

# Independent System Operators – The Investment Issue

D. Balmert\*, G. Brunekreeft\*\*,<sup>1</sup>

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## Abstract

*A central issue in the design of an ISO is that of investment: how and by whom will the investment decision be taken, and who will have to carry it out. Even the draft directives in the third legislative package of the European Commission take up this question, at least to some extent. One source of a possible solution is the review of existing ISOs, such as PJM in the USA. Further topics of discussion are how the interests of all the stakeholders can be taken into account adequately within the configuration of the governance system of an ISO, as well as the introduction of instruments such as merchant investment and tendered transmission investment.*

## 1. Introduction

After the publication, already in January 2007, of the Sector Inquiry and the Communication on the outlook of the gas and electricity markets, the European Commission unequivocally expressed its vision of a continuing vertical unbundling of the European energy companies in the publication of the third legislative package in September 2007<sup>2</sup>. The Sector Inquiry brought up the disappointing development of the intensity of competition of the energy market (at least in the view of the European Commission) and accentuated the scarcity of network investments and the accompanying problem of security of supply. These two problems are to be solved by the proposed unbundling regulations. The Commission stresses the argument of – as we call it – *Strategic Investment Withholding*, i.e. that a vertically integrated utility (VIU) is lacking sufficient incentives to upgrade the transmission network, as this upgrade would increase the competition against its own generation and distribution branches, and thus hurt the interest of the group as a whole. According to the European Commission, vertical unbundling would strengthen the incentives for network investments and thus improve both the competition and the security of supply.

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\* KEMA Consulting GmbH, Bonn (until October 2008 David Balmert was employed at Bremer Energie Institut)

\*\* Jacobs University Bremen and Bremer Energie Institut

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<sup>2</sup> The provisions for the electricity sector can be found in “Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/54/EC concerning common rules for the internal market in electricity” COM(2007) 528, 19.09.2007

Furthermore, competition would be strengthened by eliminating the potential for discrimination and for cross subsidies.

For the countries that still have not implemented a complete ownership unbundling and would neither like to do that in the future, the proposals for directives of the European Commission from September 2007 provide for an independent network operator (from now on we will be using the term Independent System Operator (ISO)). The Commission clearly favours ownership unbundling, but as the application of such a separation in the private sector has been ridden with legal uncertainty, the ISO concept seems to be a realistic option. With the decision of the Council of Ministers on 10/10/2008 to accept the so called 'third way' as proposed by a group of Member States under the leadership of Germany as well, there probably will be a strengthening of the existing rules for legal unbundling as a third option.<sup>3</sup> This decision definitely weakens the proposal of the Commission, and it can surely be doubted, if countries without an ISO or full ownership unbundling yet will not settle for 'third way'. Nevertheless it can be assumed, that the topics of ownership unbundling or ISOs will remain in the focus of the debate. Especially in the case of a growing together of the European grid areas, the ISO seems to be a very useful solution to merge the grids on a operational level while the question of ownership has not to be touched, as is one of the driving forces for setting up ISOs in the USA.

The Commission adopts a definition of a rather potent ISO with far-reaching competences. Article 10 of the proposed directive contains the provisions applicable for ISOs:

- The establishment of ISOs must not deter the (voluntary) ownership unbundling of vertically integrated firms.
- The ISO, nominated by the Member State, must be approved by the European Commission and undergo a certification procedure that applies also for the ownership unbundling of transmission companies.
- The ISO is "responsible for granting and managing third party access, including the collection of access charges [...] for operating, maintaining and developing the transmission system, and for ensuring the long term ability of the system to meet reasonable demand through investment planning."
- When developing the network, the ISO is responsible for "planning (including authorisation procedure), construction and commissioning of the new infrastructure."

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<sup>3</sup> Cf. press release IP/08/1484 by DG TREN

- The VIU as being the transmission owner (TO) is required to cooperate with the ISO and provide all necessary information.
- The TO finances “the investments decided by the independent system operator and approved by the regulatory authority, or give its agreement to financing by any interested party including the independent system operator.” This process, known as tendered transmission investment, will be discussed further in section 4.2.
- The TO has to “provide for the coverage of liability relating to the network assets, excluding the liability relating to the tasks of the independent system operator” and to provide guarantees to facilitate the financing of network expansions.
- The provisions for the governance of the enterprises apply to ISOs in the same way as they do in the case of ownership unbundling, i.e. the ISO may by no means have rights or control over generation or distribution companies and vice versa. Furthermore, all regulations already in force concerning legal, bookkeeping and informational unbundling apply to the TOs.

The rules for the electricity sector are mostly similar to the ones for the gas sector.

Therefore this paper will only use the electricity sector as an example.

The aim of this paper is certainly not to evaluate the Commission’s vision of unbundling. Instead, it is aimed at the analysis of the ISO concept in view of some key issues, drawing on international experience with the ISO model. Besides the design of the governance system of an ISO, the investment issue is gaining special importance: who decides upon investments, who carries them out and who is bearing the risk?

The following Section 2 exposes the basic aspects of these problems and provides an overview of the global distribution of the ISO model. PJM, a prototypical ISO especially in terms of the abovementioned issues, will be portrayed in Section 3, and a discussion will follow in section 4, section 5 concludes.

## **2. Vertical Unbundling: VIU, ISO or TSO**

### **2.1. Transmission System Operator – Three Models**

In order for a transmission network operator to function, it needs to fulfil two fundamentally distinct tasks: system operation and network maintenance.

- **System operation** is in essence the perpetual real-time match between electricity supply and electricity demand, the provision of balancing energy and other ancillary services. This function is taken up by the *System Operator (SO)*.
- **Network maintenance** includes all physical tasks on the network: servicing, maintenance, and setting up of new network connections, among others. This is the responsibility of the *Transmission Owner (TO)*

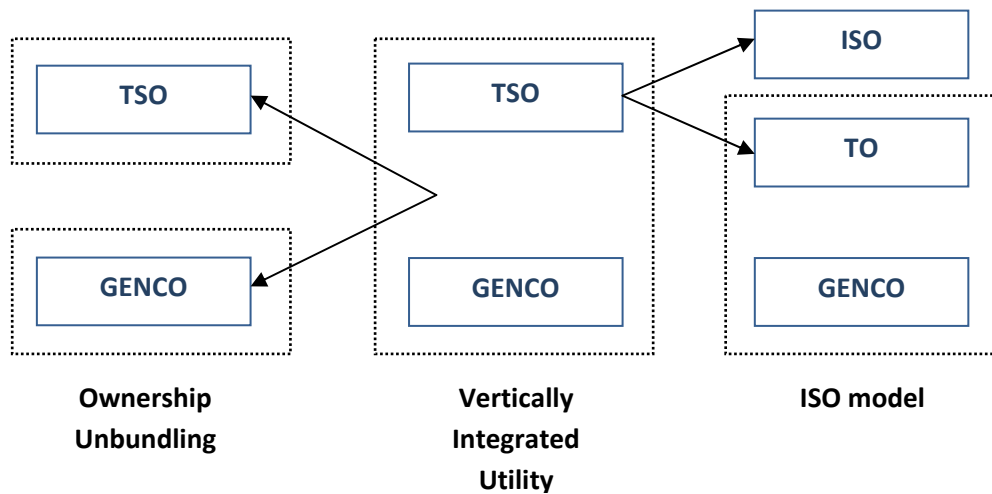
Joskow differentiates between three main models of organization of the network operation<sup>4</sup>:

- a) **VIU: Vertically Integrated Utility:** this model is characterized by the vertical integration of system operation, transmission ownership, generation, wholesale and retail marketing. In liberalized markets, the fully integrated TSO has an inherent conflict of interest because its transmission network operating, maintenance and investment decisions affect the value of its generation portfolios and marketing businesses, while at the same time it is required not to discriminate against third parties, which comes at the expense of the other business segments.
- b) **ITC: Independent Transmission Company (Transco):** This model is characterized by a complete separation of transmission network functions (system operation and maintenance) from generation and power marketing functions. In this model, system operation, maintenance, investments and asset ownership are fully integrated and can be managed by the TO in a coordinated manner. The management of the ITC can concentrate on the provision of optimal transmission services. This institutional design would result from full ownership unbundling.
- c) **ISO: Independent System Operator:** this model is characterized by the separation of system operations from transmission facility ownership, investment and maintenance, as well as from ownership of generation and marketing businesses. The ISO does not own or maintain transmission assets, but is responsible for the scheduling and dispatching of generation and load. It manages and enforces rules for the allocation of scarce transmission capacity. It works with the transmission owners and other stakeholders on the coordination of maintenance schedules and planning for new transmission investments to support changes in the demand for and supply of generation services. As the ISO has no

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<sup>4</sup> Joskow, P., March 2005, Patterns of Transmission Investment, Presentation at Electricity Infrastructure Investment Workshop, CRE, Paris, France.

direct interest in the financial performance of the owners of any of the assets that comprise or utilize the transmission network, it will behave in an unbiased manner.



**Figure 1: Structure of the ISO model in comparison to Ownership Unbundling**

A realistic transmission operator is normally situated somewhere in between these ideal types. Besides system operation and maintenance, there are other important obligations, such as congestion management within the own network, operation of interconnectors to neighbouring networks, that is usually associated with congestion management, and above all the planning and implementation, including financing, of network expansion investments. In a liberalized market, all this takes place under the oversight of a regulatory authority and with the social expectations that the TSO will assist with the development of competition in the electricity market, through turning its network in a “marketplace” on which new and incumbent electricity generation companies, national and international, could compete for the supply to small and large customers with the least possible physical limitations.

The figure above shows the two options proposed by the EC in the third legislative package in a schematic comparison. To simplify matters, only the two functions of network operation (TSO) and generation (GENCO) are represented, assuming that retail, marketing, etc. will stay within the same company or holding as the generation segment in the case of an ownership unbundling or the establishment of an ISO.

In a system with Independent System Operators, the system operation is separate from the rest of the VIU and the SO is transformed into an independent entity: the ISO. The network assets remain the property of the previous owner, the VIU; this way there is no considerable property relocation, as the SO will not possess any substantial assets.

There are two central issues in the debate:

- Who is to establish an ISO and what should the governance structure be like

- Who decides upon investments and who carries them out

There are two main reasons for establishing an ISO: better horizontal coordination between the different system operators in order to increase security of supply, and promotion of competition.

Even if the typical US ISO model can be exemplary for Europe, it should be taken into account that the conditions in the USA and Europe are different. In the USA, the networks historically have been much more fragmented and the interconnector capacity has been much lower than in Europe. Especially pressing in that respect is the problem of congestion management in the USA, and above all at the borders between the network areas (“Seams Issues”). This highly complex set of problems (coordination of the SOs and a better network regulation, for example through a nodal pricing system) is a typical challenge that almost inevitably implies the establishment of centrally operating ISOs. In Europe these problems have less of a weight, and the focus of the political debate (at least from the point of view of the European Commission) is thus oriented towards the promotion of competition and the reduction of prices.

### **Actors and Governance Structure in an ISO**

An ISO would normally face a trade-off between two main objectives. On the one hand, it is the promotion of non-discriminatory competition and on the other, the setting and coordination of different stages of the value-added chain (SO and TO). A central issue is thus how much of an influence over the TO should an ISO be allowed and vice versa.

Within the choice of an organizational design for the ISO there are normally two possible ways:

1. The club solution with all stakeholders and actors involved as members on equal standing
2. The establishment of an independent company, authorized through contracts with the actors involved

Furthermore, any form of an ISO is of course subject to state regulation. The consideration of examples for both of the abovementioned forms shows that under the club solution, where state agencies are integrated as stakeholders, state regulation seems to be weaker than in the case of a completely independent company. This can

be explained by the fact that in the first case the early involvement in the decision-making process leaves little to be solved by ex post intervention.

Besides the question of how the ISO is organized, a critical issue for the ISO design is also the decision-making scope of the ISO, and especially with regard to investments. It happens in many cases that the decision-making competence and the financial risks lie with different parties. A club solution, as in the USA, is aimed at resolving this tension through involving, although indirectly, the risk bearer.

### **The Issue of Investment: Who is to Decide?**

If the different characteristics of the ISO model are to be analyzed closely, the investment issue arises as a particularly important matter.

The considerable differences between the ISO models can be encompassed by the so-called *balancing ISO* and the *deep ISO*. The difference between the two is that the deep ISO does have competence over investment decisions, while the balancing ISO does not. In the deep ISO model, the ISO orders a TO to undertake an investment, and the TO is obliged to do so. The European Commission's vision of an ISO can be classified as a deep ISO approach, with the ISO owning the power of deciding over investments, though with the option that the TO may not be required to undertake the investment itself (see section 4.2.)

As already mentioned, the "strategic investment withholding argument" plays an important role in the unbundling debate. It is assumed that the VIUs have too few incentives to expand their electricity networks, as this would increase competition on their own market. This assumption forms the basis of the argumentation of the Sector Inquiry. The investment issue is part of the ISO design. In case the investment decision lies with the TO and not with the ISO, the investment withholding problem will not be addressed adequately. On the other hand, if the ISO has the competence to issue investment orders to the respective TO, (i.e. the TO is required to undertake the investment), then there is a clear detachment between the decision maker and the bearer of the risk.

In this case the question arises of who would carry the responsibility if the investment turns out to be poorly designed. An ISO's property is usually kept to a minimum, and the ISO neither has many assets nor much other capital, and thus would not be able to account for a wrong decision by his own means.

## 2.2. Examples of ISOs around the World

In order to separate network ownership and operations, in recent years ISOs have been founded the world over. The following table shows several examples of the current usage of the ISO model.

**Table 1: The ISO model around the world**

North America	South America	Europe	Australia
USA with 7 ISOs: <ul style="list-style-type: none"> <li>• CAISO</li> <li>• ERCOT</li> <li>• ISO NE</li> <li>• MISO</li> <li>• NYISO</li> <li>• PJM</li> <li>• SPP</li> </ul> Canada with 2 ISOs <ul style="list-style-type: none"> <li>• AESO</li> <li>• IESO</li> </ul>	Argentina <ul style="list-style-type: none"> <li>• CAMMESA</li> </ul> Brazil <ul style="list-style-type: none"> <li>• ONS</li> </ul>	Scotland <ul style="list-style-type: none"> <li>• NG</li> </ul> Ireland <ul style="list-style-type: none"> <li>• EirGrid</li> </ul> Bosnia and Herzegovina <ul style="list-style-type: none"> <li>• NOS BiH</li> </ul> Switzerland <ul style="list-style-type: none"> <li>• Swissgrid</li> </ul>	<ul style="list-style-type: none"> <li>• NEMMCO</li> </ul>

### USA and Canada

The US-American and the Canadian ISOs are similar in many important features and are shaped primarily by state regulation. They are normally founded as deep ISOs. They are either organized as association-like “clubs”, involving all stakeholders, or as completely independent companies that are not related to any other market players. Their task is primarily to secure the non-discriminatory access of all market players to the network. Furthermore, they take the responsibility of network operation, long-term network planning, the settlement and operation of various markets for electricity and related products.

### Argentina

The Argentinean network operator CAMMESA is also responsible for the operation of the transmission network and of the electricity markets. The GENCOs, TOs, distribution utilities, large users and the State all have a share of 20% each.

### Brazil

ONS was founded in 1998 as the Brazilian network operator and is responsible for the operation of the transmission network and the dispatching of power plants. Its members include GENCOs, network owners, distribution companies, traders, and

large-scale users, as well as the Energy Ministry, consumer organizations, decentralized producers, and small-scale distributors.

### **Scotland**

With the enlargement of the English electricity market over the Scottish network area, National Grid (NG) was turned into an English-Welsh network operator and owner, and an ISO for the Scottish network region, while the previous two Scottish TSOs assumed the role of TOs. Yet, NG has no competence for investment decisions for the Scottish network system.

### **Ireland**

EirGrid is state owned and since 2006 has been operating the transmission network. EirGrid's responsibility is basically the operation of the network, of the wholesale markets and the long-term network planning. Development and maintenance of the lines is carried out by the TO.

### **Bosnia and Herzegovina**

NOS BiH, as the country's ISO is primarily responsible for the reliable operation of the network, the organization of the market and the development of regulations. The owners of the network are the Federation of Bosnia and Herzegovina and Republika Srpska.

### **Switzerland**

Since December 2006, Swissgrid is the only transmission network operator for Switzerland, founded by the seven network companies in anticipation of upcoming legislative requirements. The ownership of the network remains with the Swiss network companies, who are at the same time the only shareholders of Swissgrid.

### **Australia**

NEMMCO is responsible for the operation of the Australian transmission network and the wholesale market.

## **3. Independent System Operators: the Case of PJM<sup>5</sup>**

The ISOs from the US East Coast are often used as prototypical representatives of their "kind". Especially interesting is the network operator PJM, described in more detail below.

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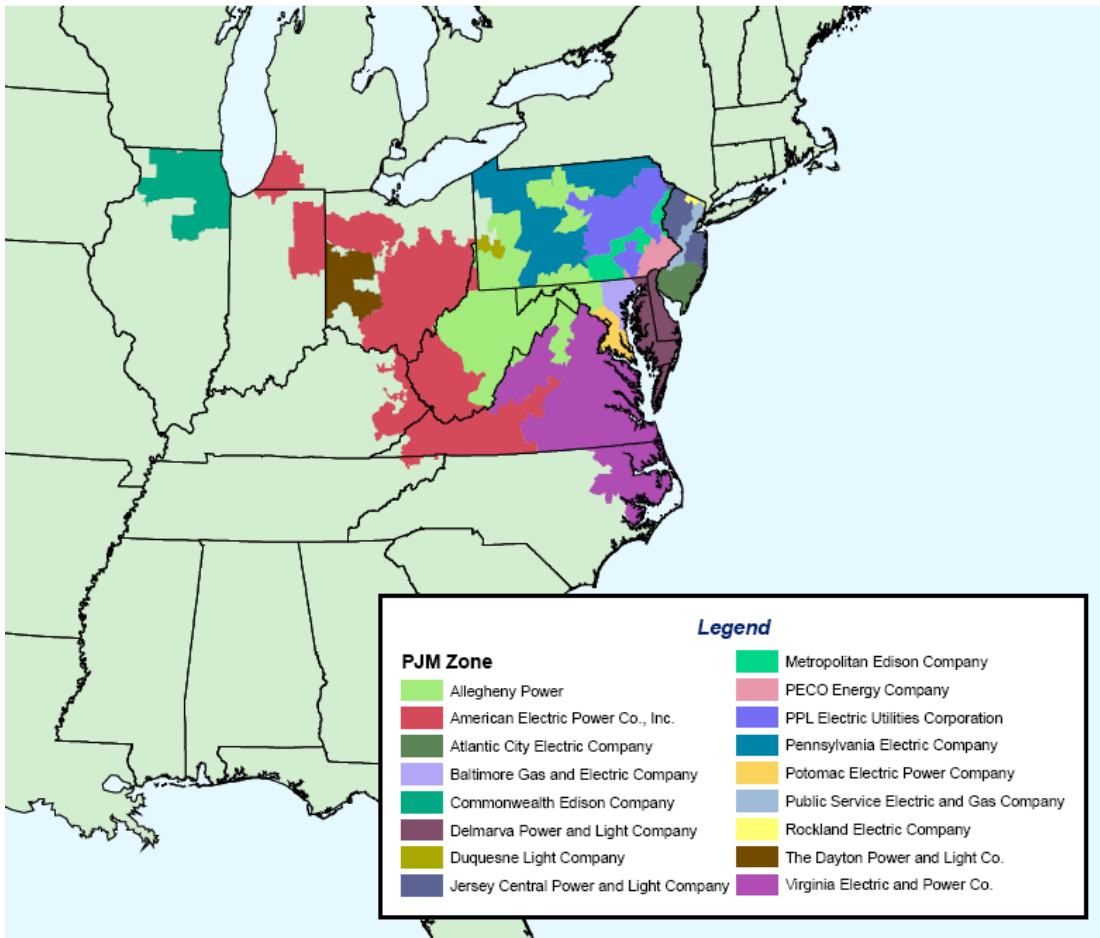
<sup>5</sup> The correct label for PJM is actually not ISO but RTO (Regional Transmission Organization). According to US law, RTOs are ISOs that operate across state borders and thus fall under the jurisdiction of the Federal Energy Regulation Commission (FERC)

The first ISO was founded in the USA relatively long ago. PJM was established already in the 1920s, by three initial companies, and has since then expanded through the integration of further actors. Until 1998 PJM had the character of a power pool, but from being a cost-based pool turned progressively into a supply-oriented spot market, and is currently one of the leading ISOs in the USA. A decisive factor for the development of ISOs in the USA was above all the *Federal Energy Regulation Commission* (FERC). As a starting point one can identify the heavily fragmented and loosely integrated electricity network, dominated by vertically integrated companies, as well as the need for dealing with the resulting transmission bottlenecks at the borders of the individual networks.

PJM Interconnection LLC (as goes the official name of the ISO) operates, according to its own account, the largest high voltage transmission network in the world (it is situated at the US East Coast and comprises (parts of) 13 states and the District of Columbia, see figure below) and the associated markets for electricity, balancing energy and transmission rights. PJM is organized as an association and acts on the behalf of and under the oversight of its nearly 450 members. Such are all the power generation companies, transmission network owners, electricity distribution companies, electricity marketers and large-scale users from the PJM domain, as well as consumer protection advocates and federal and national regulatory agencies.

PJM is a deep ISO, as it has far-reaching competences on investment decision making. PJM's functions can be classified basically into three pillars:

- Operation of the transmission network and power plant dispatching
- Operation of the wholesale market and the capacity credit market, regulation and financial transmission rights (FTR)
- Investment planning



**Figure 2: PJM's network system**  
[www.pjm.com](http://www.pjm.com)

Source:

### 3.1. PJM's Governance Structure

PJM is a typical example of a comprehensive club solution (its organizational structure is presented in the figure below). PJM resembles an association, and each stakeholder, whether a network owner or generator, marketer or consumer, is represented as a member. Each member is entitled to representation at the various committees, even though there is a differentiation between members with and without voting rights. Related companies have one vote altogether, and the ruling principle is of *one party-one vote*. Furthermore, there are also ex-officio memberships without voting entitlement that are usually reserved for regulatory authorities and consumer protection organizations.

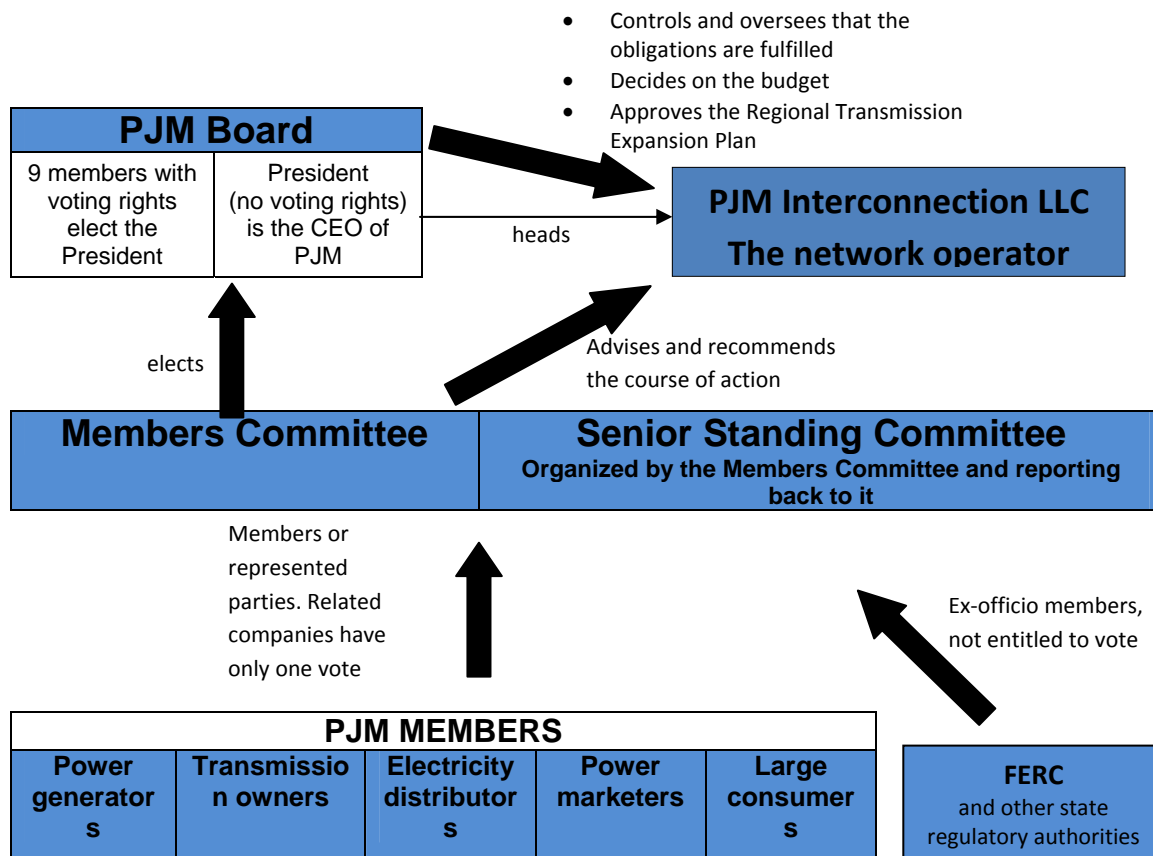


Figure 3: PJM's Governance Structure

Source: own illustration

PJM's two-tier governance structure of Members Committee and Board of Directors ensures the independence and neutrality of the decision making process and guarantees that no member or group of members could gain a dominant influence over PJM.

The central decision making authority is the Board of Directors, elected by the Members Committee, whose members by no means are allowed to have personal, professional, or financial interest in any of the actors involved. The network owners also have no particular privilege over other members of PJM.

### The Board – Governance Relationship

As common in the US context, the leadership of the ISO is the responsibility of the so-called Board of Directors, where this board is usually divided into executive and non-executive directors. The non-executive directors have the task of overseeing the company and controlling the executive directors whereas the executive directors are more involved in the management of the company. In PJM, the board is composed entirely of non-executive directors, and only the President/CEO, who is not entitled to

vote in the board, is responsible for the management of the company. Beside him there are further so-called *corporate officers*, the top management.

First of all, the Board has to choose and overlook the management and decide over the proposed company budget. Furthermore there are other tasks, mostly in mediating among the members, between the members, PJM, and/or FERC, or renegotiating the ISO's underlying agreements. All board members, except for the President/CEO, have other professional engagements, such as attorneys, university professors, management consultants, etc.

On the other hand, the President/CEO, together with the rest of the corporate officers, usually in the rank of vice presidents, forms the company's executive office. The vice presidents are usually responsible for their own business segment.

### **3.2. Investment Decision Making Power**

As described above, one of the central issues in the vertical unbundling of the network sector is the investment issue. On the one hand, there is the problem of network expansion for the inclusion of new energy sources. On the other, there is the connection of new network users and the maintenance of the existing network.

As already mentioned, the keyword in this debate is the so-called strategic investment withholding. The most important question related to the design of an ISO is who decides upon new network investments and who finances them. The PJM case can be used as an example of a deep ISO, an ISO that has the decision power over network investments, while the obligation to invest lies with the TOs.

Essentially there are three types of network investment:

1. The connection of new generation capacity, where the connection of privately financed transmission lines (merchant investment) is done in a similar manner within two network areas and thus not dealt with separately
2. Network expansion to maintain security of network and supply
3. Network expansion to deal with existing congestion problems

In case of new connections, PJM has detailed provisions on the procedures to be followed. The application for a network connection is to be directed to PJM, who attends to it together with the respective TOs. For example, studies are undertaken on the effects of the proposed connection on the network and on other construction projects in planning. The investments identified as necessary in this planning process

and the actual connection of the customer are then included in a mid- to long-term investment plan through a decision of the Board of Directors, and the respective TOs are obliged to carry out the project.

Unlike in other US ISOs, the power generator newly connected to the network pays not only for the necessary network extension, but also a deep interconnection charge, i.e. a price for the reinforcements necessary deeper within the network which are needed to facilitate the fairly unconstrained usage of the new connection.

In the case of network expansion necessary to maintain the security of supply, usually it is a matter of necessary developments for the fulfilment of stability and security criteria. They may be based on a shift of the load curve due to changing consumer behaviour, on the close-down or disconnection of old generation plants, or simply on the tightening of security criteria. Due to the blackouts in recent years, the so-called reliability investments take now a central place in US ISOs behavior. Responsible for the establishment of security criteria is The North American Electric Reliability Corporation (NERC) on behalf of FERC. Even with the planned close-down of old generation plants, it may be necessary to build new transmission lines. When these investments are included in the investment plan through a Board decision, the construction work can go on the same way as with new network connections. The investment is to be carried out by the TOs and thus goes into the regulatory asset base of the companies and as such is subject to the TO's network tariff regulation.

The third case encompasses investments necessary for congestion management, or the so-called economic investments. For this purpose, PJM collects data on congestion costs. These allow the estimation of whether a new line would be economically viable and whether the accruing costs cannot be covered by other means, such as Financial Transmission Rights (FTR). Corresponding investments should be initially undertaken by PJM through merchant investors. However, it was realized that very few merchant investments had been undertaken. As a consequence, the approach was changed. Those investments identified as economic are now first made public and within the time frame of a year it is possible for private investors to submit investment proposals. If an investment through a merchant investor is not undertaken, the identified developments can still be included in the investment plan; they then have to be carried out by the local TOs. Such economic investments are compensated through the issuing of FTRs, i.e. ARRS (Auction Revenue Rights<sup>6</sup>), to the investor.

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<sup>6</sup> Auction Revenue Rights give access to a share of the income of the FTR auctions, so that the "right" set of ARRs makes their proprietor independent from price changes in the FTR market.

If the investment, decided by PJM, is declined by the TO, the dispute settlement shall be brought by the responsible regulatory authority: FERC.

As the ones carrying out the investment (and thus bearing its risks), the TOs are subject to obligation to invest. Although as members of PJM they are not only involved in the planning, but also in the decision making process. As the membership in PJM is voluntary, at least formally, as *ultima ratio* there is the option of leaving the ISO. Even if such a step is practicable, even in light of other interests (for example by the state or the customers), the authors are not acquainted with any such cases.

#### **4. Considerations on Governance Structures and the Investment Issue**

The following section contains some considerations on how, beyond the use of existing instruments, the design of the governance structure of an ISO would be able to improve the consideration of interests of all the different actors, and how they can contribute to solving the investment issue. The authors would like to stress that these considerations are only meant as points for discussion.

##### **4.1. Two-Tier Governance Rules: a Bicameral System**

The governance structure of an ISO is defined by the tension between the independence of the single stakeholders to guarantee the level playing field on the one hand, and on the other, an effective governance of the interests involved. The independence of the ISO from single actors and with it the limiting of individual influences ensures that the operation of the ISO will not be pushed into any single direction, but rather that all interests will be accounted for. As noted earlier, the main principle in PJM's governance is the one party - one vote rule. Moreover, it is made sure that no single actor can exercise unduly influence, but at the same time it is not guaranteed that the single interests in turn would be treated disproportionately (i.e. compared to the optimal weight of these interests if they were considered objectively), whether granted too little or too much attention.

This basic problem reminds of the classical problem of a democracy: there is always the risk of the majority dominating the minority or vice versa.

When designing an ISO for example in Germany, this problem would be especially pronounced. There are only four transmission network operators in the electricity sector in Germany (and these are also within the same holding as the large power generators and electricity distributors) and some 900 distribution network operators, surrounded by

plenty of large and small generators. In any case, many of the distribution network operators are interrelated with the four large German energy utilities. In a one-tier one party – one vote system, it would be very probable that the interests of the four transmission network operators fall victim of the disproportionately large decision power of the hundreds of small distribution network operators. We would like to point out that even in a system with a deep ISO, the TOs carry out tasks fundamental for the functioning of the entire electric system, and thus their willingness to cooperate is indispensable.

Many federal political systems could offer a solution to this problem: the transformation of a one-tier governance system into a two-tier one: Two-Tier ISO Governance.<sup>7</sup> One level would be organized as before under the one party - one vote principle, and on the second level there should be a voting system based on a separate differentiation criterion. This is analogous with a parliamentary bicameral system, as found frequently in federal structures. A bicameral system should guarantee the balance of interests through two-level differentiation system, as illustrated by the example of the European Union (and further refined by the Treaty of Lisbon, which is not yet fully ratified by all Member States). The function of the Legislature in the European Union is structured in a bicameral system with the Council of Ministers on the one hand and the European Parliament on the other. The European Commission is the executive organ and is comparable in this sense with PJM's executive council. The European Council is composed of government heads and ministers; the distribution of voting rights does not follow exactly the one party-one vote principle, but comes relatively close to that. The 785 seats in the European Parliament, however, are distributed on the basis of population sizes of the respective Member States run for in elections. The distribution of voting rights in the European Council guarantees that the large countries do not dominate the small ones, whereas the way of assigning seats in the parliament ensures that the small countries do not outweigh the large ones. Such a model could be found, with many variations, in numerous parliamentary systems.

The basic idea behind a bicameral system of an ISO is the following:

- The members committee, under a one party – one vote rule, elects the executive board, or the company management
- According to an established principle of distribution of votes for the stakeholders, the members committee can decide over issues proposed by the

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<sup>7</sup> The basic political principles are explained very well in Tullock, G. and Buchanan, J., 1962, *The Calculus of Consent: Logical Foundations of Constitutional Democracy*.

executive board or by the standing committees, such as an investment plan or a change in the fundamental agreements.

The introduction of a bicameral system for an ISO will in any case bring about more questions. A central issue would be the question of the basis, upon which the voting rights are to be distributed. One obvious criterion would be a company's annual turnover. Due to the heterogeneity of the members of an ISO (customers as well as network operators), the sense of such a criterion is not necessarily obvious. An alternative would be to use topics as a decisive factor. In particular, the TOs should be more implicated in network investment issues, due to their immediate involvement, than representatives of private customers, who only get indirectly affected by the investment. Moreover, or as another alternative, particular stakeholders could have veto power on particular issues, as long as there is no other way of preventing one group or party to exercise an undue effect over the rest.

The investment issue could be used as an example once again. It should be considered whether within a deep ISO it could be provided that the TOs have the right to impose a reasoned veto over an investment order. In this respect it should be mentioned that the TOs in the USA under are obliged to carry out the proposed investments, but are still able to file a complaint with the regulatory authority or even leave the ISO. In any case, such an option (i.e. leaving the ISO) is hardly possible considering its practical implications.

#### **4.2. Tendered T-Investment**

As already stressed several times, the approach to the investment issue is fundamental for an ISO. Even in the options for designing an ISO described in the previous section, the investment issue is central. A further possibility to solve the investment issue without taking competences on the integrated overall optimization of the system away from the ISO will be discussed in the following section.

As a balancing ISO cannot solve effectively the problem of strategic investment withholding (as explained in section 2.1.), the next alternative is to establish a deep ISO, where the investment decision making competence is transferred to the ISO. In short, the deep ISO prepares an investment plan containing the necessary network extension. Then it is the task of the TO to carry out the investments. In case of doubt, the investments can even be ordered against the will of the TO: The TO would thus have an obligation to invest and there would be an enforced separation between the decision maker and the risk bearer. As already explained above, in US deep ISOs

there is such an obligation to invest, but the TOs have at least theoretically the possibility to leave the ISO, as membership is voluntary.

A way out of this dilemma is offered by the active involvement of third party investors. On the one hand, one can think of a system of merchant investors, as is the case in the USA and as is developing gradually in Europe (for example Eastlink and Britned could be seen as such).<sup>8</sup> Merchant investments would leave investment possibilities to the market and would be financed basically out of the arbitrage between different market prices. Such a system requires a differentiated network pricing system (e.g. Locational Marginal Pricing), but it is feasible. The US experience shows however that only few investments were financed in this manner.

The alternative would be to offer *Tendered Transmission Investments*. This could be organized as the ISO designing an investment plan and then tendering single projects. What will be actually tendered is the financing of the construction works out of the pool of regulated network tariffs. Such a procedure would have various advantages:

- The decisive advantage is that the TO is freed of the obligation to invest. In case the TO would not like to carry out the proposed investment, a third party investor could do it instead. In case no investor can be found through the tendering procedure, then this could be regarded as a signal that the planned investment is not economically viable.
- There is no change in ownership structure as would be the case of full ownership unbundling.
- The risk assessment, as an entrepreneurial task, is brought back to the investors.
- The problem of strategic investment withholding is dealt with effectively, as the decision making competence lies with the ISO. If the investment is viable and there are enough other potential investors, then the TO would not have a reason why not to undertake the investment or to take part in the tendering process; as a delay of the works would not make sense, strategic investment withholding would be eliminated as an option.

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<sup>8</sup> More detailed information on merchant transmission investments can be found in Brunekreeft, G., 2005, 'Regulatory issues in merchant transmission investment', *Utilities Policy*, Vol. 13, No. 2, pp. 175-186 and Brunekreeft, G., Neuhoff, K. & Newbery, D.N., 2005, 'Electricity transmission: An overview of the current debate', *Utilities Policy*, Vol. 13, No. 2, pp. 73-93.

The aim of such instruments are “stand-alone” facilities, as these investments can be considered separately from the overall system and can be dealt with on their own from a financial and regulatory point of view, or separately from the actual network owners. This concerns mainly large new developments. The case of replacement investments is more complicated. In such cases, the investment of third parties would make it necessary from property and regulation point of view to split the facility into two entities. Tendered transmission investment is thus suitable for large scale and clearly differentiated infrastructure projects, such as interconnectors. Such a procedure could be used only as an accompanying measure in a larger perspective. As one of the reasons of weak competition in the European electricity market according to the European Commission is to be found in the delay of large scale investment projects, the tendered transmission investment could well contribute to finding a solution.

The proposal for a directive for the electricity spot market of the EC in the third legislative package, in its Article 10.6.b. foresees a similar model: the transmission system owner shall “finance the investments decided by the independent system operator and approved by the regulatory authority, or give its agreement to financing by any interested party including the independent system operator.” This means that the EC explicitly allows for investments to be undertaken by third parties. This basically implies no investment obligation. In any case the TOs are granted priority, so that they would not have to compete with other potential investors.

## **5. Summary and Discussion**

It is clear that the investment issue is always crucial when considering an ISO model. First of all, the investment issue is of fundamental importance for deciding between an ISO model and an ownership unbundling. Secondly, the question of decision making competence has an important role and the investment issue is always at the backdrop of designing a governance structure for an ISO.

Should the ISO decide over investments? Does the TO have to carry them out? How can the governance structure of an ISO guarantee a balance of all interests?

A model of a deep ISO that can make investment decisions and can thus undertake the task of optimizing the overall system seems reasonable. Even the EC follows the same line with its proposals for defining an ISO. At the same time, the governance structure and the operation rules of an ISO allows for bridging cleavages between the decision maker and the risk bearer, in order not to put to

risk the TO's willingness to cooperate. At the same time it is clear, that the ISO cannot become an exclusive "club" of the TOs, as there are other reasons for the establishment of an ISO, such as ensuring of a non-discriminatory network access, or strengthening of the competition.

Such a governance structure configuration can contain elements of a two-tier decision making system, as is the case in parliamentary bicameral systems, or strictly defined veto rights for certain actors in certain situations. It remains debatable, however, which criteria could be used for the distribution of voting rights. Another alternative or a complement to avoid a rupture between the decision maker and risk bearer could be a system in which network investments foreseen by the ISO are tendered (tendered transmission investment). The proposals of the EC include such an instrument. It would be even possible to grant the TO a certain priority, so that there is a tendering procedure only when the TO does not agree to undertake the investment itself, as proposed by the EC, instead of having to compete with other bidders.

In this sense it is still not clear how to deal with planned investments for which there is no interested investor. Is there an "investor of last resort", as for example the ISO itself? The regulatory regime for the determination of network tariffs, through which the investment is to be financed, could also be critical for the willingness to invest.

Whichever governance structure is applied to an ISO, the issue of guaranteeing a balance and considering all legitimate interests of the actors involved, and especially with regard to the investment issue, has to be taken seriously. In case there is a concrete legal prescription, it should be formulated with consideration and foresight, in order to preclude already in the regulatory basis the failure of the ISO model.