

# **Costs and benefits of vertical separation of the energy distribution industry: the Dutch case**

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## **ABSTRACT**

This paper applies insights from the economic literature to evaluate costs and benefits of the policy decision recently taken by the Dutch government to introduce ownership separation between energy distribution on the one hand, and production and retail on the other. The major benefit of this measure is that it enables the privatisation of commercial activities while keeping the infrastructure in public hands. This benefit can, however, also be realised by more efficient ways, such as improving the corporate governance structure. The other benefits arise from improved network performance, efficiency of regulatory activity and increased competition. The realisation of these results is, of course, not a free lunch. Ownership unbundling reduces economies of scope, creates one-off transaction costs, and may also affect investments in generation by the currently vertically integrated Dutch utility holdings. We conclude that mainly because of the uncertainty about the future role of small-scale generation and the uncertainty about the magnitude of the one-off transaction costs related to the cross-border leases, the net effect on welfare of ownership unbundling is ambiguous.

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## **1. INTRODUCTION**

### **1.1. Background**

Recently, the Dutch government decided to replace the currently implemented structure of legal unbundling between network and commercial activities by ownership unbundling. According to the government, legal unbundling is unable to fully guarantee free access to the network by new entrants and adequate investment in the grid.<sup>2</sup> In her view, ownership unbundling is necessary to facilitate competition as well as to enhance efficiency of network management. In addition, ownership unbundling might enable the current ultimate shareholders – regional public authorities – to sell their shares in production and supply, raising both liquidity of regional public authorities and incentives for efficiency in these parts of the holding.

Since ownership unbundling involves both costs and benefits, it is important to evaluate systematically all conceivable effects of this policy option against the alternatives of strengthening legal unbundling by additional behavioural measures. In this paper we provide such an analysis, focusing on electricity networks. In the remainder of this section we present an overview of institutional choices made elsewhere in the European Union (section 1.2), describe the current structure of the energy distribution industry in the Netherlands (section 1.3) and give more detail regarding the scope and the structure of this paper.

### **1.2 European context**

The introduction of competition in the energy industry in European countries, as in other industries, has strongly been encouraged by initiatives of the European Union. The European Union has published several directives prescribing steps towards competition to be taken by

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<sup>2</sup> The Minister of Economic Affairs, letters to the House of Parliament, Kamerstukken II, 2003 – 2004, 28982, nr.18 (March 2004) and nr. 29 (October 2004).

member countries. These steps include restructuring of the industry, design and opening of markets as well as introduction of regulation. The issue of ownership, in particular privatisation, has not been dealt with by the EU Electricity Directives<sup>3</sup> until now. The restructuring issue refers to both vertical and horizontal organisation. Although the potentially adverse effects of concentrated markets are widely acknowledged, the EU Electricity Directives have not required horizontal separation. In addition, due to the absence of proactive regulation and control, the electricity market has shown an ongoing process of concentration, which may seriously limit effectiveness of competition (Jamasp, et al., 2005).<sup>4</sup>

Following the first EU Electricity Directive (1996), several countries initially introduced weak forms of unbundling in the electricity industry, notably accounting unbundling and management (organisational) unbundling. Some countries already implemented legal unbundling, although this more strict form of unbundling was formally introduced in the second EU Electricity Directive adopted in June 2003. Ownership unbundling of the electricity distribution networks has only been the case in one country of the European Union, the United Kingdom, where 7 out of 14 incumbent suppliers do not own networks in their home regions (Van Damme et al., 2004). For transmission system operators, many European countries have chosen for legal or ownership unbundling, since TSOs perform the most crucial market-facilitating functions and need a high degree of independence.

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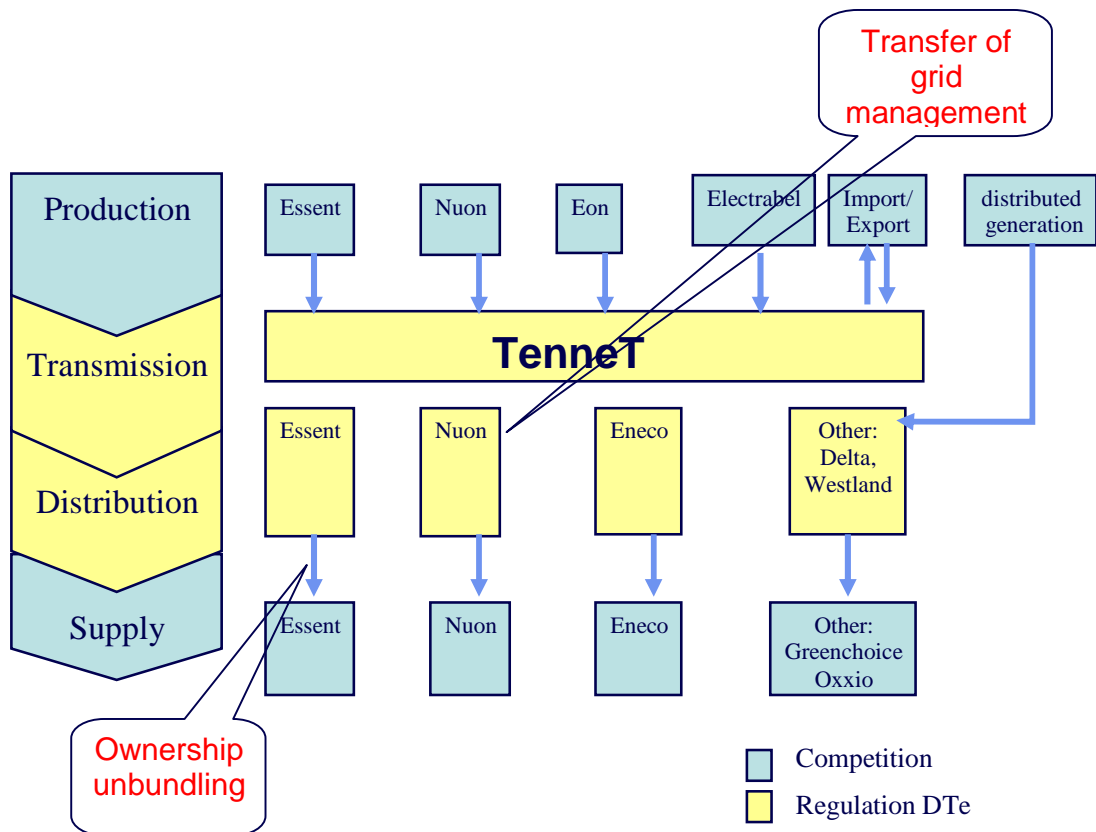
<sup>3</sup> Directives 96/92/EC and 2003/54/EC of the European Parliament and of the Council.

<sup>4</sup> In many European countries, the share of the largest three generation firms in generation is above 60%, while comparable figures exist for the retail market (Jamasp et al., 2005).

### 1.3 Current structure and structural change in the Netherlands

The current structure of the Dutch electricity industry is depicted in Figure 1.

Figure 1. The Dutch electricity industry



The Dutch transmission system operator TenneT is fully separated from commercial electricity generators and traders. This TSO is entirely owned by the state government. TenneT currently manages transmission at the national level: 100% of the high-voltage network of 220 and 380 kV lines and 12% of the 150 kV network. The rest of the 150kV grid and all the lower voltages are

owned and managed by regional distribution companies.<sup>5</sup> These companies, whose ultimate owners are local authorities, are vertically integrated firms which are active in generation, network and supply. The three largest energy holdings - Essent, Nuon and Eneco - cover a large part of the Dutch market. In addition to their network activities, they are involved in commercial activities. They own several large generation units and supply about 80% of the Dutch electricity market.

At present, network management and commercial activities of the regional companies are legally unbundled. However, network companies belong to the holdings which are also active in generation and retail. As the regulator faces difficulties in guaranteeing full independence of network management from other parts of the holding, the Dutch government has decided to introduce ownership unbundling, which structurally eliminates any influence of holdings on distribution companies. In this paper we analyse the effect of this policy measure in the Netherlands.

In addition to ownership unbundling between network and commercial activities, the government has proposed to reallocate the management of all networks at and above 110 kV (hereafter 'regional transmission networks') to TenneT. This part of the proposal represents another dimension of unbundling (between two network activities, see Figure 1) and can be implemented independently from vertical separation between network and commercial activities. However, we take this measure into consideration in our analysis, because it also affects costs and benefits of ownership unbundling between the network and commercial activities.

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<sup>5</sup> Strictly speaking, the distinction between transmission and distribution is not by voltage, but functional. However, in the Netherlands, most lines at and above 110kV have transmission function. When speaking about regional transmission, we refer to the lines of 110kV and 150kV.

#### **1.4 Scope of research and structure of the paper**

In this paper, we analyse the effects of several options for vertical separation of the electricity distribution network from commercial activities. Besides ownership unbundling and legal unbundling, we analyse two additional, intermediate options. As each option has specific strong and weak points, it is hardly possible to define the optimal structure. Therefore, we focus on describing the trade-offs between benefits and costs of each option for restructuring, instead of looking for the optimal option.

The focus of the analysis is on total welfare effects for the Dutch economy. Distributional effects, however, will also be mentioned as far as it is possible. Given the focus on economic aspects, this analysis does not include other aspects relevant for the decision on unbundling, such as legal aspects and political aspects. Our analysis is of a highly qualitative nature as empirical data on effects of separation are very scarce. In addition to desk research of both general economic literature on unbundling and studies focused on the Dutch electricity industry, we have used discussions with several participants in the Dutch debate to collect information and check tentative findings.

The paper proceeds as follows. Section 2 describes the four options for unbundling analysed in this paper. Section 3 presents the framework for analysing the costs and benefits of unbundling. The analysis of the several benefits is the subject of section 4, while section 5 deals with the costs. Section 6 offers the overall assessment of costs and benefits, draws conclusions and gives some concluding remarks.

## 2. FOUR OPTIONS FOR UNBUNDLING

### 2.1 Introduction

The current form of legal unbundling and the ownership unbundling option chosen by the Dutch government do not exhaust all options for unbundling the electricity industry. In addition to these options, intermediate options can be distinguished in which a more clear division of tasks and responsibilities is specified for the network manager. We define two intermediate options between the current situation and ownership unbundling, resulting in four alternative options for unbundling:

- a) ‘Legal-Lean’: legal unbundling with lean network managers, which is the current structure of most energy-distribution firms;
- b) ‘Legal-Fat’: legal unbundling with fat network managers, i.e. network firms with a proper allocation of tasks and the economic ownership of their assets, however, with no independent financing;
- c) ‘Legal-Fat Plus’: legal unbundling with fat network managers and a financial ring fence between the network and commercial activities;
- d) ‘Ownership’: Full ownership unbundling of the network and commercial activities.<sup>6</sup>

Below, we describe each option for unbundling in more detail.

### 2.2 Legal-Lean

Currently, the network firms belong to groups (‘holdings’), which share their operational, managerial, and financial responsibilities. For example, some strategic and operational tasks of network companies are now done in collaboration with other parts of the holdings, or outsourced

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<sup>6</sup> In our definition of ownership unbundling, the network firm is able to integrate with other non-energy, commercial activities, giving rise to other sources of cross subsidies. A stronger form of ownership unbundling could, therefore, include limitation on integration with activities outside the energy industry.

to them (e.g. shared service centres). Most network firms are 'lean', i.e. do not have economic ownership of their assets. They are organised as a BV<sup>7</sup> with no assets and only a few employees, while the network assets are typically owned and financed by the holdings. In the recent revision of the Electricity law 1998 (also referred to as the I&I-law) there is an article regarding shifting economic ownership to network companies, but this article has not come into force yet. Although the network firms do not possess the infrastructure assets, the regulator (DTe) assumes that these assets belong to the network firms, i.e. it assumes a so-called regulatory asset base.

### **2.3 Legal-Fat**

In this option for structuring the industry, the network firms are still part of the groups. They are legally and operationally unbundled from commercial activities and have the economic ownership of the assets. Operational unbundling means that all the strategic network activities<sup>8</sup> are assigned to the network firm and there are no cross-subsidies between the unbundled activities.

### **2.4 Legal-Fat Plus**

The Legal-Fat Plus option is different from the previous options in that it strengthens the existing financial rules by giving the network more financial capabilities. In the previous options, financing issues are to a large extent dealt with at the level of the holding. There is no formal restriction preventing that cash flow of networks can be used by the holdings. Cash may flow out in the form of dividends or through transactions, especially with respect to the old financial contracts of the holdings, such as cross-border leases, where the network assets provide

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<sup>7</sup> BV='Besloten vennootschap'.

<sup>8</sup> I.e. investment decisions regarding the extension and maintenance of the network; operational management (e.g., dispatch, negotiations on contracts over the access to the network, responsibility about information systems); contracting of the parties that perform outsourced activities; financial policy (setting up the annual reports, billing, contact with clients); supervision of the design of new and maintained networks and management of information systems.



guaranties<sup>9</sup>. Since commercial activities are generally more risky than network activities, this imposes the risks on the network companies that there may be insufficient cash flow to maintain the network or insufficient funds to finance network investment. A financial ring fence secures that the networks do not run into financial difficulties due to financial losses in other parts of holdings. This can be done by setting a threshold on the credit rating of the group, after which the regulator have to approve all financial transactions of the network company with other companies in the group to which it belongs.

By implementing a financial ring fence, not all links between the network firm and commercial firms are cut through. The holdings still have certain shareholder powers, e.g., through personal links with the network firm. Although, the holdings' formal shareholder powers are restricted (especially for larger network companies that are subject to the so-called 'structuurregime'), informal powers may still play a role, affecting the decisions of the management board members.

## **2.5 Ownership unbundling**

This policy option results in the strongest form of unbundling. It completely removes all financial and operational links between network firms and commercial firms, such as carrying the same name, combining commercial and network information in one mail to a customer, etc. In this option, networks are fully split from the original holdings, so that the holdings have no shareholders' rights. For example, a holding (a current owner of a network company) cannot even informally affect the choice of the board members for the network company, financial decisions or decisions on network investment. Ownership separation means that there will be no common financing of the network and commercial activities, such as generation and retail. The old

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<sup>9</sup> There is an article in the new Electricity Law that prevents using network assets as a collateral for new contracts.

contracts of the holdings regarding financing, such as cross-border leases, may need to be broken or altered, in order to implement the full separation.

### **3. FRAMEWORK OF THE COST-BENEFIT ANALYSIS**

In order to compare several options for structural separation, we use the welfare-economic approach. In this approach, the key question is whether a policy measure, i.e. an option for unbundling, affects allocative efficiency, technical efficiency or welfare distribution. Allocative efficiency refers to welfare effects of the allocation of goods and technical efficiency to the costs of supplying goods, i.e. to productivity. Both efficiency concepts have a static as well as a dynamic dimension. These efficiency concepts determine our cost-benefit analysis. In other words, we analyse whether unbundling affects the functioning of markets and the allocation of goods, the incentives for firms to improve productivity and raise quality of their products, and finally, the distribution of the results of production and welfare allocation among consumers and firms.

As unbundling potentially impacts many components of the industry, we have distinguished several categories of costs and benefits (see also OECD, 2003). First of all, unbundling affects independence of network management. Secondly, unbundling also directly impacts effectiveness and efficiency of regulation. Thirdly, both improved network performance and more effective regulation affect competition. A final, side-benefit of unbundling is related to its impact on privatisation of commercial activities. As there is no free lunch, unbundling also introduces costs. We distinguish three costs of unbundling. One-off transaction costs are costs which are directly related to the implementation of the measure to unbundle. Other transaction costs include costs of changing legislation by the public authorities. Loss of economies of scope is a potentially significant cost of unbundling as network and other parts of the chain (i.e. generation and retail)

are closely related to each other. A final cost item which deserves specific attention is the risk of less investment in generation.

Combining the options for unbundling and the above categories of benefits and costs, we construct a table with the list of benefits and costs as captions of the rows, and the four policy options as captions of the columns (see table 6.1). In section 4 and 5, we look horizontally, focusing on each individual category of benefits and costs, and compare the relative performance for this category across the four policy options. Section 6 looks vertically, analysing the trade-offs between benefits and costs for each option.

#### **4. BENEFITS OF UNBUNDLING**

##### **4.1 Performance of networks**

A direct consequence of unbundling is a more independent management and financing of the network. Unbundling increases focus of network management on the network without the need for compromising with other needs of an integrated holding (OECD, 2003). When fully unbundled from generation and supply, the network focuses on its own profit and not on the profit of the group. As a result, it better responds to regulatory incentives to do investments that are good for facilitating competition (e.g. in technology that reduces switching costs).

Also with respect to financing, especially full ownership unbundling secures that the cash flow generated by the network is not diverted to other activities, but spent in the best interests of the network company. Options Legal-Fat Plus and Ownership Unbundling are better than Legal-Fat, because they prevent the risk that network may have insufficient financial means. The option of

ownership unbundling is the best with respect to this benefit as it fully secures operational and financial independence.<sup>10</sup>

#### *Adverse effects of increased network independence*

While highlighting the positive side of a more independent position of network companies for their performance, we also have to discuss two main arguments that may be used against this claim and explain why possible negative consequences of the increased independence of the networks are minor in the current context.

First, separation may cause hold up of investment in the network. For instance, an integrated network firm has a better incentive to invest in network reliability than a separated network firm as this improves its opportunities for commercial activities. This incentive is still present in the case of legal unbundling, but may be less in the case of ownership unbundling. In practice, however, tariff regulation serves to mitigate this problem. Under stronger unbundling forms, network companies better respond to regulatory incentives, in particular towards more efficiency and a more optimal reliability, which leads to a more optimal price-to-quality ratio and enhances welfare.

A second argument relates to substitution between investment in the network and investment in generation. In some situations reinforcing the network may be more efficient than building new production capacity, but a non-integrated network firm may be less keen to take that decision. This issue is especially important for the transmission level, but with the development of distributed generation it may also play a role at the distribution level. In the Netherlands, the

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<sup>10</sup> Notice, that cash flow is perfectly secured only if networks are kept separately and not allowed to merge with *any* other businesses, which may be also an undesirable obstacle to the movement of capital. In case of merging with low-risk businesses, such as other network firms, the cash flow of the network is less at risk than in the case of merging with high-risk businesses.

management of regional transmission lines is partly done by distribution companies, but will, in accordance with the proposal of the Dutch government, be fully transferred to TenneT. As a result, unbundling does not affect this issue. Only if the proposal on transmission is not implemented then vertically integrated companies may have better incentives to take into account the substitution between transmission and generation in investment decisions. However, there is a trade off between this and the effect of vertical integration on competition. The gains of more vertical integration between large-scale generation and transmission are likely to be offset by competition gains. See section 4.4 for more detail on competition issues.

### *Economies of scale*

Another theoretical advantage of ownership unbundling of regional distribution networks is the option to achieve positive scale effects in the network management by consolidation of these networks. However, this goes at the expense of losing the possibility to apply benchmarking in regulation of regional distribution networks. Therefore it is important to evaluate how large the scale economies actually are.

It appears from the economic literature that scale economies are large in transmission, but negligible in distribution. In particular, KEMA (2004)<sup>11</sup> presents numerous arguments in favour of merging regional and national transmission together. According to their report, cost savings due to more economic design of the network, better communication, and cheaper operation could reach up to tens of millions euros annually (the total revenue of TenneT being around 350 mln<sup>12</sup>). Furthermore, an integrated network would be more reliable.

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<sup>11</sup> This report by KEMA has been commissioned by TenneT. In KEMA(2004), transmission is defined from 50kV. However, in our analysis, we refer to the lines of 110kV+ as transmission, since this was conventional terminology historically.

<sup>12</sup> According to the annual report of TenneT (2003, p.3), in 2002 the revenue of TenneT was 358.1 mln euros.

For the distribution level, there is some evidence supporting the assumption of constant returns to scale. See, e.g., Pollitt (1995) and Kittelsen (2003). For Norway, Kittelsen finds that “even for the very smallest sizes the VRS [variable returns to scale] frontier is very near CRS [constant returns to scale]”, implying negligible positive scale economies in distribution.

Therefore, if the proposal with respect to regional transmission is implemented then economies of scale in transmission are realised. Horizontally integrating distribution networks after this is unlikely to be beneficial. Firstly, economies of scale in this network hardly exist. Secondly, the regulator would lose the option of benchmarking if networks were integrated in one firm. Hence, the four unbundling options are equivalent for this benefit.

In contrast, if the proposal regarding transferring the management of transmission networks to TenneT is not implemented, then ownership unbundling may create larger benefits than any other option, because it increases the prospect of consolidation of transmission networks in the future. If regional networks are not fully unbundled from commercial activities, then the chance that the transmission can be merged in the future is smaller, because vertically integrated companies are less likely to sell their shares in transmission, or voluntary to transfer the management of transmission lines to TenneT.

### *Conclusion*

Concluding, unbundling creates a more independent position of the network, which provides benefits for the network performance. In the Legal-Lean situation, which is our benchmark, networks are the least independent, as they even do not have economic ownership of their assets. Making networks ‘fat’ creates more transparency with respect to the network firms’ assets. This and a proper allocation of the strategic tasks will decrease the interference with the holdings and secure a better performance of the network. From this perspective, the option Legal-Fat is better

than Legal-Lean; and the option Legal-Fat Plus is even better as it decreases the risk of insufficient financing. The option of ownership unbundling removes the last distortions and focuses the performance of network companies on their objectives the best.

#### **4.2 Effectiveness and efficiency of regulation**

Economic literature acknowledges three main regulatory constraints: informational, transactional, and administrative and political, which in practice prevent regulators from implementing their preferable policy (see e.g., Laffont and Tirole, 1993). The literature mostly focuses on informational and transactional constraints. An important consequence of these two constraints is that contracts are inherently incomplete, and contingencies left out of incomplete contracts have to be filled in. In such a case, the pattern of ownership matters.

Structural separation creates more transparency and leaves less incentives for network companies for cross subsidies and other distortions, which looses both informational and transactional constraints, and hence contributes to more efficient and effective regulation.

Under stronger unbundling forms, the network operator loses the possibility to strategically reallocate its internal costs. A vertically integrated firm would have the incentive to shift costs of commercial activities to the network firm and to shift resources of the latter to the commercial part of the group. By unbundling, the regulator obtains a better insight in the costs of network management. As a consequence, the regulator is able to implement more appropriate rules, such as efficiency targets, on network firms.

Moreover, unbundling makes the market-monitoring task of the regulator simpler and more effective because it reduces the incentives of the network operator to favour its subsidiary in the competitive segment. The information stream within the group is also difficult to control.

Therefore, the closer the relationship between the companies in the group, the higher the risk of preferential treatment of the affiliated company by the network.

In the Netherlands, distribution networks are already legally unbundled and subject to regulated third-party access. Network tariffs are set by the regulator (DTe) based on benchmarking of the companies' standardised costs, which includes the regulatory return on capital. The regulator also creates incentives for quality by introducing financial compensations for changes in quality indicators. Although the tariff setting procedure is the same under all four options, unbundling still may have effect on its outcome through increasing the adequacy of the regulator's information. As DTe argues in their advice to the Minister of Economic Affairs (DTe, 2004b), regulation is more difficult and less effective if there is no proper division of tasks between the network and the respective commercial companies.

### *Conclusion*

Legal unbundling cannot fully remove the incentive of the network firm to give a better treatment to their subsidiaries. Even with extra measures with respect to customer systems, billing information, etc., there will always be a risk of preferential treatment and it would be extremely difficult to prove when sensitive information would 'leak' from the network to other holding members. Only ownership unbundling eliminates this risk and creates the most effective "Chinese walls" between the network and commercial activities, as it fully removes such incentives.

### **4.3 Degree of competition**

One of the main arguments for unbundling of distribution networks is that it could increase competition and, hence, welfare. An integrated network company has both incentive and possibility to affect competition in the competitive segment. This can be done either via cross subsidies to competitive activities from the network or through distorting actions of the network



firm. As has been said in section 3, unbundling affects competition via several routes. The improved network performance leads to less allocative distortion caused by high network tariffs as well as better options for new entrants for dispatching to the grid or for supplying. Regulation directly affects competition by insuring non-discriminative third-party access. Competition is also directly affected by unbundling through the impact of the latter on cross subsidies and distorting actions by vertically integrated firms. Unbundling can, however, also have a negative impact on competition: stand-alone commercial companies may become more prone to the risk of takeovers, which may reduce the number of market players. In this section, we assess the impact on competition in both retail and wholesale market.

#### *Retail competition*

The welfare effects of unbundling depend on its impact on the number of suppliers. This number is, in turn, a function of both concentration (exit) and entry. The concentration in the Dutch retail market is relatively high, as most customers are still supplied by the three large incumbent energy companies. Given such a high concentration and no full integration in the electricity market, it is unlikely that further mergers of the ‘Top3’ commercial companies can be allowed by the competition authority, irrespectively of unbundling.<sup>13</sup> The size of entry will likely be limited due to the presence of switching costs although high switching costs can also provide an incentive for entrants to obtain a large market share.<sup>14</sup>

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<sup>13</sup> See Newbery (2002b) for more detail regarding the complexity of competition policy in the electricity industry. One of the problems to be dealt with is cross-border ownership which requires competitive measures on international (European) level.

<sup>14</sup> Such markets are in general characterised by the low activity of customers. According to the EC (2004, p.9), “based on experience of those member states which have already had a competitive market for some time one might expect a well functioning market share to have around 15-20% of business changing suppliers every year with most, if not all, seeking to renegotiate tariffs with their current supplier every year. For households, an annual level of switching of perhaps 10% would be seen a reasonable benchmark.”

Several characteristics of the retail electricity market make this market to be prone to the risk of formation of a tight oligopoly, i.e. a structure that can enable the incumbents to realise supranormal profits for a substantial period of time (Canoy et al., 2003). These characteristics include the limited number of suppliers, the relatively high switching costs, the low elasticity of demand, the rather stable level of demand (on annual basis) and hurdles for entry. Because of these characteristics, the incumbents are able to (implicitly) coordinate their activities. A conceivable example of such coordinated activities is the way the incumbents deal with administrative restructuring and the problems following from it. Unbundling the incumbents likely reduces the risk of formation of a tight oligopoly to some extent as it improves conditions for entrants.

Although it is not clear how much entry will actually occur after unbundling, we can get an impression of the welfare effects of entry in retail. Let us first note that retailers compete in two-part tariffs and that it is clear from economic theory that it is optimal to realise price-cost margins in the standing charge rather than in the per-unit price. This implies that an increase in competition (e.g. through entry) will reduce the standing charge rather than the per unit price, which has no effects on consumption volumes. According to Lijesen (2002), increasing the number of retailers from 3 to 4 leads to a decrease of the standing charge of approximately 14%, boiling down to 1% of total electricity expenditure for an average household. Likewise, dynamic efficiency gains will be limited, simply because retail costs form only a small part of total electricity costs.<sup>15</sup> On top of the dynamic effects, the disappearance of cost-increasing non-price discrimination will enhance welfare, but again, the order of magnitude is probably fairly small for the same reasons mentioned above.

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<sup>15</sup> Even in the extreme case where retail profits are absent, total expenditures on electricity decrease by less than 5 percent.

Besides, a countervailing effect of retail competition is brought forward by Joskow and Tirole (2004). They address the consequences of 'load profiling', finding that a better outcome<sup>16</sup> can be achieved by a (regulated) monopoly retailer that uses two-part tariffs than by retail competition. This is because under retail competition with no real-time metering, retailers cannot face the real-time wholesale price for the aggregate consumption of their customers, but an average price. In contrast, a monopoly retailer in an area would be able to observe the total load in real-time and to face the real-time wholesale price, thus increasing the efficiency of its electricity purchases by time of day. This argument may lose significance in the near future because of technical developments, such as real-time metering or the development of a real-time spot market. Newbery (2002a) mentions another argument against retail competition for small customers. In his view, a monopoly for small customers (up to 50-100 kW) is likely more able to act as a viable counterparty for medium and long term contracts compared to independent retailers. However, the net benefits of such a development are not straightforward, as they depend on the respective regulatory costs and effectiveness.

Concluding on the effect of unbundling on retail competition, unbundling is likely to promote entry in retail, but the net welfare effects are limited.

#### *Wholesale competition*

Improved performance of networks, more effective regulation and fewer opportunities for cross subsidisation and other distortions also affect wholesale competition. The magnitude of the effect of unbundling on wholesale competition depends on three factors: ownership of the transmission grid by the distribution companies, future development of small-scale generation, and consolidation tendencies on the North-Western European power market.

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<sup>16</sup> In economic terms, in a world with homogeneous consumers and on traditional meters, a monopoly retailer can achieve a second best outcome provided that it charges two-part tariffs, while retail competition achieves a third best outcome.

Let us first explain how joint ownership of the network and generation can harm competition on the wholesale market. When both regional transmission and the main generation in the respective area belong to the same direct owner, the network has both incentives and opportunities to strategically affect competition in production. Competition between producers may be harmed in three ways.

First, a vertically integrated firm has a strong incentive to adjust its capacity choice in order to have its generator gain local market power (Joskow, 2004).

Second, vertically integrated incumbents may hinder entry in generation or harm entrants' operations by 'non-price discrimination'. Unbundling transmission and generation is therefore likely to facilitate entry in electricity production, which leads to an increase in welfare as well as induce improvements in productive efficiency and raise the level of supply security. Simulations with CPB's model for the electricity market (Ten Cate and Lijesen, 2004) show that an extra entrant in generation would bring average per unit prices down by 9 %. Other than in the case of retail, per unit prices are affected, so that not only distributional effects arise, but welfare effects as well.

A third threat if transmission lines are vertically integrated with electricity producers is a very specific one, in which the only generator in a region is vertically integrated with the transmission network in a neighbouring region. It can then influence the ability of its neighbouring transmission lines operator to resolve congestion, thus creating a very favourable position for its own generator.

At least two options exist to deal with these threats for wholesale competition: reallocation of transmission lines to the TSO (TenneT) and unbundling of the distribution firms. Given the importance of regional transmission lines for wholesale competition, their unbundling from production is especially important even though this may lead to some loss of scope economies (see section 5.2). Therefore, only if the management of the regional transmission lines is not transferred to TenneT while distribution companies continue to manage these lines, unbundling of distribution companies from production will bring large benefits.

Another factor which has to be taken into account is the role of small-scale generation. The Netherlands has quite some small-scale generation capacity, amounting to approximately 17 percent of total generation capacity (Timpe and Scheepers, 2003). Future predictions range from a stable share to an increase to 27 percent. Most small producers generate electricity primarily to cater for their own needs and sell the surplus to the market. However, technical developments may change this. Especially if virtual utilities are created by coordinating small producers, they may form a substantial competitive fringe.<sup>17</sup> An important aspect in virtual utilities competing with large scale generators is the level at which they deliver their production to the network. Small-scale generators feed into the distribution network, whereas regular power plants feed into the transmission network. This difference may be important because, as Ackermann et al. (2001) point out, distribution networks are often designed for a different purpose than transmission networks. This causes differences in costs that are unfavourable for small-scale generators. If incumbent producers are vertically integrated with owners of distribution networks, they have an incentive to exaggerate the cost difference between transmission and distribution networks, as this enhances the competitive position of their power plants vis-à-vis virtual utilities. Wals *et al.* (2003) and Connor and Mitchell (2002) report complaints from small scale producers over high

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<sup>17</sup> Virtual utilities, also referred to as distributed generation, consists of coordinated small plants, often combined heat and power plants or renewable sources. See Künneke (2003) and Awerbuch and Preston (1996) for a more extensive discussion.

connection costs charged by distribution network operators. High fees for delivering to the local network as well as non-price discrimination are likely to dampen the success of small producers in the market place.

Finally, we have to consider unbundling in the context of consolidation in the North-Western European market. Given that consolidation processes also take place at the European level, will this process be increased by the unbundling of Dutch energy distribution firms? There are currently, seven large players in the European energy market, notably RWE, EON, EDF, Electrabel, Centrica, Vattenfall and Endesa (EC, 2005). A takeover of a Dutch generator by one of them may therefore increase market concentration.

However, such a takeover does not have to be the case, since there are more potential buyers in this market. In particular, a number of smaller companies, that are of local significance in certain European countries, might still develop the ambition to explore their activities across borders. Moreover, the existence of quite a large number of Independent Power Producers (IPPs) worldwide suggests that the operation of power plants without a network is an economically viable activity.<sup>18</sup> Some of these IPPs are already active in several European countries (Germany, UK, Portugal, Spain, Italy, Netherlands). Several large IPPs are known to have expanded either by acquisitions of individual plants (e.g. Intergen, International Power) or by acquiring small producer companies (e.g. TECO). Firms like these may be interested in increasing their European operations further in a similar manner. According to EIA (1996, p14), "Among U.S. companies, independent power producers have been among the most active in seeking overseas energy project investments.". Actually, the indication that power generation is by itself a viable activity implies that, after implementation of ownership unbundling, the generation firms can be taken-

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<sup>18</sup> IPP's obviously operate in a different manner than traditional utilities. Woolf and Halpern (2001) discuss market structures and trading arrangements aimed at reaping the full benefits of IPP's for wholesale competition.

over by a firm from outside the electricity-utility industry. Recently, IPP Intergen was sold to corporate investors American International Group and the Ontario Teachers' Pension Plan. (NRC, 2005.)

### *Conclusion*

We find that a higher degree of unbundling of generation and *transmission* networks enhances the position of new entrants and may lead to substantial welfare gains. Unbundling of generation and *distribution* networks increases the opportunities for small-scale producers to compete in the electricity market, which is especially relevant if the concept of virtual utilities is further developed in practice. Such a development is more likely if there is much entry in distributed generation, which is also facilitated by stronger unbundling of distribution networks. Finally, ownership unbundling may result in sales of generation owned by Dutch utility holdings to foreign firms, however, this is unlikely to have a remaining effect on competition on the North-Western European power market.

## **4.4 Benefits of privatisation**

### *Current ownership structure*

Ownership unbundling of network activities from commercial activities enables public shareholders to sell one of these activities separately. More specifically, it enables public authorities to privatise the commercial part of the currently publicly-owned integrated firms, despite the uncertainty with respect to the government future decision regarding network ownership. Complete unbundling would give public shareholders who do not want to run risky businesses a way out, while at the same time, keeping the essential facility, notably the network, in public hands.

Dutch incumbent energy companies are historically in public hands. They belong to local authorities and the current law prevents sales of the networks to private shareholders, as 50% of the network assets should remain with the current owners. The management of the holding is able, however, to sell commercial parts, i.e. generation plants or retail firms. There is an example of such an intention in the Dutch energy market – a combined sale of the retail businesses of NRE and Intergas.<sup>19</sup> Sale of these parts does not imply that the shareholders would always benefit from such transactions as the holding can decide to use the revenues from the transaction for other activities, for instance abroad, instead of transferring it to the shareholders. In the prevailing Dutch governance system (called ‘structuurregime’), the ultimate shareholders, such as regional and local authorities in the energy sector, are not able to effectively influence companies’ decisions with respect to both divestiture and destination of the proceeds of the divestiture. Changing the governance structure so as to increase the power of public shareholders in this respect would be one option to deal with this issue. Another option is ownership separation.

#### *Welfare effects*

Some economists argue that private shareholders do a better job in monitoring managers than public shareholders do (e.g. Karpoff, 2001). The UK example of the voluntary unbundling of British Gas also support the view that ownership unbundling may be good for a company value. As the commercial parts of energy companies are more likely to have private shareholders after unbundling, this would imply that unbundling increases the efficiency of these firms. According to Sequoia (2004), complete unbundling and privatisation of the commercial parts would improve performance of the latter. Others believe, however, that in the Dutch situation buyers will exercise their market power and, hence, offer a lower price, since splitting does not only allow for

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<sup>19</sup> Also, before the condition of 50% public ownership was introduced with respect networks, two integrated incumbent gas companies, Obragas and Haarlemmermeer, were sold to RWE.



sales of competitive businesses, but also forces such sales while the number of potential buyers is limited (Van Damme et al., 2004).

Privatisation increases the options for a firm to choose the optimal financial structure.<sup>20</sup> A large stream of related literature exists on the issue of the optimal financing structure, predominantly based on principal-agent theory and agency costs theory. Recent examples include Denis *et al.*, 1997 and Burkart *et al.*, 1997. According to corporate finance literature (e.g. Jensen and Meckling, 1976), a large share of equity financing implies that managers have limited incentives to earn a profit, whereas a large share of debt financing urges managers to invest in high-risk projects. The trade-off between these costs implies the existence of an optimal capital structure, which is probably different for a network firm and a generation firm or a retail firm. If this difference is large, the effect of bundling these activities is that they can not reach their optimal debt-equity ratio.

Unbundling possibly increases the options for attracting capital as it improves transparency. In addition, in a separated structure, managers of each firm can strongly focus on their own business, while in an integrated setting interests of a particular division, say the network division, can be compromised by the needs of other divisions (OECD, 2003). Agency costs are thought to be higher in diversified firms because individual shareholders do not have the ability to monitor and discipline managers adequately. This implies that shareholders are likely to prefer equity in focused firms, thus raising the value of those firms. Recent empirical work, though, overviewed in Matsusaka (2001) is not conclusive on the effect of diversification of firm activities on the firm value.

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<sup>20</sup> See transaction-cost literature for more detail regarding the choice of the organisation form by a firm, e.g. Joskow (2003b).

### *Conclusion*

Under the current corporate governance, public authorities have very limited options to impose privatisation of commercial parts. Ownership unbundling strongly improves possibilities of public shareholders to privatise commercial firms. The other forms of unbundling do not affect these possibilities. Another option to the withdrawal of public capital from commercial activities is a further improvement of the corporate governance. Privatisation of the commercial firms likely increases efficiency of these firms due to stronger pressure from shareholders. In addition, privatisation improves the options to choose the optimal financing structure.

## **5. COSTS OF UNBUNDLING**

### **5.1 One-off transaction costs**

Unbundling results in costs of restructuring companies' offices and rearranging contracts of integrated companies with other parties. In the context of restructuring Dutch energy distribution companies, a special issue arises with respect to one type of financial contracts: cross-border leases.

#### *Cross-Border Leases*

By means of cross-border leases, assets of the distribution firms have been leased to American investors for an extensive period of time (the headlease) and leased back, for a smaller period, in order to share financial tax benefits. Breaking or rearranging such contracts may generate one-off transaction costs, in particular in the Legal-Fat Plus and Ownership options.

In some cases – when no substantial assets are to be unbundled – the respective transaction costs seems minor. However there is uncertainty for the cases in which substantial assets need to be unbundled. Due to confidential information on these contracts, it is not possible to adequately

predict the magnitude of these transaction costs. According to some experts, the current cross-border lease contracts may not need to be broken in the case of the ownership unbundling of the networks from the holdings, because the issue might be solved by providing cross-guarantees between the current holdings (which are the parties that concluded the current cross-border lease contracts) and the companies/new holdings who will become the owners of the assets after the split. Notice that such a compromise implies no full financial ring fence. Other financial experts state that unbundling may incur significant claims demanded by the American investors.

Also the transfer of the management of regional transmission networks, proposed by the Minister, does not necessarily require breaking of the cross-border lease contracts. However, here too, there is uncertainty regarding one-off transaction costs in the case of voluntary sales of transmission assets to TenneT.

#### *Other one-off transaction costs*

In addition to the possible need for rearranging financial contracts, which in particular may be caused by the necessity to break the existing CBL contracts, there are also other transitional costs. These costs include the cost of the introduction of new ICT processes and program management, costs related to changes in personnel and housing, legal costs associated with implementing of a higher degree of unbundling, as well as costs associated with rearranging the other contracts of the companies with third parties.

Especially introduction of new ICT systems and restructuring the working process in the company may be costly. This is however one of the unavoidable costs associated with introduction of competition, since changes in technology are needed to accommodate more players in the energy market and to secure informational streams. This means that substantial transitional cost arises already under the Legal-Fat option.

Little evidence is available regarding the magnitude of these one-off costs. For example, according to OECD (2003), one-off transaction costs of breaking-up the integrated firm are significant in the telecommunications industry. However, there may be substantial differences in such costs across industries. As there is little international experience with ownership unbundling in electricity, it is difficult to evaluate these costs, although we observe a couple of voluntary unbundlings (in the United Kingdom). The latter suggests that the one-off costs associated with breaking the last link is may not be large. However, this does not include the effect of CBLs. Also, since ownership unbundling is a new development, which companies have not experienced before, it may be that it will increase uncertainty in the market during the transition period.

### *Conclusion*

Except from the current situation, which is the status quo, each of the other three policy options imposes some one-off transaction cost. Especially introduction of new ICT systems and restructuring the working process in the company may be costly. Therefore, changing the allocation of tasks when shifting to the option Legal-Fat introduces a large reorganisation cost. Shifting to Legal-Fat Plus may give rise to only little extra transaction costs compared to Legal-Fat, while the cost of shifting to ownership unbundling is larger. Both, legal and financial costs may arise in this option. In particular, there is uncertainty about the cost associated with cross-border leases.

## **5.2 Economies of scope**

In the electricity industry synergies between different activities occur because of economies of scope. We distinguish operational and financial synergy.

### *Operational synergy*

Let us first address the loss of economies of scope between the network and generation. Such scope economies exist where a company's generation is located at the own network area, however, their positive effect is countervailed by possible negative effects of vertical integration on competition. In the Netherlands, main production units feed into the transmission level (i.e., at and above 110 kV). If the management of all the high-voltage grids will be transferred to the TSO, ownership unbundling will not yield further loss of economies of scope between network and such generation units. Small generation units feed into the distribution level. Many of such units are not co-owned by utility holdings. Therefore, in many cases, economies of scope that may arise from common ownership of such units and distribution networks have not been explored anyway.

Economies of scope arise also between the network and supply activities. Common facilities such as call centres and billing machines are often mentioned as an example where synergies may arise. However, these are exactly the activities where exchange of commercially sensitive information may take place. Hence, also in the case of legal unbundling, 'Chinese walls' have to be established to separate the information streams of the network from that of commercial companies. Notice that maintaining 'Chinese walls' in not fully unbundled network and supply companies active in the same region whose profit-maximising incentives work in the same direction (as both want to maximise the overall profit) may be costly and ineffective, because of large information asymmetry between the company and the regulator. Even in the US-case, without these Chinese walls, Gilsdorf (1995) finds only insignificant economies of scope. After implementing legal unbundling and a proper division of tasks between the network and competitive activities, the additional losses of scope economies between the network and supply activities by introducing ownership unbundling are unlikely to be large in practice.

Ownership unbundling leads to some additional loss of economies of scope. These additional costs follow from the removal of all remaining shared facilities, such as a common name, and shared activities, such as shared purchase of non-strategic products and shared contracts with, for instance, lawyers. After all, in the ownership option, all relationships between network firm and holding are removed.

### *Financial synergy*

Financial synergy (which is just another term for financial cross-subsidies) may be also sometimes seen as a form of economies of scope. An integrated firm has an advantage as it benefits from lower interest rates compared to the competitors. One may, however, wonder how these benefits of lower interest rates of an integrated firm come about. Using network assets as a base for non-network debts implies that shareholders of the network pay for the higher credit rating of the holding, by bearing higher risks on their future dividends from the network.

Lower interest rates on debts are unlikely to be passed on to customers because the cost advantage is not available to all players in the market, as it is linked to owning a network. Firms without a network do not have access to the advantage, and can not gain access to this advantage either. It is a general feature of oligopoly markets that firms with exclusive cost advantages will not pass these advantages on to consumers, but transfer them into rents. From these considerations, we conclude that economies of scope that are associated with financial synergy are unlikely to be welfare improving. The effect of financial synergy is mainly allocative and not on total welfare. There is however one related issue: eliminating financial synergies may increase the risk of insufficient investment in generation, which we discuss in the next section.

### **5.3 Increased risk of insufficient investments in generation**

Theoretically, unbundling could affect risks for commercial parts of holdings in two ways. The first one is higher costs of capital. Unbundling could weaken the financial base of Dutch utilities, which may adversely impact the investment in generation in the Netherlands. The second one is the reduced role of long-term contracts, also negatively affecting investment in generation. Both arguments relate to financing capabilities of generation companies, namely to the possibility to use the network as a collateral. The current law in the Netherlands already prohibits this for *new* financial contracts of the holdings. In this respect all three options that feature legal unbundling are equivalent. The risks are higher in the Ownership option, which separates financing fully. How serious are these risks? To which extent does the argument hold that unbundling financially weakens Dutch energy companies and, hence, reduces investments in generation capacity?

#### *Effect on the cost of capital*

In a vertically integrated firm, the combined risk of all activities could be lower than the risk of some specific activities, notably commercial activities, due to the relatively low risks associated with network management. Firms active in generation and/or supply who do not have a network face a larger probability of bankruptcy. Hence, such companies have, *ceteris paribus*, a higher cost of capital than integrated firms. By reducing the financing capabilities of commercial firms, ownership unbundling reduces investments of the unbundled companies.

On the other side, if this significantly affects profitability, electricity-producing companies or supply companies may (and will) solve it by merging with other companies, in particular those active in less risky sectors or having network assets in other countries. For example, they may acquire a distribution company in another country or industry. If the market is sufficiently competitive, the companies will converge to the optimal structure in the long run.

Since the unbundled generation companies may choose to merge with other generators, this may enhance the process of consolidation in the European energy market. As discussed in section 4.4, dealing with this is an issue of competition policy.

#### *Reduced role of the long-term contracts*

In electricity, there is a concern that when supply activities compete with each other, risks on the upstream side, i.e. on the side of generation, may increase. The source of this additional risk is the reduced role of long-term contracts in the retail market. With less long-term contracting, generators facing higher risks would invest less, possibly resulting in underinvestment in production capacity.

Green (2003) argues that retail competition might lead to less long-term contracting and to higher prices. If electricity retailers face competition, then companies signing long-term contracts are exposed to the risk that a fall in short-term prices would allow their rivals to buy on the spot market and undercut them. This will result in less contracting. This argument holds for both separate and integrated companies, and relates to the introduction of retail competition rather than unbundling. In practice, both integrated and non-integrated companies have only relatively short-term contracts.

#### *Reduced investment in generation*

As said, the ability of Dutch utilities to invest in generation may reduce after ownership unbundling. However, the reduction in investment of these particular companies may be temporary, as they can improve their investment position by merging with other companies who may have investment capabilities. Furthermore, it is not obvious why such investment should necessarily be financed from the Dutch networks, as Dutch regional utilities are not the only investors in this market.



The amount of generation investment is determined by the future price for energy and the average costs of producing electricity. If access to the grid is guaranteed, new firms may enter the generation market if investment becomes economically attractive. This implies that the network does not and should not play an important role in financing generation investments. Higher levels of investments due to network-based lower capital costs may even be labelled overinvestment, as it is partly financed from other sources than the investment itself.

### *Conclusion*

We conclude, except for ownership unbundling the other three options are equivalent with respect to the effect on generation investment. The Ownership option may indeed reduce investment in generation by the currently integrated Dutch utility holdings. However, other parties will still be willing to invest as long as the expected returns are sufficiently high. In such a case, the risk of insufficient generation investment does not increase much.

## **6. CONCLUSION**

In this section, we compare the four policy options with each other. Table 6.1 depicts the trade-offs of Legal-Fat, Legal-Fat Plus and Ownership, using the current structure (Legal-Lean) as benchmark.

### *Legal-Fat*

One difference between the Legal-Lean structure and the Legal-Fat structure, is that the step towards the latter increases independency of network managers and raises transparency of all the different activities of the integrated firm, thus increasing both the effectiveness and efficiency of network regulation. These are clear benefits of this option for structuring the energy distribution industry.

Compared to the Legal-Lean structure, the Legal-Fat structure levels the playing field for all suppliers and may stimulate entry both in retail and in generation. In the case of retail, increased competition will merely redistribute wealth from retailers to consumers, rather than increase the level of wealth. In the longer run, increased competition between retailers may increase their efficiency, but given the cost share of retail in the end-user price of energy, welfare gains are likely to be modest. For generation, there is much more room for welfare increases. Therefore, a decrease in the scope for gaming in generation may increase welfare substantially. These benefits are (partly) achieved by applying the Legal-Fat structure, which is a stronger unbundling form than Legal-Lean.

Going from the Legal-Lean structure to the Legal-Fat structure also gives rise to costs. Making the network owner fat gives rise to one-off transition costs. Furthermore, due to the extended operational separation between network and supply, loss of economies of scope occurs.

Note, however, that DTe already treats network companies as economic owners of their assets, and takes the corresponding capital cost into account when setting prices for network services. Hence, moving the economic ownership of the assets to the network companies – i.e., a shift from ‘lean’ to ‘fat’ – seems to be a logic step, formalising this and giving the regulator a better view on the network companies’ costs.

**Table 6.1 Costs and benefits of unbundling: improvement/decrease in total welfare under the alternative policy options as compared to Legal-Lean**

	Legal-Fat (Legal unbundling with 'Fat' networks+ task allocation)	Legal-Fat Plus (Legal unbundling with 'Fat' networks+ task allocation+ extra rules on financing)	Full ownership unbundling
<b>Benefits</b>			
a. Performance of networks:			
- Better focus and more secure financing	Improvement	Larger Improvement	Even larger improvement
- Economies of scale	No change	No change	Depends on scenario
b. Effectiveness and efficiency of regulation	Improvement	Improvement	Larger improvement
c. Degree of competition:			
- retail	Small improvement with modest welfare effects	Small improvement with modest welfare effects	Small improvement with modest welfare effects
- generation	Improvement	Improvement	Larger Improvement
d. Benefits of privatisation	No change	No change	Improvement
<b>Costs</b>			
a. Transaction costs			
- Cross-border leases	Uncertainty, likely no effect	Uncertainty, but risk of large costs	Uncertainty, but risk of large costs
- Other costs	Welfare decrease	Welfare decrease	Larger welfare decrease
b. Loss of economies of scope:			
- Operational	Welfare decrease	Welfare decrease	Larger welfare decrease
- Financial	No change	No change	No change
c. Less investments in generation	No change	No change	Unlikely to change

*Legal-Fat Plus*

Compared to the Legal-Fat structure, the Legal-Fat Plus structure would mainly affect the independence of network financing. Note from the table that these options are very similar in terms of costs and benefits. In the Legal-Fat Plus option, the management of networks will have increased financial means, as the credit rating based on network assets is now fully available for the network itself. On the negative side, giving the network more financial independence imposes

some risk on old financial contracts of the holdings, such as CBL contracts. However, there is uncertainty regarding the latter effect.

### *Ownership*

The Ownership structure alters several categories of benefits and costs compared to the Legal-Fat structure. The entirely independent status following from full ownership unbundling will further improve the management of networks, as network firms will now no longer be compromising between the interests of the network and other activities. Furthermore, depending on the scenario with respect to regional transmission, full unbundling may facilitate horizontal mergers at the transmission level, which may give rise to economies of scale.

A further benefit of ownership unbundling is that it eases network regulation greatly, especially since the network firm no longer has an incentive to influence downstream competition. This implies that network regulation will become both more effective and more efficient.

Competition in retail or generation is further facilitated, as cross-subsidies are now fully impossible and the incentive for all forms of anti-competitive behaviour is taken away. Note that, as said before, welfare effects from competition in generation are likely to be larger than welfare effects from competition in retail. The net effect of entry and consolidation in the case of ownership unbundling depends on the current market structure. As discussed before, the Dutch supply market is already highly concentrated. It must be questioned whether ownership unbundling would result in further concentration due to consolidation. Other measures, notably directed at tackling mergers and concentration, would be needed to prevent this outcome.

A benefit which (under the current governance structure) can be achieved by ownership unbundling is the possibility to privatise commercial activities while keeping network firms in

public hands. If this option is highly valued, ownership unbundling seems to be the appropriate choice.<sup>21</sup> The increased transparency following from the unbundling attracts more focused shareholders for both parts of the firm, thus increasing the value of the firm to shareholders. Moreover, privatisation of the commercial activities increases shareholder pressure to raise efficiency.

The costs of the Ownership option, compared to the Legal-Fat Plus are an increase in the loss of economies of scope and higher transitional costs. Furthermore, investment in generation may be affected. The loss of economies of scope is fairly small, due to the regulations already in place in all of the options in the table. The order of magnitude of transitional costs mainly depends on the risk of dissolving the current CBL contracts of some companies. Regarding the generation investment, the effect is likely to be small and temporary.

#### *Final conclusion*

Mainly because of the uncertainty about the future role of small-scale generation and the uncertainty about the magnitude of the one-off transaction costs related to the cross-border leases, the net effect on welfare of ownership unbundling is ambiguous. Ownership unbundling is not the only option to realise some of the benefits mentioned above. By fierce regulatory surveillance and competition policy, competition in the retail market can be improved. Moreover, changing the corporate governance structure can give (public) shareholders the option to withdraw from risky, commercial activities. As in that case shareholders have information on the magnitude of the transaction costs they incur by unbundling a specific utility, voluntary unbundling will take place where it is efficient.

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<sup>21</sup> However, if shareholders would have more influence on decisions on the current distribution firms, as result of another governance structure, some firms would split voluntarily.

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