

**SECOND ANNUAL CONFERENCE ON  
COMPETITION AND REGULATION IN NETWORK INDUSTRIES**

**20 NOVEMBER 2009**

**CENTRE FOR EUROPEAN POLICY STUDIES, BRUSSELS, BELGIUM**

**Assessing the Integration of Regulatory Arrangements:  
The Energy and Telecommunications Sectors in Belgium**

Emmanuelle Mathieu\*, David Aubin, Koen Verhoest, and Joery Matthys

\* Association universitaire de recherche sur l'action publique (AURAP)

Université catholique de Louvain

Place Montesquieu 1/7, B-1348 Louvain-la-Neuve (Belgium)

Tel.: 32-10-47-4222 Fax. +32-10-47-4603

Email: [emmanuelle.mathieu@uclouvain.be](mailto:emmanuelle.mathieu@uclouvain.be)

*Abstract*

In the utilities sector, the OECD regulatory restrictiveness index provides a measure of liberalisation in different sectors and countries. However, the index does not provide information about the political and administrative arrangements that manage regulation. The way regulation is organised between a wide set of authorities with general or sector-based competencies situated at multiple levels is as much a critical success factor as the abolishment of anti-competitive regulations to reach the objectives of the European liberalisation programs. The aim of this paper is to present a typology of regulatory arrangements based on two indices, namely the procedural coordination index and the centralisation index. The typology is built on the assumption that an effective market depends on the degree of coordination between all the public (and private) actors involved in regulation, i.e. the extent to which all the regulatory tasks within the arrangement are included, and, the extent to which the tasks of the respective actors are mutually aligned. It measures the proliferation of regulatory authorities, the degree of specialisation of the tasks assumed by each authority and the coordination between them, as well as the centrality of the main regulators within the arrangement. A first test of reliability of this typology of regulatory arrangements is made on the cases of the energy and telecommunications sectors in Belgium. The paper ends with discussing the strengths and weaknesses of the indices, as well as the relevance of the indices for descriptive and explanatory research on the organization of regulatory tasks.

*Keywords*

Regulatory arrangement, regulatory authorities, coordination, telecommunications, energy

## **Introduction**

Regulation is the public administrative policing of a private activity with respect to a rule prescribed in the public interest (Mitnick 1980: 30). Its role is therefore to shape private activity that has an impact on the public interest, to make the two more compatible with each other. In the last decades, our society has witnessed a significant retreat of the public sector in economic areas where the operational tasks were normally carried out by the government (e.g. transport, postal services, telecommunications, etc.). This unbundling of operational tasks from other tasks (Scott, 2004: 148) towards the private sector resulted in a significant increase in regulation to compensate the decreasing grip of public authorities, and therefore public interest, on these economic activities.

The increase of privatisation and the resulting increase of regulation has had deep consequences on the structures of the State and the way public authorities govern. Economic activities that were originally completely carried out by public institutions are now performed by private companies, mostly within a (at least partially) competitive market. The locus of activity thus shifted from the public to the private, and public guidance of the economic activity, which was implemented together with the direct supply of goods and services (“organic” definition of the public service), now necessarily comes after it, if not chronologically then ontologically. Regulation is dependent on private activity: without the latter the former has no reason for existence. Consequently, public authorities must adapt to private activity, which pressures governance structures.

Scholars of regulation have understood this pressure and increase in complexity of regulation, and a lot of research has been devoted to one specific mechanism to take this into account: the delegation of regulatory tasks to independent regulatory agencies. This research has significantly enhanced the understanding of the conditions and extent of autonomy of these agencies, thereby contributing to our understanding of modern regulatory governance. However, these regulatory agencies, although called independent, do not operate in an institutional vacuum. Other public actors interact with them, and can therefore be seen as taking part in the regulatory process. In order to understand the impact of regulation, it is necessary to take this whole regulatory arrangement into account. The regulatory arrangement can be defined as the constellation of public actors that together organize regulatory activity for a specific economic or social sector. It is in other words a set of interacting organizations within a given public policy (Jordana and Sancho 2004: 302). The concept includes the way regulatory competencies are distributed among public authorities and, how these competencies are coordinated between these authorities.

The aim of this paper is to present a typology of regulatory arrangements based on the combination of two indices, namely the procedural coordination index and the centralisation index. These indices give a picture of the way regulation is organised between a wide set of authorities with general or sector-based competencies situated at multiple levels. The central assumption is that an effective market regulation depends on the degree of coordination between all the public (and private) actors involved in regulation, i.e. the extent to which all the regulatory tasks within the arrangement are included and the extent to which the tasks of the respective actors are mutually aligned. Based on that assumption the indices are able to provide insights about the degree of specialisation, concentration and coordination of the regulatory

arrangements in the utility services. Moreover they allow comparisons of regulatory arrangements across sectors and countries. The basic idea of the indices is to combine measures of the proliferation of regulatory authorities involved in the arrangement, the degree of specialisation of the tasks assumed by each authority and the coordination of these tasks, and the centrality of the main regulators within the whole arrangement.

In this sense the indices complement two former approaches of regulation in utility sectors, also based on the construction of indices. The first is the OECD regulatory restrictiveness index developed by Conway and Nicoletti (2006). It provides the means to measure the level of anti-competitive regulations in the services sectors, and helps to assess the level of liberalisation reached in different sectors and countries. The second is the independence index for national regulatory authorities developed by Gilardi (2003; 2008). It measures the degree of formal delegation of regulatory powers by the governments to independent agencies. With an original method for assessing the interactions between several regulators, the typology and indices of regulatory arrangements complement these two former measurement tools. This typology supports the common endeavour to evaluate the impact of the European reform programs in the utility services.

This paper is divided in several parts. In the first part the theoretical underpinnings of the typology will be presented, mainly inspired by the regulation and public administration literature. The calculation method of the indices is included in this. In a second part a first test of reliability of this typology is made, by evaluating the first empirical results of the comparison of the cases of the telecommunications and electricity sectors in Belgium in a multi-level governance perspective. Finally, the potential usefulness of the typology to better understand how regulation actually works is discussed.

## **1. A Typology for the Systematic Assessment of Regulatory Arrangements**

The typology of regulatory arrangement is based on the combination of two indices, namely the procedural coordination and centralisation indices. It addresses the dimension of specialisation, fragmentation and coordination in regulatory arrangement.

The definition of regulation by Hood et al. (2001) distinguishes three *functions* in a regulatory regime: rule-making, monitoring and enforcement. Elaborating on that definition, an organization can be defined as having a regulatory *task* when it has at least one of the following *regulatory tasks*: (1) Transition of general policy and laws to more concrete rules, norms and standards, standards in this regard indicate the acceptable levels and distributions of a specific risk (e.g. safety standards, goals in distributive justice, pollution, chemicals); (2) Application of rules and standards in individual cases via licenses; (3) monitoring of compliance, including all actions that are aimed at gathering information on the compliance of actors to rules, while information-gathering can occur both through desk work and on-site inspections and audits; (4) Enforcing compliance, defined as modifying the behaviour of an actor through the application of sanctions and rewards, forbidding to do an activity or demanding a reversal/change of a decision. A regulatory regime should normally have all components, although the functions can be spread across several bodies within a sector.

The regulatory arrangement can be defined as the constellation of public actors that together organize regulatory activity for a specific economic or social sector. It is in other words a set of interacting organizations within a given public policy (Jordana and Sancho 2004: 302). The concept includes the way regulatory competencies and tasks are distributed among public authorities and, how these competencies are coordinated. Therefore the regulatory arrangement encompasses both administrative and political actors: if for example ministers also take individual decisions such as the granting of licenses, they will be included in the regulatory arrangement. Because of this, the regulatory arrangement includes actors from different governmental levels (i.e. international, European, Federal, Regional and local) and actors at the same governmental level (e.g. both a sector-specific regulator and the general competition authority).

The characteristics of the regulatory arrangement are influenced by the levels of specialisation, organisational proliferation, fragmentation as well as all forms of coordination. In our view, these characteristics will affect the way regulation is implemented, the coherence of the regulation from the view of the regulatees, the possibilities for strategic behaviour by regulatees, and ultimately regulatory effectiveness. As any concept in the social sciences, these concepts of specialisation, proliferation, fragmentation and coordination tend to be polycentric, i.e. with several meanings and must be clearly defined.

### 1.1 Specialisation and Organisational Proliferation

The private sector is organized in different markets, and many of them have become extremely sophisticated. As a result, a lot of enterprises are very specialised and only operate in a limited number of submarkets, while other companies stretch their operational activities not only on a number of submarkets, but even between market sectors (e.g. phone services, internet services, and digital media services). Regulating such a complex environment is not an easy task.

One way of confronting private complexity is for the regulatory arrangement to also become increasingly complex (Papadopoulos 1995). This way, complicated problems are decomposed. Divided into segments mirroring markets structures, regulation could achieve the degree of sophistication needed to effectively steer private activity towards broader societal goals. The trend to segment regulatory tasks refers to what management and organization theory call more generally *specialisation*. Specialisation refers to the way work is divided among public actors and how regulatory tasks are differentiated. More specifically, it has been defined as the determination of what tasks and relations can be grouped together and coordinated and what tasks and relations can be separated (Christensen and Laegreid 2006).

Because regulatory tasks are divided amongst different organizations, it causes an *organizational proliferation*: the growing role of expertise in regulation has fostered the creation of specialised public bodies entrusted with the implementation of specific segments of regulation, often for specific economic sectors. Specialisation and organizational proliferation are most visible with sector-specific regulation (e.g. in the financial, energy and telecommunications sectors). They can be described as unfolding along four main axes: horizontal, vertical, between sectors, and between general competition and sector-specific regulation.

*Horizontally*, an uncoupling occurred along the lines of the policy cycle, to be precise between policy making and policy implementation. Sector-specific regulators were created, which were in general quite independent from the political level. In these sectors ministers, departments, independent regulatory agencies and in some cases even private regulators hold specific competencies and tasks and need to interact with one another.

Regulatory tasks can further be divided along *sectoral* lines between several agencies. This specialisation axe is most easily understood: different sector-specific regulators are created, and each of them is only responsible for one sector. Obviously, this is a specialisation along economic sector lines (e.g. separate regulatory bodies for media and telecommunication), leading to sectoral regulators, each focussing on a narrowly defined market. This may lead to problems when enterprises develop activities which cut across different markets (e.g. telecom companies offering media services).

Specialisation along policy cycle lines and along regulatory lines can also have a *vertical* component: sector-specific regulators can be established on different governmental levels, and be responsible for different regulatory tasks. More generally, as private activity expands beyond the nation state, there is a pressure to have a political debate and possibly regulate on a European level. At the same time, modern nation states have been delegating tasks to lower levels of government as well (Hooghe and Marks 2003). Thus the number of governmental levels involved in the policy cycle and in regulation has grown, and sector-specific regulators have been established on different governmental levels, with similar regulatory tasks, but with competencies limited to those for which the governmental level they reside in is responsible.

Finally, Market regulation is not necessarily tied to specific sectors. Market dynamics are expected to enhance overall productivity and decrease prices, as long as a condition of perfect competition is obtained. Market failures can supposedly inhibit the creation of such perfect competition however, and government intervention was deemed necessary to correct the market when necessary. This is the aim of general competition law, and regulatory agencies were set up to ensure companies complied with it. As competition law is applicable to all economic sectors, sector-specific regulation represents a specialisation of it, only applicable to one economic sector. This is the fourth and last specialisation axis, the one *between general competition regulation and sectoral regulation*. Here, organizational proliferation takes the form of the creation of general competition authorities and sectoral regulators alongside each other.

## 1.2 Fragmentation

Though specialisation may indeed allow a greater level of sophistication, as described above, it also can have adverse effects: a growth in intricacy of regulation makes it at the same time more difficult to make the regulation itself compatible with multiple societal interests. Combined with a proliferation of regulatory actors, these different specialised organizations risk to focus only on the specific problem they are meant to remedy, without taking into account the broader picture. This might lead to both overlaps in tasks and competencies, and blind spots. We define this effect as fragmentation of the regulatory arrangement.

Fragmentation is not always defined purely as a negative in academic writings. The theory of “regulatory competition” for example explains how overlaps of regulatory competencies can be a way to increase the effectiveness of regulation: governments can compete against each other,

through regulation, in order to attract companies, citizens and resources (Tiebout 1956). The latter can vote with their feet, and relocate to the territory that has the most effective regulation. Likewise, this regulatory competition can exist between regulatory actors within one country, located on both different governmental levels or the same level. Competition between these actors would result in favourable outcomes, such as innovation in the used types of regulation, the avoidance of ‘regulatory capture’ and other regulatory failures, the increase of performance of the regulatory organisations (because benchmarking becomes possible), an intrinsic drive to minimise and simplify regulation, the creation of checks and balances, and the existence of a back-up in case of failing regulators (Hood et al. 2001: 174-175). Opponents of this theory have argued on the other hand that regulatory competition comes with disadvantages as well: the lack of transparency, high administrative costs for companies dealing with divergent regulators, risks of blame shifting between regulators, and companies that play regulators off against each other. Moreover, these opponents have pointed out that the theory of regulatory competition only takes into account overlaps in regulation, and ignores the possibility of blind spots in rule enforcement (Hood et al. 2001; Geradin and McCahery 2004).

This analysis sides with the opponents of regulatory competition, and defines fragmentation in a negative way. The specialised actors in the regulatory arrangement we are investigating will necessarily be interdependent, which makes the development of coordination a must in order to avoid incoherencies. Coordination should provide these actors with the tools to reduce the number of rules and administrative burdens, stimulate innovation (because of the pooling and the exchange of experience and expertise), improve the enforcement of regulation (by exchanging standardised information), prevent ‘regulatory capture’ (because the regulator is not the only decision-maker), and increase the regulators’ accountability.

Fragmentation in the regulatory arrangement can occur along all four of the axes described before. Horizontally, sector-specific regulatory actors, like ministers, departments, regulatory agencies and private regulators, operating in the same sector but with different regulatory competencies, can work alongside each other instead of with each other. Vertically, sector-specific regulatory actors working on different governmental levels could potentially overlap in competencies, thereby unnecessarily burdening their regulatees. Similar competence overlaps may occur between the sector-specific regulator on the one hand, and the general competition authority on the other hand. Finally, the policy making level is often seen as a natural link between several related sectors. Since this link has been severed when competencies are primarily given to independent agencies, a fragmentation between sectors can occur, when sector-specific regulators of highly interdependent sectors, such as for example telecommunication and digital media, have no contacts with each other any more.

### 1.3 Procedural and Structural Coordination

*Coordination* has been defined as the “instruments and mechanisms that aim to enhance the voluntary or forced alignment of tasks and efforts of organisations within the public sector.” These mechanisms are used in order to create a greater coherence and to reduce redundancy, lacunae and contradictions within and between policies, implementation or management (Verhoest and Bouckaert 2005: 3; Peters 1998). In the post NPM era, coordination mechanisms have been developed to reduce fragmentation within the public sector (Verhoest and Bouckaert

2005: 5; Boston and Eichbaum 2005). Coordination fulfils this role by counterbalancing specialisation and organizational proliferation, thus avoiding fragmentation in the regulatory arrangement.

A broad consensus exists on the distinction between *three mechanisms of coordination* in social life, i.e. hierarchies, networks and markets (Thompson et al. 1991; Peters 1998). Hierarchical mechanisms rely on authority and power, network mechanisms on mutual cooptation and mutual norms, and markets (or competition) mechanisms on bargaining and information (Bouckaert et al. 2010)<sup>1</sup>. However, our research into regulatory arrangements in the electricity and telecommunication sectors has suggested that these ideal types of mechanisms are not reflected in the coordination instruments used in practice. Rather, a scale of instruments has been observed, some leaning more towards a hierarchical mechanism, others more towards a network-type mechanism. Market-type instruments can also be observed, but they are clearly separate from the two other types of mechanisms, since we were not able to observe a range in these instruments<sup>2</sup>.

We consider two types of coordination: procedural coordination and structural coordination. The first type of coordination aims to limit fragmentation by strengthening the functional links between actors in the performance of their different tasks. It refers to the interactions between the sector-based regulator (e.g. BIPT, the Belgian regulatory agency in the telecoms sector) and the other organisations involved in the regulatory arrangement, but specifically those defined in legally set procedures (i.e. primary and secondary legislation). The sector-based regulator can play different roles in these procedures (e.g. advisory role, decision proposal, decision-making or overruling of other's decisions). For example, one actor (e.g. minister) may be legally obliged to consult another actor (e.g. sector-specific regulator) in a licensing procedure, and may have to ask yet another actor for relevant information. Procedural coordination concentrates solely on the decision procedures engaged in by the sector-based regulator, which include appeal procedures against these decisions. We define a decision procedure here as a formal interaction between organisations that leads to a regulatory decision. Hence, a decision procedure can be seen as a sequence of bilateral interactions, that leads to a better coordination between the involved regulatory actors.

Structural coordination aims to limit fragmentation by strengthening the organizational links between actors. It groups together the interactions not handled in legally defined decision-making procedures, mainly those occurring in platforms for advice and consultation, information sharing systems, coordinating functions, and even shifting tasks and changing control lines between regulatory actors (Bouckaert et al 2010). For example, Belgium uses formal and informal concertation platforms between national and regional regulators where discussions are

---

<sup>1</sup> The market coordination mechanism should be distinguished from the concept of “regulatory competition”. The latter concept implies a lack of coordination, while the market coordination mechanism means that certain coordination mechanisms used in the free market, such as contractual obligations, are also used in the public sector.

<sup>2</sup> It can be argued that the market-like instruments listed here can also be seen as in essence hierarchical, since they establish a principal (hierarchical superior) – client (hierarchical subordinate) relationship, be it a more voluntary one than the purely hierarchical enforced one.

held on issues which are not dealt with in the legal decision-making procedures (e.g. ENOVER and FORBEG in the energy sector). Another example is the participation of a member of one actor in the board of another actor.

While structural coordination has a general scope and unfolds implicitly and pervasively, procedural coordination is more explicit and issue-specific. In the design of the typology and indices, which we develop in this paper, we only consider procedural coordination. This means that all procedural instruments are taken into account, but not the structural coordination instruments as such. In fact, the coordinating effect of many structural instruments is difficult to assess. What is the effect of the actors represented in the management board of the sector-based regulator in terms of coordinating decisions? What kind of information from an advisory platform is transferred into the elaboration of an individual decision? Thus, only the procedural aspects of structural coordination can be included in the indices<sup>3</sup>.

The typology of regulatory arrangement is aimed at providing a standard judgment about the degree of specialisation, fragmentation and coordination of the regulatory arrangements in the utility services that can be replicated in a multitude of sectors and nations. It is based on the combination of two indices, namely the procedural coordination index and the centralisation index. The first index starts from the assumption that the regulators are specialised and assess their capacity to interact in the decision-making process. We identify several decision procedures where they are involved, one for each regulatory task<sup>4</sup>. As such, the procedural coordination index measures the degree procedural coordination for all the regulatory tasks. The idea is to look at the capacity of the sector to avoid fragmentation while the process is specialised. Second, the centrality index looks at the relative position of power of individual actors in the regulatory arrangement.

#### 1.4 The Indices: Evaluating the Regulatory Arrangement

The indices presented hereafter have been designed so as to describe the regulatory arrangement. The first index focuses on the procedural coordination, the second on individual actor's centrality, the third on the centralisation of the arrangement. The actor's centrality index is used to calculate the centralisation index and will not be used separately in the typology of regulatory arrangements. For calculating the indices it is necessary to gather the list of actors involved in the regulatory arrangement, the list of tasks that are being made in this arrangement, and the way each actor participates (or does not participate) to the different tasks. The dataset can be based on analysis of exclusively formal elements or include informal aspects, depending on the time dedicated to the research. In our case, the data was collected with an analysis of the legislation to identify decision-making procedures, and completed with a survey targeting the sector-based regulators and interviews with experts to unveil informal dynamics. As such, the index reflects a more accurate image of the regulatory arrangement.

---

<sup>3</sup> For more detailed studies of structural coordination, see the results of the COBRA project (*Comparative Public Organisation Data Base for Research and Analysis*, <http://www.publicmanagement-cobra.org/pub/index.htm>).

<sup>4</sup> For practical reasons, we neither do collect data at the level of individual decisions that are too numerous to be properly managed, even if in absolute terms, this would be a much more precise indicator. However, we don't think it is useful to disaggregate the regulation to individual decisions to describe the regulatory arrangement.

*Procedural coordination index*

The **procedural coordination index** refers to the interactions between the actors involved in the regulatory tasks. It measures the extent to which the decision making process in a regulatory arrangement implies procedural coordination. In other terms, it gives an overall picture of the degree of involvement of the different actors in the different decision procedures. Either the decision procedures only involve one or a few actors, in which case procedural coordination is low; or the decision-making process can be more open and requires the participation of a great number of actors for each task, in which case procedural coordination is high. The index thus takes the form of a ratio ranging from 0 to 1, a score of 0 meaning that each task involves only one actor, a score of 1 meaning that all actors are involved in all tasks.

To calculate the procedural coordination index it is first necessary to delineate the regulatory arrangement by listing the decision procedures ( $D1$ ,  $D2$ , etc.) and the number of actors ( $A1$ ,  $A2$ , etc.) involved in the making of each of these decisions. The following table presents the coding of the different variables used for the calculation of the index:

**Table 1: Variables of the procedural coordination index**

Variable	Description
PC(abs)	Absolute value of the procedural coordination index
PC(rel)	Relative value of the procedural coordination index (ratio between 0 and 1)
a	Number of actors in the regulatory arrangement
d	Number of decision procedures in the regulatory arrangement
$a_i$	Number of actors involved in the decision procedure number i

The calculation of  $PC(rel)$ , the procedural coordination ratio, is made in two steps. First the  $PC(abs)$ , the absolute value of procedural coordination, is calculated by adding the number of actors involved in each task (see equation 1). In a second step,  $PC(rel)$  is calculated by transposing  $PC(abs)$  into a ratio ranging from 0 to 1. The goal of this operation is to allow the comparison of the level of procedural coordination between regulatory arrangements characterized by a different number of actors and/or decision procedures. To do such a transposition, it is first necessary to locate the  $PC(abs)$  on a scale bounded by a minimum and a maximum. The minimum corresponds to the case in which each decision is made by only one actor, which equates  $d$ , the number of decision procedures. The maximum corresponds to the case in which each decision involves all actors, which equates  $ad$ , the number of actors multiplied by the number of decisions procedures. Then, the value of  $PC(abs)$  on a scale ranging from  $a$  to  $ad$  should be transposed into a value on a scale ranging from 0 to 1. This is done again in two steps: by first withdrawing  $a$  (to translate  $PC(abs)$  onto a scale with 0 as a minimum), and then dividing the obtained value by its maximum ( $ad-a$ ) to translate it into one that would have 1 as a maximum (see equation 2).

**Equation 1: Formula for calculating the absolute value of the procedural coordination**

$$PC(abs) = \sum_{i=1}^d a_i$$

**Equation 2: Formula for calculating the relative value of the procedural coordination**

$$PC(rel) = \frac{PC(abs) - a}{\max[PC(abs) - a]} = \frac{\left(\sum_{i=1}^d a_i\right) - a}{\max\left[\left(\sum_{i=1}^d a_i\right) - a\right]} = \frac{\left(\sum_{i=1}^d a_i\right) - a}{ad - a}$$

*Actor's centrality index*

The second index is exclusively used to calculate the centralization index. It shows the extent to which an actor is central in a regulatory arrangement. It is built upon two variables: the number of decision making procedures the actor is involved in, and the power of influence it enjoys in each decision. The score of the index will be high if the actor is taking part in many decision procedures, and if each involvement is granted a high power of influence. The index is thus a ratio ranging from 0 to 1, 0 meaning that the actor is not involved in any decision procedure, and 1 meaning that it is the central decision maker, dominating other actors, in all decision procedures.

Similar to the procedural coordination index, the calculation of the **actor's centrality index** needs the delimitation of the regulatory arrangement, through a list of decision procedures ( $D_i$ ) and a list of actors ( $A_j$ ). Moreover, this index requires another variable, the power of influence of the actors involved in each task. Here again, the relative centrality implies the calculation of the absolute centrality beforehand. The following table presents the coding of the variables intervening in the actor's centrality index:

**Table 2: Variables of the actor's centrality index**

Variable	Description
$C(abs)_{A_j}$	Absolute value of $A_j$ 's centrality
$C(rel)_{A_j}$	Relative value of $A_j$ 's centrality (ratio between 0 and 1)
$P_{A_j D_i}$	Power of influence of $A_j$ in $D_i$ (ratio between 0 and 1)
$d$	Number of decision procedures in the regulatory arrangement

The basis of the index is the number of decision procedures the actor is involved in. Hence, each decision procedure is not merely counted as 1, but is weighed according to the power of influence the actor enjoys in its making. This has led to the creation of the variable  $P_{AjDi}$ , the power of influence of the actor number  $j$  in the decision procedure number  $i$ .  $P_{AjDi}$  basically measures the extent to which an actor's position must be taken into account in the decision. If an actor is giving a non binding advice, its position will not be considered as seriously as if it holds a veto power over the decision.  $P_{AjDi}$  is designed as an ordinal variable that can take six values bounded by 0 and 1 (see Table 2).

**Table 3: Scale of measurement of the power of influence of regulators**

Value	Description
0	The actor is not involved in the task
0.2	The actor is informed
0.4	The actor is consulted or gives a non-binding advice
0.6	The actor holds a binding position or can make proposals
0.8	The actor is a co-decider
1	The actor is the main decider

When the actor is not at all involved in the decision making procedure, it gets a 0. When it is required that the actor is informed at some point of the decision making procedure, it is rated 0.2. Even if the actor is not allowed to express its views, this deserves to be distinguished from the latter case. As the decision maker may seek support within the community of the regulatory arrangement, this obligation to inform can lead it to anticipate and consider, even very slightly, the actor's position.

The following category, consultation, is counted as 0.4. It includes every kind of mechanism that allows an actor to express its views on the decision to be made, without granting it the power to impose this view. As a consequence, the main decision maker is officially aware of the actor's position, but can disregard it. For example, non binding advice, consultation, and non-binding guidelines or recommendations would be classified here. Consultation however could also revert to the previous category if the main aim of the consultation is to allow the consulted actor to know the decision that will be made by the central decision maker.

The next category, rated 0.6, refers to cases in which the actor's position is binding for the decision maker. This means that his position is not only officially exposed, but should be reflected in the final decision. However, this category does not exclude the possibility for the decision maker to partially divert from the actor's position under specific and restrictive conditions, such as a qualified majority. The 'binding position' gathers different mechanisms

quite different one from another, such as the right to initiate a proposal or to issue a binding advice.

An actor is considered as a co-decider, thereby having a score of 0.8, when its consent is absolutely necessary for the decision to be made. This is the case when the actor has the possibility to veto the decision, either ex ante (veto) or ex post (overruling). The central decision maker should also be classified as a co-decider when the decision involves another co-decider. The last category, the main decider, supposes that the actor has the final word on the making of the decision. This is not the case when another actor may veto the decision. Only in the latter case the actor can receive a score of 1. Note however that we exclude normal administrative appeals from the category of co-decider, only appeals that have full jurisdiction.

The **absolute centrality** of an actor,  $C(abs)_{Aj}$ , equates the sum of its power of influence in all decision procedures (see equation 3). The minimum value of the absolute centrality is 0, when the actor is not involved in any decision procedure. The maximum value is  $d$ , it corresponds to the case in which the actor is the main decider in all tasks. In order to compare scores of different actors, within and between regulatory arrangements, it is necessary to calculate  $C(rel)_{Aj}$ , the **relative centrality**. This is done by simply dividing the absolute centrality by its maximum value,  $d$  (see equation 4).

**Equation 3: Formula to calculate the absolute centrality of the Actor j**

$$C(abs)_{Aj} = \sum_{i=1}^d P_{AjDi}$$

**Equation 4: Formula to calculate the relative centrality of the Actor j**

$$C(rel)_{Aj} = \frac{C(abs)_{Aj}}{\max[C(abs)_{Aj}]} = \frac{\sum_{i=1}^d P_{AjDi}}{\max\left(\sum_{i=1}^d P_{AjDi}\right)} = \frac{\sum_{i=1}^d P_{AjDi}}{d}$$

In fact, the allocation of an actor's participation into a task has a formal and an informal dimension. Actors may have an actual stronger (or weaker) influence on the decision than that indicated by his formal mode of participation. For example, an actor whose formal competence is to issue non binding guidelines is systematically followed by the decision-maker, e.g. because of its high moral value. Then, its actual influence is closer to the category 'binding position' than that of 'consultation'. The category indicated by the formal data becomes less relevant and can be replaced by the informal data when available. In any case, the method for coding must be exposed clearly.

### *Centralisation index*

Social network analysis has developed tools to calculate the centrality of a point within a network. Freeman (1979) has designed a formula to calculate the centralization of the network on the basis of the centrality of its points. The actor's centrality index developed in this paper is distinct from those used by social network analysis. Nevertheless, the way centralities are used for measuring centralization can apply here. Therefore we propose a centralisation index largely inspired by Freeman's one.

The centralization index evaluates the extent to which decision making power is more or less centralised within the regulatory arrangement. It allows to evaluate whether there is a most central actor who is clearly dominating other actors or whether decision making power is relatively equally distributed between all actors. We can measure it by looking at the differences between the centrality scores of the most central actor and those of all other actors. The sum of these differences gives  $C(abs)$ , the absolute centralization (see formula 5). Here again,  $C(rel)$ , the relative centralization, is calculated by dividing the absolute centralization by its maximum possible value. The maximum possible value of the absolute centralization is achieved when the most central actor has a centrality of 1 and all other actors have one of 0. In this case, the sum of the differences equates  $a-1$  (see equation 6).

**Equation 5: Formula to calculate the absolute centralization of the regulatory arrangement**

$$C(abs) = \sum_{j=1}^a (C_{A \max} - C_{Aj})$$

**Equation 6: Formula to calculate the absolute centralization of the regulatory arrangement**

$$C(rel) = \frac{C(abs)}{\max[C(abs)]} = \frac{\sum_{j=1}^a (C_{A \max} - C_{Aj})}{\max \left[ \sum_{j=1}^a (C_{A \max} - C_{Aj}) \right]} = \frac{\sum_{j=1}^a (C_{A \max} - C_{Aj})}{a - 1}$$

### *A Typology of Regulatory Arrangements as a Combination of Two Indices*

The aim of calculating these two indices, as already mentioned is to describe regulatory arrangements taken as a whole in a multi-level and multi-tasks perspective. After a short reminding of what is exactly measured by the indices, a typology of regulatory arrangements is proposed.

The *procedural coordination index* measures the degree of interactions between the actors involved in the regulatory decision procedures. It gives an overall picture of the degree of involvement of the different actors in the different decision procedures. The index is low or tends towards zero when actors generally decide alone in the different procedures, i.e. without appealing to other actors to bring information or advice or co-decide. The index is high or tends towards a score of one when the decision-maker takes the position or opinion of other actors into account or when the procedure requires the intervention of several actors in the decision-making process. The value of the index is independent of the total number of actors involved in the regulatory arrangement, and is independent of the total number of decision procedures. The balance between the number of actors and the number of decision procedures is neutralized by the calculation to a 0-1 ratio.

The *centralisation index* brings information about the overall distribution of powers within the regulatory arrangement. It is based on the identification of the kind of procedural coordination used to involve the different actors in each task (i.e. actor's centrality index). Their power is low when they are only informed or consulted and high when they co-decide or even decide unilaterally. The resulting values are then aggregated in a single index that reflects the relative positions of all actors in all decision procedures. This reveals whether or not there is a dominant actor. Thus, if the centralisation index tends to zero, it means that power is equally distributed between the actors involved and no one dominates. If the index tends to one, it means that a single actor or two are dominant on the others and are leading the regulation process.

The *typology of regulatory arrangements* results from a combination of the results of the two indices, i.e. the procedural coordination index and centralisation index (see table 1). Of course the resulting categories are ideal-typical in a Weberian sense. They are pure forms and do not describe actual regulatory arrangements. It is expected that the arrangements observed empirically are combining different features of these ideal-types<sup>5</sup>. The matrix identifies four types of regulatory arrangement that are referred as fragmented, concentrated, concerted and centralised.

**Table 4: Typology of regulatory arrangements**

		PROCEDURAL COORDINATION INDEX	
		Low	High
CENTRALISATION INDEX	Low	<b>Fragmented Arrangement</b> One actor performs each task, with power equality between actors  <i>Several actors take unilateral decisions</i>	<b>Concerted Arrangement</b> All actors are involved in each task, while power is equally distributed among actors  <i>Several actors interacting through mutual adaptation or negotiation</i>
	High		

<sup>5</sup> A graphical representation among an X and Y axis could denote intermediate cases as well. If we then overlay the matrix and graph, we can identify in which quadrant an actor in a given sector is positioned.

<b>High Concentrated Arrangement</b>	<b>Centralised Arrangement</b>
One actor performs each task, with power concentrated in the hands of one actor	All actors are involved in each task, and power is concentrated in the hands of one actor
<i>A single actor in charge of most or all regulatory tasks</i>	<i>Several actors responsible for regulation, with a leading actor who takes final decisions or overrules them</i>

The *fragmented arrangement* is an arrangement where each task is performed by a single actor (low procedural coordination) and power is equally distributed between the different actors. The actors are specialised (low procedural coordination) and do not interact or cooperate (low centralisation). For example, the competition authority and the sector-based regulator act unilaterally without exchanging any information. In this type of arrangement, several actors act unilaterally.

The regulatory arrangement is a *concentrated arrangement* when the procedural coordination index is still low, but the centralisation index is high. Each task is performed by a single actor and power is concentrated in the hands a one actor. Either all tasks are conducted by a single actor or one actor is in charge of most of the tasks. For example, in the pre-liberalisation area the telecommunications sector was organised within a single ministry in Belgium and the services provided under state control. In this arrangement, a single actor is in charge of most regulatory tasks, and other actors perform only secondary tasks and/or are scarcely involved in the decision-making-process (e.g. limited to information exchange).

The *centralised arrangement* refers to situations where procedural coordination is high and centralisation is low. All actors are involved in each task, but the power is concentrated in the hands of one actor. Either the central actor has the competence to decide on several tasks, even if other actors participate, or it has a hierarchical authority on the other actors. For instance, the central actor may take the final decision (e.g. the Federal Minister of Energy in Belgium for economic regulation in the energy sector on the basis of a draft of the sector-based regulator, CREG) or have the capacity to veto decisions of other actors (e.g. the European Commission on the market analysis made by the national sector-based regulators in the telecommunications sector).

Last but not least, the *concerted arrangement* describes a situation where all actors are involved in each task, while power is equally distributed among them. Regulatory coordination is high and centralisation is low. In such a case, no leader is emerging from the regulatory arrangement. The different actors cooperate in order to coordinate their activities, either through mutual adjustment or negotiation (see Scharpf 1997). For instance, in Belgium, the Federal telecommunications regulator must cooperate with the media regulators from the federated entities on tasks of common interest. Decisions are taken by consensus and no actor is in a higher position than another. Thus, in concerted arrangements, several actors interact through mutual adaptation or negotiation.

This typology is developed with the aim to describe regulatory arrangements and make them comparable through sectors and countries. It is built on two indices, the procedural coordination index and the centralisation index. As a consequence, the description puts an emphasis on the intensity of interactions between the actors involved in all the regulatory procedures affecting a particular sector as well as the distribution of power between these actors, notably the identification of a dominant actor. In order to assess the usefulness of this typology, and mostly its comparative capacity, the matrix is now tested on the regulatory arrangements of the telecommunications and electricity sectors in Belgium.

## **2 Regulatory Arrangements in the Electricity and Telecommunications Sectors in Belgium**

The empirical part presents the different tasks contained in the regulatory arrangement in the energy and telecommunications sectors. The procedures used in each task are explained and the method used to code the indicators is specified. The coding itself and an elaborated overview of the actors and decision procedures can be found in Annexes I, II and III<sup>6</sup>.

### **2.1 Regulatory Arrangement of the Electricity Sector**

The regulatory arrangement in the electricity sector went through significant changes as compared to before the liberalisation process. Liberalisation of the electricity sector in Belgium began on the Federal level in 1999 on the transmission/transport network. In January 2001, green stream electricity was liberalised on both the transmission/transport and the distribution network. Full liberalisation through the transmission network was achieved in July 2004. As far as liberalisation of electricity through the distribution network is concerned, this was finalized in July 2003 for the Flemish Region, and in January 2007 for the Walloon and Brussels Region. In general, the Federal level is responsible for production and the transmission network, while the Regional levels are responsible for the distribution network.

On the Federal level, regulation is primarily handled by the Federal sector regulator, CREG with regards to implementation of electricity policy, and by the Belgian Competition Authority with regards to general competition policy. However, both the Governmental level and the administration (Federal DG Energy) also are involved in regulation, as we will see later on. Finally, FORBEG, a voluntary construction, provides a platform for deliberations between the electricity sector regulators on the Federal level and Regional levels, making it more possible to coordinate actions, which can have an impact on regulation.

---

<sup>6</sup> Before commencing, a small clarification has to be made regarding the concept of “Government”. In the previous part of the paper, we have used the broader definition of the term, designated as “government”, which includes both political and administrative actors. However, in the analysis of the electricity and telecommunications sectors a more narrow definition is used, designated as “Government”. This latter category designates either a Minister taking a decision, or a number of Ministers or all Ministers taking a decision together. In other words: political decision makers are grouped together as one actor, designated as “Government”.

Enforcement of regulation on the Federal level is handled by CREG, which can impose administrative fines. Decisions by the Federal sector regulator can be appealed either in front of the Competition Council, the Court of Appeal in Brussels or the High Administrative Court, depending on the nature of the decision. The General Competition Authority is also responsible for the enforcement of general competition norms, though sometimes it will have to yield jurisdiction to the European Court of Justice, if European matters are involved. Appeals against decisions by the Competition Authority are handled by the Court of Appeal in Brussels.

On the Flemish Regional level, the agencies directly responsible for implementation of electricity policy are VREG, which is the Regional sector regulator, and VEA, the Flemish Energy Agency. As was the case on the Federal level, the Government is heavily involved in regulation as well. The administration seems to be less involved. In the Walloon Region, the sector regulator is CWaPe, and in the Brussels Region, the sector regulator is Brugel. In both these Regions the Regional Government plays an important role as well.

On the Flemish Regional level, both VREG and VEA can impose administrative fines to impose specific norms. These decisions can be appealed before the High Administrative Court or the normal Courts of First Instance. In the Walloon and Brussels Regions, the sector regulators have similar competencies.

To be able to compose the different indices, the different regulatory decisions had to be mapped. An exhaustive list with the different values, differentiating between the electricity and gas sector, can be found in Annexes I and II. In this chapter, we present the different decisions shortly, and concentrate on the electricity sector. For the Regional level, we will only include the Flemish Region in the regulatory arrangement, because we take the perspective of the regulatory arrangement seen from this territorial perspective.

### *Economic regulation*

Both CREG and VREG have general monitoring competencies to ensure conformity to the Acts and Decrees, including the right to impose administrative fines. In case of CREG however, a special appeal procedure is foreseen in front of the Court of Appeal in Brussels. In case the monitoring pertains to rational energy use and informing the consumers on energy conservation, VEA is also involved on the Flemish Regional level.

A first set of specific regulatory decisions pertain to access to the market. The transmission network operator is chosen by the Federal Government, after a proposal made by the former transmission operator. CREG provides advice, as well as CBFA<sup>7</sup> in case of natural gas. The general criteria for the transmission are set by the Federal Government as well. In both decisions the Federal DG Energy also plays a role, though it is not formally involved. This is the case throughout most if not all decisions on the Federal level, so it will not be repeated for every decision procedure. New transmission lines can be built after a fiat by the Federal Government, in a procedure similar to the establishment of new production facilities for electricity, described

---

<sup>7</sup> CBFA: independent regulator for banks and financial institutions.

later on. The distribution network operators are appointed by VREG, while the general conditions for appointment are set by the Regional Government. In specific cases, the local governments also have a say in the designation of the operator. A permission from the Flemish Government is needed to build new direct lines in the distribution network. New production facilities for electricity have to be licensed by the Federal Government, after a proposal by CREG. If the production facility is to be established on Flemish soil, VEA is consulted. Any local government that has the production facility on their territory is also consulted. Finally, to be able to build the production facilities, the Regional administration has to give building and environmental permits, making it a central decider. General criteria for production facilities are set by the Federal Government, after advice from CREG. A specific subset concerns concessions for offshore facilities. In this case, the Federal DG Energy is formally involved, as well as up to sixteen Federal, Regional and local actors. Again, the final decision lies with the Federal Government. Finally, supply companies are licensed as well. If they supply electricity through the transmission network, they are licensed by the Federal Government, after a proposal from CREG. General conditions are set by the Federal Government after advice from CREG. In case of companies that supply electricity through the distribution network, licensed are provided by VREG, and the general conditions are set by the Regional Government.

A second set of regulatory decisions concern tariffs for transmission and tariffs for distribution. This is entirely in the hands of CREG, which has to accept the proposals made by the transmission operator and the distribution operators. However, the Federal Government can in specific circumstances revoke the decision made by CREG, and appeals can be launched before the Court of Appeal in Brussels.

A separate procedure that cannot immediately be placed with more general categories, is the establishment of a mechanism for exchange of electricity blocks. This is decided on by the Federal Government, more specifically as a collaboration between the Minister for Energy and the Minister for Finances. Both CREG and CBFA provide advice.

#### *Environmental and social regulation*

A number of environmental decisions are taken on both the Federal and Regional level. Minimum purchase obligations for green stream certificates in the transmission network are set by the Federal Government, proposed by CREG. On the Regional level, VREG provides green stream certificates, qualitative heat power certificates, and green warmth certificates. The criteria for the provision of these certificates are set by the Regional Government, after advice from VREG. Public service obligations on the Regional level can pertain to sustainable energy and energy conservation. In this case, both VREG and VEA provide advice, while the Regional Government sets the conditions.

With regards to social regulation apart from public service obligations, maximum social prices are drafted by CREG and decided on by the Federal Government. There are also deliberations with the Regional Governments.

As already seen, public service obligations can be aimed towards both environmental and societal goals. Public service obligations can be set by both the Federal Government and the

Regional Government, after advice from respectively CREG and VREG. It is however always CREG that has to accept the costs made by abiding to public service obligations. The electricity companies make a calculation on the basis of a method decided on by CREG.

### *Technical regulation*

Pure technical regulation can be found in the technical regulation and code of conduct on both the Federal level (for the transmission network), and the Regional level (for the distribution network). On the Federal level, technical regulation is decided on by the Federal Government, after an advice by CREG. Monitoring is also done by CREG, but an appeal can be made before the Court of Appeal in Brussels. On the Regional level, technical regulation applies to technical issues, while code of conduct relates to interactions with other actors. The procedure is the same however: VREG drafts the documents after input from the supply companies and distribution networks. The Regional Government decides. VREG is also in charge of monitoring. Finally, decisions on refusal of access to the transmission network are handled by CREG, decision on refusal of access to the distribution network are handled by VREG. In the case of CREG a special appeal can be made before the Competition Council.

Several plans are drafted to ensure the continued exploitation of the different networks. On the Federal level, a development plan for electricity is drafted by the Federal DG Energy, together with the Federal Planning Bureau. CREG provides an advice on the draft, and the transmission network operator is consulted. The Federal Minister for Energy decides on the plan, after consultation with the Minister for the Environment pertaining offshore concessions. A second plan on the Federal level is the prospective study, drafted by the Federal DG Energy. CREG, the Federal Planning Bureau and the transmission/transport network operator are consulted, while the Interdepartmental Commission for Sustainable Energy and the Central Council for Entrepreneurship are asked to provide advice. Finally, on the Regional level an investment plan is worked out for the distribution network. The plan itself is drawn by the distribution network operators, but has to be approved by VREG.

### *Competition law*

Adherence to general competition law is enforced by the Competition Council. However, CREG can report suspicious market behaviour to both the Competition Council and the Federal Government, and can propose measures to the Federal Government. It is the latter that decides whether or not to take these measures.

### *Calculation of the indices*

The full list of all indices can be found in Annex I, but the most important ones are presented here.

**Table 5: Actor centrality of most dominant actors in the electricity sector**

Actor	Centrality
CREG	0.31
Federal Government	0.43
VREG	0.3
Regional Government	0.23

When we take a look at the actor's centrality index, we see that both the Federal and Regional sector regulators score relatively high. However, the actor's centrality of both the Federal and Regional Governments is noteworthy, especially considering European Union regulation that mandates that the sector regulator should play the most central role. Especially the score of the Federal Government, making it the actor with the highest actor centrality, is of interest, though it is not contradictory of our observations in the field. The general low scores of all actors should be interpreted with care: most decision procedures on the Federal level only consider Federal actors, while all decision procedures on the Regional level only consider Regional actors. Therefore, it is not abnormal to have lower scores. In fact, it is quite likely that the scores will reveal a very different situation when only the own level is taken into account<sup>8</sup>.

**Table 6: Procedural coordination index in the electricity sector**

Procedural coordination index	0.15
-------------------------------	------

The procedural coordination index reveals that a significant number of decisions are decided on by a very limited number of actors. This does not necessarily mean that there is one actor responsible for most of the regulation, only that in each procedure only a limited number of actors are involved. Again, the differentiation of the regulation into two different governmental levels can play a significant role in the low index result, because more actors become involved. When only considering one level, the index will most likely be higher.

**Table 7: Centralization index in the electricity sector**

Centralization index (central actor: Federal Government)	0.34
---	------

<sup>8</sup> For a detailed analysis of the actors when only considering the own level, see Annex IV

The centralization index reveals whether there is one actor that dominates the regulatory arrangement. We observe that in general this is not the case. The basis of calculation for the centralization index was the Federal Government as the actor with the highest actor's centrality however, which is a significant finding. It could be interesting to make a second calculation, this time with the Federal sector regulator as the reference. If a similar centralization emerges, this could mean that both are dominant actors, while most other organizations play a lesser role. However, this theoretical framework has not been worked out yet, so that no definite conclusions could be reached from such a new approach.

## 2.2 Regulatory Arrangement Index in Telecommunications Sector

The regulatory arrangement considered here is composed of all public actors participating in the regulation of the telecoms sector in Belgium. This includes both the implementation of the current European legislative framework for electronic communications launched in 2003 (thereafter referred to as the 2003 framework) and general competition law. The regulation of electronic communications can be divided into three categories: economic regulation, social regulation and technical regulation. Economic regulation aims at creating a competitive market in a sector formerly monopolized by the incumbent. It consists of opening the market to other operators and preventing the incumbent to abuse its dominant position. Social regulation consists of imposing some obligations to operators to make sure that the basic elements of the public service are still provided in a context of liberalisation. Technical regulation operates through the establishment of technical standards in order to enhance interoperability of networks and services.

The central actor of the implementation of the 2003 framework is the Belgian Institute for Post and Telecommunications (BIPT), an independent regulatory agency operating at the federal level. Nevertheless, many other public actors are involved in the implementation of the framework: the Belgian Competition Council, the European Commission, the Belgian Federal Government, media regulators, etc. From a structural point of view, they are in general quite independent from each other. But interactions are present at the procedural level, and procedural coordination is an essential feature of the regulatory arrangement. The central actor of the implementation of competition law is the Competition Council.

### *Economic regulation*

The central tool of economic regulation is the market analysis. As the telecoms sector is divided into six sub-markets<sup>9</sup>, the regulators actually carry out six market analyses. Each market analysis is divided in three steps, although being formally presented as composed of four steps. The first step is the market definition, i.e. the identification and delineation of the market that is going to be analysed. The second step is the market analysis as such, i.e. scrutinizing the market to assess

---

<sup>9</sup> These sub-markets are: (1) Access to the public telephone network at a fixed location, (2) Call origination on the public telephone network provided at a fixed location, (3) Call termination on individual public telephone networks provided at a fixed location, (4) Wholesale unbundled access (including shared access) to metallic loops and sub-loops for the purpose of providing broadband and voice services, (5) Wholesale broadband access, (6) Wholesale terminating segments of leased lines.

whether it is competitive enough. The third phase is the identification of operators with significant market power (SMP), that will be regulated. In practice the second and third steps are not conducted separately, they are on the contrary totally mutually dependent: if an operator is considered to have SMP, the market cannot be seen as competitive, and vice versa. For this reason we refer to both steps together as the second step. The third step is the choice of remedies, i.e. the choice of obligations that will be imposed on the operator with SMP. These three steps, although formally gathered under a single decision, the market analysis, of which they constitute the three basic components, are essentially three distinct decision procedures. For this reason, we will consider them as separate in our calculation of the indices.

All six markets are defined *ex ante* by the European Commission. Nevertheless, the BIPT can propose to define an additional market, which the European Commission can accept or reject. To be accepted, the market definition must fulfil specific conditions, to be interpreted by the European Commission. In addition, the decision to define a new market has to follow the general procedure applicable to the market analysis (see below).

Lead by the BIPT, which takes the final decision, the market analysis involves other actors, both national and European. The procedure starts with a public consultation, allowing the operators to give their position on the decision project of the BIPT. Then it goes to the Competition Council, which issues a non binding advice. Then, the BIPT has to consult the Conference for Regulators of Communication (CRC)<sup>10</sup>, which can decide to handle the case instead of the BIPT. However, if such a decision is to be taken, it requires unanimity among the three media regulators and the BIPT.

After coordinating with national regulators, the BIPT coordinates with European actors, mostly with the European Commission. The BIPT starts this phase by informing the European Commission and the European regulators group (ERG)<sup>11</sup> about the decision project. While the national telecoms regulators have the possibility to express their view to the draft measure, which they almost never do, the Commission has the power to veto the decision of the BIPT. The process however rarely reaches the veto stage and the coordination looks more like a negotiation between the BIPT and the European Commission. Nevertheless that negotiation takes place under the shadow of the veto, which provides the Commission with a significant weight.

The decision-making procedure applicable to the choice of remedies is very similar to that just described, but shows two significant variations. First, the Commission has only the possibility to issue non-binding recommendations. And second, some remedies, if chosen, need the approval of the Competition Council.

---

<sup>10</sup> The CRC is a forum operating as a cooperation mechanism between the BIPT, and the three media regulators operating at the Community level. Belgium is a federation composed of two categories of sub-national entities: regions and communities. The three communities (French, Flemish, and German Communities) refer to groups of people and are in charge of issues linked with people, such as culture and education. As Telecommunications are a competence of the federation and broadcasting one of the Communities, competence conflict developed regarding the implementation of the 2003 framework. These have been solved by a cooperation agreement, signed in 2006, by the Federal State, and the three communities, establishing the CRC.

<sup>11</sup> The ERG is the European network gathering the telecoms regulators from all member states.

### *Technical regulation*

The political objective to create competitive markets needs technical support. A pre-condition for allowing alternative operators to compete with the incumbent is to let them access the market. For most of the telecommunications services, this aspect is dealt with by the legal general authorization regime: the EU Member States are not allowed to deny the authorization to anyone willing to provide telecom services or networks. Nevertheless the provision of telecom services can be limited by restricting access to rare resources, like radio frequencies or numbers. Rare resources have to be efficiently managed, which justifies some exceptions to the principle of general authorization. This is where technical regulation comes into play: Member States can regulate the use of radiofrequencies and numbers via the granting of individual authorizations when necessary, for example to avoid harmful interferences.

As for the regulation of numbers, the BIPT is in charge of the national numbering plan, the attribution and withdrawal of the right to use specific numbers, as well as the execution of corresponding procedures. The conditions for attribution and the right to use specific numbers are determined by the relevant Minister. Where it is necessary to harmonize numbering resources at the European level for the development of pan-European services, the Commission can take technical implementing measures under the control of the Communications Committee (Cocom)<sup>12</sup>. In this case the Cocom follows the regulatory procedure, which means that the Cocom can veto the Commission's decision with a simple majority. The BIPT has also been given the competence for allocating and withdrawing the right to use radio frequencies, as well as to control their use by operators. The modalities framing the frequencies management by the BIPT are inscribed in a regulation issued by the Federal Government, after consultation of the BIPT. Similarly as with numbers, the EU level is competent for issuing technical measures pursuing the harmonization of the conditions of availability and use of the spectrum on a pan-European level. These measures are adopted by the Commission, together with the Radio Spectrum Committee (RSC)<sup>13</sup> according to the regulatory procedure, on the basis of a proposition made by the European Conference of Postal and Telecommunications Administrations (CEPT)<sup>14</sup>.

A second kind of technical regulation comes from the necessity to create standards to foster the technical harmonization of networks and means of transmitting communications, since different networks should be interconnected: operators should be able to interconnect to networks both in other countries and within their own country. The Commission, together with the Cocom, can

---

<sup>12</sup> The Cocom is a committee attached to the European Commission and composed of representatives of the Member States. Its role is to assist the European Commission when exercising its implementing powers delegated through the European framework for electronic communications.

<sup>13</sup> The RSC is a committee attached to the European Commission and composed of representatives of the Member States. It assists the Commission in the development and adoption of technical implementing measures for harmonization of conditions of availability and efficient use of the radio spectrum as well as availability of information regarding the use of the spectrum.

<sup>14</sup> The CEPT is a body of policy-makers and regulators of 48 countries. This network serves several objectives. One is to provide a discussion platform for European regulators; the other is to influence political developments by European and international organizations.

draw up and publish a list of standards to serve as a basis for encouraging the harmonized provision of electronic communications services and networks. To the extent strictly necessary to ensure interoperability, the Commission and the Cocom may make these standards compulsory. With regards to the establishment of the standards, the Cocom is only consulted, but it becomes a co-decider when the decision has to be made whether or not to make the standards compulsory. In cases the Commission has not issued such a list of standards, the Member States have encourage adoption of the standards set by the European standards organizations (CEN, CENELEC, ETSI), which are supposed to take into account the standards established by the international organizations for standardization (ITU, ISO).

### *Social regulation*

Universal service is defined in the European framework as a minimal series of services of a determined quality available to all users regardless of their geographical situation, this at an affordable price that is determined with regard to specific national conditions.

The concrete dispositions over the quality of the services concerned and their price are included in an annex to the national law. These can however be reformed to take into account technological and market evolutions, by a Royal Decree of the Government. The price of those services, calculated according to a formula established by the legislator, can be lower than the real cost. Consequently, Belgian law has created a fund to compensate universal service providers. It is managed by the BIPT and funded by contributions from operators based on their financial turnover. The modalities of the mechanism for designating the operator that will provide the services are decided by the Government, upon a proposal of the BIPT.

Member States can decide to make additional services available on their territory, separate from services necessary to comply with universal service obligations. Belgian law lists therefore other services that must be provided by operators designated by the Government. These services are: access to a digital network and to related services; and access to telex and telegraph services. The technical and tariff conditions for these services are determined by law. The Government is also allowed to make other services available if these are in the general interest, this by adopting a Royal Decree, after the BIPT gives an opinion on it.

### *Competition law*

Telecom services and networks that are not considered as markets to be regulated by telecom regulation, are dealt with by general competition law. When a case arrives at the Federal Competition Directorate General (Federal Competition DG), the European Commission must be informed through the European Competition Network (ECN)<sup>15</sup>. The Commission has the option to seize the case, relieving the national competition authority normally in charge.

---

<sup>15</sup> The ECN is a network of European competition authorities that aims at fostering a common culture and understanding of competition policy

When a case is brought before the Competition Council, the inquiries are done by the Federal Competition Directory General and the decision is made by the Council. Throughout the inquiry, the BIPT is a very important source of information. The BIPT is also involved in the decision made by the Council, because the Council invites the BIPT at the hearings to consider its views as an expert. This procedure is totally informal and has developed as a natural cooperation mechanism between both organizations.

### *Calculation of the indices*

The exhaustive values associated to the decision-making procedures and actors' influence in the telecoms regulation are presented in Annex III. The procedural coordination amounts to 0.38, and the centralization index to 0.37. These will be discussed in the next section, through the comparison with the electricity sector. As for actor's centrality, unsurprisingly the sector regulator is the most central actor of the arrangement (see table 6). This illustrates the very idea of specialisation: most tasks related to telecoms regulation are made by an actor specialised in telecoms regulation. It is however striking that the second most powerful actor is the European Commission, and that the Belgian Federal Government arrives only at the sixth position, after the CRC, the competition Council and the operators. Moreover, the implementation of European policies is in principle a competence of the member states, so we could have a priori expected the Federal Government to play a more significant role. Instead of this, this index reveals that it is more than twice less influent on the sector regulation than the European Commission.

**Table 8: Actors' centrality scores of the telecoms regulatory arrangement**

Actor	Centrality
BIPT	0.62
European Commission	0.48
CRC	0.35
Competition Council	0.30
Operators	0.23
Federal Government	0.19
ERG	0.15
Cocom	0.10
RSC	0.03
CEPT	0.02
Federal competition DG	0.02

The main regulatory innovation of the 2003 framework is the market analysis procedure, which binds telecoms regulation to a competition law's approach, concepts, and jurisprudence. Yet competition law is an extremely Europeanized policy, harmonized by the dominating and

coordinating position of the EU Commission on the application of European Competition law in the Member States. Consequently, the connection of telecoms regulation to competition law logically places the European Commission in a privileged position. The Commission indeed supervises most of the market analysis procedure. And as this procedure has been granted such an importance within the 2003 framework, the EU Commission has become a very significant actor concerning the implementation of EU telecoms regulation. The same argument can explain the weak position of the Federal Government: national Governments are minor actors in the development of competition policy. Such a strong linkage between telecom regulation and competition law has obviously lessened the role of the Government, to the benefit of the EU Commission.

### 2.3 Comparison of the Regulatory Arrangements in Both Sectors

We also present a short comparison between the different sectors, where relevant in a graphical representation.

#### *Procedural coordination index*

**Table 9: Procedural coordination index in the telecoms sector**

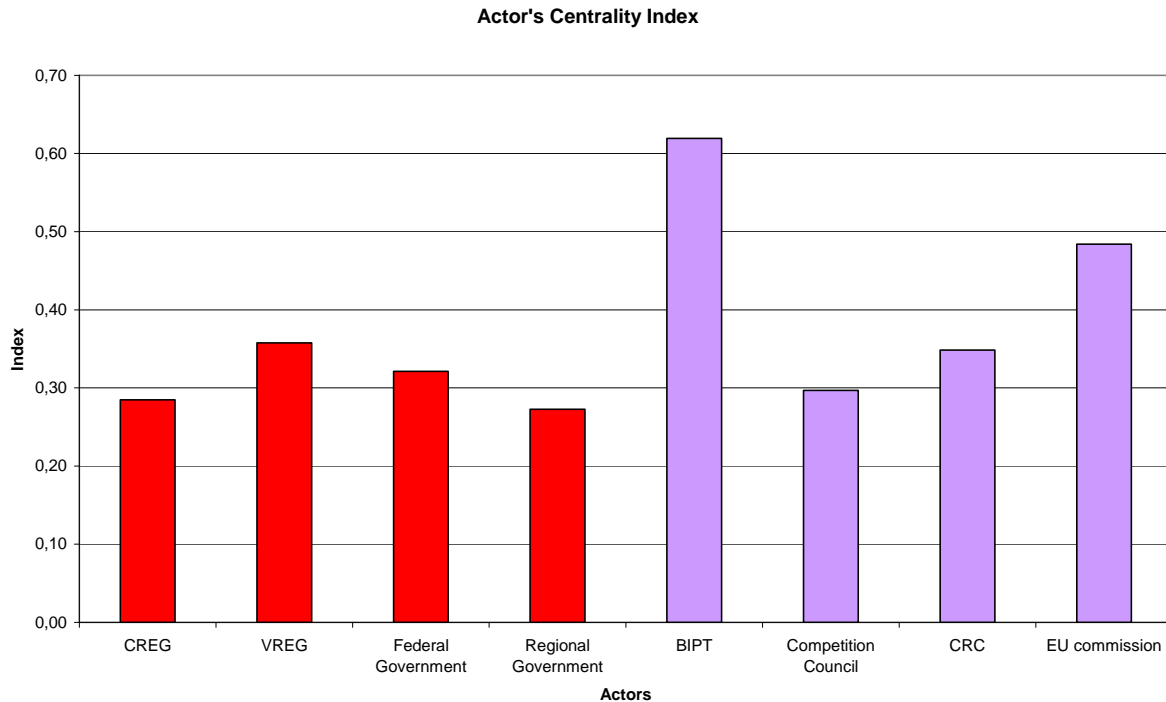
Procedural coordination index electricity	0.15
Procedural coordination index telecommunication	0.38

More actors of the regulatory arrangement seem to be involved in the different decision procedures in the telecommunications sector than in the electricity sector. This could be explained first by the fact that the telecom regulation is dominated by the market analysis, which according to the European directives should mean the consultations of many actors. As telecoms regulation had been brought so close to competition law, a close collaboration with the Competition Council was deemed necessary, as well as with the European Commission (see above, the section on actor's centrality in the telecom sector).

A second possible explanation could lie in the fact that the distribution of competencies between the Federal and the federated entities is clearer in the electricity sector. In the latest, the Federal level is responsible for transmission and the Regional level for distribution. This distribution of competencies is quite clear, and thus provides less incentive to procedurally coordinate between the two levels. Conversely, in the telecoms sector, the distribution of competencies between the Federal level and the Communities is much more blurred. A series of conflicts over competencies occurring between 2003 and 2004 led the Constitutional Court to oblige both levels to cooperate, as competencies between the telecoms and the broadcasting had become too intricate. Following the cooperation agreement signed in 2006, the consultation of Community regulators has been systematically included in the market analysis process lead by the BIPT.

## Actor's centrality index

Figure 1: Calculation of the centrality index for the main actors of both sectors



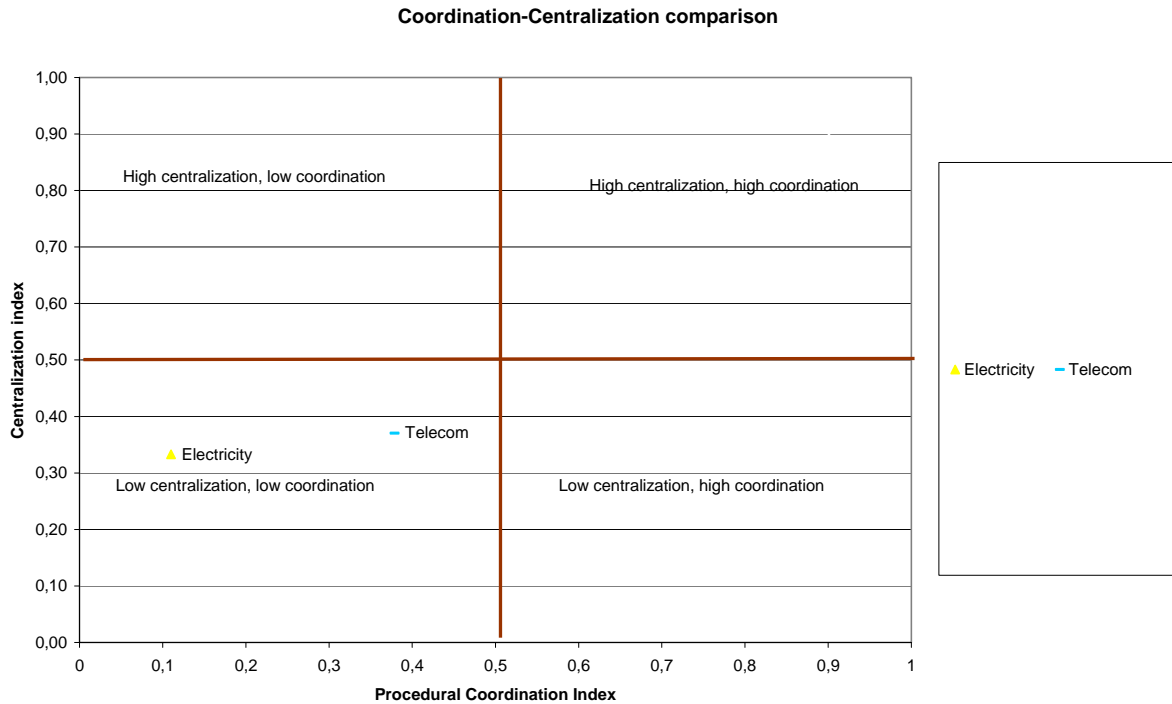
A first remark is that the telecom sector seems to be more centralised than the electricity sector. The most central telecoms actors are dominating more the arrangement than the most central electricity actors. Both the BIPT and the European Commission are a lot more central to the decision making procedures in telecommunications than any of the other actors in electricity. We can again refer to the distribution of competencies between the Federal and Regional entities to provide a part of the explanation. The competencies of the CREG and the VREG are similar, but relate to different sub-sectors: each regulator has its own realm. This explains both that they have a rather similar level of centrality, and that this level is not very high. The picture is very different in the telecom sector, where competencies cannot be neatly divided in two groups (i.e. each group of competencies being allocated to either the Federal or Community level). The intricacy of competencies implies coordination within the implementation of these decision procedures. This means that for most decision procedures the BIPT is the main decider, while for some decisions the Community authorities are co-decider. As a consequence, both actors get high centrality scores. As for the high centrality score of the European Commission, the explanation has already been given above.

A second point is that the electricity sector entails the Federal and the Regional Governments within the four most central actors, while no Government counts among the most central actors of the telecoms sector. In addition, the European Commission appears to be a very important actor in the telecoms sector, which is not at all the case in the energy sector. Following the explanation given above, we can hypothesize this is due to the fact that telecoms regulation is closer to competition law, and therefore reflects the same balance of powers. Indeed, the

implementation of competition law largely favours the European Commission and marginalizes national Governments.

*Procedural coordination index and centralization index*

**Figure 2: Positioning of the Belgian electricity and telecoms sectors in the typology**



The telecoms sector is both more centralised and more coordinated than the electricity sector. We can therefore expect the telecoms sector to be less fragmented than the electricity sector, as both centralization of competencies and procedural coordination are likely to lessen fragmentation.

**3 Discussion and Conclusion**

This section relates to the relevance of these indices compared to other indices and asks the question what these indices could contribute to current regulation studies.

First, it should be said that the regulatory arrangement typology and indices developed here of course have their limitation. Although the regulatory arrangement indices are very promising and go quite far in describing task allocation and interactions within regulatory arrangements, they do not give the full picture. They have two main limitations: Since we focus on what kind of formal and actual interactions happen between regulatory actors *within legally imposed procedures*, we might miss interactions between actors that are formally not involved in a specific procedure, but that influence the outcome of a certain decision making procedure through informal communication. Second, the indices do not grasp interactions through structural coordination forms, like joint platforms (e.g. FORBEG in the energy sector) where regulators discuss issues

which are not dealt with within the legally set decision making procedures. However, it does not mean that the typology or indices fail to meet all kinds of informal interactions. As said, when data collection goes beyond legal analysis of procedures and includes interviews and surveys, one can take the divergence between formally prescribed interactions and actual interactions into account. In our cases of energy and telecoms, we have taken such divergences into account when calculating the indices.

The regulatory indices also give interesting insights in the extent of specialisation and organisational proliferation that can arise within regulatory arrangements, because of processes like e.g. delegation of powers from Ministers and parent departments to regulatory agencies; decentralisation to lower levels of authorities in case of regionalisation, and processes of supranationalisation (shifting decision making power to the EU level). Because of these trends, regulation within a sector is more and more a multi-actor and multi-level issue, which raises the need for coordination between these actors by involving them in legally set decision making procedures.

Now in terms of relevance, the regulatory arrangement typology and indices give replicable knowledge about utility sector regulation. It provides an answer to former demands to generalise systematic enquiries to the institutional arrangements: “There are several potentially promising directions for further developing the OECD’s indicators on non-manufacturing regulation to increase their relevance in policy analysis and empirical work. [...] For example, the indicators of regulation in network sectors could be expanded to reflect the institutional arrangements governing regulators in these sectors, such as the degree of independence from government and method used to determine the price of network access for third parties. Further sector-specific arrangements that are relevant for the development of competition could also be incorporated in the indicators” (Conway and Nicoletti 2006: 23). This call in favour of indicators on institutional arrangements was already expressed in a former publication: “The paper does not address the finer issues related to regulatory design that arise after basic entry liberalisation has been implemented” (Boylaud and Nicoletti 2000: 6). Thus, the regulatory arrangement indices are complementary to these OECD ECTR indicators which measure the degree of liberalisation.

Much like the OECD ECTR indicators, the regulatory arrangement indices enable sound and systematic cross-national and cross-sector comparisons. The data is encoded with only a limited subjective appreciation of the researcher and is independent from the context. The aim is to identify with precision the differences between the regulatory arrangements set up across nations and sectors. It is not sufficient to simply admit the presence of heterogeneity in regulatory arrangements to start systematic comparisons and use them to build valid theories. The variations must be measured with robust tools. Following the intuition of Gilardi, who developed an independence index for national regulatory authorities (NRAs), the regulatory arrangement indices provide the means to develop systematic assessments of the overall organisation of regulations (Gilardi 2003: 2). It is not limited to the functioning of the sector-based regulator, but encompasses all the actors that participate in regulation (e.g. ministers, competition authorities) at different levels (e.g. European, national and regional). It is able to grasp the nature of the variation between regulatory arrangements between sectors and countries.

Although the potential of explanation of the indices must still be demonstrated, it is certain that regulatory arrangements constitute an interesting variable to explain the functioning and outcomes of regulation. On the one hand, the structure of and procedures in the regulatory arrangement can be explored as a dependent variable. The influence of the independence of NRAs, the degree of liberalisation, path dependence or the political regime could explain the difference observed between sectors and countries. Political science variables may contribute to understanding the organisational options retained to design regulatory arrangements. For instance, the national political institutions, path dependence, policy transfers or the presence of veto players could have contributed to shape the arrangements (Lijphart 1999; Pierson 2004; Dolowitz and March 2000; Tsebelis 2002). In particular, the impact of independence on regulatory arrangements is a promising hypothesis (see Thatcher 1994; Gilardi 2002). The existing indices on formal and *de facto* regulatory independence could be combined with the regulatory arrangement indices to test such hypotheses (Gilardi 2005; Magetti 2007).

On the other hand, the regulatory arrangement could be used as an independent variable to explain, for instance, the quality of the regulation (regulatory coherence), the economic development of the sector (market effectiveness, namely investment, productivity, growth, domestic capital formation and sector employment growth) or the strategic behaviour of regulatees (Conway and Nicoletti 2006: 21; Baudrier 2001; ten Heuvelhof et al. 2009). For example, if these regulatory arrangement indices could be computed for a large number of sectors or countries, one could model statistically the relationship between the extent of specialisation and coordination of the regulatory arrangement of sectors on the one hand, and the level of restrictiveness in terms of competition (by using the OECD ECTR index). The theoretical hypothesis to be elaborated and tested would in that case be that a large extent of fragmentation within the regulatory arrangement influences the degree of competition in a market.

Thus, the regulatory arrangement indices presumably complement former attempts to systematically assess the utility sectors with the development of indicators, i.e. about the degree of competition and the formal and *de facto* independence of regulatory agencies (Boylaud and Nicoletti 2000; Conway and Nicoletti 2006; Gilardi 2005; Magetti 2007).

In this paper we developed a typology of regulatory arrangements, which can be measured by a set of indices. This typology of regulatory arrangements enables regulation scholars to measure and compare the degree of task specialisation, organisational proliferation of, and coordination between regulatory authorities. Moreover, although it still needs further elaboration and refinement, the typology and indices may have potentially an explanatory use. First, analyses could help to explain the specialisation and coordination within regulatory arrangements by linking them to agency features (like the independence of the main regulators), sector characteristics (kind of service or product, size of market), or country-level features (like polity and politico-administrative culture). Second, the extent of fragmentation of regulatory arrangement may help to explain the speed of liberalisation, the competitiveness of the market structure, but also the regulatory coherence, as perceived by regulatees, or the extent of strategic behaviour by the latter.

## References

- BAUDRIER, A. (2001) "Independent regulation and telecommunications performance in developing countries". Paper prepared for the *Annual ISNIE Conference*, Berkeley, 13-15 Sept.
- BOSTON, J. AND EICHBAUM, C. (2006) "State Sector Reform and Renewal in New Zealand: Lessons for Governance". In G. Caiden and T. Su (eds), *The Repositioning of Public Governance: Global Experience and Challenges*. Taipei: Taiwan National University
- BOUCKAERT, G., PETERS, B. AND VERHOEST, K. (2010) *The Coordination of Public Sector Organizations: Shifting patterns of Public Management*. Basingstoke: Palgrave Macmillan.
- BOYLAUD, O. AND NICOLETTI, G. (2000) *Regulation, Market Structure and Performance in Telecommunications*. Paris: OECD. Economics Department Working Papers 237.
- CHRISTENSEN, T. AND LAEGREID, P. (2006) *Autonomy and Regulation: Coping with Agencies in the Modern State*. Cheltenham: Edward Elgar.
- CONWAY, P. AND NICOLETTI, G. (2006) *Product Market Regulation in the Non-Manufacturing Sectors of OECD Countries: Measurement and Highlights*. Paris: OECD. Economics Department Working Papers 530.
- DOLOWITZ, D. P. AND D. MARSH (2000) "Learning from abroad: The role of policy-transfer in contemporary policy-making", *Governance*, 13(1): 5-24.
- FREEMAN, L. (1979) "Centrality in Social Networks: I. Conceptual Clarification", *Social Networks*, 1 (3).
- GERADIN, D. AND MCCAHERY, J. (2004) "Regulatory Co-opetition: Transcending the Regulatory Competition Debate", In J. Jordana and D. Levi-Faur (eds), *The Politics of Regulation: Institutions and Regulatory Reforms for the Age of Governance*. Cheltenham: Edward Elgar.
- GILARDI, F. (2002) "Policy credibility and delegation to independent regulatory agencies: a comparative empirical analysis", *Journal of European Public Policy*, 9(6): 873-893.
- GILARDI, F. (2003) *Delegation to Independent Regulatory Agencies in Western Europe: A Cross-Sectional Comparison*. Paper prepared for the *ECPR Joint Sessions of Workshops "Delegation in Contemporary Democracies"*, Edinburgh, 29 March-2 April.
- GILARDI, F. (2005) "The Formal Independence of Regulators: A Comparison of 17 Countries and 7 Sectors", *Swiss Political Science Review*, 11(4): 139-167.
- GILARDI, F. (2008) *Delegation in the Regulatory State: Independent Regulatory Agencies in Western Europe*. Cheltenham: Edward Elgar.
- HOOD, C., ROTHSTEIN, H. AND BALDWIN, R. (2001) *The Government of Risk: Understanding Risk Regulation Regimes*. Oxford: Oxford University Press.
- HOOGHE, L. AND MARKS, G. (2003) "Unravelling the Central State, But How? Types of Multi-level Governance", *American Political Science Review*, 97(2): 233-243.
- JORDANA, J. AND D. SANCHO ROYO (2004). "Institutional Constellations and Regulatory Policy", In J. Jordana and D. Levi-Faur (eds), *The Politics of Regulation: Institutions and Regulatory Reforms for the Age of Governance*. Cheltenham: Edward Elgar.
- LIJPHART, A. (1999) *Patterns of democracy*. New Haven: Yale University Press.
- MAGGETTI, M. (2007) "De Facto Independence After Delegation: a Fuzzy-Set Analysis", *Regulation & Governance*, 1(4): 271-294.

- MITNICK, B. (1980) *The Political Economy of Regulation: Creating, Designing and Removing Regulatory Forms*. New York: Columbia University Press.
- PAPADOPOULOS, Y. (1995) *Complexité Sociale et Politiques Publiques*. Paris: Montchrestien.
- PETERS, B. G. (1998) "Managing Horizontal Government: The Politics of Co-Ordination", *Public Administration*, 76 (2): 295-311.
- PIERSON, P. (2004) *Politics in time: History, institutions, and social analysis*. Princeton: Princeton University Press.
- SCHARPF, F.W. (1997) *Games Real Actors Play: Actor-centered Institutionalism in Policy Research*. Boulder: Westview Press.
- SCOTT, C. (2004) "Regulation in the Age of Governance: the Rise of the Post-Regulatory State", In J. Jordana and D. Levi-Faur (eds), *The Politics of Regulation: Institutions and Regulatory Reforms for the Age of Governance*. Cheltenham: Edward Elgar.
- TEN HEUVELHOF, E., DE JONG, M. ET AL. (2009) *Strategic Behaviour In Network Industries. A Multidisciplinary Approach*. Cheltenham: Edward Elgar.
- THATCHER, M. (1994) "Regulatory reform in Britain and France: Organizational structure and the extension of competition", *Journal of European Public Policy*, 1(3): 441-464.
- THOMPSON, G., FRANCES, J., LEVACIC, R. AND MITCHELL, J. (eds) (1991) *Markets, Hierarchies and Networks: The Coordination of Social Life*. London: Sage.
- TIEBOUT, C. M. (1956) "A Pure Theory of Local Public Expenditures", *Journal of Political Economy*, 64 (5): 416-424.
- TSEBELIS, G. (2002) *Veto players. How political institutions work*. Princeton: Princeton University Press.
- VERHOEST, K. AND BOUCKAERT, G. (2005) "Machinery of Government and Policy Capacity : The Effects of Specialization and Coordination", In M. Painter and J. Pierre (eds), *Challenges to State Policy Capacity: Global Trends and Comparative Perspectives*. Basingstoke: Palgrave Macmillan.

# Annex I: Electricity

DECISIONS	ACTORS																		n1
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	n1	
	VREG	EBF4	Federal Planning Bureau	VREG	EBF4	Federal Government	Regional Government	Local Government	Federal Administration	Regional Administration	Conductors (Grid)	Inter-Departmental Commission for Sustainable Energy	Special Council for Entrepreneurship	Transmission network operator	Distribution network operator	Supply companies	Court of Appeal in Brussels	Site of sites involved	
D1	Monitoring the market on Federal regulation	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	2
D2	Acceptance of tariffs for transmission	0.0	0	0	0	0	0.0	0	0	0	0	0	0	0	0.6	0	0	0.0	4
D3	Acceptance of tariffs for distribution	0.0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.6	0	0.0	4
D4	Establishment of a mechanism for exchange of electricity blocks	0.4	0.4	0	0	0	1	0	0	0.4	0	0	0	0	0	0	0	0	4
D5	Minimum purchase obligations for green stream certificates on Federal level	0.0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
D6	Designation of transmission operator	0.4	0	0	0	0	1	0	0	0.4	0	0	0	0	0.2	0	0	0	4
D7	Criteria for transmission operator	0.4	0	0	0	0	1	0	0	0.4	0	0	0	0	0.2	0	0	0	4
D8	Licenses for supply on the transmission network	0.6	0	0	0	0	1	0	0	0.4	0	0	0	0	0	0	0	0	3
D9	Criteria for licenses for supply on the transmission network	0.4	0	0	0	0	1	0	0	0.4	0	0	0	0	0	0	0	0	3
D10	New production facilities	0.6	0	0	0	0.2	1	0	0.2	0.4	1	0	0	0	0	0	0	0	6
D11	Criteria for new production facilities	0.4	0	0	0	0	1	0	0	0.4	0	0	0	0	0	0	0	0	3
D12	Reinforcement of the transmission network	0.6	0	0	0	0.2	1	0	0.2	0.4	1	0	0	0	0	0	0	0	6
D13	Domum concessions for offshore facilities	0.4	0	0	0	0.4	1	0	0	0.4	0.4	0	0	0	0	0	0	0	6
D14	Development plan for the transmission network	0.4	0.6	0.6	0	0	1	0	0	0	0	0	0	0	0.2	0	0	0	5
D15	Prospective studies	0.2	0	0.2	0	0	0	0	0	0	0	0	0.4	0.4	0.2	0	0	0	5
D16	Calculation method for costs made due to public service obligations	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	2
D17	Imposition of public service obligations by the Federal Government	0.4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
D18	Maximum social prices	0.6	0	0	0	0	1	0.2	0	0.4	0	0	0	0	0	0	0	0	4
D19	Technical regulation of the transmission network	0.4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	0	3
D20	Monitoring technical regulation	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	2
D21	Access to the transmission network	0.0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	2
D22	Application of general competition law	0.6	0	0	0	0	1	0	0	0	0	0.0	0	0	0	0	0	0.0	4
D23	Monitor the application of electricity and gas Decrees, except rational energy use and informing the consumers on energy conservation	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D24	Monitor rational energy use and informing the consumers on energy conservation	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
D25	Appointment of distribution network operators	0	0	0	0.0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	2
D26	Conditions for distribution network operators	0	0	0	0.4	0	0	1	0	0	0	0	0	0	0	0	0	0	2
D27	Permissions to build direct lines	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
D28	Licenses for supply on the distribution networks	0	0	0	0.0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	2
D29	Criteria for licenses for supply on the distribution network	0	0	0	0.4	0	0	1	0	0	0	0	0	0	0	0	0	0	2
D30	Provision of green stream certificates, qualitative heat power certificates, and green warmth certificates	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D31	Criteria for provision of certificates	0	0	0	0.4	0	0	1	0	0	0	0	0	0	0	0	0	0	2
D32	Investment plan of distribution network	0	0	0	1	0	0	0	0	0	0	0	0	0	0.6	0	0	0	2
D33	Imposition of public service obligations on the Flemish Regional level concerning sustainable energy and energy conservation	0	0	0	0.4	0.4	0	1	0	0	0	0	0	0	0	0	0	0	3
D34	Imposition of public service obligations on the Flemish Regional level not concerning sustainable energy and energy conservation	0	0	0	0.4	0	0	1	0	0	0	0	0	0	0	0	0	0	3
D35	Imposition of technical regulation	0	0	0	0.6	0	0	1	0	0	0	0	0	0	0	0.2	0.2	0	4
D36	Monitoring of technical regulation	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D37	Imposition of code of conduct	0	0	0	0.6	0	0	1	0	0	0	0	0	0	0	0.2	0.2	0	4
D38	Monitoring of code of conduct	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D39	Access to the distribution network	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cirel(a)	Actor's centrality general	0.31	0.03	0.02	0.30	0.06	0.43	0.23	0.04	0.11	0.06	0.04	0.01	0.01	0.04	0.04	0.02	0.12	
FCore(i)	Procedural coordination index	0.3501540																	
Cirel(i)	Centralization index CREG	0.21																	
	Centralization index Federal Government	0.34																	
	Centralization index VREG	0.20																	
	Centralization index Regional Government	0.13																	
	Actor's centrality when only considering the Federal level	0.55	0.05	0.04	0.00	0.04	0.75	0.01	0.04	0.19	0.11	0.07	0.02	0.02	0.06	0.03	0.01	0.22	
	Actor's centrality when only considering the Regional level	0.00	0.00	0.00	0.69	0.00	0.00	0.52	0.05	0.00	0.00	0.00	0.00	0.00	0.06	0.02	0.02	0.09	
	Procedural coordination index only considering the Federal level	0.1904762																	
	Procedural coordination index only considering the Regional level	0.291667																	
	Centralization index Federal Government only considering the Federal level	0.695231																	
	Centralization index VREG only considering the Regional level	0.690564																	
	Centralization index Regional Government only considering the Regional level	0.480564																	

## Annex II: Natural gas

ACTORS	DECISIONS																	N	
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17		
	VFES	KBFA	Federal Planning Bureau	VREG	LEA	Federal Government	Regional Government	Local Government	Federal Administration	Regional Public Institution	Competition Council	REGULATORY COMMISSION FOR SUSTAINABLE ENERGY	Energy Council for Entrepreneurship	Transport network operator	Distribution network operators	Supply companies	Score of Impact in Studies	No. of actors involved	
D1	Monitoring the market on Federal regulation	0,8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,8	2
D2	Acceptance of tariffs for transport	0,8	0	0	0	0	0,8	0	0	0	0	0	0	0	0,6	0	0	0,8	4
D3	Acceptance of tariffs for distribution	0,8	0	0	0	0	0,8	0	0	0	0	0	0	0	0,6	0	0	0,8	4
D4	Designation of transport operator	0,4	0,4	0	0	0	1	0	0	0,4	0	0	0	0	0,2	0	0	0	4
D5	Criteria for transport operator	0,4	0	0	0	0	1	0	0	0,4	0	0	0	0	0,2	0	0	0	4
D6	Licenses for supply on the transport network	0,4	0	0	0	0	1	0	0	0,4	0	0	0	0	0	0	0	0	3
D7	Criteria for licenses for supply on the transport network	0,4	0	0	0	0	1	0	0	0,4	0	0	0	0	0	0	0	0	3
D8	Reinforcement of the transport network	0,6	0	0	0	0,2	1	0	0,2	0,4	1	0	0	0	0	0	0	0	6
D9	Prospective studies	0,2	0	0,2	0	0	0	0	0	0	0	0,4	0,4	0,2	0	0	0	0	5
D10	Calculation method for costs made due to public service obligations	0,8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,8	2
D11	Imposition of public service obligations by the Federal government	0,4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
D12	Maximum social prices	0,6	0	0	0	0	1	0,2	0	0,4	0	0	0	0	0	0	0	0	4
D13	Code of conduct of the transport network	0,6	0	0	0	0	1	0	0	0	0	0	0	0	0	0,2	0	0	4
D14	Monitoring the code of conduct on the transport network	0,8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,8	2
D15	Access to the transport network	0,8	0	0	0	0	0	0	0	0	0,8	0	0	0	0	0	0	0	2
D16	Application of general competition law	0,6	0	0	0	0	1	0	0	0	0,8	0	0	0	0	0	0	0,8	3
D16	Monitor the application of electricity and gas Decrees, except national energy use and informing the consumers on energy conservation	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D18	Monitor rational energy use and informing the consumers on energy conservation	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
D19	Appointment of distribution network operators	0	0	0	0,5	0	0	0,5	0	0	0	0	0	0	0	0	0	0	2
D20	Conditions for distribution network operators	0	0	0	0,4	0	0	1	0	0	0	0	0	0	0	0	0	0	2
D21	Permissions to build direct lines	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
D22	Licenses for supply on the distribution network	0	0	0	0,8	0	0	0,8	0	0	0	0	0	0	0	0	0	0	2
D23	Criteria for licenses for supply on the distribution network	0	0	0	0,4	0	0	1	0	0	0	0	0	0	0	0	0	0	2
D24	Provision of green stream certificates, qualitative heat power certificates, and green warmth certificates	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D25	Criteria for provision of certificates	0	0	0	0,4	0	0	1	0	0	0	0	0	0	0	0	0	0	2
D26	Investment plan of distribution network	0	0	0	1	0	0	0	0	0	0	0	0	0	0,6	0	0	0	2
D27	Imposition of public service obligations on the Flemish Regional level concerning sustainable energy and energy conservation	0	0	0	0,4	0,4	0	1	0	0	0	0	0	0	0	0	0	0	3
D28	Imposition of public service obligations on the Flemish Regional level not concerning sustainable energy and energy conservation	0	0	0	0,4	0	0	1	0	0	0	0	0	0	0	0	0	0	3
D29	Imposition of technical regulation	0	0	0	0,6	0	0	1	0	0	0	0	0	0	0,2	0,2	0	0	4
D30	Monitoring of technical regulation	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D31	Imposition of code of conduct	0	0	0	0,6	0	0	1	0	0	0	0	0	0	0,2	0,2	0	0	4
D32	Monitoring of code of conduct	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
D33	Access to the distribution network	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
(rel)A	Actor's centrality general	0,20	0,01	0,01	0,36	0,05	0,32	0,27	0,03	0,07	0,03	0,05	0,01	0,01	0,04	0,05	0,02	0,15	
FC(rel)	Procedural coordination index	0,10990712																	
(rel)	Centralization Index CREG	0,19																	
	Centralization Index Federal Government	0,23																	
	Centralization Index VREG	0,27																	
	Centralization Index Regional Government	0,10																	
	Actor's centrality when only considering the Federal level	0,59	0,03	0,01	0,00	0,01	0,66	0,01	0,01	0,15	0,06	0,10	0,03	0,03	0,08	0,04	0,01	0,30	
	Actor's centrality when only considering the Regional level	0,00	0,00	0,00	0,69	0,00	0,00	0,52	0,05	0,00	0,00	0,00	0,00	0,00	0,06	0,02	0,00	0,00	
	Procedural coordination index only considering the Regional level	0,11309524		Procedural coordination index only considering the Regional level	0,29166667														
	Centralization Index CREG only considering the Federal level	0,53		Centralization Index Federal Government only considering the Federal level	0,60516162		Centralization Index VREG only considering the Regional level	0,6728		Centralization Index Regional Government only considering the Regional level	0,46884848								

### Annex III: Telecommunications

DECISIONS \ ACTORS		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	ai
		BIPT	Federal Government	Competition Council	CRC	EU commission	ERG	Cocom	RSC	CEPT	Operators	Nb of actors involved
D1	Definition market 1	0,6	0	0,4	0,6	1	0,2	0	0	0	0,4	6
D2	Definition market 2	0,6	0	0,4	0,6	1	0,2	0	0	0	0,4	6
D3	Definition market 3	0,6	0	0,4	0,6	1	0,2	0	0	0	0,4	6
D4	Definition market 4	0,6	0	0,4	0,6	1	0,2	0	0	0	0,4	6
D5	Definition market 5	0,6	0	0,4	0,6	1	0,2	0	0	0	0,4	6
D6	Definition market 6	0,6	0	0,4	0,6	1	0,2	0	0	0	0,4	6
D7	Analysis market 1	0,8	0	0,4	0,6	0,8	0,2	0	0	0	0,4	6
D8	Analysis market 2	0,8	0	0,4	0,6	0,8	0,2	0	0	0	0,4	6
D9	Analysis market 3	0,8	0	0,4	0,6	0,8	0,2	0	0	0	0,4	6
D10	Analysis market 4	0,8	0	0,4	0,6	0,8	0,2	0	0	0	0,4	6
D11	Analysis market 5	0,8	0	0,4	0,6	0,8	0,2	0	0	0	0,4	6
D12	Analysis market 6	0,8	0	0,4	0,6	0,8	0,2	0	0	0	0,4	6
D13	Choice of remedies on market 1	0,8	0	0,6	0,6	0,4	0,4	0,4	0	0	0,4	7
D14	Choice of remedies on market 2	0,8	0	0,6	0,6	0,4	0,4	0,4	0	0	0,4	7
D15	Choice of remedies on market 3	0,8	0	0,6	0,6	0,4	0,4	0,4	0	0	0,4	7
D16	Choice of remedies on market 4	0,8	0	0,6	0,6	0,4	0,4	0,4	0	0	0,4	7
D17	Choice of remedies on market 5	0,8	0	0,6	0,6	0,4	0,4	0,4	0	0	0,4	7
D18	Choice of remedies on market 6	0,8	0	0,6	0,6	0,4	0,4	0,4	0	0	0,4	7
D19	Elaboration of the national numbering plan	1	0	0	0	0	0	0	0	0	0	1
D20	of use	1	0	0	0	0	0	0	0	0	0	1
D21	Determination of the conditions of attribution and withdrawal of rights	0	1	0	0	0	0	0	0	0	0	1
D22	resources	0	0	0	0	0,8	0	0,8	0	0	0	2
D23	frequencies	1	0	0	0	0	0	0	0	0	0	1
D24	Regulation of the modalities framing the management of the frequencies	0,4	1	0	0	0	0	0	0	0	0	2
D25	European harmonization of the condition of use of the radio spectrum	0	0	0	0	0,8	0	0	0,8	0,6	0	3
D26	services	0	1	0	0	0	0	0	0	0	0	1
D27	Management of the fund for universal service	1	0	0	0	0	0	0	0	0	0	1
D28	Design of the mechanism for designating the operator in charge of providing the universal	0,6	1	0	0	0	0	0	0	0	0	2
D29	Definition of additional services	0,6	1	0	0	0	0	0	0	0	0	2
D30	additional services	0	1	0	0	0	0	0	0	0	0	1
C(rel)Aj	Actor's centrality	0,63	0,20	0,28	0,36	0,47	0,16	0,11	0,03	0,02	0,24	
PC(rel)	Procedural coordination index	0,4										
C(rel)	Centralization index	0,42										

**Annex IV: Electricity Comparison on Federal and Regional levels**

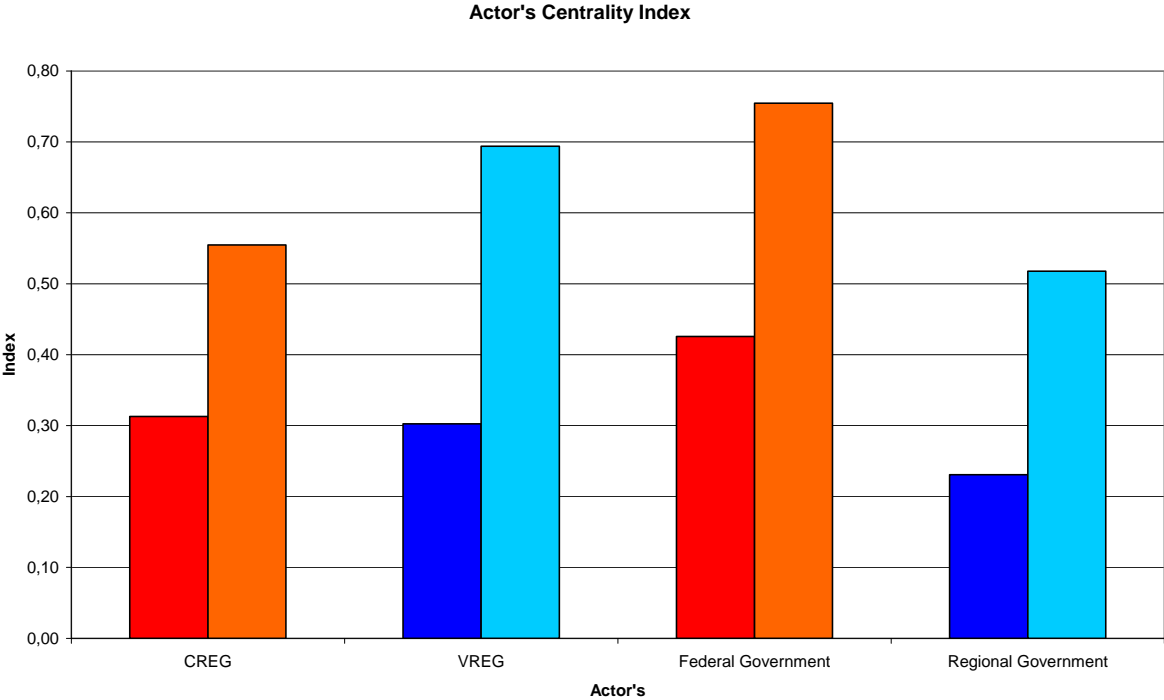
*Actor’s centrality index*

Before starting the analysis, we would like to stress that the definition of the concept of “Government” is the same as in the main document, meaning political decision makers: individual Ministers or several Ministers making joint decisions.

**Table 10: Actor centrality of most dominant actors in electricity**

Actors	Centrality general	Centrality only considering Federal level	Centrality only considering Regional level
CREG	0.31	0.55	0
Federal Government	0.43	0.75	0
VREG	0.3	0	0.69
Regional Government	0.23	0.01	0.52

**Figure 3: Actor centrality of most dominant actors in electricity**



When we take a look at the actor’s centrality index, we see that both in general and per level the sector regulators play a fairly important role, but especially on the Federal level the Federal

Government can be considered more central than even the sector regulator, which seems to be contrary to European regulation. However, it is not unexpected given our understanding of the relations in the sector.

On the Regional level, the Regional sector regulator does have a higher centrality than the Regional government, but in general the Federal government remains the most central, and both actors on the Federal level are more central than those on the Regional level. When compared to the centrality of the BIPT in the main document, the keen observer may note that the actor' centrality of the Federal government, when only considering the Federal level, is even higher than that of the BIPT. Again, this contradicts the assumption that it is the sector regulator that should be the most central player in the regulatory arrangement.

### *Procedural coordination index*

**Table 11 : Procedural coordination index in the electricity sector**

	General	Only considering Federal level	Only considering Regional level
Procedural coordination index	0.15	0.19	0.29

The procedural coordination index reveals that a significant number of decisions are decided on by a limited number of actors. This does not necessarily mean that there is one actor responsible for most of the regulation, only that in each procedure only a limited number of actors are involved. This is more obvious on the Federal level than on the Regional one, where there seems to be more inclusiveness. The low number on the general level could have been explained by the fact that there are two distinct levels, Federal and Regional, and that there is only a low amount of interaction between them. Therefore it is quite important to have the differentiation between the two levels: it reveals that the low score of the index transcends the two-level issue, and can also be found per level.

A small warning still has to be given with the interpretation of the procedural coordination index: it takes into account all organizations that are involved in procedures. This means that if there are several organizations that are only involved in one procedure, the index will automatically be lower. Right now, all organizations are seen to be of equal importance, which is not necessarily the case. A weighing of the importance of the organizations may cause the procedural coordination index to be stronger than first expected, this on all levels.

### *Centralisation index*

The centralization index reveals whether the most central actor in the arrangement also clearly dominates the regulatory arrangement, in other words whether the regulatory arrangement as a whole is quite central or not (see Table 12). Since unlike in the telecommunication sector, it is actually the Federal government that is the most central actor, we have additionally calculated the centralization index with the second most central actor on each level as the reference point.

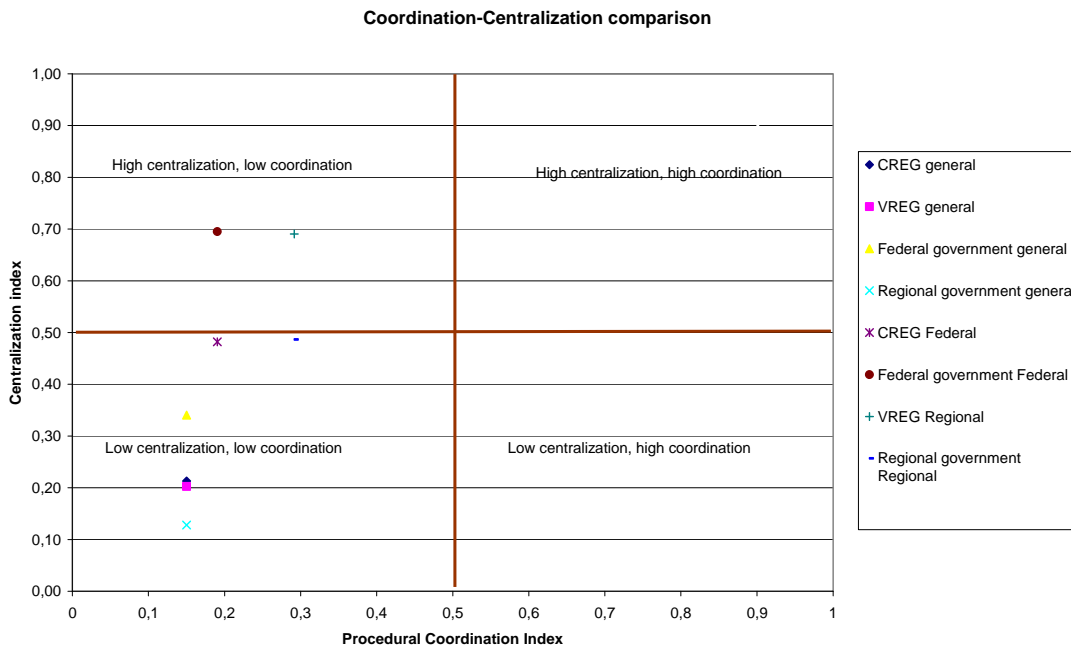
Since this is not the original intention of the index, we have to be cautious about attributing a strong explanatory value to this, but the results may be interesting to compare nevertheless. In general, we observe that it is not the case that there is a very centralized regulatory arrangement. Only considering the Federal level, the Federal government does have a significant centralization, but we see equally high numbers when CREG is taken as a reference point. This may indicate, based on an interpretation of the calculation method and on their actor's centrality indices, that both actors are more central to the regulatory arrangement, and that other actors circle around them. The same can be said on the Regional level, but there it is indeed the Regional sector regulator that has the highest actor centrality and thus is the normal reference point.

**Table 12 : Centralisation index in the electricity sector**

	General	Only considering Federal level	Only considering Regional level
Centralization index CREG	0.21	0.48	N/A
Centralization index Federal government	0.34	0.70	N/A
Centralization index VREG	0.20	N/A	0.69
Centralization index Regional Government	0.13	N/A	0.49

*Integration of procedural coordination index and centralization index*

**Figure 4: Integrated graph coordination and centralization indices electricity**



Since we have calculated the centralization index both in general and for every level with different reference points, we list all these reference points in the graph. However, the ones we are most interested in are the points that retain the original calculation method: Federal Government general, Federal Government Federal, and VREG Regional.

When we look at the regulatory arrangement in general, the combination point falls within the header of low centralization and low coordination, or a fragmented arrangement. When only considering the Federal level, the combination point falls high on centralization and low on coordination, defined in the paper as a more concentrated arrangement. This can also be observed on the Regional level, but unlike on the Federal level there it is in fact the sector regulator around which the arrangement is concentrated. Additionally, the Regional level is moving more towards a centralized arrangement, where more actors are involved, but there is still a central decision maker.

Of course, we reassert that this situation can still change if the different decisions are weighed in their importance. At this point in time, all decisions are considered to be of equal value. Since both the procedural coordination index and the centralization index take the number of actors in the field into account, this could affect both parameters.