes. Similarly, Jordana (2017) studies the benefits of interaction for both global and local regulators in the context of banks. Global regulators benefit from the ability to disseminate rules, while national regulators can use meetings to obtain information and advice. Jordana also emphasizes how collaboration requires "soft" organizational structures that operate with low costs. We expect similar forces to apply to important topics in infrastructure regulation, such as improving production efficiency, developing methodologies and procedures for tariff reviews, and incentivizing better service quality. Sector-specific regulatory networks are able to drill down to more narrow issues, as when a group of water regulators try to identify best practice in dealing with an issue like non-revenue water (NRW), which we discuss later in the paper. Jordana's observations regarding low overhead organizational structures also apply to regulatory networks in infrastructure. The benefits of cross-border cooperation are particularly clear in areas of infrastructure regulation that have the ability to impact regions that are larger than the countries themselves—challenges such as climate change, disaster-preparedness (and responses to catastrophes), pollution-control enforcement, and efficiency benchmarking.

The structure of the paper moves from governance frameworks appropriate for cross-border organizations to the wide variety of networks that have emerged across regions and sectors over the past several decades. Those networks include ministerial-based organizations and networks serving sector regulators, regional regulators whose decisions have formal legitimacy across national boundaries, in-country networks for larger nations with federal systems, mixed networks of regulators and operators, and service provider networks. Non-government organizations also have activities in a number of countries and often meet to coordinate initiatives in regions. Professional associations linking academics, consultants, and practitioners also bridge principles and practice through meetings and publications. In addition, regional regulatory networks participate in global associations—further leveraging activities, across continents. Given the wide range of networks designed to exchange information and influence policy, it is helpful to have some concrete examples of different organizations. Latin America and the Caribbean provide most of the examples of the regulatory and operator networks under consideration here—though examples from other regions are also presented to illustrate the governance, inputs, and outputs of infrastructure networks.

1. Governance Frameworks for Infrastructure Networks

Abbott, Levi-Faur, and Snidal (2017) propose a governance model whereby a three (or more) party relationship exists. This would include Regulators (R), Intermediaries (I), and a rule-taker or Target (T), which corresponds to the Operator in the infrastructure framework. Intermediaries can serve several roles, such as providing expertise and monitoring target behavior. Infrastructure Networks fit nicely into this RIT framework, acting as organizations that organize meetings, promote information-sharing, design programs for professional development, monitor cross-border initiatives (requiring harmonization), and provide other services as intermediaries. Abbott, Levi-Faur, and Snidal describe four broad capacities that intermediaries bring to regulatory governance: Operational Capacity, Expertise, Independence and Legitimacy. These capacities can be applied to infrastructure networks as follows:

Operational Capacity: National regulators can turn to intermediaries to carry out activities for which the regulator lacks capacity. Benchmarking activities performed by infrastructure networks fit this framework well. While it would be expensive for each country to set up studies comparing their key performance indicators with those of peers, a regional infrastructure organization, such as the Asociación de Entes Reguladores de Agua Potable y Saneamiento de las Américas (**ADERASA**, for the water/wastewater sector in Latin America), can collect and provide regulators with this information.

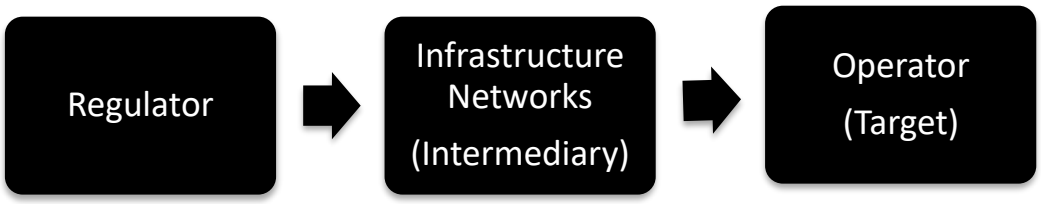
Expertise: Regional infrastructure organizations can serve as intermediaries offering mechanisms and forums for obtaining expertise. Expertise can come in several shapes and forms. For instance, several regulatory networks offer training for professionals. Similarly, case studies presented at conferences can help regulators in one nation to better address issues in their own situation. While there is no single recipe for improving sector performance, the ingredients suggested by consultants and development partners can be better evaluated by regulatory staff if they are able to take advantage of experts—including those from neighboring nations. Beecher (2012) emphasized how the network of U.S. regulators (NARUC) addressed information asymmetry by bringing together experts from regulatory commissions and other organizations in examining alternative policies and procedures.

Independence: While regulators (and/or operators) are members of these organizations, they operate independently from one another. Generally, national regulators are able to prioritize their own objectives and develop procedures for implementing public policy in ways that are appropriate for their own legal systems. Nevertheless, a regional regulatory network with a track record for balanced and analytically correct studies can serve as "reality check" on a national regulator. For example, a specific country's regulator cannot tell ADERASA that it should change its cross-country benchmarking report because their specific country's performance report is not as good as expected.

Legitimacy: Membership and active participation in these organizations can increase the legitimacy for member agencies (or organizations). Having organizational rules, expertise, and well attended conferences influences how the association (or organization)

is viewed by both regulators and operators. Engaging with a wide range of stakeholders can also help increase the legitimacy of an infrastructure organization since being perceived as having a participative orientation is a plus for those promoting transparency and evidence-based decision-making. Figure 1 depicts Regulatory Infrastructure Networks as an Intermediary. Of course, Operators (the Target of regulatory rule-making) have also established their own networks, where the ultimate target is their own regulator. In both cases, other stakeholders (like Sector Ministries) are also targets of these networks.

Figure 1 The RIT Intermediary Model Applied to Regulatory Networks



The RIT model was developed by Abbot, Levi-faur and Snidal (2017b). We applied this model to infrastructure industries.

2. Types of Infrastructure Networks

Six types of infrastructure networks are presented below to illustrate the variety of organizations that have served as intermediaries—serving as catalysts for conferences, workshops, training, policy-pronouncements, and autonomy. Although no cross-national network can bring total legitimacy to a relatively new institution, active membership does alert stakeholders to the fact that the regulatory agency serves important functions in other jurisdictions and that agency leaders view professional development as contributing to the quality of regulatory decision-making processes. One type of network consists of members who are service-providers. Managers have similar objectives for their organizations, and view membership in industry associations as one way to leverage the skills (and political clout) of members. Other collaborative activities are organized by non-governmental organizations and by professional groups—bringing the number of networks under consideration to eight, although the focus is on the first six. This study examines the roles played by these networks rather than the financial support and funding problems of organizations providing regional public goods.

Ministerial vs. Regulator Networks: These two type of networks are created (and funded) by different constituencies. Government ministries are generally described as *developing* public policy, with regulatory agencies given the task of i*mplementing* policy. A sharp division of labor between developing and implementing infrastructure policy is

not possible, since implementation often involves creating detailed rules (such as service quality standards) that become micro-policy. Nevertheless, some regional associations are driven by ministerial concerns, while others focus more on how regulators can retain some autonomy from political pressures, including sector ministers. Each situation is unique, where the catalyst for creating the network and the forces sustaining the organization can differ across sectors and regions. For example, the Organización Latinoamericana de Energía (**OLADE**, Latin American Energy Organization) had its origin in 1973, at the beginning of the energy crisis and has members from 26 countries in Latin America and the Caribbean[4]. Subsequently, energy ministers have met annually to share information. Their work areas include: energy policies, fossil fuels, energy efficiency, information systems, projects of integration and cooperation, learning, new energy sources, and demand side management. OLADE also provides free energy data and indicators from all member countries to the public. In addition, it supports online courses on topics such as energy tariffs and energy efficiency.

A different organization that serves the needs of sector regulators in the region is the Latin-American Association of Regulatory Agencies for Energy (Asociación Iberoamericana de Entidades Reguladoras de la Energía, **ARIAE**). Since 1997, the 19-member organization has met annually to discuss regulatory concerns, including knowledge transfer and professional capacity-building. Unlike its open meetings, some products are "excludable" through the use of passwords required to access its database.

A similar pair of organizations exists for telecommunications policy in the region. The Inter-American Telecommunications Commission (**CITEL**, https://www.citel.oas.org/en/) is part of the Organization of American States since 1923—focusing on spectrum allocation, technical standards and technological issues. CITEL serves as a platform for government and private entities to get together and plan future strategies in the telecommunications industry and to make sure their systems are compatible[5]. On the other hand, the Latin American Forum for Telecommunications Regulators (Foro Latinoamericano de Entes Reguladores de Telecomunicaciones, **Regulatel**, http://www.regulatel.org/ represents regulators who are implementing policy. This regulatory network was established in 1998 following regional discussions regarding ITU reform. Rather than being a ministerial creation, this network considers shared regulatory issues. At the time, regulators were dealing with powerful incumbent firms. As regulators designed interconnection regimes, they could learn from one another regarding impacts on service quality and customer perceptions. These two types of networks—ministerial and regulatory—have some overlap in their interests, but they have different sources of funding and different constituencies.

For water, the Conferencia de Directores Iberoamericanos del Agua (**CODIA**, or Conference of Iberoamerican Water Ministers), was created in Spain in 2001 as a forum for the region's water infrastructure representatives. Their main stated goal is to act as a technical forum in support of water resource management. Other goals include

[4]http://www.ariae.org/download/cursos/CursoRegulacionGuatemala/Anexos/SrD_PedroMariaMerono/Organismos_Reguladores.pdf

[5] http://www.mintic.gov.co/portal/604/w3-article-4424.html

facilitating cooperation in the water sector, promoting the exchange of experiences and best practices, coordinating activities across countries, exchanging information about water policy (legal, technical, and operational) and developing of courses and programs for professionals involved in public administration. CODIA's members are all from Iberoamerica: European (Spain, Andorra, Portugal) and North, Central, and South American countries that speak Spanish or Portuguese. One of their main products consists of a conference and "technical notebook" in which they cover topics relevant to the water sector. For example, the organization recently produced a technical report regarding Spain, Cuba, Mexico and Costa Rica's approaches to dealing with drought conditions. CODIA also provides a very complete calendar listing of all the water symposiums and conferences in the area to members and non-members. As has already been noted, **ADERASA** serves as the organization for water regulators since its founding in 2001—the same year CODIA was founded.

Another common goal of regional initiatives is to share best practices and experiences. ADERASA, the regional group of Water and Sanitation Regulators, has the sharing of experiences and best practices of regulators as its main stated goal (ADERASA website). Over the years, organizations such as PPIAF at the World Bank have provided seed money that allowed ADERASA to meet its goals. For example, in 2006, PPIAF funds were used to create a teleformation program, which consisted in launching distance learning initiatives on topics such as the regulation of public services. ADERASA currently hosts web courses on several topics. For instance, a recent web course on "green initiatives for water and sanitation" was launched. The top performers in each course were invited to attend an in-person course. Topics covered included governance and conservation mechanisms[6]. ADERASA also provides members with information on other initiatives that may be helpful, such as the SIAGUA initiative, which allows for information sharing of water data in the region. Additional funds allowed ADERASA to create several working group areas. These currently include: Benchmarking, Water Quality, Regulatory Accounting, Public Operators, Green Infrastructure, and Small Operators. ADERASA's benchmarking initiative produces information that is useful to all its members. For example, in past years, it has produced benchmarking reports with data from all its member countries that choose to submit information that year that is available in their website. Benchmarking reports allow members to evaluate their performance relative to peers in Latin America.

ARIAE, the regional regulators association for energy in Latin America, mostly focuses on education and sharing of best practices. Their regulatory cooperation consists of three main areas: (1) Meetings between regulators, (2) Seminars and Forums for regulators, and (3) Courses meant for training of regulators. Courses cover varied topics which change from year to year. Recent topics include rural electrification and regional energy markets[7].

Regional associations that are more technical and specific in nature have also arisen. For instance, **COMTELCA** (Comisión Tecnica Regional de Telecomunicaciones) is a

[6] http://www.sunass.gob.pe/boladerasa2016/junio/notacentral1.html
[7] http://www.ariae.org/index.asp

technical commission for telecommunication regulators in Central America (Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama). COMTELCA has focused on providing information on important topics to the sector such as: dealing with catastrophes and communication in emergency situations.

To these examples from Latin America could be added the Organization of Caribbean Utility Regulators (**OOCUR**) established in 2002 as a multi-sector network of regulators from small island nations (as well as Belize and Guyana). Like the other regulatory networks, OOCUR has annual meetings, a newsletter, workshops, and training courses. Harmonization of regulatory policies is one theme that regularly arises, along with information sharing. This nine-country organization is currently based in Guyana, with an Executive Council consisting of individuals from five nations.

Table 1 provides a list of Regulatory Organizations and related associations from across the world (with their founding years in parenthesis). It updates the Table presented a decade ago in Berg-Horrall (2007). The additions fill in a number of "gaps" that existed in 2007.[8] The long term financial viability of these organizations will depend heavily on whether the initial sponsors (key regional leaders) were able to convince members and development partners providing seed money that the organization truly met identified needs. Some regional associations have become somewhat moribund, while others are very entrepreneurial. A series of comparative case studies of these organizations would shed more light on the long term sustainability of particular networks.

To capture more of the detail regarding the activities of sector-specific networks, Table 2 provides examples of energy regulators' associations from around the world and the types of support each organization provides to its members.

Regional regulators: The Eastern Caribbean Telecommunications Authority (**ECTEL**, https://www.ectel.int/) is one of the few agencies that is truly cross-national in terms of recommending public policy—with national regulators implementing policies accepted by national governments. Given the scale economies associated with the evaluation of alternative policies in the rapidly-changing telecom market, a regional organization can provide the expertise and autonomy that small island nations often lack. ECTEL was created in 2000 by the Governments of Commonwealth of Dominica, Grenada, Saint Christopher and Nevis, Saint Lucia, and Saint Vincent and the Grenadines in the Caribbean. It addresses issues of access and interconnection, licensing, numbering, price regulation, spectrum management, and universal service funds.

ECERA, the Eastern Caribbean Energy Regulatory Authority Project, was originally established to provide supranational regulation in the Caribbean. The project was launched with two countries (Grenada and St. Lucia) and World Bank involvement. The goals were modified and the organization is currently attempting to work in advancing the establishment of national regulatory entities of member countries, rather than

[8] For example, The International Water Association established the International Water Regulators Forum in 2014 (http://www.iwa-network.org/projects/water-policy-and-regulation/). The European Water Regulators Network began in 2014 as well (http://wareg.org/)

supranational oversight[9]. The organization's objectives include harmonization of policies and regulatory frameworks. Their meetings include observer countries as well, such as St. Kitts, Antigua and Dominica. They also invite ECTEL members to meetings.

Table 1. Regulatory Organizations and Related Associations: Updated[10]

	Global	**Africa**	**Latin America**	**North America**	**Caribbean**	**Asia, M East & Pacific**	**Europe**
All Sectors	**IFUR** (1996-98)	**AFUR** (2000)	**ARIAE** (2000) **ABAR** (1999)	**NARUC** (1889) **CAMPUT** (1976)	**OOCUR** (2002)	**EAPIRF** (2003) **SAFIR** (1999)	—
Energy	***ICER*** (2009)	**RERA** (2003)	**ARIAE** (1997)		**CRIE** (2001) ***ECERA**** (2013)	***MEDREG*** (2006)	**CEER** (2000) **ERRA** (2000) **ERGEG** (2002-10) ***ACER*** (2010)
Telecom	**ITU** (1947)	**TRASA/CRASA** (1997) **ARICEA** **(2003)** WATRA (2004)	**Regulatel** (1998) ***CAATEL*** ***(n.a.)*** ***COMTELCA*** *(1966)*		**ECTEL*** (2000)	**SATRC** **(1997)**	**IRG** **(1997)** **ERG** (2002-2009) **BEREC** (2010)
Water	**WWC** (1996) **IWRF** (2014)	**WUP** (1996)	**ADERASA** **(2001)** ***FIAR (2001)*** ***FOCARD (2006)***	—		**SEAWUN** (2002 operators)	**WAREG** (2014)

[9] https://stluciatimes.com/2016/09/14/ecera-regional-energy-committee-meeting

[10] Berg and Horrall (2007) served as the starting point. Additions are in italics. ECTEL and ECERA are supranational regulatory authorities. If an organization was dissolved, the year it last operated is also provided.

Table 2: Support for Associate Members offered by several Energy Regulators Associations

Training courses	AFUR, ARIAE, CAMPUT, CEER, EAPIRF, ERRA, MEDREG, NARUC, OOCUR, RERA, SAFIR
Information exchange	AFUR, ARIAE, CAMPUT, CEER, EAPIRF, ERRA, MEDREG, NARUC, OOCUR, RERA, SAFIR
Technical studies and reports	ARIAE, CAMPUT, CEER, NARUC, SAFIR
Technical working papers	CEER, MEDREG, NARUC, RERA
Formulation of regulatory policies	AFUR, CEER, NARUC, RERA
Regulatory guidelines	AFUR, CEER, RERA
Legislative support	CEER, NARUC, RERA
(Source: ICER Report A)	

Regional initiatives in energy also involve harmonization and cost allocation issues. When cross-border investments in transmission are envisioned, organizations that coordinate policy across national boundaries have emerged. Often, such organizations lack authority to reward or punish actors for non-fulfillment of obligations. Similarly, regional collaboration in water is becoming an important area for regional planning, resource allocation, and conflict resolution.

In Central America, **SIEPAC**, the System of Electric Interconnection of Central American Countries (Sistema de interconexión eléctrica de los países de América Central), was formed with the objective of creating and integrating the regional electric market in Central America with help from the Inter American Development Bank (IDB). There are many benefits to regional market integration, such as gains from specialization/exchange and cost savings. Plerce, Trebilcock, and Thomas (2007) study the effects of greater integration of infrastructure in regional electricity markets and their benefits. SIEPAC's stated goals included: the establishment of rules for a common market with regional transactions, the creation of two regional networks (including a regulator and an operator), and the construction of 1,830 km. of transmission lines and substations from Guatemala to Panama. This association spans the countries of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama[11]. According to the IDB, one of the main reasons behind this regional cooperation was to try and address high electricity prices and prepare for higher use of renewable energy in the area,

[11] http://www.ariae.org/download/cursos/CursoRegulacionGuatemala/Anexos/SrD_PedroMariaMerono/Organismos_Reguladores.pdf

improving the energy mix and capacity[12]. SIEPAC supported the creation of a regional energy market (**MER**, Mercado Eléctrico Regional), and **CRIE**, the regulating entity for this market. CRIE was started in 2001 with the main objective of providing oversight to the regional energy market[13].

When organizations lack authority to reward or punish actors for non-fulfillment of obligations, it becomes difficult for projects to be implemented quickly. A case in point is the Andean Community of Nations' (Comunidad Andina de Naciones or **CAN**) telecommunication goal of launching a supranational satellite. Several aspects of public goods, such as the free rider problem and lack of property rights, have made taking cooperation to this level difficult to implement. In the 1970s, several countries from the Andean Community, decided that an important next step for regional integration in telecommunications would be to create a regional satellite system to be used for public broadcasting of children's educational television programs. The initial idea evolved into different projects for a supranational satellite (such as SATAN- Satelite Andino, CONDOR, and Sistema Satelital Simon Bolivar). The countries spent decades trying to complete a satellite project. Complications such as securing a location, meeting deadlines, wasted resources, and lack of funding are often mentioned as part of the roadblocks faced in this endeavor[14]. In 2006, the ITU, notified the countries of the possibility of losing their frequency assignation if this lack of action continued. This indirectly served as an authority with the ability to punish actors, since it imposed a deadline and penalty.

The notification prompted regulatory action by member countries. Specifically, a regulatory framework was established. The framework established the regulation for commercial use of the satellite and provided laws for authorizations of its use. A contract specifying how the satellite would be used, who could use it, and how it was used was signed by all member countries. Colombia assumed the role of representing them with the ITU. Once the property rights and responsibilities were established the project quickly moved forward. The Andean Community countries: Colombia, Peru, Bolivia, and Ecuador (Chile left the program in the 1970s and Venezuela left in 2006), launched the Andean Satellite in March of 2017 (nearly 50 years after the initial talks). It is expected to be used for the fulfillment of education, health and social needs of member countries both regionally and individually. It operates under **CAATEL** (Committee of Andean Telecommunications Authorities) and CAN and has commercial services available to providers in all the countries[15]. CAATEL's goal is to develop advanced services in the telecommunications sector and to promote the integration of Andean region countries. Their objectives include harmonizing interconnection rules and matters relating to

[12] http://www.iadb.org/en/news/webstories/2013-06-25/energy-integration-in-central-america,10494.html
[13] http://www.ariae.org/download/cursos/CursoRegulacionGuatemala/Anexos/SrD_PedroMariaMerono/Organismos_Reguladores.pdf
[14] https://www.dspace.espol.edu.ec/bitstream/123456789/25458/1/Resumen%20de%20tesis%20JCortez%2C%20NVasquez%2C%20director%20de%20tesis%20Ph.D.%20Freddy%20Villao%20Q.%2007%20marzo%202014.pdf
[15] http://mediatelecom.com.mx/index.php/telecomunicaciones/satelites/item/136050-se-concret%C3%B3-el-proyecto-satelital-de-la-comunidad-andina

spectrum regulation for member countries. This also includes physical aspects of systems, such as the interconnection of fiber optics among several members' countries[16].

In-Country Networks: For some countries in Latin America, specifically those operating under Federal government systems where each state has its own regulator, such as Argentina, Brazil, and Mexico, within country associations exist as well[17]. The Associação Brasileira de Agências Reguladoras (**ABAR**) began in 1999 and sponsors courses and meetings for the state and national regulators in Brazil. Similarly, **AFERAS**, the Federal Association of Water and Sanitation Regulators in Argentina, provides a forum for state regulators to meet. They mainly share information and hold conferences for their members. They also help promote ADERASA's work by providing a link to ADERASA's benchmarking report on their website. AFERAS provides information for members with technical issues and who are trying to understand regulations. The organization is also associated with projects at the regional level. AFERAS helped organize **FIAR** in Argentina in 2016 (with ADERASA). For electricity, Argentina has the Association of Electric Regulatory Entities (Asociación de Entes Reguladores Eléctricos, **AERE**). They were founded in 1996 and have several objectives such as: promoting studies in the area of electricity regulation, knowledge and experience sharing, educating future professionals, maintaining links with organizations of regulators in other countries, efficient use of energy, and understanding/working on regulations. They also have working groups on relevant topics, such as a working group on alternative sources of energy. Their website also serves as a link to other organizations and programs. They also promoted FIAR and AFERAS (their water counterpart) on their site. Their website provides links to each members' regulatory agency. Most within country organizations provide both public and members-only services.

Mixed Networks: This is another category that has not been carefully studied. Here, members might be the regulatory commissions and associate members (providing some funding) representing service providers. An example is the Comision Tecnica Regional de Telecommunications **(COMTELCA**, http://www.comtelca.int/) in Central America. Guatemala's regulator—Superintendencia de Telecomunicaciones (SIT), El Salvador's Superintendencia General de Elecricidad y Telecomuniciones (SIGET), and Hondura's Comision Nacional de Telecomunicaciones (CONATEL) are members, and associate members include two service providers in the region (Hondutel and Cable & Wireless) and Costa Rica's regulator, Superintendencia de Telecommunications, (SUTEL). Mixed networks can be born from larger regional initiatives. For instance, **FOCARD**, the Central American Forum for Water and Sanitation, is a forum with members from Central America and the Dominican Republic; the organization arose from a larger process of integration between those countries, known as **SICA**. SICA is the "Central American Integration System". SICA's main goals are the integration of the countries, in order to consolidate democracy and strengthen institutions, strengthen the countries'

[16]http://www.iirsa.org/admin_iirsa_web/Uploads/Documents/anr_lima01_presentacionboliviatelecomunicaciones.pdf

[17] Another example is the United States of America. Beecher (2012) provides a detailed list of networks in the United States of America's regulatory policy and a case study of NARUC as network.

economics, and create a strong economic block[18]. FOCARD's main goal is to facilitate universal access to water in the region, but it covers other relevant areas, such as, for example, projects in preparation for climate change threats. SICA provides services in many other functions, including a working group on the electrification of Central America (**CEAC**, Consejo de Electrificación de America Central).

Organizations of Operators (Service Providers): As noted in the introductory section, infrastructure operators share information to improve their financial situations, influence policy-makers, and to better understand regulatory trends in the region. For example, water operators have much to gain by identifying ways that operations might be improved. In Latin America, **ALOAS**, Asociación Latinoamericana de Operadores de Agua y Saneamiento (Association of Latin American Water and Sanitation Operators) is a regional association of operators founded in 2010. Their manifesto states that the main objective is to develop mechanisms to help lead to common actions for water and sanitation providers. Managers appear to believe that through cooperation and an exchange of ideas, water operators can provide a more sustainable service. Their objectives include knowledge-exchange, discussions on how to participate in the definition of national and regional goals, promoting meetings between member countries, helping with obtaining financial assistance from multilateral international credit organizations, and providing capacity-building and studies[19]. As of 2017, the organization's website shows over 100 member firms from North, Central and South America. The organization does has several sections of its website with access for "members only", so it is able to exclude non-payers.

There are also operator groups for telecommunications firms in Latin America, such as **ASETA**, Asociación de Empresas Estatales de Telecomunicaciones de los Países Andinos (Association of State Owned Telecommunications Firms of the Andean Countries). Their stated goals are knowledge sharing and the integration of Andean countries. Knowledge sharing is typically done through reports, such as a recent study on broadband regulation in member countries. Table 3 lists associations of utility suppliers in Latin America and the Caribbean, both at the regional and country level.

NGOs serve another set of functions—representing stakeholders who often do not have a voice in developing or evaluating infrastructure policies. For example, NGOs can serve the purpose of promoting water access in less developed countries or rural areas. Note that representatives of NGOs could attend open events sponsored by regulators and operators. For example, at a water meeting in Mexico several years ago, a group of protestors were invited to voice their concerns, so attendees could appreciate the passionate desire for better water quality and service coverage in the region. That presentation illustrates how representatives of key stakeholders are sometimes invited to speak at Conferences so network members gain a broader perspective of citizen concerns.

[18] https://www.sica.int/sica/ejes.aspx
[19] http://www.aloas.org/institucional/Pages/Objetivos.aspx

Table 3: Associations of Utility Suppliers (Operators) in Latin America and the Caribbean

Energy		
CIER	Commission of Regional Electric Integration	Regional
CARILEC	Caribbean Electric Utility Service Corporation	Regional
ABINEE	Brazilian Electrical and Electronics Industry Association	Brazil
APINE	Association of Independent Power Producers	Brazil
ADERE	Association of Electric Regulatory Entities	Argentina
Telecom		
AHCIET	Hispanic-American Association of Research Centers and Telecommunication Enterprises	Regional
ASETA	Association of Telecommunication Companies of the Andean Community	
CANTO	Caribbean Association of National Telecommunication Organizations	Regional
CITEL	Inter-American Telecommunications Commission	Regional
Water		
AFERAS	Federal Association of Water and Sanitation Regulators	Argentina
ANEAS	National Association of Water and Sanitation Utilities of Mexico	Mexico
ALOAS	Latin American Association of Providers of Water and Sanitation	Regional
Gas		
ARPEL	Regional Association of Oil and Natural Gas in Latin America and the Caribbean	Regional
ASTRA	Association of Argentine Oil and Gas Producers	Argentina

Professional Associations like the International Water Association (IWA) and the International Association for Energy Economics (IAEE) represent another type of organization that brings together specialists in different infrastructure fields. They generally support one or more technical journals and their meetings provide opportunities for analysts to learn about developments in their fields. An examination of association growth, roles, activities, and outputs warrants a separate study. In particular, it would be interesting to learn the extent to which these associations bridge principles and practice as academics, consultants, and practitioners gather together to learn from one another at annual or regional meetings. In some cases, these professional organizations co-sponsor conferences or meetings with ministerial or regulatory networks to promote cross-fertilization of ideas on particular topics like development policy or wastewater treatment technologies. The full policy impacts of professional organizations have not been adequately investigated, but these networks certainly need to be included as an organizational form providing another venue (or network) for sharing ideas and critically evaluating the impact of different approaches to sector governance.

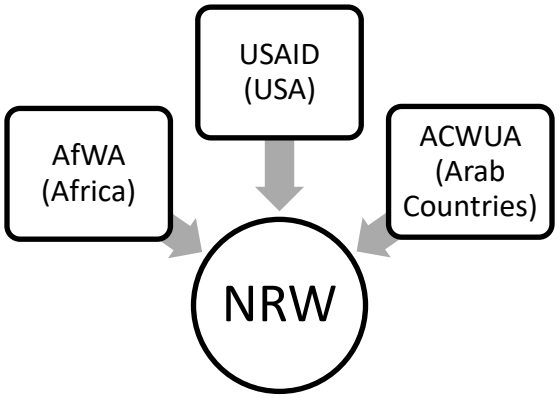
3. Mixed Initiatives and Cooperation among Regional Associations

Regional operators, regulators, and donor agencies also form groups, mostly to share experiences and best practices across regions. Regional Associations also meet with other Regional Associations. Even though the example presented below is from a partnership formed in Africa and the Middle East, we included it because it provides a good case study on what regional initiatives can achieve.

The Arab Countries Water Utilities Association (ACWUA), launched in 2009, has members from more than 100 water utilities in 18 Arab countries. They get funding from several organizations such as GIZ and USAID, and are involved in training programs, international conferences, and the dissemination of best practices. One of their current initiatives consists on developing strategies to reduce Non-Revenue Water (NRW) in the area through a partnership with AfWA, the African Water Association and USAID.[20] Specifically, as part of the Further Advancing the Blue Revolution Initiative (FABRI), USAID and AfWA worked with 23 water utility companies in 20 African countries to come up with ideas to tackle NRW. In addition to holding workshops and meetings, one of the first steps consisted on conducting water audits in all 23 utilities in order to develop detailed water balances. As noted by USAID, “this is often the first time that the utility has a comprehensive understanding of how much water it has and how much it uses” (Usher and Reiss 2013). Additionally, this approach allowed for large cost savings without necessitating large investments.

[20] https://acwua.org/

Figure 2 Organizations involved in a Non-Revenue Water initiative



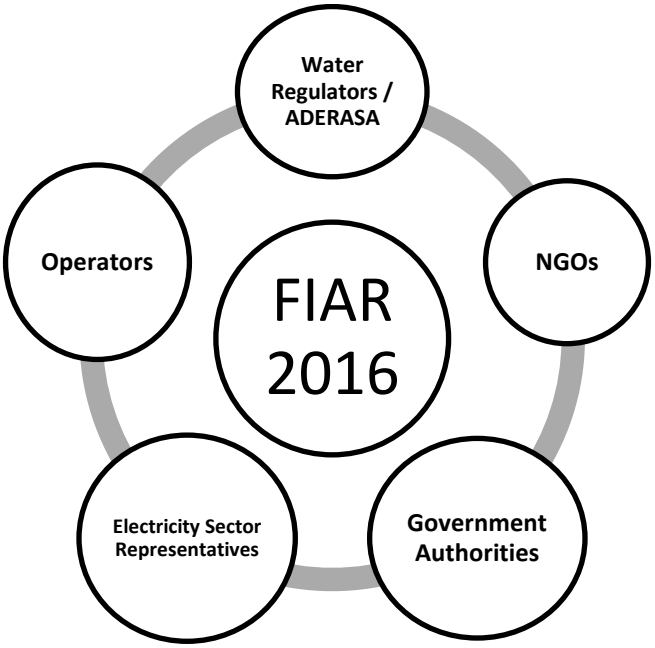
This image was created by the authors using information from Usher and Reiss (2013).

Another example of a mixed initiative is **FIAR**, the Foro Iberoamericano de Regulacion (Iberoamerican Regulation Forum). FIAR is a forum that brings together regulators from Latin America, the Caribbean, and Portugal. FIAR's main goal is the exchange of experience and debate of ideas related to regulation in the region[21]. It includes regulators, operators, NGOs, and government authorities who are looking for a more broad perspective on important topics. FIAR is hosted by members of ADERASA and its main driver is water regulation, but they also expand meetings to include other groups. For example, FIAR 2016, included electricity regulation topics and was focused on service sustainability in the areas of universal access, water quality, climate change, pollution and risk assessment. The forum also allows for participants to interact with other areas, such as Academia.

Regional regulators can also cooperate with regulators from other regions. For instance, Regulatel (Latin America) and BEREC (Europe) hold summits together in which they discuss challenges for the telecommunications sector. Regional associations in emerging markets also hold meetings as a larger group, internationally. For instance, in 2016, the following regulatory associations in the energy sector met in Italy: ARIAE (Latin American and Iberian countries), ERERA (West Africa), ERRA (Eastern Europe), MEDREG (Mediterranean) and RERA (Southern Africa). This particular meeting focused on topics such as barriers to sustainable energy investment, off grid solutions, energy access, and issues facing regulators.

[21] http://www.sunass.gob.pe/boladerasa2016/agosto/notacentral2.html

Figure 3 Organizations involved in FIAR (Regulation Forum)



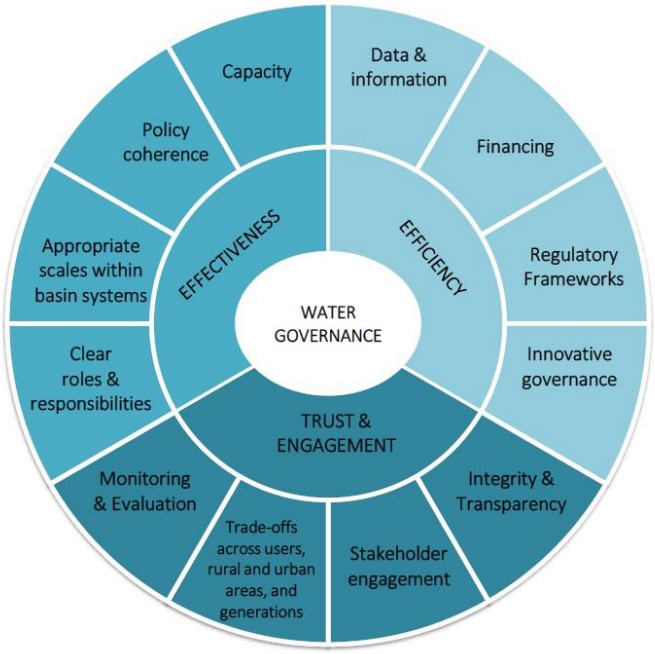
Source: FIAR 2016 program. http://fiarweb.org/programa/

In addition, international meetings, such as the World Forum on Energy Regulation, provide areas for professionals working in regional organizations to meet with their counterparts from other world regions. Other forums of international cooperation include the **OECD Network of Economic Regulators (NER)**[22], which is a forum that promotes dialogue across regulators operating in different sectors (communications, energy, transport, water) and countries. NER initiatives go beyond the concerns of high-income nations. Regulators from OECD member-states as well as from developing countries share experiences, discuss challenges, and identify best practices of a "world class regulator". The technical support staff of the OECD is able to prepare reports that consolidate information from a wide range of sources. For example, the OECD water governance program has produced a series of studies on nations and regions (Brazil, Netherlands, Jordan, Tunisia, Mexico, and Latin America and the Caribbean). In addition, the program published excellent studies of specific regulatory issues: stakeholder engagement and the governance of water regulators. Figure 4 shows the twelve elements that are components of three foundations of good governance: *effectiveness*, *efficiency*, and *trust* (through engagement).

While it is beyond the scope of this paper to go into further detail regarding this particular partitioning of best practice principles, it should be clear that international organizations are finding ways to draw upon the expertise available through regional regulatory networks. The resulting reports and studies can help regulators strengthen their performance and improve the operations of infrastructure operators.

[22] http://www.oecd.org/gov/regulatory-policy/ner.htm

Figure 4 OECD (2015) Principles on Water Governance



Source: OECD (2015b).

Another relatively new resource internationally is the International Confederation of Energy Regulators (**ICER**)[23], a voluntary framework for cooperation between energy regulators from around the globe established in 2009 at the fourth World Forum on Energy Regulation (WFER IV) in Athens. This network attempts to serve as a clearinghouse for information on relevant Conferences, regulatory training, and other activities.

Organizations focusing on cooperation for specific topics in larger regions have emerged as well. Sometimes, access to water in rural areas is outside the purview of the water sector regulator (who focuses on urban and peri-urban operations). The Sistema de Información de Agua y Saneamiento Rural (SIASAR, System of Information for Rural Water and Sanitation) is an initiative of several country governments in Latin America which provides information on rural services in the member countries. They focus on characteristics of rural areas, such as low coverage, lack of information/data, and other issues that are different from urban areas. The idea is that there are commonalities when examining water and sanitation provision across countries but in the same type of area (rural). Members include Honduras, Nicaragua, Panama, Dominican Republic, Oaxaca (a city in Mexico), Peru, Ceara (a state in Brazil), and Bolivia. The system provides data relevant to rural areas, such as number of rural schools with sanitation services, and information on water services[24]. Even though all the countries are listed, data are only

[23] www.icer-regulators.net/
[24] http://new.siasar.org/es/que-siasar

available for some countries. This is a common problem with having a system that "requires" provision of information but no penalties for failing to provide it.

Energy and Water groups often times discuss elements related to sustainability. Climate change is a concern among water and energy regulators. Given generational free riding, differing effects based on geography, and the threat of Sea Level Rising, Island nations are particularly vulnerable to climate change. For this reason, regional associations of countries (mostly through the United Nations) have banded together to create awareness and act as a voting block in the United Nations. Intercountry and interagency partnerships in the Small Island Developing States (SIDS) in the UN, include several initiatives in the water and energy sectors, such as the Global Wastewater Initiative and the Caribbean Energy Efficiency Lighting Project.

Web platforms facilitating the exchange of information from different regions is a common way to foster cooperation. For example, the International Energy Regulation Network (**IERN**), was a website created for the exchange of information about electricity regulation. Created in 2006 under the auspices of the Florence School of Regulation in collaboration with the Council of European Energy Regulators, it provided information (and even data) on hundreds of countries, meeting and training initiatives, and web pages dedicated to several regional associations. The activities have been taken over by ICER.

The demise (or transformation) of networks can occur because initial institutional funding dries up or other institutional structures prove to be more effective in delivering services to regulators. For example, as part of its promotion of autonomous regulators required for private investment in infrastructure, the International Forum for Utility Regulators (**IFUR**) was initiated by the World Bank to collect data on regulators and regulatory activity. That particular program was "lost" in organizational re-structuring, but support for various regional initiatives did continue.

World Bank support for information collection has continued. The private participation in infrastructure database includes over 6,000 infrastructure projects in 139 low and middle income countries from 1984-2015.[25] Information on contracts, laws, procurement procedures, and agreements is available at another site, the Public-Private Partnership in Infrastructure Resource (PPPIRC).[26] These resources cover hundreds of countries and all the infrastructure sectors. Information on specific infrastructure sectors is also viewed as important by the World Bank: the International Benchmarking Network for Water and Sanitation Utilities (IBNET) provides data on water utilities from around the world.[27] All these initiatives have numerous reports—often drawing upon international regulatory networks for data and providing regulators with tools for addressing policy issues.
One of the World Bank's initiatives to consolidate information regarding regulation was funded through the Public-Private Infrastructure Advisory Facility (PPIAF—a multi-donor technical assistance facility financed by a number of multilateral and bilateral donors, including the World Bank Group). A web platform developed by the Public

[25] http://ppi.worldbank.org/
[26] http://ppp.worldbank.org/public-private-partnership/
[27] https://www.ib-net.org/

Utility Research Center (PURC, University of Florida) continues to be updated, drawing upon studies by international organizations and regulatory networks. The *Body of Knowledge on Infrastructure Regulation* serves as a relatively authoritative source of case studies and a library for several important topics in regulation (www.regulationbodyofknowledge.org). Most recently, a portal on regulatory reform and revitalization has been added to the site (focusing on fragile states and low income nations). Those seeking an overview of major topics can also find answers to Frequently Asked Questions. In addition, he Glossary of Infrastructure terms has now been translated into ten languages. The web pages of many regulatory networks link to this website so agency staff, journalists, and interested stakeholders can draw upon this resource.

There are also regional entities whose main focus is not on infrastructure but do work on areas that indirectly deal with water, electricity or telecommunications. For example, the Pan-American Health Organization (OPS/OMS) holds regional meetings related to infrastructure. In 2016, for instance, in close collaboration with other organizations such as ADERASA[28] they hosted a symposium on "Water and Sanitation in 2030" for Pan-American countries. Topics covered included regulation, sustainable development, and sanitation.

CLAD, El Centro Latinoamericano de Administración para el Desarrollo (Latin American Center for Administrative Development) was started in 1972 through cooperation between the governments of Mexico, Perú and Venezuela with backing from the United Nations. CLAD's goal is to promote the analysis and information exchange in regards to government reform of Public Administration. They have specialized meetings, courses, and publications. Its members are government ministries and agencies, such as the Minister of Economics and Public Finances in Mexico or the Minister of Modernization in Argentina. Its full members are Latin American countries and it also has Angola as an observing member. Even though their main focus is on public administration, they do cover topics relevant to infrastructure. For example, one of their books is titled "What is new in regulations for telecommunications, electricity and water in Latin America?" They also teach online courses in topics such as "sustainable development for growing cities".

ALADYR (Asociación Latinoamerica de Desalación y Reúso del Agua or the Latin American Association of Water Desalinization and Reuse), is an association of entities dedicated to reuse and desalinization of water across Latin America[29]. They are associated with their Spanish and Caribbean counterparts. Their members span different types, including water associations, educational entities, engineering companies, and providers (such as LG). Their main focus is on information sharing. For example, one of their recent meetings focused on reusing water in industry and in municipalities.

This partial census of cross-border networks dealing with infrastructure issues underscores the wide variety of platforms attempting to address shared concerns regarding network

[28] http://www.sunass.gob.pe/boladerasa2016/agosto/notacentral3.html
[29] http://aladyr.net/en/

industries, including long term sustainability, environmental and health impacts, and technological change. The examples from Latin America represent the tip of the iceberg in terms of organizations sponsoring conferences, trainings, and other collaborative activities around the globe.

4. Concluding Observations

In Latin America, regulators, ministries, operators, and NGOs have formed a number of networks that serve as platforms for many collective activities. These networks are characterized by the sharing of information, data, reports, and best practices, networking during meetings and availability of forums, online courses, and training. Information creation and dissemination has many public good characteristics that can be exploited through cross-national collaborations. Examples from telecommunications, water/sanitation and energy illustrate the strengths and limitations of such organizations: often operating on a voluntary basis with minimal instruments for punishment or reward. Nevertheless, a pattern has emerged, whereby regulators and operators from different regions band together to work on common issues, such as performance (through international benchmarking reports), data collection and authentication (through the creation of websites), and professional development (through meetings and online courses). The advent of the internet has provided new vehicles for these initiatives to take place. Compared to the census presented a decade ago (Berg and Horrall, 2007), networks continue to emerge and many have expanded their functions.

Networks of regulators, operators, and NGOs have also delivered physical results, such as an electricity network in Central America, a sharp reduction in water losses in Africa/Middle East, and a supranational satellite in the Andean nations. These are expected to create large cost-savings for member countries. For instance, a country's energy mix and capacity can immensely benefit from cross-country electricity networks, particularly for small nations where reaching economies of scale is difficult. Similarly, regional public goods have been created to tackle common problems, such as climate change for Small Island Nations, which have formed a voting bloc in the United Nations. Other important benefits from these networks include harmonization (particularly in the telecommunications sector), leveraging experience in obtaining international assistance, and promoting best practice. For instance, countries facing droughts can turn to case studies from Mexico's experience with droughts and implement the responses they find useful. Similarly, a rural region in Nicaragua that has more in common with a rural region in Panama than with an urban region in Nicaragua, can use a website to see how it compares to other rural areas across Latin America. The accumulation of knowledge has several public good characteristics. If a firm, regulator, operator, or country gains knowledge, others can benefit from their "discovery" and "free ride" on the information. Regional organizations provide vehicles for this cooperation and data-sharing to take place. In countries with limited resources and competing government objectives, this collaboration has proven to be an important component supporting improvements in the delivery of infrastructure services.

The RIT governance model developed by Abbott, Levi-Faur, and Snidal (2017) places regulatory networks as an intermediary between national regulators and operators. In that position, a regulatory network can provide justifications for insulating national agencies from undue political interference, while providing platforms for informing stakeholders about best practice in the regulatory arena. Although regulators monitor operators based on their national laws or executive decrees, the methodologies they use and the lessons they draw upon come from a variety of sources, including regional (and global) networks of regulators. Those tools and cases are available through meetings, training, and resources—supported by international development partners and by regulatory intermediaries. These networks strengthen the operational capacity of national regulators, provide opportunities (and resources) for improving staff expertise, promote the theme of greater independence (autonomy) of agencies, and reinforce their legitimacy as agencies that can improve infrastructure performance. Since they face the same challenges, operators have formed networks, both as a form of countervailing power and as a source of information and experience. The different organizations described here each serve specific groups who are confronting similar problems. In the case of infrastructure networks in Latin America and the Caribbean, intermediaries can come in many forms, such as organizations of regulators, sector ministries, in-country networks (for large, federal nations), mixed organizations (involving both regulators and operators), cross-border agencies, organizations of operators (for information exchange and lobbying), or organizations with specific tasks such as tackling climate change or creating a transnational electricity transmission system. The growth and potential impact of such networks warrants greater attention from academic scholars, policy-researchers, and professionals at international organizations funding initiatives in this arena.

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Appendix Table: Founding dates of Regional Regulatory Networks, Updated List.

Date	Organization	Seed Money / Early funding	Members
1889	NARUC (National Association of Regulatory Utility Commissioners)		United States of America, Puerto Rico, Virgin Islands
1976	CAMPUT (Canadian Association of Members of Public Utility Tribunals)		Canada, United States of America
1997	SATRC (South Asian Telecommunications Regulators' Council)	APT, ITU	Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan and Sri Lanka
1997	IRG (Independent Regulators Group)	EU	Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Serbia, Romania, Spain, Slovak Republic, Slovenia, Sweden, Switzerland, Turkey, and the United Kingdom
1997	ARIAE (Asociación Iberoamericana de Entidades Regularoras de Energía)	Energy Commission of Spain, participation from regulators in Iberian Peninsula.	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Spain, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Portugal, Puerto Rico, Dominican Republic, Uruguay, Venezuela.
1997	CRASA/TRASA (Telecommunications Regulators Association of Southern Africa).	USAID, ITU, CTO (Commonwealth Telecommunications Organization)	Angola, Botswana, DRC, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe

Date	Organization	Seed Money / Early funding	Members
1998	Regulatel (Foro Latinoamericano de Entes Reguladores de Telecomunicaciones)	ITU	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Spain, Guatemala, Honduras, Italy, Mexico, Nicaragua, Panama, Paraguay, Peru, Portugal, Puerto Rico, Dominican Republic, Uruguay, Venezuela.
1999	SAFIR (South Asia Forum for Infrastructure Regulations)	World Bank, PPIAF	Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka.
2000	ARIAE	Member fees, AECI and the Foundation CEDDET Carolina.	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Uruguay, Venezuela.
2000	AFUR (African Forum for Utility Regulators)	World Bank, PPIAF	Angola, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Senegal, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.
2000	CEER (Council of European Energy Regulators), EU	European Commission (meetings in 1996, 1998)	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom.
2000	ERRA (Energy Regulators Regional Association)	USAID and NARUC	Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Russia, Saudi Arabia, Serbia, Ukraine, United Arab Emirates, UNMIK Kosovo.
2001	ADERASA	World Bank, PPIAF	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Honduras, Nicaragua, Panama, Peru.
2002	OOCUR (Organisation of Caribbean Utility Regulators)	USAID	Bahamas, Barbados, Belize, Dominica, Guyana, Jamaica, Trinidad and Tobago, US Virgin Islands.

Date	Organization	Seed Money / Early funding	Members
2002	ERG (European Regulators Group)	European Commission	Replaced by BEREC.
2003	ARICEA (Association of Regulators for Information and Communication Services of Eastern and Southern Africa) with COMESA		
2003	EAPIRF (East Asia and Pacific Infrastructure Regulatory Forum)	World Bank, PPIAF	Australia, Cambodia, China, Fiji, Indonesia, Kiribati, Laos, Malaysia, Mongolia, New Zealand, Papua New Guinea, Philippines, Samoa, Solomon Islands, Thailand, Tonga, Vanuatu, Vietnam.
2006	RERA (Regional Electricity Regulators Association)	SADC (Southern African Development Community)	Angola, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Senegal, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.
2006	MEDREG (Mediterranean Energy Regulators)	CEER Mediterranean countries and European Commission	Albania, Algeria, Bosnia Herzegovina, Croatia, Egypt, Israel, Jordan, Montenegro, Morocco, Tunisia, Turkey.
2009	BEREC (Body of European Regulators for Electronic Communications) (successor of ERG)	Replaced ERG.	Members: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Slovak Republic, Slovenia, Spain, Sweden, Netherlands, UK. Observers: Albania, Macedonia, Iceland, Liechtenstein, Montenegro, Norway, Poland, Portugal, Romania, Serbia, Switzerland, Turkey.
2013	ECERA (Eastern Caribbean Energy Regulation Authority). *Supra national regulatory body.	World Bank	