

# Trends in the management of regulation: a comparison of energy regulators in member countries of the Organisation for Economic Development and Co-operation<sup>1</sup>

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## **Abstract**

This paper studies the design and functions of energy regulatory agencies building on a cross-country analysis of energy regulators in OECD (Organisation for Economic Development and Co-operation) member countries. There is a strong trend towards specialization of the regulatory function that has resulted in the creation of separate regulatory organizations in many of the countries examined. Regulatory organizations, however, show significant differences in their independence, powers, and relationship with the executive branch of the government. The focus of this paper is on two questions.

First, what do independent regulatory agencies have in common? It has been shown that most independent regulatory agencies share a common blueprint concerning their decision-making structure, procedures and core activities. This suggests that international benchmarking and identification of best practices can help improve the performance of regulatory agencies where they exist.

Second, what explains the variation in the powers and independence of regulatory agencies? The analysis suggests that differences among regulators reflect not only different legal and

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administrative traditions, but also the regulatory framework adopted in each country. Regulatory agencies generally have more power in countries and industries practising active competition policies, such as those requiring the unbundling of networks, and active regulatory policies, such as ongoing regulation of network prices. At the other extreme, regulatory agencies do not exist in countries that practice 'light-handed' regulation. In other words, the choice and design of regulatory organizations reflects to some extent the scope of the functions that regulators have to manage.

## Introduction

Regulatory reforms bring with them substantial changes in the management of regulation, often including the creation of new regulatory agencies and a new distribution of functions and responsibilities among regulators, 'line ministries', competition authorities, and other parts of the government. Regulatory agencies in energy, telecommunications, and other industries, once only present in Canada and the US, were established in many other countries as an integral part of the reform. The organization, decision-making structures, and processes of the new regulatory agencies are often similar to those of traditional utilities commissions and their federal counterparts in the US. However, their role has been redefined and extended to areas related to the introduction and advocacy of competition, and the rationale for independence and neutrality of decision-making has also evolved with the advent of competition. This paper studies recent trends in the organization, decision-making structure, and functions of regulatory agencies building on a comparative analysis of energy regulators in 23 OECD (Organisation for Economic Development and Co-operation) countries.

### *Specialization*

There is a global trend towards specialization of the regulatory function. Specialization is implemented with two different approaches to the management of regulation. In one group, comprising 10 countries, there are independent regulatory agencies with concrete regulatory powers. In another group of countries, the 'line ministry' (within the executive) retains all regulatory powers but delegates the management of some regulatory functions to a ministerial agency in five of the cases examined and to an independent advisory agency in another four cases. These bodies act in a manner similar to an independent regulator but have no final regulatory powers. Only five countries have no specialized regulatory organization apart from the line ministry and this occurs in countries with virtually no ongoing regulation of the industry or with minimal market opening.

### *Convergence*

There is convergence in the design of independent regulatory agencies. The independent regulatory agencies examined in this

paper share a number of key elements regarding their core functions, decision-making structure, procedures, and independence safeguards. Kerf, Schiffler, and Torres (2001) similarly conclude that there is significant convergence across European Telecommunications regulators. However, it is also demonstrated that the powers of these agencies vary. Some agencies work under a general mandate to regulate the industry while the functions of others are more restricted. The analysis suggests that differences in national approaches are partly explained by the regulatory framework adopted in each country. Where the scope of regulatory functions is larger, regulators are inclined to have more power and independence. On the other hand, where regulatory functions and competition policies are less developed, regulatory institutions tend to have less power. There is consistency between the design of regulatory agencies and the scope of regulation.

### *Organizational changes*

There are two alternative views on organizational changes that are currently taking place in the regulatory function. One view emphasizes convergence by highlighting that many independent regulatory agencies have been established in the electricity, gas, telecommunications and, to a lesser extent, water industries. This trend is observed in the OECD countries—Latin America, Eastern Europe, and some Asian countries such as India. The rapid expansion of regulatory agencies suggests that international benchmarking and the identification of best practices could be effective tools in the management of independent regulatory agencies. Berg (2000) provides a comprehensive review of ‘best practice’ design principles for utility regulators. The other view emphasizes diversity by highlighting the large variety of approaches to the design of regulatory agencies and other regulatory bodies, including a number of countries where no regulatory agency has been established. The power and independence of regulators seem to differ across countries, particularly in sectors like energy where reforms are very recent. This would imply that the organization and management of regulation are largely country-specific issues, linked to the legal and administrative tradition of each country. Benchmarking and identifying best practices would not be effective in this context.

The evidence examined in this paper lends support, with some qualifications, to the view that regulatory institutions are

not entirely country specific so that benchmarking and comparison of practices and performances across agencies can contribute to a more effective management of the regulatory function. There is evidence of increasing convergence in the regulatory institutions overseeing the energy sector. A similar trend has been identified in the telecommunications industry (OECD 2000). Furthermore, differences in the design of regulatory agencies across countries reflect, at least in part, the regulatory frameworks and are not purely the result of legal and administrative traditions in each country.

There are, however, country-specific factors that seem to have significant weight in the choice of regulatory organizations. For instance, several early reformers in Northern Europe – Norway, Sweden, and the Netherlands – have established ministerial agencies for regulation rather than fully autonomous bodies. In practice, these ministerial agencies operate with a large degree of autonomy, similar to an independent agency, but are formally subordinated to the line ministry. This choice does not seem to respond to differences in the regulatory frameworks adopted that are roughly similar to those in the UK, the US or Australia.

### **Design of regulatory agencies**

This section provides an overview of the main design options for independent regulatory agencies and the trade-offs involved. Design issues are discussed in Smith (1997), Smith and Shin (1995), and with a focus on process, in Brown (1996) and Berg (2000), among others. Green (1999) considers the interaction among the various institutions involved in the regulatory process with a focus on the British experience.

Independent regulatory agencies are defined as autonomous public bodies empowered to regulate specific aspects of an industry. Regulatory agencies may also have judicial or quasi-judicial powers such as setting fines and penalties for non-compliance or acting as an arbitrator in disputes among industry participants. Independence, in this context, specifically means that the regulatory agency is protected from short-term political interference. Political independence is primarily meant as a commitment to provide for a stable regulatory framework over time. This commitment protects investors against opportunistic government intervention. The value of commitment is discussed in Spiller (1996). This is valuable even in a fully regulated market, which suggests an explanation for the emphasis on

political independence in traditional regulatory agencies overseeing investor-owned industries such as electricity in the US. In a deregulated environment, political independence may also contribute to other goals such as enhancing the transparency and competitive neutrality of regulation, particularly when some of the utilities are publicly owned.

Regulators are also meant to be independent from stakeholders in the sense that the regulated parties should not be able to influence regulatory decisions. This is necessary to ensure that regulation is fair and does not favour one group of stakeholders over the others. Almost all approaches to regulation are based on the principle that regulators should not be 'captured' by the interests of industry players. See Noll (1989) and Viscusi, Vernon, and Harrington (1998) for a discussion of regulatory capture and its economic implications. Unlike political independence, which is an attribute of independent regulatory agencies, independence from stakeholders is sought for all public bodies involved in regulation.

A few countries have independent advisory agencies. These agencies are similar to independent regulatory agencies but have no decision-making powers on regulatory matters. They advise the ministry on a wide variety of regulatory issues, have monitoring responsibilities and authority in the resolution of disputes on issues such as network access.

In most regulatory systems, several organizations either deal with regulatory issues or influence regulatory outcomes. Typically, regulatory agencies split regulatory activities with a 'line ministry'. In theory, the 'division of labour' between the ministry and regulatory agency allocates policy-making, setting the general framework and rules, to the line ministry. Implementation of these rules is the responsibility of the regulatory agency. However, there is some overlap between policy and regulation. This overlap of regulatory activities may indeed be one of the main advantages of setting-up regulatory agencies. Laffont and Martimort (1999) argue that the co-existence of two or more regulatory institutions may result in additional effective monitoring. It may also reduce the regulators' scope for capture by industry interests. On the other hand, the existence of many regulatory institutions increases the complexity of regulatory processes, creates a need to protect the independence of the regulatory agency from other parts of government and requires the development of appropriate coordination mechanisms.

Autonomous ministerial agencies subordinated to the 'line ministry' have been set-up in some countries. These institutions operate on a separate budget, under an autonomous management and may be subject to a differentiated legal framework but are ultimately subordinate to the ministry. In practice, however, autonomous ministerial agencies in some countries operate with a substantial degree of independence.

Competitive authorities can influence regulatory outcomes, particularly when acting *ex ante* to prevent mergers and acquisitions that are deemed detrimental to competition or apply structural solutions to remedy an anti-competitive industry structure. There is significant overlap between regulatory and competition agencies in many areas including network access and pricing, and structural policies such as the unbundling of networks, mergers and divestitures.

Regulatory agencies can be designed in many different ways. Components include the role (or 'mission') they are assigned, their governance, the specific regulatory functions and processes, the resources and internal management of the agency, the start-up strategy and other factors. The main components are summarized in Table 1.

## Case studies

### Overview

The study covers 23 countries in Western and Central Europe, North America, and the Asia-Pacific. Institutional approaches to utility regulation can approximately be grouped into four categories according to whether regulation is managed exclusively by the ministry, the ministry and an independent advisory body, the ministry and a ministerial agency, or the ministry and an independent regulatory agency. The basic approach to regulation adopted by each country is summarized in Table 2.

Independent regulatory agencies have been established in 10 countries. As discussed in the previous section, these entities are autonomous bodies with specific powers, and are governed by one or several commissioners appointed for a definite and non-revocable period. The goals, powers, and activities of these regulatory agencies vary to some extent. The (federal and state) agencies in the US, the UK, Canada, and Australia have a broad mandate to regulate industry and may act on almost all regulatory and competition policy issues. The agencies in Ireland and

**Table 1** Designing regulatory agencies

Area	Design issue	Key options
Mission	Objectives	<ul style="list-style-type: none"> <li>■ One or several among               <ul style="list-style-type: none"> <li>• Consumer protection</li> <li>• Investor protection</li> <li>• Economic efficiency</li> <li>• Competition advocacy</li> </ul> </li> </ul>
	Jurisdiction (powers)	<ul style="list-style-type: none"> <li>■ Regulatory powers only or, additionally               <ul style="list-style-type: none"> <li>• Mergers</li> <li>• Other competition law</li> <li>• Policy on entry, investment, privatization</li> </ul> </li> </ul>
	Industry coverage	<ul style="list-style-type: none"> <li>■ One industry or multi-industry</li> </ul>
Governance	Decision-making structure	<ul style="list-style-type: none"> <li>■ Single regulator or commission</li> <li>■ Odd or even number of commissioners</li> <li>■ Staggered terms or not</li> </ul>
	Appointment of regulators	<ul style="list-style-type: none"> <li>■ Made by parliament or by government</li> <li>■ Stakeholders allowed or not</li> <li>■ Based on professional competence criteria or not</li> </ul>
	Independence safeguards	<ul style="list-style-type: none"> <li>■ Irrevocable mandates</li> <li>■ Prohibition of conflicts of interest during and after mandate</li> <li>■ Stable funding</li> </ul>
Regulatory activities	Functions	<ul style="list-style-type: none"> <li>■ One or several among               <ul style="list-style-type: none"> <li>• Regulation of monopolies</li> <li>• End-user tariffs and quality standards</li> <li>• Monitoring</li> <li>• Dispute resolution</li> <li>• Advisory role to government</li> </ul> </li> </ul>
	Process and appeals	<ul style="list-style-type: none"> <li>■ Process based on               <ul style="list-style-type: none"> <li>• Rule-making</li> <li>• Negotiation among stake holders</li> <li>• Monitoring and remedial action</li> </ul> </li> <li>■ Rules to promote transparency of decision-making such as hearings and publication of decisions</li> <li>■ Designation (or not) of an independent appeals body</li> <li>■ Grounds for appeal restricted to complaints on undue process or not</li> </ul>
	Coordination with other authorities	<ul style="list-style-type: none"> <li>■ Formal or informal mechanisms for consultation and referral</li> </ul>
Resources, management, and external control	Funding	<ul style="list-style-type: none"> <li>■ Earmarked or not</li> <li>■ From state budget or from industry</li> <li>■ Size</li> <li>■ Stability of time horizon</li> </ul>

*Continued*

**Table 1** *continued*

<i>Area</i>	<i>Design issue</i>	<i>Key options</i>
	Human resources	<ul style="list-style-type: none"> <li>■ Salaries at market levels or subject to civil service rules</li> <li>■ Competence and specialization of staff</li> <li>■ Use of external resources</li> </ul>
	Reporting and auditing	<ul style="list-style-type: none"> <li>■ Reporting to parliament, to line ministry, to other ministry</li> <li>■ External audits</li> </ul>
Transition issues	Start-up strategy	<ul style="list-style-type: none"> <li>■ Timing: set up before or after reform</li> <li>■ Initially, staff on secondment from industry or ministry allowed or not</li> </ul>

**Table 2** Approaches in IEA countries

<i>Institutional approach</i>	<i>Country</i>
Independent regulatory agency and ministry	Australia Canada Czech Republic Denmark France Ireland Italy Portugal UK US
Ministerial agency and ministry	Finland Hungary Netherlands Norway Sweden
Ministry and independent advisory agency	Belgium Greece Luxembourg Spain
Ministry only	Germany Japan New Zealand Switzerland

the Czech Republic are responsible for network and end-user tariff setting and network access issues, licensing and authorizations. The remaining agencies have more limited and specialized powers, mainly related to network and end-user tariff setting and network access issues. This is the case in France, Italy, Portugal, and Denmark. These agencies have been established over the past 12 years, except in the US and Canada where they have been in operation for several decades. Many of these agencies have been created in step with market reforms. Table 3 summarizes the main characteristics of national and federal independent regulatory agencies.

At the other end of the spectrum, the 'line ministry' is the only organization directly involved in the management of regulation in Germany, Japan, New Zealand, and Switzerland. In three of these countries – Germany, Japan, and New Zealand – there is no ongoing regulation of networks (that is tariffs and access conditions are negotiated by industry players), which, arguably, diminishes the potential role of an independent regulatory agency.

Independent advisory agencies have been established in Belgium, Greece, Luxembourg, and Spain. These agencies provide advice to the ministry and are responsible for monitoring and arbitration, but have no definite regulatory powers. In accordance with their advisory role, the areas of activity of these organizations are broadly defined to include most regulatory issues. Governance and decision-making structures and independence safeguards are similar to those adopted by independent regulatory agencies. Table 4 summarizes the main characteristics of these organizations.

In the remaining five countries – Finland, Hungary, the Netherlands,<sup>2</sup> Norway, and Sweden – management of day-to-day regulatory affairs is delegated to a ministerial agency formally subordinated to the line ministry and managed by a president or director, appointed for an indefinite but revocable period (Table 5). Ministerial agencies specialize in regulating monopolies. Their main role is to manage network regulation including tariffs and access conditions.

Competition authorities have jurisdiction over electricity and gas markets in the majority of the countries examined. Formally, competition law applies to energy in all countries. However, there

<sup>2</sup> There are plans to establish an independent energy regulator in the Netherlands.

**Table 3** Independent regulatory agencies

	<i>Australia*</i>	<i>Canada*</i>	<i>Czech Republic</i>	<i>France</i>	<i>Denmark</i>	<i>Ireland</i>	<i>Italy</i>	<i>Portugal</i>	<i>United Kingdom (England and Wales)</i>	<i>United States*</i>
Scope	Energy, telecommunications and airports; competition law	Electricity, gas, and oil	Electricity and gas	Electricity and gas	Electricity and gas	Electricity	Electricity and gas	Electricity and, since 2002, also gas	Electricity and gas	Electricity, gas, and oil
Board Members	7	9	1	6	7	1 (could increase to 3)	3	3	5 (+ 6 non-executive members)	5
Length of appointment (Years)	Up to 5 years	7	5	6	4	Up to 7	7	5	5	5
Possibility of renewal	Yes	Yes	Yes	No	Yes	Yes (only once)	No	Yes	Yes, one time	Yes
Main source of financing	Treasury's Budget	Annual fees paid by the regulated companies (based on volume of regulated activity)	State budget	State budget	Charge on regulated companies	Paid by electricity undertakings	Tax on utilities revenue not to exceed 1 per thousand of regulated industry income	Surcharge on transmission tariffs	Charge on the income of the regulated parties	Fees for services (filing fees) and annual charges on utilities
Main functions	Network regulation; wholesale market rules; antitrust	Regulation of electricity exports	Licensing, network regulation and end-user tariffs	Network Regulation	Network tariffs and supervision of end-user tariffs (ex post)	Network regulation; licensing	End user tariffs; network regulation	End user tariffs	End user tariffs; licensing	Rules for interstate electricity sales and transmission; transmission and wholesale tariffs; Overseeing mergers

\* Federal Regulatory Authority

**Table 4** Independent advisory agencies

	<i>Belgium</i>	<i>Greece*</i>	<i>Luxembourg</i>	<i>Spain</i>
Scope	Electricity and gas	Electricity and some gas activities	Electricity and telecommunications	Electricity, gas, and oil
Board Members	6	5	5	9
Length of appointment (Years)	6	5	3	6
Possibility of renewal	Yes	Yes, one time	Yes	Yes, one time
Main source of financing	Surcharge on transmission tariffs	Surcharge on electricity and gas consumption	Surcharge on electricity consumption	Surcharge on consumption not to exceed 0.5 per 1000 of electricity revenue
Main functions	Advise on regulatory issues, monitoring, and arbitration	Advise on regulatory issues and monitoring; gas distribution and end-user tariffs	Advise on regulatory issues and arbitration	Advise on regulatory issues and mergers and acquisitions, monitoring and arbitration

\* The Greek agency has an advisory role in electricity, which is its main activity, but some definite regulatory powers in gas distribution have recently been added.

are exemptions in some countries that may block enforcement in practice. The most common approach is that the competition authority enforces competition law, including cases of abuse of dominant position, anti-competitive behaviour and mergers, and the ministry and regulatory offices manage regulation. This is often complemented with some formal or informal cooperation arrangements to facilitate the exchange of information.

There are, however, significant departures from this approach. In Australia, administration of competition law and most regulatory issues are the responsibility of a single independent

**Table 5** Ministerial agencies

	<i>Finland</i>	<i>Hungary</i>	<i>Netherlands</i>	<i>Norway</i>	<i>Sweden</i>
Scope	Electricity	Electricity and Gas	Electricity	Energy and water resources	Electricity
Main functions	Licensing of network activities; network price regulation (ex post)	Licensing and authorizations, implementing tariff decisions, approval of contracts among regulated parties and arbitration	Network regulation	Network regulation and licensing of network and generating facilities	Network regulation

agency. This applies both at federal and state levels. In the Netherlands, competition law and regulation are also controlled by a single institution, namely the ministry. In the US and UK, merger policy is concurrently enforced by the energy regulatory agency and the antitrust enforcement office.

### *What do independent regulatory agencies have in common?*

The design of the ten independent regulatory agencies identified in Table 2 is analysed below and, more specifically, identifies the common characteristics. This suggests a common blueprint from which regulatory agencies are designed and adapted to national circumstances.

### Objectives

The role of independent energy regulators is largely concentrated in two inter-related areas. One is monopoly control. Most regulatory agencies are responsible for price control and access in the monopolistic segments – transmission and distribution networks – while avoiding any anti-competitive impact of these segments on competitive segments such as production or generation and supply. The other is consumer protection. Regulatory agencies often have responsibility for end-user tariffs and other conditions such as quality of service. However, some agencies have a more general mission to promote efficiency, including oversight of the competitive activities.

## Jurisdiction

Regulatory agencies usually deal only with economic regulation. Social regulation is the responsibility of other authorities. As an exception to this rule, the UK launched in 1998 a review of the role of regulators that aimed to shift the emphasis of their activity from efficiency towards distributional issues. The government proposed changing the primary statutory duty of regulators to one of consumer protection, including dealing with fuel poverty and other social objectives. In Denmark, the regulator is charged with overseeing some environmentally motivated objectives.

Competition law is not the primary responsibility of most regulators, except in Australia where the competition authority is also the ESI independent regulator. However, ESI regulators often perform some supporting functions for the application of competition policy, such as monitoring, providing information and advice or bringing cases before the competition authority. In the US, the regulator has concurrent jurisdiction with the antitrust authority in merger cases.

## Industry coverage

Electricity and gas are regulated by the same institution in all of the cases examined except Ireland. This is consistent with ministries that also cover all forms of energy. This pattern of association of electricity and gas reflects significant and growing interdependencies between the two industries, such as the increasing use of gas for power generation and the integration of gas and electricity firms. It also reflects the fact that both are network industries facing similar regulatory issues, such as access to the network, and are subject to a similar regulatory approach (both industries are being deregulated worldwide).

## Decision-making, appointment, and independence of regulators

A commission governs a majority of independent regulatory agencies, the exceptions being the Czech Republic and, until recently, the UK where there is a one-person regulatory board. However, the Utilities Bill in the UK established a collegial board for the regulatory agency. Appointments are for a fixed term of between three and seven years. Casual observation indicates that, with few exceptions, stakeholders are not appointed as regulators but this does not seem to obey formal rules. Formal

independence safeguards generally include the non-revocability of appointments except in extreme circumstances, such as serious misconduct or insanity, a separate budget, managerial autonomy, or a stable source of financing.

### Functions

The functions of independent agencies vary. However, the regulation of the monopoly elements (networks) is typically allocated to the independent agency when it exists. The regulation of energy transmission tariffs is a core activity of all independent regulatory agencies, with the exception of Portugal. Another common activity of independent regulators is the regulation of end-user tariffs, with the exception of France and Ireland. Regulating entry and exit into the industry through the issue of licenses and authorizations is the responsibility of the independent regulators in Australia, Canada, the Czech Republic, Ireland, the UK, and the US.

To carry out these tasks, regulatory agencies are typically responsible for monitoring market conditions, compiling and auditing company information, and pursuing and penalizing misconduct. The more technical aspects of regulation, such as system operation rules, are frequently left to industry bodies, while the more strategic aspects of regulation and legislation are conducted by legislative bodies and government. For instance, in the US there has been an increase in legislative activity by individual states in areas that were traditionally handled by the Public Utilities Commissions and stakeholders have taken a leading role in developing operational rules.

In federal countries, regulatory functions are split between the federal and the state or provincial regulators, with the latter typically being responsible for the regulation of retail markets, including distribution and retail supply activities. This is the case in Australia, Canada, and the US. The split of regulatory powers reflects the local nature of distribution and retail supply services versus the systemwide dimension of production, generation, and transmission.

### Process and appeals

The procedures of regulatory agencies show significant similarities, which include

- a decision-making process that includes an obligation to conduct hearings and consultations with affected parties

and to make reasoned decisions, and to make these decisions public;

- an appeals mechanism, which establishes that either an administrative court or an ordinary court of justice is the appeals body;
- mechanisms to make these institutions accountable, which include an obligation to submit a report of activities to the parliament or other political body, and some form of auditing and control of performance by the relevant administrative body.

Most regulatory agencies are governed by a collegial body with an odd number of members appointed for a non-revocable term and subject to strict conduct requirements in their relationship with the industry during and after their term in office to prevent conflict of interests. The agency has jurisdiction only on economic regulation (it does not deal with health, safety or environmental regulation), covers electricity and gas issues and, in particular, deals with the regulation of monopolistic segments of the industry and setting end-user tariffs. The agency also monitors the industry and provides advice to the ministry. Process is regulated to ensure transparency and neutrality of decisions. Finally, in federal countries, the state regulator specializes in retailing while the federal regulator primarily deals with wholesale activities.

### **Why do approaches differ?**

Independent regulatory agencies' powers vary significantly from those with a general mandate to oversee and regulate the energy sector to those with a specialized function such as regulating network access or end-user tariffs. Diversity is even larger when ministerial and advisory agencies are considered intermediate options between a fully independent regulator and a ministry-only approach to regulation. While the legal and administrative traditions of each country are important determinants of the choice of regulatory approach, some of this variation can be explained by the regulatory framework in which the agency is set-up to operate.

The evidence examined in this section suggests the following three empirical regularities. First, there is no regulatory agency in countries that have adopted a 'light-handed' approach to regulation, such as New Zealand and Germany, in

which there is no ongoing price regulation and prices and access conditions are negotiated or proposed by the utilities regulated. In the other countries where no regulator exists, market opening has been minimal to date. The lack of a specialized regulator may be explained by the few regulatory tasks to be performed in countries where regulation is minimal or markets have not been established. In Finland, where access to networks is regulated in principle but there is no ongoing price regulation, the powers of the regulatory agency are also very restricted.

Second, in countries that have vertically restructured their industries at the time of reform, regulators have relatively large powers and independence. Some countries restructured the industry simultaneously with the introduction of competition. Restructuring measures include the unbundling of competitive activities, such as generation and end-user supply, from network activities and divestitures to reduce market power. Australia, Italy, New Zealand, the UK, and some US states provide examples of this approach, which requires that many regulatory tasks be recurrently performed, including the auditing of regulated activities, monitoring access conditions, and setting prices for regulated activities. Strong regulatory agencies separated from the ministry and endowed with relatively important regulatory powers have been established in most of the countries following this strategy, such as Australia, Italy, the UK, and the US (the exception being New Zealand as discussed above). The broad scope and powers of these organizations are consistent with the large range of regulatory functions to be performed.

Third, in the remaining countries regulatory organizations show variation that cannot be readily related to the regulatory framework. For instance, as noted in the introduction, some ministerial agencies may act rather independently in practice. In explaining institutional design among these countries, legal and administrative traditions seem to play an important role. However, the experience in the telecommunications industry suggests that perhaps there will be increasing convergence in the future, as reforms mature.

### **Policy implications**

Regulatory institutions are changing in step with the development of new regulatory frameworks. Institutional change

reflects adaptation to a new regulatory environment characterized by open markets, new regulatory needs such as transmission pricing and increasing both regionalization and the links between industries.

The allocation of power and responsibilities to different organizations makes objectives more explicit and decisions more transparent in each area of public intervention. It also provides for a framework that supports neutrality in regulatory decisions. There is, however, no such thing as an institutional 'free-lunch'. The co-existence of several institutions that have jurisdiction over the same industry creates complexity that spawns the need for increased coordination among the various authorities involved and, possibly, greater compliance costs to the regulated parties. Developing coordination mechanisms in an increasingly complex institutional setting is the key condition to an effective reform.

The multiplication of organizations also raises concerns about the efficiency of the public sector. Bureaucracies are expensive, and tend to grow and self-perpetuate. Thus, it is essential that regulatory institutions be examined over time and that their role and resources be continuously adapted. A key challenge in this regard is to find the appropriate balance between general energy policy, industry-specific regulation, and competition policy. The relative weight of each of these policies is gradually changing as competition in energy markets progresses and the allocation of resources to different policy areas may need to be adjusted in response.

Periodical reviews of the institutional setting must take into account the changing boundaries of the energy industries. The need for harmonization across the gas and electricity industries as well as the trading areas will continue to put pressure on regulatory institutions. The scope of sector regulators may need to adapt in order to cope with these structural changes as has been the case in some countries with the merger of electricity and gas regulators. Further change can be expected in this very dynamic setting.

Most independent regulatory agencies share a number of characteristics. These common elements provide a blueprint for the design of new agencies. However, this blueprint is incomplete given that regulatory agencies differ widely on a number of issues. Designing regulatory mechanisms will benefit greatly from international experience.

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