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The energy transition: Does ownership matter for realizing public interest objectives?

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Abstract
This paper explores the relationship between local public ownership and the sustainability mission of companies in the energy transition. Public ownership may matter due to "contractual incompleteness" where legislation and regulation fall short in dealing with market failures or addressing public interests. Ownership provides a measure of influence and control over the mission and strategy of a company, which is important considering the unanticipated consequences of the energy transition. The role of municipal ownership is underlined by the growing popularity of district heating and cooling systems and the impact of the energy transition on the urban environment.

Highlights
- It's impossible to anticipate and regulate all consequences of the energy transition
- Market failure may arise due contractual incompleteness
- Public ownership can align the objectives of energy companies with public interests
- Spatial impacts of the energy transition require shareholders with local interests

Keywords: energy transition, public ownership, incomplete contracts

JEL classification: D2,

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1. Introduction

The energy transition — the transition from the use of fossil fuels to sustainable energy sources, such as solar and wind energy — is a complex interplay of technical, economic and societal changes. It calls for innovative solutions for the generation, storage and use of sustainable energy, which require substantial investments and innovations. At the same time, short and long term uncertainties abound, for instance related to the economic and technological viability of the required inventions, the potential absorption for sustainable energy in the existing system, the impact on the (spatial) local environment, and the effect on the labor market. Because of the local effects and the growing importance of local energy governance (van der Schoor & Scholtens, 2015), decentralized governments will increasingly be called upon to facilitate and support the energy transition. In the light of these requirements, and in the context of the growing commercialization and internationalization of publicly owned utility corporations (Furlong, 2016), this paper considers whether the identity of owners of an energy company matters for its pursuit of a "green" strategy, and explores what this implies for situations where the privatization of energy companies is being considered.

The relevance of our research question is illustrated by the energy sector in the Netherlands. The Dutch 1998 Electricity Act initiated the liberalization of the electricity market (see e.g. Tanrisever *et al*., 2015). It increased the opportunities available to individual customers and suppliers for buying and selling electricity, while aiming to safeguard the reliability, sustainability and efficiency of the sector. The Act also led to the establishment of TenneT, the state-owned transmission system operator (TSO) of the high voltage grid. Just under a decade later, the Dutch government in 2006 introduced the Independent Grid Administration Act to implement a European directive (2003/54) that mandates a split between the infrastructure operations and commercial activities of generation, trade and sale of energy. In 2008 this led (at that time with one exception, which we'll raise below) to the unbundling of the medium and low-voltage transmission grids, and by doing so to the creation of several distribution system operators (DSOs). These changes caused the infrastructure used for the distribution of electricity to become separated from the rest of the supply chain, in particular from production and retailing, and thereby introducing competition into the latter markets.

The vertical separation also paved the way for privatization in production and retailing of energy. In 2009, as a follow-up to the unbundling of the supply chain, two of the three largest Dutch energy retail companies, Essent and Nuon (Willems & Mulder, 2016), were swiftly privatized and sold to RWE (Germany) and Vattenfall (Sweden), respectively. RWE and Vattenfall are major players in the international wholesale energy market. A third Dutch retail company, Eneco, which is still in public

hands but about to be privatized,[1] owns a relatively modest production capacity, and is substantially involved in sustainable energy projects. Its mission statement, "Everyone's sustainable energy", illustrates the firm's approach to the energy transition.[2] Eneco was unbundled in 2017, after it had contested a split for several years. The unbundling of Eneco prompted the 53 municipalities[3] that own the company to consider selling their shares.[4]

After a period of disagreement, conflict, and mediation on whether to privatize the company, the municipal shareholders and management board of Eneco published a joint statement announcing an intention to do so,[5] and at the end of 2018, the process of selling shares through a controlled auction had been initiated (at the time of writing this paper, it was still in progress).[6] This raised the interest of oil majors, which are under increasing pressure to switch to greener energy and contribute to climate change goals. International energy companies (cf. the acquisitions of Dutch energy companies by RWE and Vattenfall) as well as foreign private equity groups may also be interested.[7] An important element in the initial disagreement between Eneco's owners and board of management was the latter's fear that new owners would give priority to financial goals and put the ambition towards sustainable energy in jeopardy. The joint statement by shareholders and the management board, however, said that certain commitments and conditions will be imposed on the buyers in order for the sustainability strategy of Eneco to be maintained.[8] Indeed, after internal deliberations the choice for a controlled auction was made, implying that bids must satisfy certain conditions, so that current shareholders can assess potential buyers by giving some weight to criteria like (maintaining) the sustainability strategy and employment.[9]

[1] Situation as of January 2019.

[2] See https://www.enecogroup.com/who-we-are/mission-and-strategy/mission/ (accessed 13 Jan. 2019).

[3] Eneco's main shareholders are the municipalities of Rotterdam (32%), The Hague (17%) and Dordrecht (9%). The other municipalities' shares are smaller than 3.5%. See https://www.enecogroup.com/who-we-are/about-eneco-group/shareholders/ (accessed on 13 Jan. 2019).

[4] Before the restructuring of the company, the public shareholders were now allowed to sell their shares.

[5] "Dutch energy company Eneco to be privatized after boards, owners agree", Reuters 16 Feb. 2018, https://www.reuters.com/article/us-eneco-sale/dutch-energy-company-eneco-to-be-privatized-after-boards-owners-agree-idUSKCN1G01MO (accessed on 13 Jan. 2019).

[6] See https://news.enecogroup.com/start-sale-eneco-group/ (accessed 3 Feb. 2019).

[7] Potential contenders in the energy sector include Total and Engie (France), Centrica (UK), Verbund (Austria), and Mitsubishi (Japan). Investment companies that may be interested include CVC (UK), EQT (Sweden) and Macquarie (Australia). See "Eneco gewilde prooi in de energiewereld", *Het Financieele Dagblad*, 12 Jan. 2018.

[8] As reported by on Reuters 16 Feb. 2018 (see above).

[9] "Eneco's verkoop gaat om meer dan alleen de prijs", *Het Financieele Dagblad*, 20 Dec. 2018.

In the run-up to the preparation of the privatization, the municipalities holding shares argued that the relevant public interests (identified as security of supply, safety, sustainability and affordability) were safeguarded by national legislation and public support initiatives, public ownership in the infrastructure companies, and competition in production and delivery. In particular, the claim was made that the historical reasons for municipal shareholding no longer seem to apply to a company active in production and delivery of energy,[10] and that "reducing the shareholding does not result in a reduced guarantee of public interests."[11] However, the motivation for these claims was not connected to the challenges imposed by the energy transition, which put local considerations and local public policy back in the spotlight. By extension, a relevant question is what the consequences would be of a relinquishment of control on the company.

The privatization of Eneco provides a useful case study for a research question with general, international relevance. For instance, many cities in the US are reclaiming public ownership or control over private electric utilities in order to realize climate change goals (Welton, 2017). In the public discourse around the privatization of Eneco it was claimed that, to the extent that energy companies perform tasks and activities that serve the public interest, these interests are already safeguarded by national legislation and regulation, competition in the retail market, and government subsidies for investments in renewables production (Gemeente Rotterdam, 2017). In our view, however, the specific nature of the energy transition and supporting public policy measures should be taken more explicitly into account.

Furthermore, municipalities may have other motivations for privatization, such as generating revenue for alternative expenditures, possibly driven by political pressure. This creates a risk of government failure, in particular in the form of "internalities and private organizational goals" where (for instance) political decision makers try to optimize the benefits for their constituency groups (Wolf, 1993), as opposed to longer term objectives. Arguably, the highest bidders in a privatization process may be entities that have the strongest intentions to cut costs and maximize revenues for shareholder. Politicians may consider privatization as a means of expanding their budget. In the case of Eneco, a leading municipality's alderman had the intention to use the revenues for goals related to the energy transition as well as for a new metro line, education and public housing.[12] If budget expansion is a goal, politicians may therefore be less interested in selling the company to parties who put sustainability above a financial

[10] See chapter 5 in Aandeelhouderscommissie Eneco (2017).

[11] Aandeelhouderscommissie Eneco (2017), § 5.4.5, p. 25 (translated from Dutch).

[12] "Opgestapte Rotterdamse wethouder Visser: 'Het was een lelijk politiek spel'", *NRC Handelsblad* March 22, 2019, https://www.nrc.nl/nieuws/2019/03/22/de-meest-nette-bewoording-is-dat-ik-me-verbaasd-heb-a3953954 (accessed March 24, 2019).

rate of return. Or, equivalently, they would attach a lower weight to the identity of the new buyers. Of course, the current shareholders may add non-financial criteria in the assessment of potential buyers, but such conditions can be hard to specify in advance and enforce in the longer term.

This paper explores, in the light of the growing importance of decentralized public policy that facilitates investments in renewable energy, the relationship between local public ownership and the sustainability objectives of energy companies. At a general level, several market failures (which imply a potential rationale for public intervention) occur in relation to the energy transition.[13] First, there are external effects of the benefits of clean air and reduced climate impact (and by extension: there are public goods because of the inability to fully absorb the benefits of clean air and climate impact). The local impact may, for instance, materialize through urban air quality. Second, there are external effects caused by the spatial impact of energy generation, conversion and storage of renewables and necessary infrastructures. These effects pertain largely to the local level, as the necessary technologies and infrastructure imply a smaller reach and scale. Third, there are external effects caused by knowledge spillovers of green innovation, with a positive impact on employment in companies. This may disrupt the labor market in the energy sector which may have distributional consequences. Combined with the spatial impact of generation, it is likely that there will be a labor market impact at the regional and local levels. Fourth, there are increasing returns due to large-scale investments in generation, usage and matching of supply and demand (see OECD/IEA and IRENA, 2017), and also with regard to the need for specific infrastructure.

We are aware that the entrepreneurial spirit and financial resources with which government owned entities are able to deal with the large investment challenges of the energy transition is a matter of contention (see also the discussion on the impact of privatization in the next section). The perspective adopted in this paper relates to recent calls for a nuanced and expanded notion of public involvement.[14] In light of the market failures described above, we deliberate and specify potential reasons for public ownership and local involvement. We argue that ownership matters, and that it may be prudent for local governments to maintain a formal say in an energy company. The core of our argument relies on the theory of incomplete contracts, which presumes that contracts — or more broadly, rules and regulations — cannot fully specify a course of action for every possible contingency (see e.g. Maskin, 2002; Hart, 2003). In unforeseen situations, the owner has the "residual right of control" to make decisions when contracts (or any formal arrangements) fall short. This may include the right to determine the company's

[13] For a general classification of market failures, see for instance Wolf (1993).

[14] See for example Mazzucato (2015), and, specifically with regard to efforts to decarbonize the power sector in the United States, Boyd (2014).

mission and define the corporate strategy to implement it (Speckbacher, 2008). In situations with non-contractible public objectives such control rights may be highly relevant.

2. Conceptual issues explored in the literature

This section briefly discusses relevant findings and insights from selected strands in the literature, on which we build to develop out argument. To start, it is worthwhile to look at studies into outcomes of privatization. Studies that have investigated the outcome of privatization in the energy sector reveal mixed results. The efficiency and effectiveness of public entities are often drawn into question, but there is also evidence that private ownership is not necessarily superior to public (government) ownership. A remarkable finding is that in the 15 largest EU member states over nearly three decades, public ownership goes together with lower consumer electricity prices[15] (Fiorio & Florio, 2013). Noting the investment requirements for long-term R&D in renewable energies, there is evidence of dramatically declining investments in R&D associated with the energy sector (Sterlacchini, 2012). In particular, the recent R&D performance of major electricity providers worldwide show that privately-owned companies have strongly lowered their R&D efforts, while this is not the case for companies under public control. This suggests that privatization – and per definition ownership by new shareholders – may be in conflict with the investment challenge of the energy transition. Furthermore, empirical studies focusing on the energy sector in the US have shown that while privately owned producers are often able to achieve lower energy generation costs, public enterprises are better at achieving non-contractible objectives associated with energy distribution (Kwoka, 2005): the presence of large and informed buyers provides a measure of assurance and quality. The experience however differs in local retail markets that provide electricity to numerous small customers. In these instances, the criteria for service and reliability are more difficult to specify, causing local control and a commitment to quality to play a greater role. In the case of local producers, it therefore helps if shareholding is tied more closely to customers.

The general empirical findings on privatization pertain to a divergence of private and public (collective) interests. More specifically, in a context of radical uncertainties on technological change, Bance (2015) argues that because of the uncertain, potential immeasurable impacts of climate change, public authorities should adopt policies that allow them to exert a high degree of control. The action of public enterprises can, by internalizing missions in the public interest, help to overcome the lack of private investment in activities with high technological uncertainty and a risky return on investment. This argument is based on transaction-costs theory, in which strategic (opportunistic) behavior by parties outside of one's control has to be taken into account. It fits into the current debate on the role of public

[15] Net of tax.

enterprises regarding their ability to contribute to economic policies and sustainable development (Bance & Obermann, 2015).

A special issue of this journal explored what distinguishes publicly owned corporations from their private counterparts (Furlong, 2016). One of the contributions (Clifton *et al*., 2016) provides an ideal-type stylized framework of five core dimensions of the expected behavior from public and private shareholders. In the financial dimension, for instance, the profit motivation of a public shareholder will be tempered by key public and social objectives, while a private shareholder is predominantly motivated by short-term profits, financial costs and benefits, which may come at the cost of accountability and transparency. In the technical dimension, a public shareholder will have a long-term aim of optimal resource allocation (e.g. through innovation), while for a private shareholder, technical efficiency is subjected to profitability. Privatizing a company that is responsible for a public task — also if the buyer is a public, but foreign, company — is therefore likely to have consequences for the way in which it carries out its tasks (we will come back in more detail to the authors' findings in section 5).

According to Glac (2014), in a historical overview of ways in which shareholders have influenced corporate social responsibility over the past seventy years, shareholders can range from narrow-minded profit-maximizers demanding that managers ignore calls for social responsibility, to shareholders who submit social proposals to annual shareholder meetings and work together with management to pursue social goals. These attitudes of shareholders may impact on the prioritization of different objectives. One could argue, though, that policy makers who want companies to act responsibly — even if this comes at the cost of shareholder value — can force them to do so by enforcing legislation and regulation that support the social purpose. However, as will be discussed in more detail later, ownership provides control rights that are relevant outside of the scope of contracts or regulation, as they may pertain to issues that cannot be foreseen or specified in writing. In such situations, shareholders may exercise these rights in order to influence the interpretation of the mission or the execution of the strategy of a company. Therefore, the corporate governance of a firm — that is, the owners' exercise of authority, direction, and control — affects the realization of a company's mission (Speckbacher, 2003).

Various papers have explored the local nature of the energy market and its policy context. As Chittum and Østergaard (2014) discuss in the context of (the success story of) district heating in Denmark, local actors make the majority of the decisions that affect the local heat system, and because the national government has refrained from making rigid prescriptions, "local actors have a true sense of agency" (p. 471). Moreover, Danish heating companies are local entities that closely cooperate with municipalities. Ownership may be in the hands of consumers, municipalities, housing authorities, or commercial companies, but are controlled by consumers and not allowed to make profits (Chittum and Østergaard, 2014). In other European countries, with the UK as a prime example, liberalization and privatization

have reduced municipal control over the provision of energy, reducing the effectiveness of governance of urban energy systems (Hawkey *et al*., 2013). As a counterpoint, in a case study of the energy transition in regional contexts within Germany, Gailing and Röhring (2016) found that many local stakeholders felt overlooked when companies external to the region could invest in renewable energy, suggesting a role for regional empowerment. In a study of legal challenges to planning decisions regarding wind energy in the UK, Fisher (2018) relates the planning system to the absorption of small-scale renewable energy technologies into existing urban and rural landscapes.

In what follows, we provide a deeper layer of understanding to the findings discussed above, based on the theory of incomplete contracts and within the context of localness and severe uncertainty related to the energy transition.

3. The impact of the energy transition

As an intermediary step towards a discussion on ownership, we elaborate on some relevant features of the energy transition. Innovation in generation and storage of energy leads to major changes in the value chain. Traditionally, it consisted of a series of (largely sequential) activities, including exploration of primary fuels, large-scale energy generation, trade, transmission, distribution and sales to end-users. The energy transition upsets the linear nature of this chain. Large-scale energy generation of renewable energy remains relevant at the beginning of the value chain, but further down there is now value creation through decentralized generation and storage. For instance, the development of gas-free neighborhoods, where an electricity network (if necessary, in combination with decentralized heating and cooling (DHC)) is sufficient for the supply of heat, creates new challenges. Also, a growing number of local collectives focus on generating and saving energy and on the collective purchasing of energy and solar panels. Although still modest in size, there is an increasing number of cooperatives developing collective sun and wind projects (ECN, 2016). At the same time, society expects that the energy system and infrastructure remain capable of absorbing fluctuations associated with changes in the weather and variations in transport flows. They do this, for example, through intelligent demand management, supply flexibility, combining (photovoltaic) solar energy with heat pumps, and the development of energy-autonomous areas (Burger, 2016).

Decentralized energy generation and storage makes different demands on infrastructure and spatial planning (in particular regarding spatial integration of installations), causing the energy transition to have major consequences for the urban environment (van Hoorn & Matthijsen, 2013). For example, the number of wind turbines and solar panels are increasing, and installations for transport, conversion and storage of renewable energy (bio, wind and solar energy and ambient heat) also take up space. Solar

energy and ambient heat make different demands on the urban environment and, as in the case of solar parks, may require changes in the design of wastelands. Some options for energy saving also have a spatial impact, such as the use of residual heat in the urban environment, or the reduction of heat consumption in and CO_2 delivery to greenhouse horticulture. The above creates a need for the construction of new infrastructure for DHC and CO_2 delivery. This spatial impact occurs in particular at the local level. Similar observations can be made regarding mobility (if only due to speed reductions on motorways) as well as the labor market, where, in 2020, an estimated 43 per cent of energy-related employment will be driven by renewable energy and energy savings (ECN, 2016).

Local spatial impacts are also affected by the introduction of national energy policy legislation, in particular as renewable energy resource endowments vary between regions. States with poor resource endowments may find it more difficult to meet national standards, and states that have lagged behind will have to “play a potentially expensive game of catch-up” (p. 287) to initiate renewable energy development (Carley, 2011). The energy transition therefore means that governance at municipal and other subnational levels will continue to play an increasing important role (Schönberger & Reiche, 2016). Dütschke and Wesche (2018) go so far as to as to say that the energy transition, as a transnational process, manifests by disrupting at the community level by leading to new functionalities and system change. Bolton and Foxon (2013) emphasize similar trends but caution that “as we move towards more decentralised energy systems, with cities potentially playing a more prominent role in the transition process, conflicts and tensions between actors and institutions embedded at different scales of the energy system are likely to emerge" (p. 2207).

These local impacts underline the importance of coherent public policy, as well as socio-political acceptance and support among citizens for the energy transition (see e.g. Wüstenhagen *et al*. 2007). From the outset, for example, spatial integration must be taken into account (Coutard & Rutherford, 2010) and needs to be reflected in procedures, local spatial plans and efforts to encourage involvement and support. The spatial consequences of modifications in generation and infrastructure play at multiple levels, each with their own stakeholders: Europe and higher (e.g. interconnection); national and international (high-voltage network, gas pipelines, fuel flows); regional (heat grids, CO_2 grids); and locally (cables and pipelines in buildings and the built environment) (van Hoorn & Matthijsen, 2013). Policy coordination is required among all of these levels (Strachan *et al*., 2015; Hawkey, 2012, in the context of district heating in the UK).

Local governance is of particular relevance to DHC systems, which is quickly gaining importance in the energy transition. DHC requires investments in infrastructure, which gives rise to questions concerning the regulation and identity of the network operators (e.g. DSOs versus other companies). In Scandinavian countries such as Denmark, DHC systems were, in general, developed by municipalities,

most commonly through municipally owned energy companies, through an integrated approach to urban infrastructure development (see e.g. Hawkey *et al*., 2013; Chittum & Østergaard, 2014). Di Lucia and Ericsson (2014) consider district heating in Sweden, and state that companies offering DHC could "act more freely and with less political control" after they were transformed into municipally owned companies. As argued by Bolton and Foxon (2013), based on experience with combined heat and power with district heating in the UK, regulation needs to move away from the primordial focus on markets, and design a governance system that empowers local actors (see also Hawkey, 2012). The Danish experience informs us that DHC systems have a strong potential to reduce emissions but require "hyper-local energy analysis and benefit from local design" (Chittum & Østergaard, 2014, p. 473).

Summarizing, there is a trend towards decentralized generation and storage, calling for public policies and planning that coordinate and facilitate the required investments in the light of the local, physical environment. Therefore, local governance and public policy can be expected to become increasingly important to safeguard facilitating conditions at the local level.

4. Contractual incompleteness of public objectives

The presence of market failures, as discussed in the introduction, may form a rationale for government to determine the framework and rules to ensure that market players act in the public interest. A sector-specific regulator, for example, monitors the efficient implementation of investments by network operators and the tariffs for energy distribution. In contrast, competition in generation and supply should discipline commercial providers and provide the necessary incentives to innovate. Thus, in a stable market situation, legislation (to determine the structure of the market and stimulate, where possible, competition) and regulation (to constrain behavior by market players) should be sufficient to make sure that the market functions well and public interests are safeguarded.

The energy transition, however, places the current system under stress (Edens, 2017). Given the drastic overhaul of the sector, the need for public policy at various levels, and uncertain and large consequences, it is no longer certain whether competition and regulation can be counted upon to support the necessary adaptations of the system and the public interests that are at stake.

The unanticipated consequences of new technology, its adoption, and impact on society may be especially large in situations that are characterized by drastic or uncertain changes in technology (Healy, 2005; Marchant, 2014; Bance, 2015). For instance, the ambitious European emission targets require a wide range of technologies that are not yet fully developed (Ros, 2015). The required innovation is therefore difficult to specify in advance and its social impact unpredictable (Marchant, 2014). There are

many uncertainties associated with the efficiency potential of renewables (e.g. biomass, wind, solar and soil heat). While the viability of new technologies is gradually improving, the absorption of more renewable energy requires a substantial increase in the flexibility of the system to match supply and demand and distribute energy. This change constitutes a complex transition that requires adjustment and coordination across various geographical levels, ranging from international to local. The policy implications are, at present, barely visible.

The technological complexity associated with the energy transition is not the only source of uncertainty: how regulators respond can also create apprehension in the minds of potential investors. Fabrizio (2012) considers how investment in renewable generation assets in the US electricity industry are influenced by regulatory uncertainty. He finds that in states where legislation to restructure the electricity industry has either been passed or repealed there has been less investment in new assets, concluding that "firms may be unwilling to invest in assets that are long-lived and location- and policy-specific in an environment with significant regulatory uncertainty" (p. 790-791). If the government is involved as a shareholder, some of the policy uncertainty may be resolved and investment more closely aligned with policy objectives.

The presence of substantial unforeseeable contingencies of the energy transition makes it difficult to make binding agreements with market parties on, for instance, the nature and timing of the necessary investments and innovations, and the contributions they make to sustainability goals. The digitalization of the energy network underlines this uncertainty, leading to increased vulnerabilities with a growing societal impact (Council for the Environment and Infrastructure, 2018). The economic theory of incomplete contracts posits that ownership matters, and may be especially relevant for the uncertainty introduced by the energy transition: when it is impossible to foresee all relevant contingencies, the owner of a company has the ability to make decisions concerning the company that are outside the scope of the initial "contract" (Hart, 2003; Maskin, 2002), or more broadly, not covered by formal agreements, legislation and regulation (Hart *et al*., 1997). In other words, an owner has the residual control rights to decide on the use of assets in unforeseen situations that are not covered by previously established governance rules or contract terms. Privatization implies delegation of residual control to the private owners of the company.

Contractual incompleteness may have important implications for efficiency, or more generally, the overall value (or surplus) generated in markets or transactions. For instance, private (for-profit) firms may try to reduce costs in dimensions (e.g. certain aspects of quality) that cannot be covered by formal agreements. If this dimension is of particular importance for customers, then such efforts to increase cost efficiency are inefficient from a welfare perspective (see Francois, 2000, who investigates this issue in the context of public service provision). More generally, if contractual incompleteness plays a role in

the safeguarding of certain public interests, high-powered incentives that aim at one-dimensional (typically quantifiable) goals like financial returns, may put too much weight on cost efficiency or profit maximization, and undermine more elusive goals that benefit society as a whole (Boot, 2006). As an example, suppose that an energy company is owned by an investor who gives priority to short-term financial returns. In that case, incentives to cut costs can be expected to gain the upper hand over public objectives that are difficult to ensure through legislation and regulation. Profitability and cost efficiency then prevail over the societal returns and the safeguarding of public interests.

The contrary scenario may also occur: even with owners (investors) who are committed to achieving the objectives of the energy transition, agency problems can come in the way. Lozano and Reid (2018) consider the role that investors have in moving firms towards a more sustainable energy generation mix. Through interviews with five asset managers, they find that utility companies may not always be receptive to the idea of changing their generation models, and investors (as principals) therefore have a critical role to play. The large investments that are required to establish new generation models and to fund the innovation associated with the energy transition, call for active principals to drive the process in utility companies who may be slow to do so on their own accord. Investors therefore have an important role to play in communicating to energy generation companies that maximizing shareholder value through financial returns should not be the sole objective function.

Note also that privatization implies a transfer of residual control to a private provider. As argued by Ellman (2016), while this may increase cost efficiency, it may reduce the accountability and responsiveness of a government to public concerns. As a consequence, privatization introduces a dependency on the private company (or its private owners) in case of an unanticipated need for adaptations affecting public interest objectives. This, in turn, may make the government less wiling to evaluate public demands, as doing so could lead to costly renegotiation for which constituents will have to pay the bill.[16]

The following section delineates the potential consequences of the contractual incompleteness of public objectives for the ownership of energy companies.

[16] Ellman (2006) develops a theoretical model of incomplete contracts in which these effects can occur.

5. Result: ownership is relevant

Based on the arguments in the previous sections, it follows that ownership of a company playing a major role in the public sphere matters, in particular in situations in which public objectives are non-contractible. An ownership stake gives the government more (that is, residual) control and may strengthen its accountability regarding public concerns. Still, one should weigh this against an increased chance of government failures, so that public ownership is not automatically superior. Examples of government failures include political opportunism, soft budget constraints and unintended side effects (Wolf, 1993). In particular, private ownership typically allows for more financial discipline (due to stronger cost-cutting incentives) and a sharper focus on the rate of return. It may also shield governments (and constituents) from large financial risks. Hence, when appropriately incentivized and regulated (or exposed to competition), in many cases private companies may be able to satisfy public objectives, or to carry the risks associated with big investments. To adequately assess this tradeoff, one should make precise why it makes sense to maintain residual control, and at what cost. In this comparison, the increased control from public ownership should provide a government with a relevant means to (for instance) influence the mission of a company or block initiatives that may conflict with public objectives, in particular where rules and regulations are likely to fall short.

As discussed in the previous sections, this tradeoff is particularly relevant in the light of the energy transition. For energy companies, the informal influence and formal control that shareholders have may facilitate a strategy aimed at sustainability and corporate responsibility, and — depending on what shareholders are aiming at — it might also lead to the dilution of such a mission.[17] Indeed, privatization may make a government, in this case a municipality, less accountable and less responsive to public concerns regarding the energy transition. The intention and goals pursued by shareholders (see e.g. Glac, 2014) are therefore relevant for the fulfillment of a green strategy and for the public objectives related to the energy transition.

Related to this observation, Clifton *et al*. (2016), based on their framework to distinguish the expected behavior from public and private shareholders (discussed in section 2), analyze the internationalization activities of two large public utilities, Vattenfall in Sweden and Endesa in Spain, that have strongly respectively weakly entrenched public values. They find that not only did Endesa give unambiguous priority to financial expansion, but also that Vattenfall, in its international ventures, was ultimately driven by profits. A general lesson from these case studies is that a more distant or remote owner —

[17] As remarked by Bartkus and Glassman (2008), shareholders tend to be the primary group of stakeholders to be satisfied.

even if it fosters public values — cannot be expected to prioritize location-based needs elsewhere. It is more likely that its priority is to maximize profits in its cross-border activities.

Dutch examples in which the non-infrastructure energy activities were privatized are the former public utilities Nuon (now known as Vattenfall Benelux, which was acquired by state-owned energy company Vattenfall in Sweden), and Essent, sold to state-owned RWE in Germany (currently RWE's spinoff called *innogy*). The general impression in the public debate seems to be that these takeovers were not successful.[18] The acquisition of Nuon led to a political controversy, due to the financial burden that the deal later implied for the Vattenfall energy conglomerate.[19] The purchase did not meet the state's profit requirements: Nuon was bought for SEK 89 billion and, at a later stage had to depreciate its value by SEK 15 billion. The pressure abroad is likely to reduce Vattenfall's priority to invest in the energy transition in the Netherlands, in particular as the public shareholder based in Sweden has little stake in achieving Dutch public goals. Similar observations can be made for Essent and RWE: the German owner cannot be expected to give priority to Dutch investments if the German energy industry is struggling with uncertainty on the demand side, the supply side and in terms of regulatory framework.[20] These observations are supported by Darmani *et al*. (2016) in a longitudinal case study of Vattenfall, which empirically confirms that in the energy industry — in which national circumstances and institutions are highly important — multinationals give priority to their core global strategy, often at the expense of local institutional considerations.

In the examples above, the acquiring multinationals are energy companies that can at least be expected to have the intention (to a greater or lesser extent than national objectives) to contribute to the energy transition. The situation could have been different (presumably, worse) if the new owners were private equity firms with short-term financial targets and no interest in the energy transition. Shareholders that pursue such goals may try to look for cost reductions, and cut down on investments that fall outside of the scope of prevailing requirements imposed by national and regional governments.

Figure 1 summarizes the choice between public and private ownership, highlighting the tradeoff between the dimensions of contractual incompleteness, the local/spatial impact of the energy transition and the importance of financial considerations.

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[18] "Bij elke Eneco-koper valt een kanttekening te plaatsen", *Het Financieele Dagblad*, 20 June 2019.

[19] "Anders Borg: The government is not liable for the Vattenfall-Nuon affair", Sveriges Radio, Feb. 14, 2013; https://sverigesradio.se/sida/artikel.aspx?programid=2054&artikel=5444084 (retrieved October 16, 2018).

[20] "Vattenfall writes down $4.6 billion in ailing energy market", Reuters, July 23, 2013; https://uk.reuters.com/article/uk-vattenfall-earnings/vattenfall-writes-down-4-6-billion-in-ailing-energy-market-idUKBRE96M0LJ20130723 (retrieved Oct. 16, 2018).

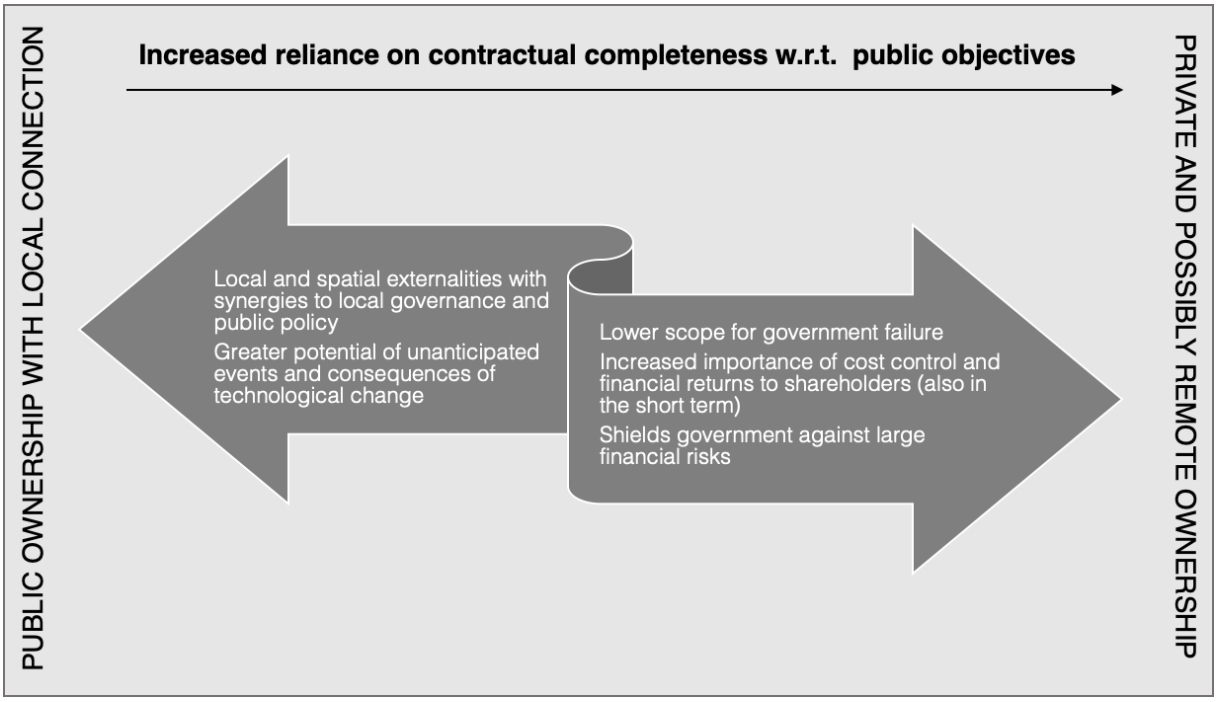

Fig. 1. Trade-offs in the sustainability mission of energy companies

6. Discussion

Interestingly, the Dutch Electricity Act 1998 illustrates the importance of control in the light of (non-contractual) public interests related to energy supply. In particular, Article 86f obliges energy producers, who are sufficiently large in terms of electric power, to report changes in control to the Minister of Economic Affairs. The Minister may, as a safety net, impose conditions pertaining to the security of supply, or even prohibit a change in control. The Explanatory Memorandum accompanying the Act shows that the underlying assessment relates to the financial reliability and management of the company.[21] This allows the government to exert influence over undesirable takeovers; apparently it is impossible to specify in advance the conditions that could safeguard public interests independent of the identity and nature of shareholders. This control however does not accommodate the remaining contractual incompleteness specifically associated with the uncertain environment created by the energy transition. To consider this further, this section provides a view on the identity of owners in the privatization of energy companies that will allow a "green" strategy to be pursued.

[21] Kamerstuk 32 814, "Wijziging van de Elektriciteitswet 1998 en van de Gaswet (implementatie van richtlijnen en verordeningen op het gebied van elektriciteit en gas)".

Due to the fundamental uncertainties associated with the energy transition, we make the case that public authorities should carefully consider the identity of potential shareholders before transferring ownership to owners who might pursue objectives of a different nature. Sustainable business strategies with a local and spatial dimension require stable and involved shareholders, who ideally also support public interest objectives at local levels, or who in the least do not increase uncertainty. Accordingly, three factors should characterize the "signature" of shareholders in an energy company. First, shareholders should have a long-term perspective to allow for the continuation and stability in their business strategy. Second, to prevent the sole pursuit of maximizing financial returns in the short term, they should be invested in wanting to pursue sustainability goals. Third, they should have some geographic connection to the region in which the externalities of their activities occur. This reduces the risk that they lose sight of (local) public interest objectives in the face of more pressing demands elsewhere (such as in the home country).

Let us return to the case of the intended privatization of the Dutch energy company, Eneco. As discussed in the Introduction, the municipalities holding shares in Eneco argued, without taking into account the impact and requirements of the energy transition, that the historical reasons for municipal shareholding was no longer relevant, and that privatization would not affect the safeguarding of public interests. While it is beyond the scope of this paper to determine whether or not energy companies should be privatized, our proposition is that one cannot simply claim that legislation and regulation (in particular at the national level) is able to address all public concerns. The importance of maintaining a formal say through a share in ownership should not be dismissed. Privatization requires careful consideration of potential shareholders' views on non-contractible public interest objectives. It also calls for clarity about how the company mission is executed. The identity of shareholders therefore plays an important role, in particular because it is difficult to capture all uncertainties and externalities associated with the energy transition in the rules and statutes of an energy company. While guarantees or promises for investments in R&D may be included in a shareholder contract to help achieve public interest objectives, these are only effective in the short term: by definition and their very nature, such conditions cannot be used to achieve non-contractible public interest objectives or to establish long-term commitment.

There is also a pragmatic reason why complete privatization should be approached with caution. It is difficult to reverse a process of privatization one it has taken effect, and it harms the investment climate if an energy company vacillates between the market and government intervention. Furthermore, trying to repair the undesired consequences of relinquishing formal control later on may be ineffective, and also creates additional uncertainty for investors.

7. Conclusion

Over the last couple of years, commentators and experts in the energy transition have increased their call for coordination and direction. Recent developments illustrate that capacity adjustments and spatial incorporation of infrastructure are quickly becoming major bottlenecks in the energy transition process. These bottlenecks, caused by supply diversification, lead to more complexity energy planning and distribution. Although primarily a problem for infrastructure providers, coordination with producers as well as local authorities can substantially simplify it. When municipalities give up their stakes and control in local utilities, there is less scope for alignment of goals and incentives across the value chain.[22]

The energy transition gives rise to technological developments that are hard to foresee, with consequences (like energy efficiency of renewables, market adoption and commercial viability) that still have to materialize. This makes public intervention to elicit the "right" direction and level of investments by the energy sector inherently difficult to implement. Unanticipated obstacles will inevitably appear, and once they do, governments may very well wish that they still have some influence (residual control rights) on the situation at hand to allow coordination among stakeholders and choose a direction from a public interest perspective.

We argue that (i) ownership matters because the involvement of an owner may support or undermine goals related to sustainability; (ii) if there is a shortfall of the regulatory grip on certain public goals, it is worthwhile to consider a degree of public ownership to support the mission and strategy of a company pursuing a green strategy; and (iii) local ownership is relevant in the light of the increasing local and spatial impact of energy generation and storage, as well as the emergence of district heating and cooling. Accordingly, if public policy at the local level gains relevancy, then it may be prudent for a municipality to maintain some ownership in order to keep a formal say in a company that plays a key role in the energy transition.

[22] A similar observation applies with regard to complementary developments, such as the possibility to use residual heat from data centers for city heating (requiring policy coordination regarding spatial planning, the energy transition, and economic goals) or the transformation of waste into energy (requiring policy coordination regarding waste collection and the energy transition).

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