# Energy Governance, Suppliers and Demand Side Management


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### Abstract

This paper examines the policies, regulations, rules and incentives governing gas and electricity suppliers in Great Britain (GB) from the perspective of how far these have served to facilitate or prevent a shift towards a more sustainable energy system. The precise context is the desirability of a fundamental shift in the underlying design of the energy system from the supply to the demand side. This paper focuses just on the governance of gas and electricity suppliers, defined as incumbents or independents, in order to explore in detail how their practices enable or constrain greater demand management and how these outcomes relate to energy governance. Energy governance is, in turn, defined broadly as including policies, regulations and rules aimed at incentivising greater demand management as well as those aimed at delivering other public objectives (such as supply security). Indeed as a complex whole energy governance must in effect balance the desire for climate mitigation (and energy transition) with supply security and also with affordability. Examining energy governance as a whole, rather than focusing just on demand policies, has revealed the *variety* of corporate practices that it allows and rewards: vertical integration; incumbent business models driven by volume and scale; barriers to entry and expansion for independents; innovations in trading and cost cutting that outweigh those in demand management; poor customer service and higher prices per unit charged to vulnerable (often legacy) customers. Incumbent suppliers, due to their recent dominance of the market place, are presented here as having been important for how demand management has developed so far in the UK - both in terms of their central role within the overall utility system, as the primary interface with customers, but also in terms of their direct responsibilities for implementing energy efficiency policy. These roles are, in turn, all the more important given the need for customer trust and active engagement with energy services within successful demand management and sustainable transitions. Some independent suppliers, on the other hand, are presented as offering new value propositions and motivations that are more in line with demand management and climate mitigation more broadly. On balance energy governance is understood to have done too little to challenge traditional utility business models, to enable more innovative market entrants or to enable greater demand management in the UK.



**Keywords:** demand management, energy governance (policy objectives, instruments, regulations and rules), incumbent suppliers, independent suppliers, innovation



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## GLOSSARY of Terms:

| | |
|---|---|
| BETTA | British Electricity Trading and Transmission Arrangements |
| BM | Balancing Mechanism |
| BSC | Balancing and Settlement Code |
| BSUoS | Balancing Services Use of System |
| CESP | Community Energy Savings Programme |
| CfDs | Contracts for Difference |
| CM | GB Capacity Market |
| CMA | Competition and Markets Authority |
| CSE | Centre for Sustainable Energy |

| | |
|---|---|
| CUSC | Connection and Use of System Code |
| DCUSA | Distribution Connection and Use of System Agreement |
| DUoS | Distribution Use of System |
| EBIT | Earnings before interest and tax |
| ECO | Energy Company Obligation |
| EPS | Earnings per share |
| EUCo | Energy utility company (business model) |
| D3 | Demand reduction; demand side response; distributed energy |
| DCUSA | Distribution Connection and Use of System Agreement |
| DE | Distributed energy |
| DR | Demand reduction |
| DSR | Demand side response |
| DECC | Department of Energy and Climate Change |
| FCF | Free cash flow |
| GLA | Greater London Authority |
| kWh | Kilowatt hour |
| LAs | Local authorities |
| M&A | Merger and acquisition |
| MMC | Monopolies and Mergers Commission |
| MW | Mega watt |
| NETA | New Electricity Trading Arrangements |
| NGTA | New Gas Trading Arrangements |
| NTBMs | Non-traditional business models |
| P&L | Profit and loss account |
| RECs | Regional electricity companies |
| RMR | Retail Market Review |
| SEC | Smart Energy Code |
| SLC | Standard Licence Condition |
| SO | System Operator |
| SPAA | Supply Point Administration Agreement |
| SSE | Scottish and Southern Electricity |
| TNUoS | Transmission Network Use of System |
| ToU | Time-of-use |
| TWh | Terawatt hour |
| UNC | Uniform Network Code |
| VI | Vertical integration |

## Executive Summary

This paper takes energy governance as one important variable in explaining practices and outcomes in energy markets given that government decisions have, over the years, structured energy markets and influenced how energy companies have operated within those markets. One assumption is that governance, if conducted correctly, can enable greater demand management in the UK through providing environments conducive to new and better (more innovative) business models. This clearly also assumes that energy companies, public and private/large and small, can under these circumstances play an active role in facilitating climate mitigation (see GreenBiz 2015). This paper assess, in some detail, whether this has indeed been the case in the UK. This is achieved by analysing a wide variety of energy policies, rules and regulations, how they structure markets and incentivise and/or deter certain industry practices, and how they enable or constrain demand innovations. It concludes that energy governance has been sending very mixed signals to industry actors as policies, regulations and rules, designed to achieve different outcomes, have been layered up, without sufficient coordination, over time. The effect of some demand management policies has been drowned out by other rules and regulations not designed with sustainability in mind. Taken as a whole policy and regulatory incentives and mandates have not yet stimulated incumbents to significantly include demand management within their ongoing practices, nor has there yet been an adequately enabling environment for new, more innovative, market entrants.

Some key takeaway points (also highlighted in each main section in the text) are:

- Demand management, and sustainable energy system transformation, is happening in other countries and governance has had a positive role to play (see Vanamali 2015). What this has caused, however, is challenges for large utility companies and a spate of related company restructuring announcements (see RWE, E.ON and ENEL). The governance environment for large UK utilities has, however, been more favourable to traditional, large-scale, supply oriented, utility business models (and oil and gas production). This has meant less and/or slower transformation in energy systems and less competition from new innovations in the UK.
- Suppliers, as a whole, are understood to be important to demand management (defined to include demand reduction; demand side response and distributed energy) for a number of reasons. Suppliers, under the supplier hub model, are the interface between consumers (who are important to demand management but who are also voters and lobbyists) and the gas and electricity systems. Suppliers, in this case only large companies, have also been responsible for how domestic efficiency policy has been implemented. Lastly, new and innovative suppliers offer alternatives to consumers in terms of localising supply, of affordability and of opportunities to prosume. They can also be motivated by different

values, often specifically including sustainability, demand management, and facilitating clean and/or distributed energy.

- This paper defines gas and electricity suppliers in terms of incumbents and independents. As a result of how privatisation was conducted in the UK (including allowing vertical integration) incumbent suppliers have become integral parts of much larger (often multinational) utility conglomerates. The analysis of their practices here is sensitive to this fact – suppliers are not masters of their own profits nor of their own corporate strategies in that they must comply with parent company aspirations and interests.
- Independent suppliers to the extent that they follow sustainably innovative business models and to the extent that they can successfully place downward pressure on prices are understood here to represent possibility for innovation. For example some independent suppliers can facilitate greater customer activity/demand reduction/demand side response; more nuanced customer relationships and information sharing; prosumer activities; demand aggregation; new contracts for local authorities; and dedicated markets for renewable energy production.
- Applying a broad definition of energy governance, and by not restricting the analysis to demand and/or efficiency policy and regulations in isolation, has allowed us to analyse more inclusively multiple ways which energy companies are mandated and incentivised. This provides a hugely complex picture of uncoordinated energy policies and regulations but does reveal how mixed energy governance signals are. It also helps us to understand that demand and efficiency policies do not operate, in practice, within any sort of governance vacuum. Indeed we feel (unlike the CMA) that it is important to assess all obstacles to independent market entry and expansion as it is the *combined effect* of such obstacles that companies seeking to innovate and grow actually face.
- Lastly, this paper offers a critical insight into how the costs and benefits of energy governance and industry practices are distributed. This points (amongst other things) to financial benefits (profit) not reinvested in UK energy system transformation but distributed instead to parent companies/shareholders; sticky (vulnerable) domestic and SME consumers paying more than necessary; cost reductions whilst incumbent supplier customer satisfaction remains poor; and an increasingly tricky politics of energy and climate change as consumers remain sensitive to price increases and poor service.

This overview of the many ways in which energy governance interacts to shape corporate practices in UK can be seen as one way of explaining not only that there are problems but that, due to the inter-related and complex nature of energy governance, governance changes made should be profound. IGov has already opened up a debate about the need for entirely new, flexible, transparent, legitimate and coordinated governance structures in order to better enable sustainable innovation and leaning by doing (for details see Mitchell et al 2015). Also included in

this working paper are recommendations for an overhaul of supplier licences and statutory codes (not least to overtly recognise the need for sustainable practices in energy industries); the inclusion of climate mitigation across all energy market policies, regulations and rules; a requirement for suppliers to treat vulnerable consumers fairly; to consider the *combined* effects of barriers to entry and expansion on independent suppliers and level out the playing field; to conduct an in depth analysis of how energy policies and regulations relate to one another in practice – not least in terms of reducing the mixed nature of signals sent to industry actors.

The UK government should not be afraid to create new markets; to challenge utilities that stand in the way of progressive change and who do not treat customers fairly (or indeed with much respect) and to recognise in policy practice the possibilities for change presented by the broad range of innovative independents that have been trying to offer improved energy services to UK consumers for some time now. Given that government thinking on energy has largely emphasised the role of markets in delivering public policy objectives, and of delegating responsibility, then a refocus on innovative new companies allows for some continuation of markets playing a strong role in change. The difference being, however, that government will need to start listening to a new range of corporates (small not large). Furthermore, in order to enable continual innovation and change during the process of transformation governance will need to be much more flexible, to emphasise sustainability across all energy governance and (frankly) brave.

# 1. Introduction: Demand Measures and Energy Markets

This paper examines the policies, regulations, rules and incentives that govern gas and electricity suppliers in Great Britain (GB) from the perspective of how far these have facilitated, or constrained, a shift towards a more sustainable energy system with lower and more flexible demand. The precise context for the paper is the need for a fundamental shift in the underlying design of the energy system from the supply side to the demand side and a refocus on how to match demand with available supply (Warren 2014: 942). Following a recent report for the Department of Energy and Climate Change (DECC) this paper conceptualises demand side management in broad terms to include demand reduction (DR); demand side response (DSR) and distributed energy (DE) (DECC 2014c: 4; see also DECC 2012c; Agrell et al 2013; Ruester et al 2014). This broad definition has been referred to as D3 in a recent report for DECC, a term that will be utilised in this paper to denote this broad range DECC 2014c: 4). Greater D3 is important in enabling the UK to meet various binding national and EU 2020 targets on energy efficiency and emissions reduction and, if pursued correctly, could have positive implications for energy poverty and security, as well as allow for better balancing as renewables become more prevalent.

Governance arrangements for gas and electricity have long been designed with an emphasis on providing secure supply for whatever consumers demand, what some refer to as a predict and provide mentality (DECC 2014: 3; Lockwood 2014; Warren 2014: 942). Consequently, as energy service demand has grown, an infrastructure geared simply to meeting, as opposed to influencing, that demand has also grown. The resulting energy system is not only supply-oriented but also large, centralised and costly. As we move to decarbonise energy production, however, it is becoming increasingly clear that this will be far easier and less costly the smaller energy demand is, whilst flexible demand is also a better route to balancing electricity markets than building more (costly) back-up supply (ECC 2010: 14-16).[1] This is true not only of overall energy demand, but also of peak demand, which tends to occur at particular times of day and year (i.e. in the winter, in early evening). The energy system is effectively sized to meet this demand, so being able to make demand more flexible, to reduce peaks, will become increasingly important as decarbonisation proceeds (e.g. ECC 2010: 14-16, Strbac 2008). Ofgem (2010a) quantifies the potential benefits of reducing peak electricity load by 10% at between £550 million and £1.2 billion a year, although with more renewables and higher use of electric vehicles and heat pumps, the benefits are likely to be higher. Over ten years this would be between £5.5 billion and £12 billion, and should be seen within the context of Ofgem's estimate that roughly £200 billion will be needed in energy infrastructure to achieve low carbon targets (Ofgem 2010b). Beyond cost, achieving energy saving through much better energy efficiency and more flexible energy use will have other benefits,

[1] These claims are supported by various DECC and other scenarios for GB energy system decarbonisation wherein those with lower demand are also those with lower costs (Steward 2014).

including fewer winter deaths, greater comfort in the home for poorer households, and less resource use in supply chains.

Within this context this paper poses questions about what practices GB gas and electricity market governance have been incentivising and whether outcomes have been beneficial or harmful to the overall task of progressing profound and long-term D3 as part of a sustainable energy system transformation. The emphasis here is on governance of gas and electricity *supply* companies, and governance is broadly defined to include regulation, corporate licences and codes of practice as well as the broader market structures that have been put in place as a result of policy decisions over time. For analyses of how governance effects generation, transmission and distribution company, as well as customer, practices please see separate IGov papers.[2] Energy suppliers, and the market and political context in which they operate, are explored here as one fundamental segment of the GB energy system – one that appears on balance to have resisted change to status quo business models and could do more to encourage and facilitate D3.

Although the UK has been widely praised for adopting binding climate targets, through the Climate Change Act, it is also clear that without significant governance action such targets become difficult to meet. This is not to say that there has been no progress but just to suggest that Great Britain could do better and that many aspects of how the sector is governed need to be changed in order to achieve progressive demand innovation. It has been claimed elsewhere that current GB regulatory arrangements present some barriers to the uptake of demand management technologies (Strbac 2008: 4426), and that significant change is still required in the way our energy system works as well as to utility business models (CSE 2014). A number of analyses have claimed that governance in other countries has been better at incentivising innovation and sustainability than the UK (Mazzucato 2013; Mitchell et al 2006; Rosenow et al 2013), whilst others have pointed out that despite a high number of changes to UK energy policy over the past decade practices in the gas and electricity markets remain remarkably unchanged (Kern et al 2014). In addition, the UK has fared badly in a number of reviews of energy efficiency in Europe and appears at or near the bottom on a range of measures that also take affordability into account. As a result, and bearing in mind the high relative number of avoidable winter deaths, the UK has been dubbed 'the Cold Man of Europe' (Energy Spectrum 2015b: 2).

This working paper forms part of an EPSRC-funded project on governance and innovation (IGov) but focuses mainly on governance of gas and electricity suppliers.[3] Section two outlines the GB

[2] Two of these working papers are forthcoming on the IGov website: R. Hoggett (customers) and M. Mitchell (generation). The paper on transmission and distribution governance is already available (Lockwood 2014).
[3] NB: the term Great Britain, which refers to England, Wales and Scotland but not Northern Ireland, is used here as most of the governance analysed in this paper is relevant to GB but not Northern Ireland. United Kingdom, of course, refers to GB and Northern Ireland.

gas and electricity supply market, current types of business model split into categories of the incumbent EUCo model and innovative independents. This section also explains why suppliers occupy an important position in D3, and could occupy more substantial roles. This is partly because innovative independents can offer demand innovations, but also because collectively suppliers are the interface between the energy industry and consumers and because large suppliers have responsibility for implementing some domestic energy efficiency policies. Section three sets out what is meant here by energy governance – including a table of the public objectives, policy and regulatory instruments and markets rules that have relevance for understanding how GB suppliers are incentivised and how this relates, either directly or indirectly, to demand management. Section four, and the various subsections within it, provides the more detailed analysis of how energy governance has incentivised suppliers, incumbents and independents, in practice and what kinds of market structures and practices it has rewarded.

The empirical evidence upon which this working paper rests has been collated both through documentary analysis and interviews with gas and electricity stakeholders. A wide review of regulatory and commercial documentation has been drawn upon including: analysis by NGOs, academics, think-tanks and energy consultancy firms; corporate accounts, web-pages and other publications; DECC and Ofgem consultation and policy documents. It also draws, in parts quite heavily, on on-going market reviews being undertaken by the Competition and Markets Agency (CMA) and Ofgem (see in particular CMA 2015a; 2015b; 2014a and 2014b and Ofgem 2015a; 2014a and 2014e). The interviews were semi-structured and were undertaken with gas and electricity regulators, policymakers and representatives from incumbent as well as new gas and electricity companies (see bibliography) in order to provide further insight into supplier practices and how governance has inter-acted with these practices over time.

The argument here is that *on balance* the governance of GB gas and electricity suppliers has contributed towards a supply orientation in energy markets, powerful incumbents, barriers to entry, a rewarding of shareholders over other societal groups and relatively low levels both of change and of demand innovation. Part of understanding these governance effects lies in the fact that GB energy governance is cumulative and policy and regulatory instruments have become layered up over time. Energy governance, as a whole, is currently set towards achieving more than one objective: security (of supply) and affordability in addition to climate mitigation. In the past energy policy has also been set towards achieving freely trading, competitive markets (via privatisation and liberalisation). Another layer of complexity is added when considering some regulations and corporate codes of practice to the extent that they have not been initially designed with specific climate mitigation objectives in mind. As a result various policies, regulations and rules have been put in place over time in order to meet *different* objectives – indeed a range of regulations and codes were designed with security of supply in mind rather than climate mitigation, let alone the

more recent notion of D3. Taken together the impact of this wide variety in energy governance has been to constrain possibilities for D3 and to delay the more proactive business models aimed at facilitating D3.

## 2. Gas and Electricity Suppliers and Demand Management

*This section provides an overview of the gas and electricity supply market. The first sub-section lays out the overall size and growth of gas and electricity markets before moving onto section 2.2 which sets out some of the different types of company that are currently engaged in supply. Business models are described under two broad categories: incumbent/energy utility company (EUCo) and independent. This is followed by an introductory outline the different ways in which suppliers interact in GB markets with demand management – some inter-actions tend to support D3, whilst others work to constrain, delay or even prevent certain aspects of D3. Overall suppliers in the incumbent/EUCo category have tended to constrain change whilst many independent suppliers work according to business models that allow them play a more positive role in enabling D3 innovations.*

With apologies up front for any confusion caused, this working paper sometimes refers to Great Britain (GB) markets and governance, and sometimes to United Kingdom (UK) markets – this is because some market measurements and rules are specific to GB (such as the British Electricity Trading and Transmission Arrangements (BETTA) and the Balancing and Settlement Code (BSC)), whilst other market measurements, policies and regulations are UK wide. The UK encompasses England, Scotland and Wales and Northern Ireland; whilst GB includes all except Northern Ireland.

### 2.1 Overview of the supply market

Total UK primary energy demand is currently at similar levels to the mid 1980s, having peaked in around 2005 and having since then fallen considerably (Dukes 2014). Declines in economic growth, rising prices and energy efficiency policies, in the business and domestic sectors, are understood to have produced various downward pressures on demand at different points over the past decade (Coates et al 2014; Lockwood 2014).[4] It is important to note that in terms of future demand the Department for Energy and Climate Change (DECC) forecasts that – given current policies in place – final energy demand will be similar in 2030 to 2014 levels (DECC 2013d). This forecast clashes with the majority of sustainable system scenarios, by DECC, AEA and the UK

[4] The UK economy formally entered recession in the 2nd quarter of 2008 and exited in the 4th quarter of 2009 during which time the economy shrank by 7.2% - this was the longest recession since records began. In 2012 the economy stagnated and shrank for two consecutive quarters. Only in 2013 did the economy start to recover and estimates now are that, as of the 3rd quarter of 2014, the volume of GDP is 3.4% above the pre-recession peak (so 3.4% growth in seven years). All this information relating to the UK economy can be found at the Office of National Statistics: http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Economy

Energy Research Council (UKERC), which estimate considerable reductions in UK energy demand by 2030 (Steward 2014: 27). These scenarios attempt to map out energy system pathways towards meeting targets, laid out in the Climate Change Act, for UK emissions.

If we disaggregate primary energy demand numbers we can see that although historical consumption of solid fuels and petroleum have fallen since 1970 consumption of gas and electricity have overall risen.[5] The longer-term gas consumption upward trend came to an end in 2004 and by 2011 had fallen by 24% overall - the biggest falls were consumption from electricity generators (41%), industrial (41%) and other energy industries (22%). Domestic consumption, which represents a growing proportion of the overall number, fell by only 13% over this time period whilst consumption in services has risen over the same time period by 5%. Electricity consumption has also fallen but by a far lower amount, 9%, and its peak was in 2005 rather than 2004.[6] Industrial and domestic consumption have fallen, 16% and 9.7% respectively, whilst consumption by the public administration, transport, agriculture and commercial sectors has remained flat. Average gas and electricity demand per customer has also been falling from the 2004/5 peak (Coates et al 2014: 4).

Table 1 below details 2014 gas and electricity consumption volumes represented by business and domestic customer groups – these numbers do not include consumption of gas by electricity generators but otherwise represent the overall available market for suppliers. There are far more domestic customers than business customers in terms of overall numbers albeit, in terms of electricity, as a collective group they consume fewer terawatt hours (TWh) than the business user group. For gas there are more domestic accounts and domestic usage is also greater than business use. Business supply markets can be further described according to type and/or size of customer demand: industrial and commercial (I&C); commercial; public administration and small and medium enterprises (SMEs) (Hoggett 2015 forthcoming). I&C customers tend to have a more inter-active relationship with suppliers due to the scale of their demand but also because their demand is more actively measured via ½ hourly (HH) meter reports. Demand from most domestic and SME users is estimated (except those on economy-7 or economy-10 electricity meters). Almost all SME and domestic consumers receive their electricity and gas via a supplier, whilst some I&C users will have a direct relationship with a generator – especially in gas markets (see CLNR 2013: 43-44).

[5] For long term gas trends see: https://www.gov.uk/government/statistical-data-sets/historical-gas-data-gas-production-and-consumption-and-fuel-input-1882-to-2011
[6] For long term electricity trends see: https://www.gov.uk/government/statistical-data-sets/historical-electricity-data-1920-to-2011

**Table 1: Overview of British electricity and gas markets**

| Fuel | Demand | Domestic | Business | All |
|---|---|---|---|---|
| Electricity | Customers (k) | 27,125 | 2,748 | 29,838 |
| | Consumption (TWh) | 110 | 190 | 300 |
| Gas | Customers (k) | 22,540 | 874 | 23,384 |
| | Consumption (TWh) | 349 | 244 | 593 |
| Household dual fuel | Customers (k) | 18,925 | N/A | N/A |
| | Duel fuel as % gas accounts | 84% | N/A | N/A |

*Household customers are accounts, business customers are meters live on supply at reporting date. Consumption is energy volume billed to customers in the year to the reporting date. Household figures are for the year to 31 January 2014 and business figures for the year to 31 October 2013.*[7]

*Source: Cornwall Energy 2014a: 9.*

Although there are now over 30 companies actively supplying gas and electricity to business and domestic markets six large, incumbent companies, E.ON, Scottish Power, British Gas/Centrica, Scottish and Southern Electric (SSE), RWE npower and Electricité de France (EdF), continue to dominate (Hannon et al 2013: 1032).[8] The total available 'profit pool' in UK supply was £1.2bn in 2013 and this is expected to decline in future (Coates et al 2014: 4).

The incumbent suppliers were formed during a period of mergers and acquisitions and general market consolidation during the 2000s, in the period following privatisation and liberalisation (Coates et al 2014: 2; see also Helm 2003). The six incumbents are all vertically integrated in that all have generation and supply assets, but some also own distribution assets (SSE and Scottish Power) whilst others also engage in production and storage of physical gas (Centrica and SSE). As will be seen in section 4.1 below in-house generation and supply tends to match up better in electricity than in gas. It is worth noting, however, that when starting the research for this paper at the end of 2013 there was less competition for these incumbent supply companies than there is now.

Market dominance of the Big 6 incumbent suppliers is heaviest in the domestic, or household, sector where they commanded 91.3% of total accounts as of the end of October 2014 (Cornwall Energy 2014b: 9), but they also maintain a percentage of the small and medium-sized enterprise (SME) market. Given higher rates of switching away from incumbents, from the end of 2013 into

[7] These figures tie in with those reported by the Competition and Markets Authority in 2015 (CMA 2015b: 24).
[8] This is a broader list of energy suppliers: Drax (through Haven Power), GDF SUEZ Energy UK, Statoil, Total Gas & Power, Wingas UK, ENI UK, DONG Energy Sales, Gasprom Energy, First:Utility, Opus Energy, Hudson Energy, Contract Natural Gas, Corona Energy, Business Energy Solutions, Crown Energy, Smartest Energy, Regent Gas, Ovo Energy, Ecotricity, EBICo, Flow Energy, LoCo2 Energy, M&S Energy, iSupply Energy, Sainsbury's Energy, Spark Energy and Good Energy.

2014, their degree of market dominance has fallen: at the start of 2013 incumbents had held 98% of domestic accounts. Gains by independent, or non-incumbent, suppliers in the domestic, dual-fuel market have been most impressive where they now account for 10.4% of all GB households.

Some independents, First Utility, Ovo and Co-op, have benefitted from recent switching trends and they each now supply over 250,000 dual fuel accounts (see Table 2) – indeed Ovo trebled in size during 2014. This group is sometimes referred to as the 'mid-tier suppliers' (CMA 2014b: 8), and also includes the Utility Warehouse which was spun off from npower in 2013. A further two, Spark and Utilita, are approaching the 250,000 customer level (Cornwall Energy 2014b: 2). Given that Good Energy features later in our analysis we also note here that their client base was 74,500 customers as of year end 2014 having grown 37% over 2013 numbers (Sustainable Planet 2015). There has been much talk of change in supply markets, partly as a result of these 2013/4 switching numbers, but it should also be noted that this is not the first time that the energy supply industry has seen a raft of new entrants (Coates 2014: 7; IPPR 2014: 24). As such, it is important to keep an eye on longer-term trends as well as on what current governance is doing to enable or constrain these recent challenges to incumbent gas and electricity companies.

**Table 2: GB Gas and Electricity Suppliers: Total customer numbers**

| Supplier | Customers (m) |
|---|---|
| British Gas | 15.3 |
| SSE | 7.9 |
| EDF | 6.0 |
| Scottish Power | 5.8 |
| npower | 5.9 |
| E.ON | 7.3 |
| Co-Operative Energy | 0.3 |
| First Utility | 0.6 |
| Ovo Energy | 0.4 |

Competition in business supply markets is steeper than in domestic markets – there are fewer accounts and each customer tends to demand higher volumes. This is particularly the case for gas markets: the Big 6 incumbents held 80.8% of total business electricity supply market but in business gas supply they maintain only 20.4% (Cornwall Energy 2014: 12 and 15). On 2011 numbers collated by Nationwide Utilities companies dominate in the business electricity market are: npower (18.4%), E.ON (15.8%), EDF Energy (15.7%), SSE (15.2%), GDF Suez (9.8%), British Energy/EDF (8.6%), Scottish Power (5.8%), others (4.3%). Those that dominate gas business supply markets, also on 2011 numbers, are: Total Gas & Power (24.5%), Statoil UK (21.8%), DONG Energy (14.6%), ENI (13.1%), GDF Suez (7.1%), Gazprom Energy (6.3%), Wingas (4.5%),

E.ON (3.6%).[9] In gas, one arm of Centrica, British Gas Business, has remained a large supplier for both large and small-and-medium enterprise (SME) markets, whilst E.ON and RWE npower are also large suppliers to the SME market (Cornwall Energy 2013).

Overall, therefore, competition is greater in gas markets than in electricity markets, and in I&C over SME and household markets (Labour 2013: 7; see also CMA 2014a). This is partly why the Competition and Markets Authority (CMA) is concentrating its current supply market enquiry on domestic and SME customers (CMA 2014b: 6). Taken together the six incumbent energy suppliers supply 432 Twh annually to domestic customers and 204 TWh annually to business customers (CMA 2015d: 4). Indeed domestic and SME customers combined supply 72% of revenues and 83% of EBIT for incumbents. As such it is clear that domestic customers are of particular importance to incumbent suppliers.

## 2.2 Supply within Energy Systems

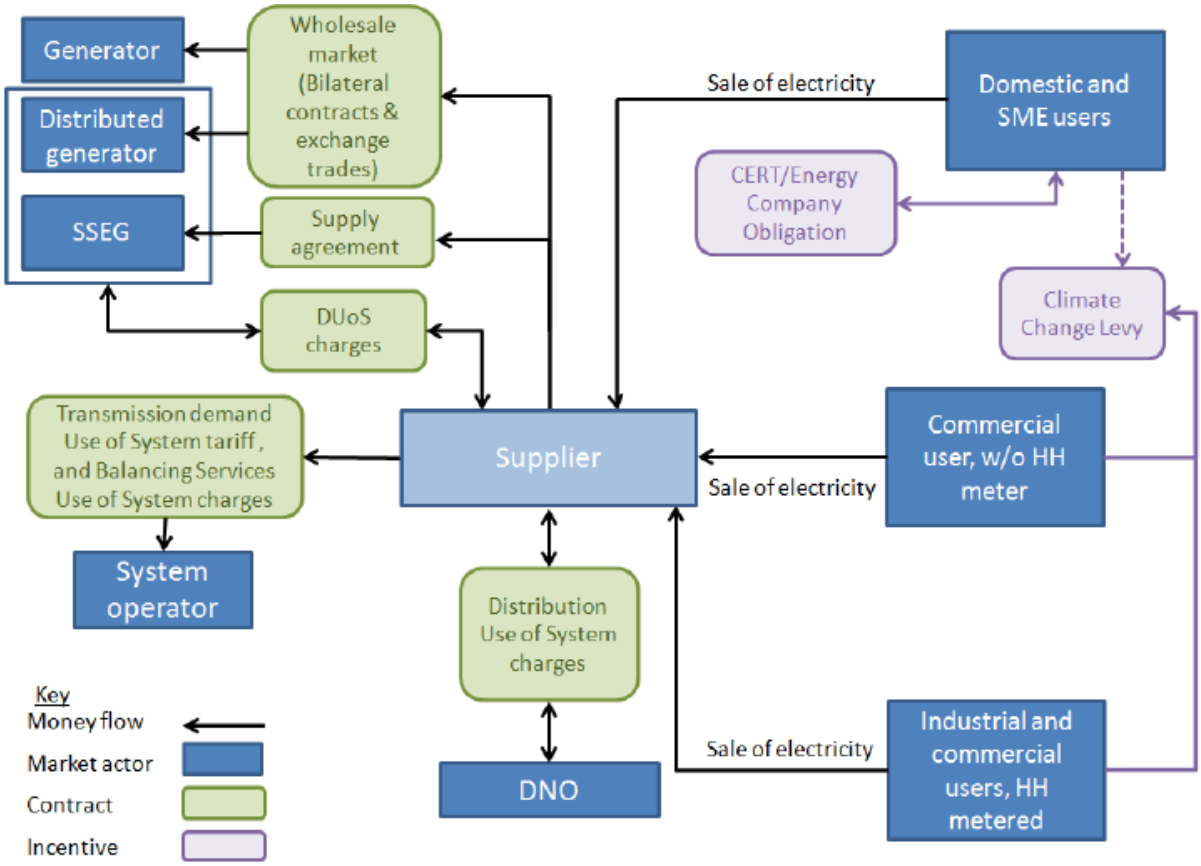
*This section aims to place suppliers within overall energy systems in order to highlight their position as the inter-face between energy systems and consumers – as illustrated in Figure 1 below. This figure also illustrates the complexity and level of inter-connections between suppliers and other system stakeholders. In addition to managing customer relations and relations with other actors within energy systems most large suppliers have also acted as route to market for generation and as the route through which cash (and or profits) has entered integrated utility businesses.*

Generally speaking suppliers (large and small), have tended to increase revenues either by growing volumes or by increasing prices. Profitability, measured often as Earnings Before Interest and Tax (EBIT) or operating profit margins, depends largely on such revenues rising more quickly than costs.[10] However, as outlined in Figure 1 and as detailed in sections 4.2 and 4.3 below, suppliers must pass on large costs that arise from the terms of supplier codes and licences and from supplier obligations. This adds further complexity to supplier business models.

[9] All business sector gas and electricity markets shares are based on 2011 statistics from Nationwide Utilities website, available here: http://www.nationwideutilities.com/uk-energy-market-share.html

[10] See: http://www.investopedia.com/terms/o/operating_profit.asp for a description of how EBIT is calculated. Sometimes profits are measured in terms of Earnings Before Income Tax Depreciation and Amortisation (EBITDA).

**Figure 1: Suppliers within Energy Systems**




*Source: CLNR 2013: 43*

Table 3, below, outlines supplier costs by main categories and also lists main items within each category. Costs associated with operating energy systems, regulations and policies are, taken together, significant in size (roughly 35% of total operating costs). Although they are passed onto consumers they are also costs over which suppliers have little control. As such keeping other costs that are more *controllable* down offers one of the principal routes for suppliers to establish or maintain profitability. Controllable costs, also referred to as *indirect* costs, include costs associated with servicing customers including call centres, IT, meter reading, and bad debts (see Table 3 below). For more detail on how costs are broken down see section 4.2 below and the consolidated segmental statements that incumbents much produce annually.[11]

[11] Following the 2008 Energy Supply Probe Ofgem introduced the Financial Information Reporting licence condition in 2009. The aim in to increase transparency of energy companies' revenues, costs and profits by requiring incumbents to produce and publish Consolidated Segmental Statements. For the latest see: https://www.ofgem.gov.uk/ofgem-publications/93606/linkstoconsolidatedsegmentalstatements-pdf

**Table 3: Main Supplier Costs by Category**

| Direct Costs | Transportation | Environmental and Social | Indirect |
|---|---|---|---|
| Procurement of gas and electricity | Electricity Transmission<br><br>Electricity Distribution<br>Gas transportation<br><br>Market participation costs (i.e. electricity balancing) | Renewable Obligations (ROCs)<br><br>Feed-in-Tariffs (FiTs)<br><br>Energy Company Obligation (ECO)<br><br>Warm Home<br><br>Discount (WHD)<br><br>FiT (Contracts for Difference) | Sales and Marketing<br><br>Customer Service<br><br>Bad Debts<br><br>Supply Costs<br><br>Corporate Recharges<br><br>IT<br><br>Meter Reading |

## 2.3 Types of Suppliers and Business Models

*As already indicated in section 2.1 above suppliers are conceived of here as belonging broadly in one of two groups: the (now) six big incumbent energy suppliers and the independents.*[12] *Independents in this paper, see below, refer to smaller suppliers that have entered the market more recently, that compete with incumbents in gas and electricity markets but who may also offer different value propositions to customers. This section gives a broad overview of incumbent and independent business models – in the case of the latter there will be a focus on those companies that either directly or indirectly enable aspects of demand management.*

### 2.3.1 Incumbents and the EUCo Supplier Model

The incumbent energy companies tend to follow what is referred to as the Energy Utility (EUCo) business model where revenues are to a great extent predicated on the number of units of energy that are sold to customers. UK incumbents are all, also, vertically integrated to the extent that parent companies own and operate supply and generation businesses. This EUCo model is not restricted to the UK but has dominated across Europe, and in many other countries, for some decades. Within this model total volumes, and volumes on a per customer basis, are important to revenues, and this is sometimes referred to as the volume-sales driver (Hannon 2012: 19; see also

[12] See Uswitch supplier page for a brief description of all suppliers: http://www.uswitch.com/gas-electricity/suppliers/

Vanamali 2015). Put simply this is why incumbent suppliers have sought to sell as much as possible and buy as cheaply as possible, whilst keeping other costs down (CLNR 2013: 59). As observed by Ofgem, lower consumption tends to depress profits (Ofgem 2014f: 1), which is why Citigroup analysis assumes that incumbent suppliers will raise prices in order to offset any reductions in demand (Coates et al 2014).

The EUCo model has tended, therefore, not to incentivise reductions in customer energy throughput via energy efficiency gains or demand reduction – in fact quite the opposite as such measures would reduce their volumes. As outlined in Figure 1 above, incumbent suppliers have acted both as route to market for generation and as the point at which cash flow comes into the utility business (Interview 11; see also Coates et al 2014: 1). It is partly for these reasons that, in a recent review of GB energy efficiency policy, incumbent suppliers were described as exhibiting a lack of commercial alignment with the delivery of UK climate mitigation and efficiency goals (CSE 2014: iv).

Apart from growing volumes the EUCo model can also prove profitable to the extent that prices per unit exceed costs, and when it can increase prices at a rate in excess of the rate at which costs rise – see 4.4 for details of pricing strategies (Coates et al 2014). Ofgem market share figures for incumbent energy suppliers over last 15 years imply fairly steady market shares between them and, as such, little inter-incumbent competition for customers over this time period. This implies that margins have been made on price and keeping costs down rather than growing volumes beyond a certain scale – albeit scale has been important in terms of the ability of incumbents to maintain their market positions against newcomers (see section 4.1). In current markets, where not much volume growth has been available for incumbents, they have focused on cutting (controllable) costs and keeping prices paid by (certain) customers high (see Coates 2014).[13]

It is notable that the EUCo model elsewhere, especially in Europe, has been facing quite a few challenges whilst in the UK incumbents have been, relatively, more able to withstand the need to change. Challenges elsewhere have emerged, amongst other things, from greater growth in distributed (renewable) energy, political commitment to climate mitigation and the availability of new technologies (Mitchell et al 2014a; Nillesen et al 2014; Platt 2014b: 12). Large European utilities, some of which are multinational parent companies to UK incumbents, have in response been announcing strategic changes and/or large business restructuring processes. E.ON and ENEL have created new business sections in recognition that there are now ‘conventional’ and

[13] In terms of pricing, some market commentators have observed that incumbents have tended to increase prices soon after wholesale costs payable by them rise, but decrease prices with a far longer time lag after wholesale prices decrease, and by lower amounts (CMA 2014a; Ofgem 2014a).

newer (renewable, distributed and customer service) energy business segments.[14] Another area that large utilities are starting to refocus their efforts on is customer relationships. A recent report on the future for power utilities (based on interviews with senior executives in energy companies around the world) claims that 61% of survey participants said that there is 'high' or 'very high' scope for improvement in customer relations and service. Some executives pointed to the need for energy companies to become 'energy partners' rather than an energy supplier (PwC 2013: 18), inferring higher levels of customer interactivity and necessitating in the UK higher levels of trust and satisfaction. RWE's board announced in 2013 that their guiding principle will change from *volume to value* as it repositions itself over time to become a project enabler, operator and system integrator of renewables (Nillesen et al 2014: 33).

UK incumbents have not yet, however, overtly followed such radical new paths whilst there are already independent companies that do offer new, sustainable services to customers. This puts incumbents in a potentially difficult position – especially in the light of research that suggests that energy transformations are about radically departing from existing ways of producing and using energy and that those companies and technologies that successfully innovate will be the ones to benefit in the long run (see Geels 2002; Fouquet 2010). Furthermore such a sustainable transformation may well put considerable incumbent sunk costs at risk (Umbach 2002) and this can also lead to incumbents adopting institutional strategies to defend their business models and resist change (Smink et al 2013). By assessing energy governance and supplier interactions in detail we can understand better why UK incumbents have not yet felt the need to make profound changes to their core, EUCo model thereby delaying a sustainable energy transformation in the UK and potentially also putting their own long-term businesses at risk.

### 2.3.2 New Business Models and Independent Suppliers

Many independent suppliers have sought, for a number of decades, to bring novel (often more sustainable) business practices and models to the UK – most often growing organically without the benefit of incumbent customer bases (Hannon 2012; Platt et al 2014; Rosenow et al 2013; Richter 2013: 1228; see also CMA 2015a: 5). Although there are some exceptions to the organic growth model, for example the Utility Warehouse which separated out from npower in 2013. Some, but not all, independents specifically involve making sustainable energy part of their revenue streams. Indeed models that are novel in a sustainability sense tend to be broader in scope and value can be conceived in terms other than just profit maximisation (Ofgem 2015f).[15] Sustainable business models specifically incorporate a value proposition that reflects a balance between *economic,*

[14] For details on E.ON see: http://www.eon.com/en/media/news/press-releases/2014/11/30/new-corporate-strategy-eon-to-focus-on-renewables-distribution-networks-and-customer-solutions-and-to-spin-off-the-majority-of-a-new-publicly-listed-company-specializing-in-power-generation-global-energy-trading-and-exploration-and-production.html

[15] See Richter 2013 for an in depth exploration of the EUCo versus sustainable utility business models especially re: how relations with consumers differ according to business model.

*ecological and social* needs (Hannon 2012: 17). The EUCo model by contrast, as is the case with a great many business models in other sectors of the economy, has a primary focus on the economic priority of profit maximisation. Both Ofgem and DECC have recently recognised the value of this independent group of suppliers and are starting to think about how better to provide governance conditions within which these companies can compete on a more level playing field (DECC 2014g; Ofgem 2015d).

Independent suppliers in the UK, although still a relatively small part of the market, are a varied group with different business models (CMA 2015a: 4; Ofgem 2015d). They can be suppliers only with no in-house generation where trading and market access are important (i.e. First Utility). Or they can be suppliers with access to (renewable) in-house generation, for example Good Energy and Ecotricity. It should be noted that independents generally post far higher customer satisfaction rates than incumbents. In the latest Which? survey Ecotricity, Good Energy, Ebico and Ovo all score over 80% for customer satisfaction – far in excess of incumbents.[16]

In 2015 Ofgem issued a consultation on non-traditional business models (NTBMs) in the UK wherein it is claimed that some new market entrants could transform the energy market and produce positive social outcomes such as lower environmental impacts, better quality of service and lower bills (Ofgem 2015d: 1). The consultation categorises non-traditional models as having:

- Novel value propositions – i.e. different ways of meeting customer needs such as through demand flexibility or response or by providing services rather than commodities;
- Certain motivations – i.e. carbon reduction, tariff fairness, community benefit, environmental improvement;
- Novel ownership structures – i.e. publically or community owned; niche or not-for-profit;

It can be that by having a novel ownership structure, without the need to secure ever increasing financial returns to shareholders, that companies can be enabled to pursue more novel motivations that are focused on social improvements of various kinds.

As we can see, therefore, not all independents follow the same business model and not all of them do have a specific sustainability aspect to their model. Many do however overtly seek to either directly or indirectly enable some aspect of demand management – see the next sub-sections for details. This paper is interested in those independents that are working to facilitate one or more aspect of D3, in their being able to expand and supply more customers, and in understanding if/why this has not been the case.

[16] See: http://switch.which.co.uk/energy-suppliers/energy-companies-rated.html

*2.3.2.1 Co-operatives, Community Projects and Local Authorities:*

The first examples of new, more sustainably innovative energy models covered in this section are the co-operative and community models which are of particular relevance to developing the distributed energy aspect of D3 in the UK and to keeping energy affordable. These models have proven popular in countries like Denmark, Sweden and Germany for some time but have also been emerging more strongly in the UK more recently (Conaty 2013). In particular, there has been increasing interest from Local Authorities, devolved administrations and organisations such as the Core Cities group and specific strategic bodies such as the Greater London Authority (GLA) (DECC 2014c: 36).

Most co-operative energy projects are, in essence, motivated by providing a service in the form of fairer, lower cost and often also low carbon and local energy. The value proposition here is about the provision of a service rather than just profit maximisation per se. Perhaps the most obvious example of a co-operative supplier is the Co-operative Energy which has 430,000 member customers and is now one of the UK's four 'mid-tier' suppliers. It is part of the Midcounties Co-operative group which applies the co-operative membership/ownership model across various sectors – importantly members are customers and vice versa and the ethos is one of fairness and transparency. It was by pooling customers that the Co-operative Energy group initially managed to obtain an energy supply licence, but this has also allowed the group to lower prices (Conaty 2013: 30). The Co-operative Energy also has a low carbon ethos in that they source 68% of their electricity from renewable sources.[17]

Similarly community energy projects are defined as those that emphasise community ownership, leadership or control (DECC 2014e: 20). Some community projects are also co-operatives, but community emphasises location and localised benefits whereas some co-operatives, such as the Co-operative Energy, operate on a national scale. The number of UK community-led sustainable energy projects has grown in the past few years (Seyfang et al 2014: 5), a 2008 assessment found that there were 5,000 community energy groups already active in the UK (ibid: 21; see also DECC 2014e: 3). These can range from small public sector groups, such as schools, to larger community projects run by, or in partnership with, Local Authorities or City groups. There are also associated groups representing community energy such as the Association for Public Service Excellence and the Local Authority Energy Collaboration.[18]

In the UK community energy projects can be generators of low carbon electricity, and sometimes renewable heat, and many seek to distribute this generation locally rather than feeding back into

[17] See https://www.cooperativeenergy.coop/why-us/our-energy-sources/
[18] APSE website: http://www.apse.org.uk/apse/index.cfm/local-authority-energy-collaboration/

central grids (Conaty 2013). For example, the Greater London Authority (GLA) is currently undertaking actions to support the economic viability of smaller low carbon generators by taking on a 'junior', Licence Lite, electricity supplier status (DECC 2014c: 41). 'Licence Lite', as covered in more detail in section 4.2 below, was designed to help such energy groups to supply generation direct to local communities rather selling back to the central grid system (Brittan 2013). As explained in section 4.2 for most, however, Licence Lite has proven too heavy and various groups, including the GLA, are seeking reforms (Platt et al 2014b: 11; Interviews 1 and 5).

Some City groups, for example Greater Manchester Combined Authority, are trialling innovative technologies and techniques to manage demand for energy (Platt et al 2014b: 8). In other instances local authority schemes simply seek to provide a public service in the form of lower cost energy for local communities and/or to improve energy poverty and affordability (Interview 15). Examples of these are Peterborough Council, Southend-on-Sea and Cheshire East – all of which will start new offerings via amended White Label contracts with Ovo Energy (see sub-sections 2.3.2.4 and 4.2.2 for more details). Cheshire's offering is called 'Fairer Power' and it explicitly seeks to lower energy costs in its area as well as to target and customers on pre-payment meters and improve their access and affordability.

#### *2.3.2.2 Aggregating Demand Side Response*

A second example of a new, innovative business model is that of Tempus Energy, although for more information on aggregator business models and barriers to entry (Mitchell 2015 forthcoming). Tempus is a clean-tech start-up that is trying to integrate demand response into the supply service that it offers its customers thereby bringing the benefits of demand-side flexibility to all electricity customers.[19] Tempus purchases generation to match their supply needs and makes most of their money through load shifting on the demand side. It had hoped to utilise incentives offered for demand response within the new Capacity Market (CM), but has been so disappointed by possibilities so far for being rewarded for response that it has filed a lawsuit in the European General Court (Tempus 2014a). Indeed Tempus argues that opportunities to become involved in terms of demand capacity appear unclear at best, or put differently strongly biased against demand (Tempus 2014b; Mitchell 2014c; see also Sandbag 2014). Part of Tempus's argument is that the CM offers fossil fuel companies contracts that guarantee a revenue stream for up to 15 years, but only offer demand response contracts for far shorter periods. This has the effect not only of emphasising the value of supply over demand but also locking in old technologies and supporting the old EUCo business models. Because generating capacity being paid for is often for back-up, during peak demand periods, expensive contracts are being funded (ultimately by the

[19] See Tempus Energy website: http://www.tempusenergy.com/#different

consumer) when demand capacity could be more cheaply utilised to provide balancing, flexibility and security.

#### *2.3.2.3 Encouraging Pro-active Consumers and DE*

This third category encompasses independent suppliers that offer 100% renewable supply to customers and who also generate from low carbon sources. One example of this business model is Ecotricity which doubled its customer numbers from 85,000 at end 2013 to 150,000 2014. Its founder, Dale Vince, claims that supplying demand from their own renewable production allows Ecotricity to avoid volatile fossil fuel price volatility which, in turn, allowed them to keep prices frozen for two years (Sustainable Planet 2015).

Another company with a similar value proposition is Good Energy, which was founded in 2000 with the overt motivation of working towards lower carbon emissions by developing and distributing renewable energy. Good Energy have 74,500, as of 2014, and it describes itself as a vertically integrated utility with a current corporate focus on the "development pipeline of new generation assets" (Good Energy 2015). In fact they announced a profit warning for 2014, partly as a result of costs associated with developing this generation pipeline.[20] Good Energy Plc is a listed company but many holders of their shares are also customers.

In addition to in house renewable electricity generation, however, Good Energy also contracts to buy electricity produced by individual households, usually PV, that are also its customers (Interview 9). Its 'HomeGen' scheme pays household producers for total generation as well as for the units exported via the Government-backed Feed-in-Tariff scheme (FiTs).[21] Through this, and other schemes, it supports over 66,000 independent green power generators across the UK. In this way Good Energy's business model enables one aspect of demand management in that they purchase and re-sell distributed renewable energy. It also positively impacts the relationship between suppliers, as representatives of the energy industry, and customers by posting high levels of satisfaction on customer surveys but also by encouraging, through 'HomeGen', greater consumer interactivity.

#### *2.3.2.4 Affordable Energy and Small/Local Supply Facilitation*

There are a number of independent suppliers that have entered the market and expanded their customer bases on the basis of competitive tariffs – for example the recent market entrant Zog. Not all of these companies are, however, motivated by any kind of social goal. However Ovo is one example of a supplier that has a stated company ethos which is to do what is best for customers –

[20] Good Energy profit warning: http://www.marketwatch.com/story/good-energy-shares-fall-12-on-profit-warning-2014-12-18.
[21] See http://www.goodenergy.co.uk/generate/homegen for details.

this is seen to include lower prices, better customer service and, to a lesser extent, sustainability. Ovo has managed to rank highly in surveys of customer satisfaction with UK suppliers – from 2011 to 2015 it has remained in the top 5 (in 2015 it was ranked 4th).[22] It is then up to Ovo to make this value proposition viable financially and given that its founder is an ex-trader much of the emphasis has been on getting the trading right. Ovo is privately owned and operated and its shareholders overtly claim that Ovo's sole focus is on providing what is best for customers. This ownership structure, in that they do not have to return profit to shareholders, means that Ovo can and do reinvest every year in offering better supply to UK customers.

This business model is not about helping customers to manage their demand per se, although Ovo does consider sustainability to be part of what is best for customers and therefore seek always to supply double the industry average amounts of renewable energy in their mix. Considered here as an (indirect) enabler of D3 because of their focus on keeping prices affordable – and in this way improving customer experiences of the supply industry and keeping energy prices during transition more affordable (see section 2.4.2 for more details). In addition, given their interest in affordability they have just launched a new service, in partnership with the Centre for Sustainable Energy (CSE), in the form of a referral service for energy efficiency advice.[23]

There is, however, another aspect of this business model that is worth describing here which serves to (in some instances) indirectly enable distributed energy and greater affordability. As will be explained in more detail in section 4.2.2 below, Ovo use an amended version of White Label contracts to enable LAs to start offering energy supply services to their local areas. Some LAs have energy to distribute, but others, as suggested above, are merely interested in supplying affordable energy as a local service. Ovo have plans in place to enable the launch of at least one new LA energy supply offering in each month of 2015 (see section 4.2.2 for more detail).

Ovo are not only company using White Label contracts to enable smaller suppliers to start up whilst avoiding the heavy burden of full supply licence commitments. For example SSE has a White Label contract with a small supplier called Ebico which has a social motivation of alleviating energy poverty. SSE operates the connection service and billing for Ebico and Ebico use SSE supply. Ebico is a not-for-profit company that has been organised in such a way that all profits that accrued from supplying gas and electricity go toward supporting energy poverty schemes.[24] Ebico offers gas and electricity tariffs where each unit costs the same, no matter how much or little the customer uses with no discounts for above-average users, and a standing charge of zero which means that customers are more able to keep energy bills down by managing their usage.

[22] See Which survey: http://www.which.co.uk/energy/saving-money/reviews-ns/energy-companies-reviewed/
[23] http://www.cse.org.uk/projects/view/1293
[24] See Ebico website: https://www.ebico.org.uk/about-ebico

#### *2.3.2.5 Energy Service Companies (ESCos)*

The last example of a more sustainably innovative business model highlighted here is that of energy service companies (ESCos). The ESCo value proposition is often specifically predicated on improving their customers' energy efficiency, and Energy Market Contracts (Ward et al 2014: 22). Most UK ESCos service I&C market segments and tend not to offer supply services in domestic sectors.

ESCo models are built upon the notion that customers can be actively engaged, interested in reducing demand and in distributed energy, and that companies can help to deliver these innovations. In this way ESCos profit from the delivery of a service to the customer – such as heat or light – as well as from delivering demand reduction for customers. An ESCo has a different relationship with its customers than that of the EUCo model is that they tend to establish *long-term*, service oriented and sometimes bespoke contracts with customers. This embeds a much more inter-active, two way relationship with customers – as opposed to the more standardised and inert relationship between EUCo's and many of their customers (Hannon et al 2013: 1037).

Today although some ESCos have been successful in helping a number of (mainly large, industrial) businesses and public bodies improve efficiency they have been far less successful in the domestic market. UK uptake overall has, in addition, been less than in other countries like Germany, France and the United States and this is understood as being a 'niche' market (Bertoldi et al 2014; Hannon 2012: 129). Although ESCos benefit from the UK's energy efficiency objectives and associated policies, they also face (like most suppliers) high transaction costs, split (mixed) incentives, a fast changing policy environment and policy complexity (Bertoldi et al 2014: 171; Hannon et al 2014: 1039).

## 2.4 Suppliers and Demand Management

*This section sets out in more detail what is meant here by demand management, as well as the many ways in which governance inter-acts with supplier practices to enable and/or constrain greater demand management*. As already noted in section 2.1 above there has been an overall decline, since 2004/5 in the consumption of gas and electricity in the UK, although longer-term trends continue to show growth. What this working paper is interested in is exploring the extent to which suppliers have been incentivised by energy governance to be an active part of demand management in the UK. Governance drivers are taken as separate from the impact of economic decline, repositioning of the economy away from industry towards services or, indeed, of prices on demand for gas and electricity. Governance drivers for demand innovation are also considered important given DECC estimates that, on the basis of current policies, demand will be similar in 2030 to 2014 (DECC 2013d) whilst the lowest cost scenarios for future (clean) energy systems are those with lowest demand (Steward 2014). Again, as stated above, demand reduction is also taken

to be positive for other energy policy objectives of affordability and energy security. At the same time, however, criticisms (often from the nascent demand industry) are growing that recent government legislation has not only missed the opportunity to place demand at the centre of energy market reforms but that, for example, the Capacity Market does far too little to support DSR (Tempus 2014a and 2014b; DECC 2014c).

Demand management is, however, a complex area. Indeed, a recent report for DECC makes this point when defining what demand includes:

> "Demand side measures cross a broad – and increasing – range of energy reduction and small to medium scale generation technologies. These are brought together… under three categories: demand reduction, demand side response and distributed energy" (DECC 2014c: 4; CSE 2014c: 3).

These three categories are referred to collectively as D3 in this DECC report, and here, but each category can be further explained:

- Demand reduction (DR) is the long-term reduction of demand through the use of effective energy efficiency solutions (including a reduction in peak);
- Demand side response (DSR) is the short-term shifting or flexing of load by changing demand patterns (often also to facilitate intermittent renewable power);
- Distributed energy (DE) is the use of renewable and low carbon heat and power generation systems, located onsite or within the local distribution network (examples include photovolaics (PV), heat pumps, solar thermal, biomass boilers, renewable and gas fired combined heat and power (CHP)). Taken together, especially on a sunny day, energy produced in these ways can make a noticeable difference to demand for centralised grid electricity.

In an ideal future suppliers (and other system actors) will, as a whole, be able to become more involved in opportunities to develop services and interventions to support and enable one or more aspects of D3 in domestic and business sectors (CSE 2014a: 25). As already observed in section 2.3 above, some independents do already take a pro-active role in enabling various categories of D3, either directly through realising value from delivering DR, DSR and/or DE services or indirectly through improving affordability, placing downward pressure on prices and/or improving customer satisfaction (and trust). It is also important to reiterate here that value in a few more innovative business models is not always measured entirely in terms of financial capital but in terms of meeting various social goals (including sustainability and affordability).

Some UK incumbent suppliers also offer some demand reduction services to customers, or particularly business customers, such as flexible contracts, but these are limited in scope (Ward et al 2014: 23). Suppliers taken as a broader collective group are not yet, however, understood to

have done much to enable D3 in the UK (ibid), certainly not in comparison to some other countries. This is partly because independents that apply sustainable innovations are still niche and because incumbents have not sufficiently engaged with demand management yet. As a whole suppliers have, furthermore, been important in some not always positive ways to the ways in which D3 has developed in the UK because of:

- the continuing dominance of the EUCo model especially in domestic markets and barriers to entry to more innovative business models;
- supplier obligations and large suppliers' roles in energy efficiency policy implementation;
- the role of (especially incumbent) suppliers as the inter-face between the energy industry and customers.

These high-level interactions between suppliers and demand management, or D3, are complex and not always direct which is why they are explained in the following sub-sections. It is not the intention to explore the implications of these interactions in too much detail here but merely to present them as they are, in turn, important to understand for much of the more detailed analysis of gas and electricity governance and supplier practices that follows.

### 2.4.1 EUCo Model, Market Power and Barriers to Entry

It is taken here as significant to prospects for D3 that incumbent suppliers, all of whom operate under the EUCo business model, have managed to dominate the GB market over the past decade or so. The argument here is that many new entrants have found it very difficult to break into the supply market partly *because* of the market power of incumbents (Interviews 6, 8 and 9; see also Ofgem 2015a). That there has been a degree of incumbent market dominance as well as barriers to entry into supply markets has been proposed, discussed and/or recognised by a number of government and non-government organisations (Platt et al 2014a; Ofgem 2014a and 2015a; CMA 2014a).

Incumbent market dominance, although their collective market share did fall in 2014, has remained high just at the time when innovations and new business models have been furthering progress in D3 elsewhere (for example in California, Germany and Denmark) (Sioshansi 2014; Burger and Weinmann 2014). As mentioned above incumbents as a group have lost market share to independents over the past year or so such that independents now serve nearly 10% of the domestic gas and electricity market (Coates et al 2014; IPPR 2014; Cornwall Energy 2015a).[25] Despite the rapid growth of the independents innovative suppliers are still a niche section of the market and the latest switching numbers suggest that attempts by incumbents (in particular E.ON, SSE and EDF) to better compete for new customers have resulted in some success. Recent

[25] It should also be noted that the fall in 2014 incumbent market share was also partly due to NPower selling a block of customers which became the Utility Warehouse.

research suggests that switching levels in the fourth quarter of 2014 were down versus 2013, and that fewer customers switched to independents from incumbents (Energy Spectrum 2015d: 2).

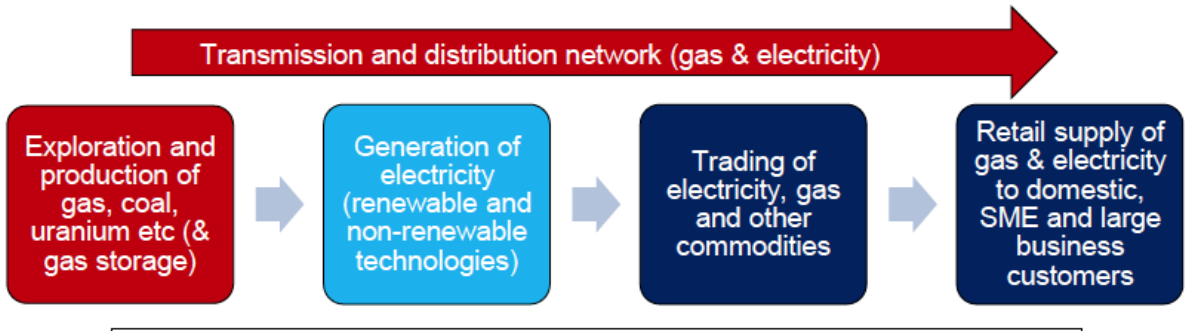
New business models are important to change – indeed analysts researching sustainable energy transitions claim that new and sustainably innovative companies are vital to innovation (Ofgem 2014a: 76; Hannon 2012; Rosenow et al 2013). In the words of the International Energy Agency (IEA):

> "A large proportion of breakthrough innovations come from new firms that challenge existing business models [and so] the growth of new firms may have an important part to play in low-carbon energy technology development" (IEA 2010: 7-8 in Hannon 2012: 18).

Ofgem too have very recently launched a new consultation seeking to better understand innovative energy models, or non-traditional business models (NTBMs), and how they could better enable sustainable energy system transformation (Ofgem 2015d; see also Ofgem 2015a). Section 4.2 of this paper outlines in detail a range of barriers to entry, and to expansion, that independent suppliers face in GB markets. These barriers are considered to be negative for demand management to the extent that they constrain the practices of more innovative suppliers and reduce their combined impact on D3.

Incumbent market dominance is the other side to this coin. Their ability to resist change and to continue to dominate the market despite their seeming inability to markedly alter the volume and scale-oriented business model presents a further reason why it is considered here important to disrupt the current UK supply market. As already suggested the EUCo model is volume and supply oriented. As Ofgem have explained "the amount of energy consumed has a significant effect on domestic supply profits, especially for gas supply" (Ofgem 2014f: 13). Incumbents have over time invested in expanding their capacity base in response to energy demand rather than seeking to influence demand reduction (Warren 2014: 942). In this way supply has historically tended to follow demand and considerable infrastructures, involving significant sunk investment, have grown in order to service rather than influence that demand. Figure 2, below, presents in diagram form this tendency for suppliers to act as route to market for generation – note all arrows point towards the consumer.

**Figure 2: Suppliers As 'Route to Market'**




*Source: CMA 2014b: 6*

Another important reason why incumbent suppliers tend to act as routes to market for generation is, as discussed in detail in section 4.1, because of their position within wider utility business portfolios. It is difficult to judge incumbent suppliers as stand alone businesses given that they provide important functions within these wider corporations – including as the route through which cash flow enters vertically integrated utility businesses. This too serves to further *re-emphasise supply* over demand and narrows the function of supply to a vehicle through which generation reaches customers, rather than as a company that supplies services in a two-way relationship with its customers. In addition, and this is more to do with generation than with supply, the current EUCo model has focused on large-scale generation which has driven a centralised over distributed model.

It is also notable that the model of suppliers as route to market assumes that consumers sit at the end of the line listlessly receiving energy – something that some large utility parent companies are talking about changing but with little result so far in the UK. Unlike the active consumer relationship envisaged as essential to demand management, the EUCo relationship with customers is more often than not one of customer inertia (Hannon et al 2013: 1036; Stirling 2014). As discussed in detail in section 4.1.3, incumbent suppliers have tended to make more money out of legacy customers that have not switched and they are therefore incentivised to keep these customers inert/inactive (see also CMA 2015b: 31). Furthermore, the measure of an active customer is often based on switching but not upon demand response or involvement in home energy production.

Incumbent suppliers operate large businesses, have significant sunk costs, are keen to defend their market share positions, and must satisfy parent companies in terms of sticking to budgets and delivering according to hurdle rates set. As such although many would like to see greater activity in terms of demand management it is difficult for these businesses to introduce new value propositions that would make a difference within the terms of the core EUCo business model. Because incumbents distribute benefits, in the form of financial returns, to parent companies this

can result in money not being reinvested in UK markets at a time when a sustainable transition is required. As already discussed above, however, many NTBMs directly or indirectly enable aspects of D3 and many recycle profits back into improving energy services in terms of social goals such as affordability, better service and sustainability. Much of the research below concentrates, for these reasons, on understanding incumbent dominance and on understanding barriers to entry and expansion that independents must overcome.

### 2.4.2 Energy Efficiency Obligations

Perhaps the most direct interaction between suppliers and D3, in particular DR, has been through the central role that gas and electricity suppliers have played in implementing domestic UK energy efficiency policies. Suppliers with more than 250,000 customers (albeit according to a sliding scale discussed in more detail in section 4.3.2 below) have been, and remain, responsible for the delivery of government efficiency policies in the domestic, but not I&C, market segments. For some time only incumbent energy companies were of sufficient scale in terms of customer numbers to be responsible for implementing these UK policies, but now some 'mid-tier' suppliers, Co-operative Energy, First Utility and Ovo, have also reached the de-minimus. Such policies have included the reasonably successful CERT and CESP supplier obligations, as well as today's arguably less effective Energy Company Obligation (ECO) and Green Deal.

Early thinking was that suppliers were well placed to deliver these policies given existing, and in some cases long-standing, domestic customer relationships (CSE 2014: 13). These relationships are important in a technical sense given that there are so many gas and electricity, and dual-fuel, customers in GB markets and inter-acting with them on energy efficiency without utilising existing contacts would have been a tall order. In another sense, however, using existing supplier-customer relationships that are not positive, or where high degrees of distrust, passivity and/or dissatisfaction dominate, can also make implementing energy efficiency policy difficult. The domestic sector is, in turn, understood to be important to GB demand management because of its size in overall gas (40%) and electricity (36%) consumption. Moreover, as detailed in section 2.2, domestic sector gas and electricity consumption declines, from 2004/5 peaks, have been less impressive than those in the industrial sector. Given that policies designed to increase the efficiency of industrial and other business customers are not conducted through suppliers there is some emphasis in the analysis below on the domestic sector when assessing energy governance, suppliers and D3.[26]

In order to understand better the current role of suppliers in enabling D3 through supplier obligations it is worth noting the degree of discretion they have had in deciding *how* to meet

[26] Please see Steward 2015 forthcoming for a full list of efficiency polices aimed at business users; and Hoggett 2015 for an analysis of how energy governance incentivises consumer D3 responses.

emissions targets implied in the obligations (Rosenow et al 2013). For example, suppliers have been able to decide whether to use third parties to implement obligations; how costs are incurred and passed on; as well as the ways in which consumers are engaged, or not, within these processes. As will be seen in more detail in section 4.3.2 below, in practice implementation has varied quite considerably between suppliers. These business choices have, in addition, had implications for the ways in which costs and benefits have been distributed, for how suppliers perceive the value of entering efficiency markets and for how consumers perceive energy efficiency programmes and (Rosenow et al 2013). As such, the degree to which demand and efficiency policies succeed or fail, in many ways, have lain in the hands of incumbent suppliers. Some more recent events have, however, highlighted a tendency to want to reduce commitments to efficiency policies, the ECO in particular. In addition, given that incumbents make more money out of inactive customers (see sections 4.1; 4.3 and 4.4 below) their incentives have not been aligned with encouraging pro-active consumers overall. Again, see section 4.3 for a more detailed analysis of how suppliers have implemented efficiency policies and implications, in particular, for DR.

However, IGov is interested not just in greater active demand management in the UK, but in D3 being enabled in an affordable, fair and secure manner. A second set of interrelations between suppliers and D3 emerges as important here, but is harder to explain. At the heart of this argument lies the fact that in theory and in practice energy efficiency and affordability policies have in practice become inter-related. One of the formal objectives of UK energy policy, in addition to climate and efficiency targets, is to reduce energy poverty whilst the responsibility to protect vulnerable consumers is also built into supplier licences. Suppliers, via their role as conduits of what remains of the Warm Homes Discount, have become responsible for implementing affordability policy focused on the domestic segment of heat markets (Rosenow et al 2013).[27] In addition the ECO has been designed not only to increase efficiency but also to reduce costs for priority groups with high usage and/or from low-income households (Mallaburn & Eyre 2013). The positive relationship between efficiency and affordability is also highlighted by the various scenarios (see section 2.1 above) which show that lower demand, including greater energy efficiency, is the most cost effective way of cutting emissions.

The general lack of supplier-customer interactivity implied in the EUCo business model means that in some respects incumbents have not been best placed to implement demand management which infers greater customer pro-activity – even customers becoming ‘prosumers’. Many incumbents have not directly engaged with domestic customers nor made many attempts to

[27] The Warm Homes Discount was itself a clawback of free EU ETS carbon allowances that headed off calls for a windfall tax on the industry (Interview 1). Please also note that the Warm Homes Discount is now funded through general taxation and not through customer bills.

pursue a pro-active relationship to enable customers to reduce or flex demand, or indeed produce their own electricity and/or heat. The CMA and Ofgem have been concerned about low levels of domestic and SME consumer engagement – but their interests are in engaged consumers (that switch) as a sign of competition not in creating consumers active in DE and/or DSR (Ofgem 2014a: 21-22). The way in which consumers are or are not engaged is considered as important here also because of the relationship between successful DR and DSR and (pro)active consumers. Consumer practices, large and small, can make a considerable difference – indeed a wide array of stakeholders argue that demand management is more achievable through actively engaging with, and through pro-active, consumers (Warren 2014: 942; Parag & Darby 2009: 3985; Rosenow et al 2013; CSE 2014; DECC 2014c). Given that some independents do engage customers more directly (Good Energy and Tempus for example) these are perhaps the companies that should be better supported by energy governance.

### 2.4.3 Delegated responsibility and supplier hub model

The above section has argued that suppliers have been important to how efficiency and affordability policies have been implemented and have been, as such, a key interface between consumers (as customers and as voters) and efficiency governance. There is a third and last, related, set of interactions between suppliers and demand management that will be explored here. Current retail markets work using the 'supplier hub' principle, whereby most customers (except some larger customers) deal only with their supplier (Ofgem 2013f: 17-18). As already outlined in section 2.2 suppliers recover their own costs through customers and also pass on costs from further up the supply chain, such as wholesale energy costs, network charges and energy policy costs. In practice therefore, as the CEO of SSE explained in evidence to the House of Commons Energy and Climate Committee, the energy supply business 'deals with customers' whilst the other parts of their UK electricity and gas businesses generate, trade, distribute and procure (Phillips-Davies in ECC 2013a). In these ways suppliers have become, for a great many households, *the face* of the gas and electricity industry in Great Britain as well as the channels through which environmental and social policies are experienced. The supplier hub model also means that suppliers have access to, and in effect become controllers of, data about consumers in the UK – this is information needed to redesign energy systems including networks but suppliers are not (currently) under any obligation to share this date (Interview 5; see also Lockwood 2014).

It makes sense in many ways that suppliers are in practice the interface between the energy industry and consumers (except large customers) given the sheer number of households involved and the degree to which incumbent suppliers, especially, have data about consumption patterns. Unfortunately, however, incumbent suppliers have, through their practices over the past years, been known to represent the industry in a less than positive light – the Big 6 often rate low in customer satisfaction surveys. In the latest Which survey incumbents received between 35%

(npower) and 50% (SSE) customer satisfaction ratings and collectively rank below all independents except Spark Energy.[28] This has been exacerbated by price increases: a 66% increase in electricity and 137% increase in gas prices between 2001 and 2013, whilst energy company profits have been rising over the same time frame (Ofgem 2014a; Which 2013:8). Gas price increases have, in particular, taken on high social significance given the degree to which heating in the UK is dependent on gas and given rising levels of excess winter deaths in England and Wales (ONS 2013). Despite government efficiency and affordability policies many gas and electricity customers continue to have affordability issues – in 2012 the number of fuel poor households was estimated at 4.5 million and growing (DECC 2014d). Equally significant has been that consumers have been experiencing and poor standards of customer service and displaying high levels of dissatisfaction with and low levels of trust in the incumbent gas and electricity suppliers.

Price rises, poor customer service, overcharging and problems experienced when trying to switch mean that public trust in gas and electricity companies is at an all time low (see section 3.3 for more on role of trust in governance).[29] As a result the latest poll, undertaken by YouGov and published in December 2014, suggests that only 11% of consumers trust energy companies to provide unbiased information (Utility Week 2014). Trust and how suppliers behave are, in turn, important elements of consumer-supplier relations if consumers are to play an active and productive role in demand management by changing demand patterns or, indeed, becoming part of a wider distributed energy movement (Mitchell et al 2014; Ofgem 2014a; see also Davey in Carrington 2013). This is particularly the case given that large suppliers have been passed so much responsibility for implementing energy efficiency policy but under-deliver in terms of becoming positive and pro-active enablers of D3.

Independent energy companies, partly because of their higher customer service satisfaction rates, have benefited from dissatisfaction with incumbents but, again, they remain niche. Although switching to independent suppliers that offer greater potential in terms of enabling D3 is positive overall, customers that switch only for price reasons may switch again – and possibly back to an incumbent (Ofgem 2015: 4; see section 4.1.3 for more details). What most customers remain interested in from their suppliers is low(er) prices: a survey by YouGov in 2014 confirms that customers are more interested in lower energy bills than anything else – including security, climate change and customer service (see also uSwitch 2014; Utility Week 2014). As such, although some consumers are interested in climate change more broadly, too few UK consumers actively push for demand management per se (see Ward et al 2014: 41). This is why suppliers that do specifically

[28] See: http://switch.which.co.uk/energy-suppliers/energy-companies-rated.html.
[29] For details on E.ON overcharging/billing errors see Ofgem website here: https://www.ofgem.gov.uk/publications-and-updates/ofgem-secures-7-75-million-package-consumers-following-e-overcharging-error

work to engage customers, place downward pressure on prices and directly incentivise D3 are so important to change.

However it is with regard to the politics of energy, and the need for some ongoing public support for climate mitigation policy, that involving consumers positively, but this time as voters, is also important. What domestic customers experience, via their contact with suppliers, becomes critical to their willingness to be pro-active and/or positive about supplier obligations and other sustainability measures (Parag and Darby 2009: 3985). These inter-relationships between (government), suppliers and consumers in domestic demand management has been conceptualised elsewhere as the demand reduction 'triangle' (Parag and Darby 2009). Clearly consumers are sensitive to high prices and these sensitivities can and do spill over into political pressure to better control prices. It is, as such, politically difficult to add costs associated with energy transition on top of energy prices that are already higher than they need to be for company profit margin, market design and/or network cost reasons. Especially, as seen in section 4.3.2, if government blame the environmental costs for high prices rather than other aspects of energy cost structures.

# 3 Energy governance: definitions and assumptions

The rest of this paper provides explanations of how energy governance has, in practice, tended to enable or constrain demand management in supply markets. Energy governance is an important variable in explaining practices and outcomes not least because government decisions have, over the years, helped to structure energy markets and to influence how energy companies operate within those markets.

*Various aspects of energy governance are analysed in the sections that follow in order to explain why it is that there has been relatively little practice change in GB gas and electricity markets or, indeed, much change to core utility business models. In particular, this paper offers explanations as to why so little has been done so far to alter the incumbent, EUCo business model or why it is that, despite efficiency targets, those companies that are designed to enable aspects of D3 have been disadvantaged versus incumbents. In these ways governance influences corporate practices and market outcomes, but specific ways in which policies are designed and implemented also have a bearing on whether or not the UK can meet its stated public policy objectives. We are in particular exercised with whether current governance will allow the UK to meet its climate mitigation and energy efficiency objectives.*

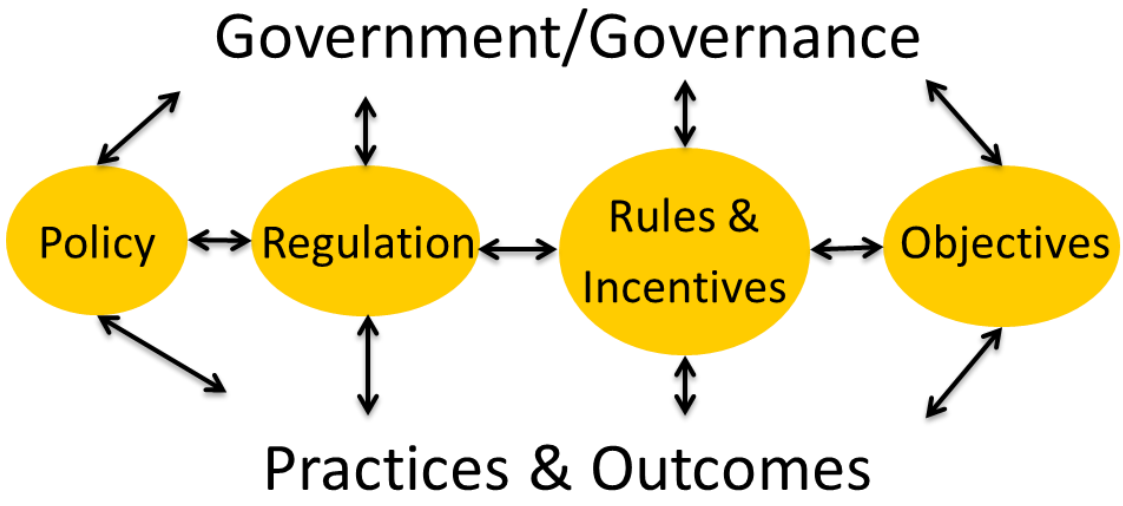
### 3.1 Governance: policies, regulation and rules

*There are certain assumptions about governance that underpin this paper and which are worth making explicit here. Firstly, the definition of governance used is an inclusive one.* Broadly speaking governance is understood to mean:

> "The use of institutions, structures of authority and even collaboration to allocate resources and coordinate or control activity in society or the economy" (Bell 2002)

Clearly governance as a term then needs to be disaggregated in order to be able to locate the precise aspects of energy governance to be analysed here. This paper does so by breaking energy governance down into the broad categories of public policy objectives, policies (including broad market decisions made), regulations, and the rules and incentives that guide how instruments are implemented and delivered (see Figure 1).[30] Rules and incentives are understood here to be the more specific forms that regulations and policies take during processes of implementation. *The important point being that each aspect of energy governance, through supplier responses and behaviours, has implications for practices and outcomes in energy markets.*

**Figure 3: Governance of the gas and electricity sector**




Generally speaking public policy objectives provide reasoning and direction for energy governance and various policy and regulatory instruments (some of which may also have specific mandates/objectives) are then put in place to meet agreed objectives. For example, the UK has a number of energy efficiency objectives, including the binding 2020 efficiency target which is part of EU legislation (DECC 2014c: 10; CSE 2014a: 5).[31] These agreed objectives then set a direction for

[30] This paper analyses policy, regulatory and market rules (such as statutory codes) but not the influence of paradigmatic thinking on the design of UK energy governance. For more information on the relationship between ideas and policy design in UK energy see Kuzemko 2013; and Mitchell 2008.

[31] Albeit as things currently stand it looks very unlikely that there will be any binding EU or UK energy efficiency target beyond 2020 – targets for 2030 are aspirational rather than binding and the current UK administration decided to block any binding EU energy efficiency target (http://www.ukace.org/category/perspective/articles-and-blog/). It is notable,

policy and regulatory instruments in that government then devises policies, such as the ECO and Green Deal, in order to deliver (estimated) emissions reduction targets (via the Statutory Instrument) (Bertoldi et al 2013). Whilst objectives have been important in policy setting over time it is noteworthy that not all official energy policy objectives are recognised within regulations – for example statutory codes within supplier licences tend not to have sustainability objectives built in. This is important as many such regulations, licences and statutory codes have remained in place, guiding corporate practices, even whilst new policies intended to deliver sustainability and/or demand management objectives are put in place.

There are, in turn, sets of more specific rules regarding how policies and regulations are implemented – for example the 'de minimus' which states that suppliers with fewer than 250,000 customers are not obligated to implement the ECO. It is in considering these further details of how policy and regulatory instruments are designed and implemented that we can better assess the effects of policies and regulations in practice. As will be seen in section 4.3 below, further rules that guide how the ECO is implemented, i.e. through large suppliers that have a high degree of say in their design, have implications for the success in practice of the ECO in delivering objectives.

It should also be noted that there are a great many public and quasi-public institutions involved in devising and implementing energy governance. These include Parliament, DECC, Ofgem, Code Review Panels, the National Grid, Elexon, but also energy companies themselves. Government, and 'independent', institutions will have set public mandates which often also reflect public policy energy objectives. For instance Ofgem has since inception worked to a set of legislative Duties based around protecting current and future consumers, whilst sustainability was added as a priority Duty only relatively recently. What is also noteworthy is what criteria can be used to challenge energy markets. Ofgem's recourse is to the Competition and Markets Authority (CMA) and current market reviews use only the criteria of competitiveness to judge current practices and governance successes. These narrow assessment criteria, clearly, leave little room for assessing whether markets as currently structured and governed are delivering on climate mitigation and/or efficiency targets (Ofgem 2014a; CMA 2015a).

## 3.2 Demand measures within energy governance

*The second main assumption that underpins the analysis here is that practices and outcomes in gas and electricity markets, that enable and constrain D3, are influenced by a wider set of governance rules than those pertaining directly to demand management.* As already suggested

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however, that Labour as part of their election rhetoric have pledged to make 'energy saving a national infrastructure priority': http://www.ukace.org/2014/09/labour-conference-puts-energy-efficiency-centre-stage/.

above there are a number of government objectives, at any point in time, to which energy policy and regulation is set. Currently, stated energy policy objectives are to:

- reduce greenhouse gas (GHG) emissions;
- to maintain energy (supply) security;
- and to reduce energy poverty.[32]

Beneath the objective to deliver a reduction in GHG emissions there are a number of more specified targets for: improved energy efficiency, growth in energy from renewable sources and measures of supply security. However, in order to be successful energy governance (taken as a whole) must in effect *balance* the desire for climate mitigation with supply security and affordability.

Energy governance is also affected, however, by economic policy objectives such as that of fiscal austerity which has had implications for how much public money can be invested in transforming energy markets (for example the Treasury's Levy Control Framework). Decisions influenced by economic growth objectives can also direct fiscal support towards fossil fuels rather than towards enabling sustainable energy systems (Butler et al 2015). It cannot, therefore, be assumed that the pursuit of one objective will not in some ways harm the UK's ability to achieve another objective and this becomes part of the balancing act. Indeed questions have been raised about whether there might in certain situations be trade offs between energy policy objectives and recommendations given that Government should not only be aware of trade offs but also have plans in place for what to do in such instances (see PIU 2002; Kuzemko 2013). In an optimal sense this would infer setting clear and *transparent* priorities between objectives but also a greater degree of coordination and flexibility than is current visible in UK governance institutions. In other instances, however and as we saw with the example of the ECO above, the government has made assumptions with regard to the abilities of certain instruments to meet more than one energy policy objective simultaneously.

This range of objectives points already toward a degree of complexity, but energy is also a vast area of governance with a great many policy and regulatory instruments and rules already in place. As such, companies, including suppliers, are being mandated and incentivised to behave in a variety of (not always complimentary) ways. Indeed, some regulations and rules were designed with a different energy world, and different public policy objectives, in mind. For example, as will be made clear in sections 4.1 and 4.2 below, many regulatory instruments were designed during the process of privatisation to enable new investors to enter markets and to establish competition whilst maintaining supply security (Interview 5; see also Helm 2003; Thomas 2006). What is important to note is that many of the historically embedded instruments were not designed with

[32] Energy poverty objectives differ between England, Scotland and Wales. English objectives have also recently changed from the commitment to eradicate energy poverty (where reasonably practicable) by 2016, to making sure that as many fuel poor homes (again as is reasonably practicable) achieve a minimum efficiency standard of SAP Band C by 2030 (CSE 2014b: 4).

climate mitigation objectives in mind and neither did they challenge the centralised and supply-oriented energy system, indeed many of them were designed to keep this system securely in place.

New demand-side policies do not operate in practice, therefore, in any kind of energy governance vacuum but in relation to a raft of other instruments and rules already in place and, in some instances, deeply embedded – hence the idea of a layering up of policies and regulations over time.[33] In this way it becomes vital to understand the full range of policies, regulations and rules that companies must interact with and respond to when supplying UK customers with gas and electricity. Looking at only one set of policies and rules gives you only one set of possible responses and interactions whilst companies must in practice respond to multiple sets of governance mandates, signals and incentives.

Table 4, below, provides a list of some of the policy objectives, policy and regulatory instruments and rules and incentives that this paper will assess in an attempt to present a broader but more holistic picture of energy governance-supplier interactions. This table also illustrates the complexity of this governance landscape. Each policy and/or regulation will have been implemented with one or more objectives in mind, but not necessarily having taken into account interactions in practice with other policies or regulations. Companies, as such, receive a wide range of (often mixed) signals from government and regulators.

**Table 4: Objectives, Policies, Regulations and Rules Covered in this Paper**

| Public Policy Objectives | Policy Decisions and Instruments | Rules and Regulations | |
|---|---|---|---|
| Competitive, freely trading markets<br><br>Energy (supply) security<br><br>Climate mitigation<br><br>Energy efficiency<br><br>Affordability and reducing energy poverty | Privatise energy companies:<br>i) make energy markets attractive to private investors<br>ii) legacy customers<br><br>Decisions to allow VI and various mergers and acquisitions<br><br>Domestic energy efficiency via supplier obligations (CERT; ECO) | BETTA<br><br>Uniform Network Code<br><br>Supply Point Administration Agreement<br><br>Balancing and Settlement Code (BSC)<br><br>Connection and Use of System Code (CUSC)<br><br>Distribution | Code rules for cost allocation:<br>i.e. TNUoS; BSUoS; DUoS<br><br>Credit and collateral code rules<br><br>Balancing Mechanism (BM) rules<br><br>Credit and collateral trading rules |

[33] For an great explanation of the concept of layering (in policy) see: Mahoney, J.; Thelen, K. (2010) Explaining Institutional Change. Cambridge; Cambridge University Press. p. 19

| | | | |
|---|---|---|---|
| | Green Deal<br><br>Smart meter policy<br><br>Feed-in-Tariffs (FiTs)<br><br>Capacity Markets<br><br>Contracts for Difference (CfDs) | Connection and Use of System Agreement (DCUSA)<br><br>Grid Code<br><br>Smart Meter Code<br><br>Licence Lite<br><br>White Label contracts | Supplier obligation de minimus rules and the taper mechanism<br><br>Tariff rules including RMR |

Analyses that pertain specifically to demand management, therefore, fail to account for the wide range of other incentives that suppliers, large and small, respond to when delivering gas and electricity services (Rosenow et al 2013; Bertoldi et al 2013; CSE 2014b; Ward et al 2014). Broadly speaking, energy (and economic) governance impact upon market design and on corporate practices in a variety of complex but not always overt ways. For example, energy governance collectively shapes the (market) conditions within which energy suppliers conduct their business; the extent to which they can be profitable by pursuing certain business models; as well as the conditions under which they are able to influence current and future governance decisions. Some rules and regulations impose costs on suppliers, which in turn provide barriers to entry to new market entrants, whilst governance also decrees that policy costs should be passed onto consumers by suppliers and not funded through general taxation.

Indeed, much of the analysis below claims that some rules and regulations tend to incentivise and reward volume and scale and a supply-orientation of markets; reinforce the EUCo model and erect barriers to entry for innovation (see also IPPR 2014: 20-22) – all behaviours that work in the long run against better demand management. Given this broader picture of governance that has relevance for the ability of corporates to deliver D3 we argue that, in order to construct a more demand focused energy system, *all* segments of energy governance need to be set up to enable an efficient and minimal use of energy (see Mitchell 2014). This would involve sustainability objectives being embedded in energy governance at all levels – including within statutory codes and those bodies that decide on code changes (i.e. the BSC panel). It may also be the case that some energy governance choices and possibilities, that have proven useful in other countries, are overlooked – in this way lacklustre demand management may also be a result of policy and regulatory choices ignored or simply not made.

### 3.3. Energy governance: influence, public policy and delegation

*There is no assumption, however, that energy suppliers merely act as receptacles for governance decisions but, quite the opposite, they and their parent companies also seek to influence*

*governance decisions in their favour*. Smaller, independent companies also seek to influence policy, but arguably with less success (not least because of their inability to afford large policy/regulatory teams). Analyses that seek to understand better resistance to sustainable innovations pinpoint incumbent industries as an active force for continuity (Smink et al 2013; Geels 2014). One analysis explains this by claiming that existing institutions, that benefit from current systems, favour stability and work to hamper change (Unruh 2000). Even if/when established, big companies do decide that they would like to change to address new (disruptive) markets they find the process difficult – so much of their existing business models and of their staff and technology practices has been implemented precisely in order to meet historical but not new market opportunities (Christensen and Overdorf 2000). This is the case for companies in almost every market sector – not just energy companies (ibid).

One way in which incumbent gas and electricity companies seek to defend their business models and capital investments in the UK is through seeking to influence policy. They have policy teams in place to understand and influence governance, they have lobbied government on a sustained basis, have had a high degree of contact with DECC and Ofgem and input into the design of policies, regulations and rules (Interviews 1, 3, 5, 6 and 10; Carrington 2011; Which 2013: 17; see also Kuzemko 2015 forthcoming). Although the claim is not that incumbents always get their way in active negotiations with policymakers it is that energy governance in place remains supportive overall of their interests – certainly more so than in other countries, for example Germany, where the 'Big 4' are feeling far greater pressure to change (Burger and Weinmann 2014; Nillsen et al 2014). Given the international scale of many of the Big 6 active engagement with political authority can operate not just at the UK but also at the EU level. For example, E.ON, Iberdrola (parent company of Scottish Power) and RWE (parent to npower) were part of a consortium of nine energy utilities which united to pressure the European Parliament for capacity payments (PwC 2013: 24), which has already been achieved in the UK in the form of the Capacity Market. Many independent suppliers also seek to influence governance in their favour but, arguably, with less effect as evidenced by their still niche position in markets and high barriers to entry and expansion.

That incumbents use their market power to influence governance decision-making is clear but this does not answer the question of why governance institutions hear these voices over others, say of smaller independents. One way of exploring this question is to recognise that under privatisation and liberalisation various responsibilities were delegated from government to 'independent', quasi-public agencies and to the private sector (Kuzemko 2014a). Indeed the delegation of responsibilities (sometimes referred to as depoliticisation) away from government institutions toward the private sector has been a specific choice of the UK government since the 1980s, across economic sectors as well as in the energy sector (Hay 2010; Kuzemko 2013 and 2014a). One of the points of market reforms in the 1980s was to remove the influence of politics from the operation

of energy markets (see Littlechild 1981: 12; Helm 2003: 286). Within the privatised energy model the 'proper' role of government then became that of (economic) regulator of services, according to set rules, delivered by market organisations (Wilks 2013: 126; Kuzemko 2014a).[34] What this has resulted in, over time, is a build-up of knowledge and market power within incumbents and a lack of investment in governance institutions that have been tasked with energy policymaking and regulation (Kuzemko 2014a).

Moreover, as a result of privatisation, a small number of private corporations have become responsible for the delivery of energy which is, as Ofgem now recognise, an 'essential service' where there are strong public policy considerations (Ofgem 2014a: 78). Energy is considered to be an essential service because it is a basic necessity: few businesses and/or households can avoid reliance on energy to provide daily essentials such as light, heat, cooking, as well as powering telecommunications and computer technologies (see Boardman 2010: 255). As a result, through privatising public energy companies, their function has shifted from that of delivering 'social' to 'private' returns (Helm 2003: 22).

The former Secretary for Energy and Climate Change, Ed Davey, recently called on the energy industry to recognise that they "serve the public" - in an attempt to bring incumbents back in line with the delivery of public objectives, (Davey in Carrington 2013). He also highlighted the fact that the public need to be able to *trust* energy companies for the relationship between consumers and suppliers to work (ibid). It has been observed that incumbents have, since the opening up of markets in the 1990s, behaved in ways that have served to undermine public trust (CSE 2014a: 16; see also Ofgem 2014a: 10). A lack of consumer trust in energy companies is harmful in many ways – not least because it can lead to public (and political) concern about the activities of suppliers as well as an unwillingness to accept suppliers' roles in implementing policy (see CMA 2014a: 11). Indeed under the UK's model of regulation consumer trust in Ofgem (as the regulator) is central to its ability to deliver social goals such as protecting consumers. Equally DECC and Ofgem's trust in markets to deliver social outcomes, such as security of supply, has become central to policy and regulatory decision-making (Woodman and Mitchell 2010: 2647; Kuzemko 2013). This all emphasises the importance of *how* inter-relationships between suppliers, the energy industry and customers are conducted for the successful deliver of energy policies within current conditions.

It also remains the case, however, that despite these various delegations of responsibility it is government that should be held accountable for delivering public policy objectives and for the

[34] For more on the delegation of responsiblities away from Government departments to independent and/or quasi-public bodies and has this has been working in practice see Lockwood 2014: 96-100.

successes and failures of policy instruments - not private corporations. Indeed incumbent suppliers are ultimately answerable to their parent companies and to their share- and debt holders not politicians nor indeed the public. Increasingly in the UK instances have emerged where the interests of energy incumbents, usually defined in terms of profit maximisation, are not aligned with public policy objectives. For example, it is partly because various disconnects currently exists in the UK between Ofgem's duty to protect consumers and some incumbent practices that the CMA has been called upon to conduct a review of supply markets (CMA 2014a and 2014b). Energy governance may need start to questioning its trust in markets to deliver sustainable change or it may need to refocus efforts on better supporting and encouraging companies (and markets) that can deliver social outcomes (such as sustainability, demand management and/or affordability)

# 4 Energy governance, suppliers and D3

*The sections below will identify in detail where energy policies, regulations and rules, as currently designed and implemented, enable or constrain greater DR, DSR and DE in the UK. There are four main critiques of current GB energy governance, as it is currently designed and implemented, that underpin each of the below sections in turn:*

- *Incumbents maintain a high degree of market power and ability to maintain their core EUCo business model, which is volume and supply oriented and tends not to encourage customer interactivity;*
- *Independent suppliers, which have business models more conducive to enabling D3 innovations, face barriers to entry and expansion (lack of 'level playing field');*
- *Large suppliers (mainly incumbents) are not sufficiently incentivised to become pro-actively involved in D3 (at scale);*
- *The costs and benefits of energy market participation have not been distributed fairly – thereby further eroding the equity of the UK's transition and trust in energy suppliers.*

It may not appear, on the surface, that all of these themes relate directly to enabling D3, but as explained in section 3.2 above, this paper takes and inclusive approach to energy governance on the basis that sustainability policies, regulations and rules operate in practice in relation to multiple other energy policies, regulations and rules not necessarily aimed at sustainability.

## 4.1 Power of incumbent energy: supply and volume orientation

The fact that incumbent energy companies have abilities to influence governance decisions should not, in itself, constrain the development of demand management at scale across GB markets. As pointed out above, the issue arises if the interests and/or practices of incumbent energy companies are not aligned with the delivery of efficiency, affordability and climate mitigation objectives. *The claim here is that various aspects of energy governance together provide*

*conditions within which incumbent energy companies can maintain market power, resist competition and make money from the volume-oriented EUCo model. The following sub-sections assess various governance decisions, largely taken during the long process of gas and electricity market privatisation and liberalisation, that have benefited incumbents. Specific aspects of energy governance assessed here below include the decision to privatise energy companies and the associated requirement to then make the market 'investible'; customer allocations to ex-RECs and British Gas supply (incumbency effect); the decision to allow vertical integration; aspects of BETTA and trading rules and incentives.*

*The overall context of section 4.1 is one of delegation of energy service responsibilities and also, ultimately, market and knowledge power to the private sector – power that has been in some respects captured by incumbents. The critique of UK energy governance is that it has, as a whole, done too little to cause practice change in markets. Indeed it has tended to support business models that do little to facilitate D3 innovations in preference to those that do – unlike other countries where governance decisions have tended to more directly support alternative models and, in some instances, challenge incumbents unwilling or unable to change. This may be because security of supply is in practice preferred over sustainable energy market transition.*

#### 4.1.1 Privatisation… in Theory

*In this sub-section we travel back in time in order to provide some historical governance context – it outlines why many governance decisions were taken but overall it argues that privatisation and liberalisation has not enabled in practice the delivery of many objectives – including competitive energy markets and a level playing field.* In the post-war years the notion of universal access and of energy as fundamental to economic growth underpinned the creation of our current electricity system: centralised, large and focused on supply (Helm 2003: 2). The supply focus, in turn, was related to the perceived need to ensure that enough power stations were built to meet the post-war economic boom under the assumption that growth required greater power capacity (ibid: 132). Under conditions of privatisation and liberalisation, however, gas and electricity suppliers subsequently became answerable to holders of capital and their purpose became the delivery of private financial returns rather than public returns (ibid: 22; see also Energy Spectrum 2015c: 18). This remains the primary incentive guiding UK supplier practices and it is, in the main, only indirectly through policies and regulations, that suppliers have responsibilities towards UK publics.

It is also important, moreover, to remember when looking back at historical governance decisions that these decisions were made within particular politico-economic contexts. The 1970s had been an intense period of crisis and energy governance became tied up, as in the 2010s, with the Conservative government's desire to lower the public sector deficit and borrowing requirements (Pollitt 2012: 7). The accepted version of the economic crises of the 1970s were that they were

caused in large part by government overload, and the response was a 'withdrawal of the state' – often in the form of the privatisation of public companies (Hay 1996; Kuzemko 2013). However, in the 2010s there are in addition other, new energy objectives that need to be met – not least in terms of climate change mitigation and energy poverty. In the 1980s and 1990s, to the extent that gas and electricity reform had been part of a wider commitment to marketisation, decisions taken were arguably less specific to energy but to the perceived need to reduce the preponderance of state ownership. Energy privatisation and liberalisation took place, furthermore, within the context of growing globalisation, capital market deregulation (the 'Big Bang') and financialisation (see Helm 2003; Rutledge 2007; Kuzemko 2013).

The original British Model for electric utility reform was motivated by a desire to improve how the system operated and envisaged:

- the creation of a wholesale spot market as the price setting arena;
- the creation of retail competition and consumer choice of supplier;
- and corporate separation between generation and retail supply (Thomas 2006: 584).

The overall vision, however, did not necessarily include privatisation and specified against vertical integration (VI) (Thomas 2006; see also Pollitt 2012).[35] Evidence from elsewhere suggested that privatisation of electricity companies could have downsides for consumers:

> "…experience in the USA shows that private ownership of electric utilities tends to raise prices… but also lower costs, increase output…" (Littlechild 1981: 17).

Despite this observation, the recommendation was to "experiment" with privatisation although Littlechild did caution that the UK needed to avoid the costs and distortions of the American regulatory procedure – including lower costs for utilities but higher costs for consumers (ibid). This caution has arguably not been reflected in current supplier pricing practices.

As we know the UK ultimately did indeed decide to privatise gas and electricity markets and a wide range of rationales were given, some of which were ideational based on public choice and agency theory (Littlechild 1981; Helm 2003; Pearson & Watson 2012). The general argument put forward at the time was that markets are more efficient at allocating costs and setting prices and therefore gas and electricity supply should be left to markets (Lawson 1989; Rutledge 2010a: 3 and 11-12; Myddelton 2010: Pollitt 2012: 6). Pressure was also being brought to bear from large private corporations to deregulate and privatise (Wilks 2013). As such private ownership of utilities and competition were understood to offer benefits to all concerned through increased cost efficiencies that could, and it was presumed would, be passed on to consumers via lower prices (see Littlechild

[35] Interestingly the 'British model' has formed an underpinning for market reform elsewhere, i.e. in Norway, but without privatisation (Thomas 2006: 584; Pollitt 2012).

1981: 13). This argument was, in turn, related to the notion that public energy market structures needed reform amidst the narrative of failing companies, high-regulated costs, government overload and a need raise capital from the sale of public assets in order to fill low Treasury coffers (Littlechild 1981; Moran 2003; Hay 1996). However, as will be discussed in more detail in section 4.3 below, there are arguments that energy companies have not become more economically efficient since privatisation and, in addition, that many realised benefits have been passed onto shareholders rather than consumers (O'Mahoney and Vecchi 2001 in Rutledge 2010a: 12-13; Thomas 2006).

Competition has also been a central aim of the privatisation and liberalisation process. Indeed one of Ofgem's primary responsibilities has been to ensure competition in energy markets in order to protect the interests of consumers (Ofgem 2006: 107). The commitment to competition, as an end goal in itself, is also a central reasoning behind the European Commission's gas and electricity market liberalisation process (see Florio 2013: 155-7). In the UK and the EU competition has been perceived as a vital element in making private markets palatable for publics through price competition. For example, it was expected that under conditions of competition consumers would *"enjoy lower prices, better choice and higher standards of service"* (DTI 2001: 1). Moreover, competition was to have led to societal benefits by challenging dominant energy companies and to reduce opportunities for collusion and abuse of market power (Florio 2013: 156).

Another notion popular among some policymakers at the time was that of increasing the depth and breadth of share ownership within the nation as a whole thereby, at least theoretically, enabling the concept of 'ownership by the people' or a nation of 'people's capitalists' (Myddelton 2010: 108; Rutledge 2010a: 5-8). New Conservative thinking at the time, expressed by Nigel Lawson in the Maurice Macmillan Memorial Lecture of 1985, was that the extension of ownership via privatisation creates a society with an "…inbuilt resistance to revolutionary change" (Lawson 1992: 206 in Rutledge 2010a: 6). What appears over time, however, to have been constructed through the application of these ideas was an *energy system* with inbuilt resistance to revolutionary change. Indeed, the ways in which energy markets were re-designed were radical to the extent that the state did, indeed, withdraw but much of the underlying centralised, supply-oriented energy system remained in place.

Privatisations and liberalisation were pursued for a number of reasons, then, but certainly with the intention of improving market conditions and providing societal benefits in a wide variety of ways – not least by reducing the market power of large energy companies by introducing competition (Florio 2013: 156). Part of the critique of how energy has been governed is, however, that privatisation has not resulted in competitive energy markets nor reduced the market power of a few, large actors (Helm 2003: 243 and 306; Thomas 2006; Rutledge 2010a). This is partly because the

‘level playing field’ for new entrants that had been envisaged by liberal market reformers has not materialised on any ongoing basis. Many of those new companies that entered energy markets post liberalisation gradually exited or were bought out and, in addition market liberalisation was followed in the 2000s by a series of mergers and acquisitions, ultimately leaving six large incumbent companies which have a considerable degree of market power (Ofgem 2014a: 71). Some of these ‘Big 6’ are owned, as will be explored in more detail in section 4.4 below, by members of the European ‘Big 5’ (see Florio 2013). That competition in gas and electricity markets has not been working per se, and also not in favour of many customers, is widely recognised in the UK, as now recognised in the Competition and Markets Authority’s current Energy Market Investigation (EMI) (CMA 2014).[36]

#### *4.1.2 Making gas and electricity markets attractive to investors*

*We turn now to explain why the envisaged competitive markets have not emerged. Indeed many claims today, about oligopoly, potential abuses of power and collusion, are similar to those that were made about energy companies in the 1970s and were, as we have seen, amongst the main problems that liberalisation was intended to solve*. *What is important to note here is that once the decision to privatise energy companies was taken it became crucial to design privatisation processes in such as way as to attract and maintain private investors* (Thomas 2006: 587; Rutledge 2010a: 6-7; Wilks 2013: 128-9; see also Helm 2003: 127 and 137). *This section also argues that this emphasis on facilitating (often large scale) private investment has remained at the centre of UK energy governance.*

In order to privatise the energy, and other, sectors the UK government needed to attract capital in sufficient quantities to divest a wide range of large assets – some of which (British Gas) were more attractive than others (nuclear) (see Mitchell 2008: 101-2; Wilks 2013: 124). As such what was needed was a range of strategies to make energy companies attractive initially, for example creating ‘saleable packages’ of assets that would be attractive to ‘the City’ and make it easier for financial markets to take part (Helm 2003: 127 and137). For example there have been claims that British Gas was sold as a monopoly precisely in order to increase its attraction to private investors (ibid; Wilks 2013: 124).

There have been criticisms voiced of UK privatisations more broadly, as well as about utilities more specifically, regarding the price paid for assets versus their book value (see Rutledge 2010a and Wilks 2013). Privatisation of gas and electricity companies was set in motion through the Gas Act of 1986 and the Electricity Act of 1989. Although original intentions, according to Nigel Lawson, had been to break up British Gas when it was privatised the ‘monopolistic and integrated gas

[36] The EMI investigation was still ongoing as this paper was being finalised.

industry' was maintained (Lawson 1992: 216). There have been claims that the energy industry was privatized for about 1/3 of its asset value – albeit most evidence seems to point more specifically towards generation assets having been undervalued or at least priced to sell (Thomas 2006: 587; Wilks 2013: 126; Rutledge 2010a: 8). Another analyst has noted that the 'market-to-assets ratio' for British Gas was very low, at only 41%, whilst this had been a profitable business and not the drain on national resources that many state companies had been portrayed when convincing MPs and voters that privatisation was worth pursuing (Rutledge 2010a: 8). Further evidence of structuring privatisation in order to attract investors is that pre-privatisation the government increased electricity prices by 7% over and above that required in order to improve the attractiveness of energy companies to investors (Yarrow 1992 in Thomas 2006: 598). The drive to make energy companies attractive to private investors, and any undervaluing of assets, in a way negated the value of public monies that had been invested in these companies over time as well as the heat and electricity services that they had provided to UK publics. Valuable assets were switched from public to private hands and, in how privatisation was designed and mergers and acquisitions allowed, a reasonably un-competitive market emerged.

One industry stakeholder has asserted that during the 2000s the theme of how to attract investments into the energy industry has persisted strongly and dominated much political thinking in energy circles (Interview 8). One recent example of how the need to keep energy incumbents profitable influences governance decisions is the decision taken, in 2014, to stretch out the delivery period for the ECO in order to protect energy company profit margins (see section 4.4 below for more detail). In addition, the design of GB's new Capacity Market has, thus far, has served to further support the existing EUCo business model by providing capital payments for existing (coal and gas) generation capacity (Mitchell 2014c).

Maintaining attractive energy markets is partly important because it is now widely recognised that significant RD&D capital is required to develop new supply and demand innovations, but responsibility for these investments rests with the private sector within the delegated responsibility/market model. This is partly also because, post privatisation, there has been no UK state-owned, tax funded agency for energy investment (Rutledge 2010a: 213). UK energy RD&D has, furthermore, fallen considerably since privatisation and there has been little government spend on developing sustainable technologies – certainly in comparison to other countries (see Mazzucato 2013). Over the past few years there has been a higher degree of government activity in facilitating investment in energy markets – not least in developing carbon capture and storage (CCS) but also, more recently, in supporting greater extraction from North Sea Oil and Gas. The newly formed Contracts for Difference (CfD) counter-party body is government backed and, although it holds no capital, it is meant to reinsure investors (Interview 1). The UK does now also have a Green Bank albeit it tends to lend at market rates and does not, in that way, offer the kind

of capital required by niche and or developmental technologies (Mazzucato 2013: 125). It, furthermore, is not particularly well capitalised – leading one observer to claim that, within the broader context of what is needed for sustainable energy transformations, it was offering 'play money' (ibid: 125).

Indeed, energy incumbents also need to be able to remain active in energy markets precisely because it is they that provide 'essential' energy services that remain politically and socially important – and security of supply remains a core policy objective. They, furthermore, have amassed high levels of current knowledge about how gas and electricity markets work over the past decade or so (Interviews 1, 3, 5 and 7). This is knowledge that is useful to policymakers seeking to redesign energy systems but private companies do not have to share with government bodies (Kuzemko 2015 forthcoming). The Government's desire to keep incumbents viable financially is one explanation of why incumbents maintain market power and have the *ability* to resist change to the EUCo model in the UK. This is part of a wider argument about lack of corporate practice change in a sustainable, more demand focused direction (more on this in section 4.3).

### 4.1.3 Incumbency

*The question of how incumbents have, thus far, had the ability to resist change to their core business model brings us to the question of incumbency (Ofgem 2015). Incumbency, legacy customer bases and inertia, are outcomes of* ***how*** *gas and electricity companies were privatised and, as such, is an outcome of governance decisions. But understanding incumbency, and how it came about, is also important given that it, in practice, has had negative implications for competition and, as such, for new market entrants. This section also draws on some of the observations made in section 3 about the importance of suppliers' inter-relations with customers within energy markets as currently designed and how these hinder aspects of D3. To reiterate, this inter-relationship is important given the importance of pro-active consumers to demand management but also given that almost everyone eligible to vote in the UK is also a customer of an energy company.*

One of the principal assets of each incumbent energy supplier is their customer base – in particular legacy customers allocated to each REC as part of the privatisation process (see Davies et al 2014: 59). There had initially been some concern, during the privatisation process, that suppliers might not prove profitable as stand-alone businesses (Thomas 2006: 586; Interview 5). One analyst has observed that such fears, at points in time, drove decisions about structuring energy companies to make them financially attractive to investors (ibid: 586). However, as Ofgem's current evidence to the CMA makes explicit, in respect of the domestic market these fears have proven needless to the extent that a high number of domestic customers have not changed

supplier since privatisation (Ofgem 2015: 2; see also Waddams-Price and Zhu 2013: 2-3; Ofgem 2014a: 45; Interview 9). This has not been the case for large business customers the majority of which change their supplier and/or renegotiate terms on a regular, sometimes annual, basis (Thomas 2006: 588). In the case of domestic customers, however, incumbent energy companies have retained high percentages of historical client bases in gas and in electricity. In electricity legacy customers account for 64% to 85% of domestic customers depending on the region (Labour 2013: 8; see also Platt et al 2014), and for gas the numbers range from 28% to 50% (Cornwall Energy 2013).

Ofgem have explained weak customer engagement and activity in domestic energy markets through reference to complexity of tariffs, the lack of clear information to facilitate comparisons, and a lack of trust in suppliers (Ofgem 2015: 1).[37] A further explanation of consumer inertia is that under conditions of oligopoly suppliers have tended to move prices in a herd like manner – thereby reducing reasons for customers to switch (Rutledge 2010b; BBC 2013). Furthermore, as some of the costs passed onto consumers are related to energy system and/or policy costs that are (generally) equally applied, differentiating prices becomes a trickier exercise (Interview 1) (see sections 4.3 and 4.4 for more detail of costs passed onto consumers).

Another way of looking at the question of customer inertia, and the value of client bases paid for at the time of privatisation, is that although customers can nominally chose suppliers of gas and electricity, they have less choice about *whether* to use heat, light and power services. In fact one interviewee has emphasised the fact that because customers always need electricity this has tended to make supply a relatively low risk business (Interview 4). Energy is an essential service with very few substitutes, or where there are substitutes consumers have to make considerable investments (which they may not be able to afford) in order to structure their demand away from gas and electricity as the sources from which derive benefits such as heat and light. In these ways energy retains a strong element of public dependence upon it – underpinning the importance of supply security and affordability objectives.

There have, furthermore, been a number of clear advantages for incumbent suppliers of having large numbers of sticky customers. One has been that incumbents have faced weaker competitive pressure from consumers than had been envisaged prior to privatisation. In addition suppliers have been able to segment their markets between active and inactive consumers and apply differential pricing strategies accordingly (Ofgem 2015a: 2). As part of this strategy of segmenting markets suppliers have charged higher prices to legacy customers compared to new customers who have

[37] Ofgem introduced measures in 2014 in an attempt to address the first two issues through new tariff rules that restrict the number of tariffs to just four gas and electricity tariffs per customer as part of the Retail Market Review policies (Ofgem 2015: 4). These are outlined in more detail in section 4.3.

switched to them (Platt et al 2014: 21; see also Ofgem 2008 and 2015a). At the most extreme, incumbents were in the past able to keep legacy customers on higher cost 'dead' tariffs which were not available to new and/or prospective customers – although this practice was stopped as part of the Retail Market Review (RMR) (Ofgem 2015a: 2). These charging practices, furthermore, have clear affordability implications and are practices that run precisely counter to other supplier business models that encourage consumer engagement and lower prices. Allowing incumbents to make money from consumer inactivity for so long, however, has been one way in which governance inaction has allowed for the continuation of the EUCo model.

There are inactive customers in other markets, for example in the personal banking market, but it is the '…uneven distribution of such consumers that causes particular concern in the energy markets.' (Ofgem 2015a: 4). This alludes to the fact that incumbents, by having inherited 'sticky' customers during privatisation, gain a considerable competitive advantage over new market entrants with no legacy customers (Davies et al 2014: 59). In fact, without the legacy customer base held by each of the Big Six, independent suppliers are reliant on market churn to establish and grow their businesses (Cornwall Energy 2015: 3). Unfortunately, however, for new market entrants those customers that tend to switch can be (much) higher cost and less profitable than those that do not, and not just because they are charged less (Ofgem 2015: 3). This is because those customers that are most likely to switch as a result of marketing campaigns may well prove more likely to do so again, especially given the focus on price as a reason to switch (Interview 6; see also see Platt et al 2014). As such, customers that switch can be lower margin, and can sometimes even represent a loss in the instances that they switch again within a few years (ibid). Campaigns to gain new customers represent costs (marketing campaigns and discounts) and it may take 3-5 years to cover that cost of acquisition (Interviews 6 and 9). Having legacy customers and/or customers that tend not to switch can also, however, contribute to greater demand predictability for incumbents thereby better enabling suppliers to perform their primary business function of predicting demand (and to avoid balancing costs – see section 4.2 below) (Interviews 6 and 9).

Inertia amongst many legacy customers has afforded incumbent suppliers a valuable asset base but also important scale, whilst also to an extent protecting them from the need to compete on service or price with new entrants. Incumbents have, in addition, not had to face and overcome the kinds of barriers to entry that new market entrants face. Clearly, when breaking into new regions supplier arms of the Big 6 did have to face marketing costs, and the risk that those willing to switch might switch again, but always with the comfort of a steady asset base in their incumbent regional markets behind them. Together, these market conditions have meant that suppliers have been actively incentivised to have sticky, inert customers rather than the pro-active, engaged customers associated with demand management, or indeed competition in markets (CMA 2015b: 31).

The CMA and Ofgem in their various recent reports have been concerned about inactive, legacy customers to the extent that they have enabled incumbents to avoid competition. When thinking more specifically about demand management, as already outlined in Section 2.3, inactive customers are also not ideal. In fact, active and responsive customers are seen as vital to broadening and deepening demand reduction and response in UK markets and this is explored in more detail in Section 4.4. Section 4.3 also presents arguments, in more detail, about some of the other implications of the incumbency effect and of segmental charging practices – in particular for trust in suppliers and for energy affordability – both important to effective efficiency policy as currently constructed (as argued in section 2.2 and 2.3).

#### 4.1.4 Vertical Integration

*Part of understanding the EUCo business model, and its thus far lasting power to survive, lies in recognition of the role that vertical integration (VI) has played. It is argued here that VI has for some decades, and as intended, acted as an important means through which utility parent companies can maintain and/or grow profits and defend strong market positions in the UK. By the same token, however, there are other arguments that VI has negative implications for competition, that it has enabled the exercise of portfolio power and other oligopolistic practices. New arguments are also emerging which claim that VI may negatively effect some incumbents ability to be flexible and, for example, respond rapidly to changing wholesale price movements.*

VI has been an integral part of GB energy markets, gas and electricity, for most of the post-war period but was not part of the original 'British Model' for electricity liberalisation (Thomas 2006). Post-privatisation incremental decisions were made by policymakers, which ultimately led to vertical integration becoming 'the norm' over time (Helm 2003: 239; Thomas 2006: 586). In the early 1990s the 14 Regional Electricity Companies (RECs) were permitted to buy 15% of supply from plant that they had 'significant ownership' shares in and most moved quickly towards this limit (Thomas 2006: 585). Part of the rationale for allowing suppliers to hold limited generation assets, despite the initial idea to do away with VI, was to kick start greater competition in generation which at the time was limited to 2 large generators: National Power and Powergen (ibid: 585). Although bids by Powergen for Midlands Electricity and by National Power for Southern Electric were referred to the Monopolies and Mergers Commission (MMC) and ultimately blocked, all other mergers in the electricity business were approved thereby, in effect, allowing VI (Helm 2003: 234-5). In this way decisions to allow VI were tied in with decisions to allow mergers and acquisitions (M&A) between generation and supply businesses.

The emergence of this new norm for policymakers and regulators tied in neatly with the fact that VI had also become the normal model to which all the main (US and European) energy companies

had come to aspire (ibid: 239). Until very recently VI has been a key corporate strategy for incumbent energy companies and benefits, for energy companies, include optimisation of generation assets, mitigation of risk and the ability to trade in-house, thereby avoiding collateral and balancing charges (Rutledge 2010b: 228-9; CMA 2014b: 8; Ofgem 2014a: 92; Interview 9). Most GB energy companies have had strategies in place to increase self-supply ratios as high as possible, particularly in electricity where balancing charges can represent a higher proportion of costs (ibid: 229; see also section 4.2 for further information on balancing costs). In fact RWE, EDF and E.ON have pursued a strategy of convincing governments that scale and vertical integration are requirements for energy utilities (Helm 2003: 243). However, as of 2013 with regard to electricity most incumbents did not have entirely balanced portfolios, i.e. E.ON, RWE npower and British Gas all had greater supply than generation but enough generation to cover domestic customer demand. EDF is alone in having greater generation than supply, and Scottish Power and SSE are closer to being balanced (Cornwall Energy 2013). The situation with gas is different where only E.ON has been able to supply most of its domestic customers, via its E.ON AG Ruhrgas subsidiary (Rutledge 2010: 228).[38]

Although there have been no governance rulings against VI, there have been a number of reports and market reviews by regulators and policymakers, including that currently being undertaken by the CMA and Office of Fair Trading (OFT), which outline some of VI's downsides (CMA 2014a). [39] The overall claim is that VI may have enabled oligopolistic practices, the exercise of portfolio power and that it may have undermined competition (Ofgem 2014a: 93; see also Labour 2013: 17; CMA 2014b: 8; Rutledge 2010b: 213). As such decisions to allow VI, taken on an ad hoc basis, can be interpreted as having allowed incumbents to maintain the scale necessary to defend their market positions quite successfully (Rutledge 2010b: 215-222; Labour 2013; Ofgem 2014a; Which 2013). This can be viewed as negative, per se, by those (such as the CMA) that rely on competition to improve energy markets but it is also taken as negative here due to the fact that EUCos have over time, through these advantages, also been able to protect their market positions against new entrants.

One of the more specific ways in which VI has been causing problems has to do with the degree of 'in-house' trading in electricity, and to a lesser extent also in gas, that takes place between generation and supply arms of energy companies. Although it is hard to measure how much in-house trading does take place, it does have implications for wholesale market liquidity and transparency and, in turn, for the ability for new entrant suppliers to access generation. The price at which generation is bought and sold within vertically integrated incumbents is called 'transfer

[38] Although this may change once the recently announced company restructure is complete. For more information on how generation and supply match up within incumbents see Mitchell 2015 forthcoming.
[39] It should be noted that this is one, albeit perhaps more thorough, review is part of a long list of reviews that includes the 2008 'Energy Supply Probe' and the 2010 'Retail Market Review'.

pricing' (Which 2013: 8), but again ascertaining the precise nature of how these prices are set has been difficult (Ofgem 2014a and 2015a; CMA 2014a). Although Ofgem has required energy companies to produce consolidated segmental statements which list revenues and costs for supply and generation divisions these statements tell us little about transfer payments and the degree of in-house trading.

An investigation commissioned by Ofgem and undertaken by the accountancy firm, BDO, found that transfer prices were not always based on wholesale energy market price information (BDO in Which 2013: 20). Traders have had discretion not to use wholesale prices as benchmarks for transfer prices in instances, for example, that they considered the wholesale price to be unreliable or inefficient (ibid). In addition, transfer prices can be determined by energy companies' internal models rather than via wholesale energy market information – models that energy companies do not have to share. Given the lack of transparency around the setting of transfer prices regulators (and customers) are in a difficult position in terms of deciding on the fairness or competitiveness of prices offered to the supply arm by in-house generators. Recent claims are that VI and 'in-house' trades together reduce the pressure on incumbents to pass cost savings on to consumers (Mitchell 2014a; Platt et al 2014). The questions of prices and how benefits, such as cost savings, are distributed by incumbent energy companies will be returned to in section 4.3.

These findings have implications for prices charged to consumers, given that for gas and electricity procurement still makes up the largest proportion of bills. For large, vertically-integrated companies it may matter little if profits come from retail or generation arms of the business (Interviews 2 and 6). Indeed, although higher prices paid by suppliers when procuring gas/electricity may hurt their margins (in the unlikely event that they cannot pass these costs onto consumers), the same higher prices benefit generation arms – hence claims above about VI and mitigation of risks. This is what has been referred to elsewhere as chasing margins up and down the value chain (Helm 2003 in Rutledge 2010b: 234). Another analyst has observed that "…it is now clear that the vertically integrated nature of their businesses means they can easily increase their total profits and total margins." (Rutledge 2010b: 213). Large utilities can, because supply companies are what consumers see of the industry, put forward arguments that retail margins are low and therefore that prices being charged to customers are not disproportionate to the costs of running utility companies (see Crooks 2008 in Rutledge 2010b: 235). In order to get a clearer picture of profitability in UK vertically integrated utilities Ofgem has started to calculate combined generation and supply margins (Ofgem 2014a: 100). Looking at combined margins gives a more accurate picture and makes it harder for utilities to argue that they are not sufficiently profitable in UK markets.

Given ongoing sensitivities to rising gas and electricity prices, and the importance of affordability in sustainable transitions, it could be argued that parent companies may continue to take their margin in the generation and trading arms of the business rather than in supply. Indeed one company CEO interviewed observed that there was little money to be made in supply now and so large energy companies currently prefer to focus on upstream and generation – further emphasising the focus on supply (Interview 2; see Which 2013: 31).[40] EDF have also identified upstream as a core future focus for their business: the '…goal is for EDF to become the biggest electricity company in the world by 2020 with 200 GW of installed capacity' (Philippe Torrion in EDF 2012).

In addition to competition, liquidity and transparency issues – VI has the added downside of reinforcing the supply orientation of energy companies and markets. In order to better understand this argument we need to understand supply arms of large companies within the context of wider utility portfolios, and these functions that they perform. This is because under the VI model supply arms have, in effect, become 'routes to market' through which generation is turned into cash (see Figure 2 in section 2.3.1 above). This aspect of the business model has tended to embed in practice the 'predict and provide' mentality, referred to in the introduction to this paper. Furthermore, as a result of comparatively low capital expenditure requirements in the supply arms of integrated incumbent companies, due in part to legacy customer bases, this has meant that supply has been a key driver of cash flow for large utilities (Coates et al 2014: 1). This cash has often then been taken out of suppliers and used to invest elsewhere within large corporations – and not always in Britain (Coates et al 2014; Interview 1).

In these ways suppliers provide value specifically within wider business portfolios (and ultimately to parent companies and their shareholders) but at the same time become rather passive. In a bid to increase transparency of activities within integrated energy companies Ofgem has asked that consolidated statements be produced on an annual basis. As part of these statements companies must produce charts of how responsibilities for business functions are allocated. If we take SSE as an example, of the 17 business functions listed along the 'route to market' it appears that the supply arm has shared responsibility only for only two: determining and implementing hedging policy (SSE 2012) – see Table 5 below.

[40] Transfer pricing refers to transactions between any connected UK corporate entities when calculating taxes (HMRC website: http://www.hmrc.gov.uk/international/transferpricing.htm) but here it refers specifically to the gas and electricity bought and sold within vertically integrated gas and electricity companies (see Which 2013:8 for a good explanation).

**Table 5: Allocation of energy utility business functions (SSE)**

| Business Function | Generation | Supply | Another part of the business |
|---|---|---|---|
| Operates and maintains generation assets | ✓ | | |
| Responsible for scheduling decisions | P/L | P/L | P/L F |
| Responsible for interactions with the Balancing Market | | | P/L F |
| Responsible for determining hedging policy | P/L F | P/L | P/L F |
| Responsible for implementing hedging policy/makes decisions to buy or sell energy | P/L F | P/L F | P/L F |
| Interacts with wider market participants to buy/sell energy | | P/L | P/L F |
| Holds un-hedged positions (either long or short) | | P/L | P/L F |
| Procures fuel for generation | | P/L | P/L F |
| Procures allowances for generation | | P/L | P/L F |
| Holds volume risk on positions sold (either internal or external) | | P/L | P/L F |
| Matches own generation with own supply | | P/L | P/L F |
| Forecasts total system demand | | P/L | P/L F |
| Forecasts wholesale price | | P/L | P/L F |
| Forecasts customer demand | | P/L | P/L F |
| Determines retail pricing and marketing strategies | | ✓ | |
| Bears shape risk after initial hedge until market allows full hedge | | P/L | P/L F |
| Bears short term risk for variance between demand and forecast | | P/L | P/L F |

Key:
✓ function and P&L impacting that area;
P/L Profit/losses of function recorded in that area;
F function performed in that area.

*Source: SSE 2013 Consolidated Segmental Statement – see bibliography for weblink*.

If we then read the notes to this chart these responsibilities are further qualified to state that the energy supply subsidiary has responsibility only for determining likely customer demand, albeit this is key input data into company trading and hedging processes (again a point to which we return again in section 4.1.5 below). The CEO of SSE has characterised the supply business as 'dealing with customers' thereby leaving generation and especially trading subsidiaries to provide the more technical or financial business functions of generation, procurement and risk management (ECC 2013a). This characterisation is similar to that given by senior executives of the other five incumbent companies in their annual consolidated statements 2012. One recent report on UK incumbent energy suppliers has claimed that "… they send out bills, that's pretty much what they do" (Hannon et al 2013: 1035).

The point of relevance to demand management here is that holding companies have had little incentive to change the EUCo model wherein suppliers are 'passive' given that their main function has been to secure cash payment for generation assets, and to predict demand. Motivation to alter supply businesses to become focused on demand reduction or flexibility is not embedded within this model – indeed the opposite may well be the case (see also Section 4.4 below). Indeed, to the extent that supplier arms of large corporations have plans to change their businesses towards enabling greater demand management VI may actually prove an obstacle. As VI is about securing the route to market for generation then the incentive is to match demand to generation and keep demand steady, which means keeping customers and a steady demand per customer. All of this is an incentive to predict demand rather than actively focusing on demand reduction. Some

integrated suppliers have been exploring DSR but there can be some tensions between the generation and supply arms of the business (Ward et al 2014: 23). In these instances allowing VI can be viewed as a problem with current energy governance.

Although VI has had the effect up until now of underpinning incumbent market power and of adding to issues around transparency and liquidity there is same debate emerging as to whether VI will at some point become negative for incumbent energy companies (Interviews 5 and 15; see also CMA 2015a: 14-15). This is partly because independent suppliers have been able to gain market share in 2014 during the period of falling wholesale prices. Independents are more flexible and better placed to pass falling prices onto customers – some because they procure non-fossil fuel energy and others because they have not had to procure in-house (see Coates 2014: 7; CMA 2015a: 14). This can make some of the large incumbent suppliers appear somewhat unwieldy by contrast. It should be noted, however, that at times of rising prices large VI companies remain better insulated. Already one incumbent, SSE, has announced plans to legally separate its supply and generation businesses by March 2015. Albeit some questions are being asked as to whether this will go beyond current licence separation requirements and Balancing and Settlement Code (BSC) rules to report volumes separately for production and consumption (Interview 1).

VI may, indeed, also be presenting some positive implications for some other more sustainable independents. Some interviewees have claimed that because of current market rules and incentives new market entrants have felt the pressure to become vertically integrated (Interviews 1 and 9). As already noted above both Good Energy and Ecotricity have been integrating renewable electricity generation assets into their supply businesses, and some LAs are seeking routes to local markets for distributed energy. Good Energy is currently focused on the ‘development pipeline of new generation assets’ (Good Energy 2015), and Ecotricity now sources 40% of the green electricity that it supplies from its own fleet of wind and sun parks (Sustainable Planet 2015). Furthermore, Ecotricity’s founder, Dale Vince, claims that supplying demand from their own renewable production has allowed Ecotricity to avoid volatile fossil fuel price volatility and to, thereby, keep prices frozen for two years (Sustainable Planet 2015). In these specific cases VI has helped independents to offer renewable electricity, lower prices to customers and, in the case of Good Energy in particular, offer a route to market for distributed renewable energy.

#### 4.1.5 Wholesale market rules: liquidity, transparency and trading

*This section analyses the incentives for supplier companies that occur as a result of wholesale gas and electricity market regulations and rules, in particular BETTA and trading rules. The overall inference, as with above sections, is that these rules reward the EUCo volume-supply model as well as further underpin incumbent market power. There is a broader argument in place here which*

*is that previous policy decisions to liberalise and deregulate financial and energy markets have resulted in a greater emphasis on trading as innovation and risk management – above any focus on sustainable innovations including demand management*.

Financial market deregulation, the increasing prevalence of short-term speculative rather than productive finance in the economy and the growing economic importance and influence of the City more broadly have provided the back-drop for energy market reforms (Dophin 2012; Kuzemko 2013; Newell and Paterson 2010; Strange 1998). It is worth noting here that in 2012/3 the world's primary economy (i.e. natural resources and biological capacity) was worth approximately $55trillion; the secondary economy (real goods and services produced via human labour) approximately $85trillion; but the tertiary economy (financial products) was worth approximately $225trillion (Floyd and Slaughter 2014: 487). Financial markets have come to dominate the world economy and drive new practices in the primary and secondary economies – sometimes referred to as the financialisation of the economy. In such ways natural resources have become commodities that have, in turn, become asset classes in which to invest or over which to speculate (Fattouh 2012). The City of London, and the Big Bang market deregulations of the 1980s, have been central to enabling these changes. Climate and environment groups and analysts have, however, critiqued this commodification of natural resources – partly because it encourages practices that tend to ignore the other values associated with our natural environment and encourage practices that are detrimental to it (Newell and Paterson 2010; Paterson 2014).

As we have seen in sections 4.1.1 and 4.1.2 above energy markets were liberalised in order to improve the economic efficiency of the energy sector, to bring in competition and, in doing so, place downward pressure on prices – thereby also protecting customers. In fact, liberalisation per se had become a central energy policy objective (Kuzemko 2013: 77). It was made clear at an early stage that the creation of liquid and transparent wholesale markets would be vital to a successful, efficient and competitive GB energy market (Thomas 2006; Maclaine 2010: 183; see also Pollitt 2012: 8). Liberalised wholesale markets, it was envisaged, would open up energy markets to new entrants by providing liquid access to generation for suppliers, transparency and a more 'level playing field' (Thomas 2006: page). However, like points made above about the ways in which privatisation as implemented failed to deliver on initial ideas, so too have energy markets under-delivered on these early assumptions. In economic theory markets work well when they are: competitive, transparent and liquid – but many observers, including Ofgem and the CMA, now agree that electricity markets, in particular, are not sufficiently transparent, liquid or competitive (Thomas 2006; see also CMA 2014; Mitchell 2014b; Ofgem 2008 and 2014a; Platts et al 2014). As such they are unlikely to function well in the interests of customers. There are also concerns about gas markets including a review, in conjunction with the Financial Conduct Authority (FCA) and the EU, that was conducted into gas trading collusion between large energy companies (Which 2013).

#### *4.1.5.1 Trading*

Suppliers, large and small, to greater or lesser extents need to be able to procure gas and electricity on markets. Typically those gas and electricity volumes not procured 'in house' are accessed through wholesale markets and trading in energy – the rules of which are discussed below. According to consolidated segmental statements of the Big 6, and as we have already seen in section 4.1.4, trading arms of incumbent energy companies have increasingly taken responsibility for procurement, albeit supplier arms must still input important demand information.[41] In fact each of the Big 6 energy companies now has a separate, but wholly owned, trading company where both physical and financial products are traded and risk management is carried out. In some cases trading arms, which provide procurement functions for GB suppliers, are not located in the UK – as it the case with RWE Trading (based in Essen), although there is a London trading arm too. Issues have already been raised in section 4.1.4 regarding transfer pricing and the lack of genuine transparency into dealings between trading, generation and supply arms of each business, but some further questions are raised here about the costs and benefits of these trading practices.

This is clearly not first time that energy companies have entered enthusiastically into trading – the 'first round' having occurred during the late 1980s/1990s wider City boom when it was generally understood that all energy companies worth their salt needed trading departments. Trading came to be perceived as something that the 'big' market players should be doing (Interviews 6 and 9). Enron's attempts to realise more fully the value of its physical assets through trading spring to mind here of course. This latest trading trend appears to constitute a second round for which there are a number of suggested drivers. One has been the degree to which weather dependency of, in particular gas, makes risk management important (Interviews 6 and 8). One example of this was the especially cold Winter of 2006 and the impact this had on demand for gas. For some companies this had resulted in a move from profit to loss within weeks (Interview 8).

The emphasis on the importance of the trading businesses within the overall business structure varies but there appears to be some agreement with regard to the ability of separate trading companies to deliver a realisation of value along the whole value chain. One illustrative quote is from the CEO of EDF: "EDF Trading… creates added value for our extensive portfolio of assets" (Philippe Torrion in EDF Annual Statement 2012). What also seems clear is that trading companies have been growing quite rapidly relative to other parts of the energy businesses, in particular suppliers. What is perhaps less clear is the degree to which trading here includes, in addition to core procurement and hedging functions, profit maximisation via speculation although

[41] For the latest see: https://www.ofgem.gov.uk/ofgem-publications/93606/linkstoconsolidatedsegmentalstatements-pdf

there have been some reports of this becoming an important element of gas and electricity company trading (see Which 2013: 10). This would infer a somewhat different risk profile for energy companies if they are exposing themselves to speculative market risks – the types of risks that some investment banks and hedge funds have so spectacularly mismanaged over the past decades.

One implication of this is that barriers to entry for new suppliers are further reinforced and scale rewarded for UK incumbents. Independent supply companies have to focus on managing wholesale price risk (Interview 8) whereas the Big 6 energy companies focus on managing commodity price risk higher up the value chain. As claimed by EDF Trading it is now actively '… able to operate along the whole length of the value chain from production to distribution' (EDF 2013). The question of who benefits from trading gains, or pays for trading losses is an interesting one which we will return to in section 4.3 below. One also has to think about what implications this has in terms of how else such financial and human capital could be deployed – the question of what practices energy governance is *not* sufficiently incentivising in the UK. Given the degree to which customers (mainly domestic gas and electricity) do not now trust energy suppliers and to which indirect costs (which include *customer service* costs) remain relatively low within company accounts, an argument could be put forward that are 'better' uses of capital. One would be to re-invest cash back into incumbent supplier arms to build more responsive and innovative customer service teams. Clearly, however, for suppliers driven by the need to act as 'routes to market', to deliver cash to parent companies there is just not enough discretion or incentive to undertake such reforms.

#### *4.1.5.2 Wholesale Market Designs*

Markets are platforms that enable parties to buy and sell gas and electricity – and they can be designed and formatted in a wide variety of ways. The general intention when liberalising and privatising energy markets was that wholesale markets should be designed such that they are liquid and transparent and, thereby, easily accessible by parties looking to trade. Liquidity is understood to be important in terms of enabling access, because low liquidity tends to raise costs of access, but also because prices can be more easily manipulated in thinly trades (or opaque) markets (CMA 2014a: 10). Under this formulation gas and electricity markets were both split into market segments, mainly by time frame for trades to complete, with the idea in mind specifically to encourage more 'within day' (spot) trading and access.

The 'Imbalance of Power' report, produced by Which, offers an in depth description of gas and electricity markets and the intention is not to repeat this analysis here (Which 2013). What is does make clear is that for gas and electricity markets are segmented by time frame: within-day (often referred to as 'spot'); day-ahead (within 24-hours); between day-ahead and 1 to 2 months (often

referred to as ‘near-term’ or ‘prompt’) and those trades not due for delivery for 2 months or more (often referred to as ‘forward’). Table 6 shows the markets segmented by time-frame, but also where these trades usually take place (i.e. either ‘over-the-counter’ (OTC) or on a privately-owned trading exchange) (Which 2013: 10). Most OTC in GB markets trades are bi-lateral, confidential and uncleared. This means that collateral and credit risks and agreements are between the trading parties, and information relating to these trades such as prices, volumes and products are not made publically available (ibid: 11).

Trading on exchanges is understood to be more expensive than OTC due to fees changed by exchanges and higher collateral required (see also section 4.2). Clearly, finding ones way around these markets takes a considerable amount of expertise and investment in personnel and IT systems. For suppliers, whose job it is to predict demand as accurately as possible, it is important to their ability to make money and to avoid costs to have sufficiently competent IT systems (Interview 9).

**Table 6: Gas and Electricity market segments and sub-market platforms**

| Sub-market | Gas market platform | Sub-market | Electricity market platform |
|---|---|---|---|
| Spot | National Balancing Point (NBP) | Spot | APX, ICE-ENDEX |
| Day-ahead | NBP, OTC | Day-ahead | N2EX, APX, ENDEX and OTC |
| Near term or prompt | OTC | Near term or prompt | OTC, N2EX, APX, ENDEX |
| Forward | OTC | Forward | OTC |

*Source: Which 2013*

The general rules that still govern gas markets are called the new gas trading arrangements (NGTA) and were introduced in 1999. The NGTA introduced Europe’s first screen-based, on-the-day commodity market for trading in the wholesale supply of gas; primary auctions for entry capacity to the national transmission system; and incentives on the owner and operator of the national gas transmission system to ensure that it operates and balances the system efficiently (Gas & Oil Connections 1999). Trading in gas has historically taken place via long-term contracts (or gas supply agreements - usually in excess of 5 years), although in GB spot and prompt markets have grown in size and liquidity over the past decade or so (Cornwall Energy 2013). Although aspects of liquidity and transparency are better in gas markets than electricity (ibid), i.e. only 70% of gas market trades are OTC versus 80% for electricity (Which 2013: 11). This is not to say that there are no current issues. As we have seen there is an investigation currently into gas market collusion and the initial CMA enquiry document suggested that there may be a lack of

transparency and liquidity in both gas and electricity markets (CMA 2014a: 8).[42] The lack of transparency makes it difficult to investigate concerns about relationships between wholesale costs and retail prices and the levels of profitability being earned by incumbent energy companies (see Labour 2013: 11). Low market transparency is also understood to be part of the reason for the growing lack of trust in energy companies in the UK (ibid: 11).

The focus here will, however, be on better understanding the incentives produced by electricity market rules and regulations and how they relate to claims of low market liquidity and transparency. Understanding how electricity wholesale markets work, including access to them, will also be covered in section 4.2 but with an emphasis there on specific barriers to new market entrants. A 'power pool' was established in 1990 as part of the privatisation and liberalisation process,[43] but due in part to the ability of generators to 'game' this market structure new market rules were later devised. The New Electricity Trading Arrangements (NETA) were introduced in March 2001 for England and Wales as a response to generators 'gaming' the previous pool (Thomas 2006; Mitchell 2014b). NETA rules were based, in part, on the New Gas Trading Arrangements (NGTA) (Interview 1). In 2005 NETA was renamed the British Electricity Trading Transmission Arrangements (BETTA) when Scotland joined.

There is some evidence to suggest that NETA, with its emphasis on bi-lateral trading, created strong economic incentives for companies to merge and trade in-house thus providing a market incentive to pursue VI (Thomas 2006: 592; Cornwall Energy 2013; Helm 2014 in Platt et al 2014: 22). From the start, some questionable decisions were made, particular in regard to liquidity. One was that the spot market element of NETA should account for less than 10 % of wholesale power sales (Thomas 2006: 592; see also Which 2013). The rest of trading was to take place within longer-term, bi-lateral confidential contracts, which are not disclosed to the Regulator. This decision to limit the spot market element to 10% was, in itself, somewhat curious given original notions about the need to provide liquidity, easy access to short-term (spot) markets, and a 'level playing field' for new entrants. Notionally the liquid (accessible) spot market was to be where most new entrant suppliers, without their own generation, would go to procure electricity (and gas).

The bi-lateral trading element of current electricity market design is also held to have implications for availability of market information (Interviews 1 and 5). In fact in 2013 80% of electricity trades (either in-house or other bi-lateral trades) were confidential, commercial transactions and therefore

[42] Albeit the re-stated CMA 'theories of harm' issued early in 2015 stated that it is not so far convinced that liquidity is an issue in electricity markets (CMA 2015b: 20-22). Specifically the updated document suggests that electricity markets are liquid enough to not distort competition in retail and generation, it should be noted that liquidity is measured in this document in a very narrow way.

[43] For an in-depth discussion of the pro's and con's of the power pool, and indeed of the complex processes of decision-making that led up to its establishment see Helm 2003 131-7.

information has not been publically available with clear implications for transparency (Which 2013: 11). Other analysis claimed, again in 2013, that of the approximate total volumes changing hands (855 Twh), 500 TWh were traded on forward markets and approximately 300 TWh were still traded on long-term structured contracts called power purchase agreements (PPAs) (Cornwall Energy 2013). These are direct contracts between two parties, i.e. generator and supplier, and the commercial terms such as volumes, payments terms and prices are set out in the contract (Which 2013: 11). These types of trades also allow trading arms of incumbents to build up considerable information about gas and electricity markets – commercially sensitive information that they do not have to share. As things have turned out short-term liquidity is even worse than initially envisaged given that liquidity on day ahead and spot market segments combined at 5-7% of total wholesale power sales (Interview 1; Which 2013; Cornwall Energy 2013 – see also Ofgem 2014a: 81).

This can have various (and varied) outcomes: for large and small suppliers and for the pricing of electricity (Interview 5). Overall the apparent lack of liquidity makes trades and pricing less transparent and access to markets at affordable rates an issue for small suppliers and new entrants – more on this in section 4.2 below. In Ofgem's original documentation, which outlines the reasons for the current CMA market review, it is stated that the majority of small suppliers they spoke to had told Ofgem that the lack of liquidity in the wholesale market was one of the main barriers to expansion and was a risk to their business" (Ofgem 2014a: 85). The same report also claims that low liquidity in electricity markets can be evidenced by wide bid-offer spreads and low churn ratios (ibid: 83).

Given the varying abilities of incumbents to trade in-house these low levels of spot market liquidity serve to further underpin their dominant market position by providing a barrier to entry for new entrants. Low levels of liquidity, in that they reward integrated companies, tend to incentivise suppliers to have generation (Interviews 3 and 9). One senior executive of a small energy supplier noted that VI is the logical business model in response to current wholesale market design – critical mass is essential therefore they must buy generation assets (Interview 9). This is especially so for renewable electricity suppliers with embedded generation as VI helps mitigate the risks of accessing power on the spot market, but also has significant embedded benefits and subsidy flows for 'green heavy' generation portfolios (i.e. FiT levelisation and administration cost payments) (Interview 1).

*In sum, vertical integration combined with the incumbency effect and transfer pricing work together to incentivise and reward scale – ultimately also reinforcing incumbent market power. In-house trading and the 'sticky' nature of domestic customer bases have provided a reliable market in terms of volumes and pricing for selling electricity and gas generation and production (Cornwall 2013). Current energy governance has provided many benefits for incumbents. This is all well and*

*good if the benefits of these state-market relations flow back to society in one form or another and/or if incumbent interests are in line with UK public policy objectives. However, as will be seen in more detail in section 4.4 below, benefits of these relations and how they are structured and governed appear to flow back to energy holding companies, and debt and shareholders, rather than to consumers or society more broadly*.

## 4.2 Barriers to entry and expansion for independents

Just as various aspects of energy governance covered in section 4.1 have enabled incumbent energy companies to maintain scale and market power there are other policies, regulations and rules that will be covered in this section that pertain more specifically to barriers to entry for new suppliers. *Clearly, the flip side of the claim that energy governance has (thus far) tended to enable incumbent market power in certain ways is the inference that their ability to defend their positions has made life difficult for new suppliers seeking to enter gas and electricity markets. What this suggests is both a market design that has to a degree protected incumbents whilst at the same time made things more difficult than necessary for new entrants. Much of this section is about how governance (esp. codes and licences) influences cost structures for suppliers, with a particular emphasis on costs faced when starting a new supply business and/or those faced by suppliers seeking to access energy markets as well as barriers to business expansion. Here we reiterate the claim that the business models of some new entrants are designed to enable DR, DSR and/or DE, thereby better enabling some energy policy objectives, whilst some of them are also socially beneficial in that they seek to distribute benefits locally; re-invest in more sustainability; and/or re-invest profits in charitable schemes.*

### 4.2.1 Licences, statutory codes and standards

*One aspect of energy governance that has been receiving a greater amount of attention, from the CMA and Ofgem, is corporate licences, statutory codes and standards (Ofgem 2015d; CMA 2015b and 2015e). Supplier licences and codes are analysed in this section to explain the ways in which they, in practice, serve to complicate independent company market entry but also abilities to expand once initially established. This subsection is sub-divided in order to explore in detail the size of set-up costs and technical proficiency requirements as well as the equally daunting ongoing running and credit and collateral costs inferred within supplier licences and codes and how these provide barriers to entry and expansion for independents and increase costs for consumers. Exploring these codes and licences in more detail is one way of making more overt the complexity of energy governance and showing one of the quite profound ways in which supplier company practices and markets are shaped by existing and embedded regulations and rules not designed with climate mitigation in mind. The analyses here below raises questions about whether licences and codes should be amended to better reflect sustainability/demand management objectives and how this might take place (given heavy industry influence in code change).*

Under the Gas Act 1986 and the Electricity Act 1989 supplying gas or electricity to customers within the GB system is a licensable activity (Ofgem 2014c). In order to gain approval to operate a supplier must demonstrate to the regulator the capacity to provide services to 50,000 or more customers (Conaty 2013: 30). Licences can be held for supplying domestic and business (non-domestic) customers, or for supplying domestic customers only (ibid). Ofgem has, since its inception, had a duty to protect the interests of existing and future consumers, including their interests in *security of supply*. In performing its duties Ofgem

> "…should have regard to the need to secure that licensees are able to finance their licensed activities and should carry out its activities in a manner best calculated to promote efficiency and economy" (JRG 2013: 6).

Generally speaking licences exist, therefore, to ensure that companies providing the important function of supply are indeed capable of fulfilling that function – bearing in mind the need to maintain security of supply and protect consumer interests. In a way political recognition that energy is an 'essential service' is embedded within company licences - companies must commit to them precisely because regular energy supply is so important socially, economically and politically (see Ofgem 2014a: 78).

Each licence, in turn, contains within it a series of conditions that suppliers must meet, including the requirement that they are parties to and will comply with certain industry codes and standards (Ofgem 2014c; Gas and Electricity Markets Authority 2015). Although there is quite an array of conditions applicable to the GB energy industry more broadly many standards are more relevant to transmission and distribution licence holders (see Lockwood 2014) or to generators (see Mitchell 2015 forthcoming). For suppliers the most relevant codes (listed below) define the terms under which balancing takes place, industry participants can access the electricity and gas networks and how the costs of doing so are calculated and passed on – i.e. via suppliers and ultimately to customers. Some industry codes have been in place for some time – many were implemented before sustainability became an energy policy objective.

Codes are, however, what can be described as a 'living documents', which means that amendments are possible over time – albeit the process for amending documents (see below) is complex. It is also worth noting that increasing the environmental sustainability of the energy system is not an objective built into most licences and codes (with the exception of smart meter codes of practice) given that they were almost all written pre-Ofgem's primary Sustainability Duty was allocated. The emphasis underpinning most codes is to ensure the ability of licencees to finance their activities and to carry out its activities in a manner best calculated to promote efficiency and economy, whilst ensuring security of *supply* (see JRG 2013: 6).

GB gas suppliers, to comply with their licences, must commit to the following codes and agreements:

- Uniform Network Code (UNC);
- Supply Point Administration Agreement (SPAA);
- Smart Energy Code: licence conditions governing the installation of smart electricity and gas meters.[44]

The SPAA sets out the inter-operational arrangements between gas suppliers and transporters. It was created in order to provide governance around supplier-to-supplier procedures – for example to oversee the effective and efficient transfer of consumers between suppliers.[45]

#### *4.2.1.1 Set-up costs and technical proficiency*

The UNC is a legal document that defines rights and responsibilities for users of the gas transportation systems and it is administered by the Joint Office of Gas Transporters. Gas suppliers have to sign an agreement which binds them to the UNC as a user. The UNC is designed with the intention of ensuring system security and safety. This includes the important task of daily balancing of physical gas in markets and the UNC sets out rules to incentivise gas shippers to balance their own supply and to make sure that robust computer systems are developed and maintained (Cornwall Energy 2013). Balancing of gas is relatively straightforward in comparison to electricity, partly because gas can be stored. With the onus on shippers to balance the system operator (National Grid) does not have to be so active in gas markets (for example, shippers' % share of traded gas market volumes in 2Q13 was 98.1% and National Grid's only 1.9%) (Cornwall Energy 2013). In this way, also, costs passed onto consumers via suppliers for balancing gas markets are low – certainly when compared with those associated with balancing electricity markets. For example, the cost of providing transmission assets and balancing makes up between 1%-3% of an average gas bill whilst it makes up 3%-8% of an electricity bill (ibid).

For electricity small suppliers who supply less than 5MW in total, with less than 2.5MW going to domestic customers are exempt from the requirement to hold a licence (CLNR 2013: 18). Other exemptions are for resale of electricity originally purchased from a licensed supplier, or for on-site supply where electricity is generated and used on-site by one consumer or a group of consumers (ibid: 18). Costs associated with code compliance in electricity are higher but so too are the licence conditions and codes more complex. GB electricity suppliers must commit to the:

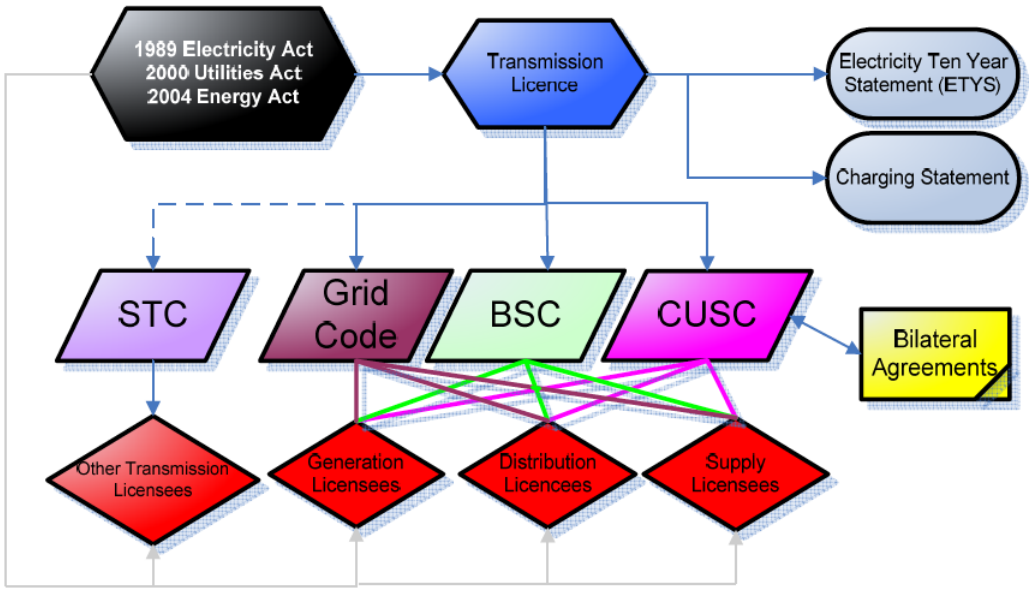
- Balancing and Settlement Code (BSC): contains governance arrangements for electricity balancing and settlement in GB;[46]

[44] For more information see: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43112/4841-government-response-to-licence-conditions-for-inst.pdf
[45] For more information on the SPAA see the Ofgem website here: https://www.ofgem.gov.uk/licences-codes-and-standards/codes/gas-codes/supply-point-administration-agreement

- Connection and Use of System Code (CUSC): the contractual framework for connection to, and use of, the national electricity transmission system;[47]
- Distribution Connection and Use of System Agreement (DCUSA): governance arrangements for connection to, and use of, distribution networks;[48]
- Grid Code: is a requirement under CUSC that specifies technical requirements for connection to, and use of, the National Electricity Transmission System (NETS);[49]
- Master Registration Agreement: governance mechanism to allow suppliers to transfer customers;[50]
- Smart Energy Code: licence conditions governing the installation of smart electricity and gas meters.[51]

There are sets of complex inter-relations and a number of bodies involved in codes – transmission, distribution and generation companies must all comply with a number of codes (see Figure 4). In addition a variety of different industry organisations are responsible for maintaining systems and codes as well as overseeing any modifications (see Lockwood 2014: 83-5). These vary according to whether the code pertains to gas or electricity markets, and according to the code – but it is common for the National Grid, as systems operator, and Ofgem to be involved in most codes.

**Figure 4: Code, industry participants and interactions**




[46] For more information see: https://www.ofgem.gov.uk/licences-codes-and-standards/codes/electricity-codes/balancing-and-settlement-code-bsc
[47] For more information see: http://www2.nationalgrid.com/uk/industry-information/electricity-codes/cusc/the-cusc/ and/or: http://www.nationalgrid.com/NR/rdonlyres/87720CE3-B779-4C89-9B51-7F3833423B2F/59002/CUSCSummaryFeb13.pdf
[48] For more information see: https://www.ofgem.gov.uk/licences-codes-and-standards/codes/electricity-codes/distribution-connection-and-use-system-agreement
[49] For more information see: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-Code/
[50] For more information see: https://www.ofgem.gov.uk/licences-codes-and-standards/codes/electricity-codes/master-registration-agreement-mra
[51] For more information see: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/43112/4841-government-response-to-licence-conditions-for-inst.pdf

To a great extent these codes delineate and underpin relationships between companies operating within GB gas and electricity systems – but meeting codes represents a big hurdle for new companies trying to enter the market (Interviews 8 and 9). As Ofgem recognised in its State of the Market Assessment, the costs of compliance are

> "…a heavier burden for new entrants and smaller suppliers with smaller customer bases over which to spread those costs" (Ofgem 2014a: 78).

Each code is highly complex, in itself, and the costs associated with the initial set up of a business capable of complying with them are high (Cornwall Energy 2013; Interviews 1 and 9). As seen from the lists above, however, a new market entrant looking to supply gas and electricity needs to prove capable of complying with not one but multiple codes each of which is difficult to understand, involves establishing relationships with a range of actors, and which implies financial costs. For example, some codes are more than 20,000 pages long and considerable time, legal fees and personnel need to be invested just to understand what the company is signing up to, let alone figuring how it needs to organise itself in order to comply in practice (Interview 9).

Incumbent gas and electricity companies have large teams dedicated to interpreting, following and giving feedback on regulations – something that small gas and electricity companies clearly cannot afford to do (Interviews 1, 3 and 9). In 1994 Ofgem recognised how complex supplier licenses had become and did remove a good deal of what was felt to be irrelevant, but since then many new sections have been added back in (Ofgem 2014a: 78; Interview 9). One independent supplier pointed out to Ofgem that, from their perspective, the complexity of regulation and codes has trebled from 2009 to 2014 (ibid: 79). Because codes are 'living documents' they can be amended, or new clauses added but these changes also infer additional costs of compliance. One industry executive interviewed for this paper pointed out that although it is easy to get a license, at a cost of £250, because it is so difficult to comply with codes a great many of the companies that are granted licences each year do not actually manage to successfully start a supply businesses (Interview 9).

One of the greatest impacts of codes in terms of creating barriers to entry for market entrants is that they affect the set-up costs faced by new suppliers attempting 'organic' market entry. This is because compliance with codes implies establishing levels of technical proficiency (that are costly to establish).[52] When interviewed by the CMA, as part of their current investigation, Ovo Energy claimed that "…it took 12 months prior to launch to understand the market well enough to prepare a good enough business model" (Ovo in CMA 2015: 9). Indeed, once a licence has been allocated it can then take 6-9 months to get sufficiently accredited to proceed and a company can spend up

[52] 'Organic' market entry is the most common method whereby a company seeks a licence from Ofgem and starts from scratch – as opposed to acquiring existing businesses. It is the most common approach taken in the UK (CMA 2015: 6).

to £5/600,000 before it gets its first customer (Interview 9; CMA 2015: 9). For example, in order to meet just one set of code requirements, the BSC in this instance, IT systems need to be purchased and installed so that future demand can be accurately predicted, as well as to avoid electricity balancing costs once operational (more on which in section 4.2.3). It is also necessary to have stress test systems in place in order to get accreditation. Therefore, costs just to gain accreditation with rules and regulation can be almost as high as normal business costs incurred to access markets and gain and maintain customers (CMA 2015: 9).

In addition to meeting code requirements, a new supplier will also need to establish:

- credit cover for power purchasing (see below on collateral);
- provide customer service systems;
- acquisition costs for securing new customers, including sales/marketing as awareness of the company will be low;
- set up customer relationship management (CRM) systems including the all important data capture;
- IT systems for billing and trading;
- set up systems capable of reporting on compliance with codes/licences and trade certificates

The CMA's most recent report, as part of its ongoing investigation, sets out some costs of organic market entry according to interviews with a number of independents. Ovo Energy estimated that its founder spent £400,000 to set up systems and obtain licences, whereas First Utility estimated its costs at £1.35m, and one independent company executive interviewed for this paper estimated the costs to be closer to £2m (Interview 9). The breakeven point, when customer receipts start to cover costs incurred, has been estimated at between 20,000 and 25,000 customers (CMA 2015: 9). Start-up costs faced when establishing a supply business are, therefore, large but when suppliers gain sufficient numbers of customers they can (relatively) 'sit back' (until they have 250,000 at which point they enter into the supplier obligation – see section 4.4) (Interview 9).

Taken together, then, up-front costs associated with meeting code and other regulatory requirements combined with those associated with acquiring and maintaining customers are widely understood to provide barriers to entry to independents – including those that seek to bring innovative business models, capable of enabling aspects of D3, to the market (CMA 2014a and 2015; Ofgem 2014a; Interviews 1, 5 and 9).

#### *4.2.1.2 Running Costs/Barriers to Expansion*

In addition to escalating up front costs, compliance with codes and standards have implications for all suppliers once up and running. In governance terms what is of relevance in this section is the

supplier hub model adopted in the UK, as outlined briefly in section 3 above, which organises the industry such that system (and some policy) costs are passed onto consumers via suppliers. What this means is that once a supplier is operational it will have four broad categories of costs (see also section 2.2 above):

- Indirect costs: i.e. those that are more controllable and are to do with business operations including customer services, meter reading, IT, bad debt costs;
- Environment and social policy costs: i.e. that are less controllable by suppliers and supplier obligations (for larger companies) (see Ward et al 2014: 25);
- Industry costs: also less controllable by suppliers and includes code/regulation compliance/costs of transmission/distribution and balancing the system;
- Direct fuel costs: this includes the cost of electricity and gas used by the licencee.[53]

In terms of calculating industry costs for suppliers each code contains a high number of additional rules – and those pertaining to electricity system interconnections and balancing are particularly complex and costly. These costs are applicable to all electricity suppliers including those with fewer than 250,000 customers. Electricity suppliers to comply with:

- The CUSC must pay Transmission Network Use of System (TNUoS) costs; [54]
- The BSC must pay Balancing Services Use of System (BSUoS) costs;
- The DCUSA must pay Distribution Use of System (DUoS) costs;

Each code sets out complex sets of rules for calculating these various sets of costs which suppliers pay and then pass onto customers. They are called 'direct'/non-controllable costs because suppliers have no say in how they are calculated – albeit they can organise their businesses to pass the costs on with least impact (see below).

It is with regard to distribution system costs that most suppliers have had cause to complain in recent years. DUoS costs have been escalating and the impact of this is felt not just by suppliers, but also by customers – in an environment where other costs have also been placing upward pressure on bills. Current estimates are that DUoS associated charges made up 15%-25% of an annual average electricity bill and distribution charges also make up between 15%-20% of an annual average gas bill (Cornwall Energy 2015c; see also EDF 2014). Although estimates are that distribution costs will start to fall (by about 12% by 2016), due to RIIO-ED1 coming into effect in April 2015, transmission costs are expected to escalate by 19% (Cornwall Energy 2015c; see also Lockwood 2014). This is unlikely to improve customers' opinions of electricity suppliers in the GB market given current price sensitivity and growing affordability problems. In May 2014 British Gas argued that networks were not sufficiently well regulated such that incentives fail to "provide the

[53] This is how incumbent energy companies lay their costs out in the required Consolidated Segmental Statements that they produce annually.

[54] For a summary of the CUSC see: http://www.nationalgrid.com/NR/rdonlyres/87720CE3-B779-4C89-9B51-7F3833423B2F/59002/CUSCSummaryFeb13.pdf

right level of pressures to ensure that costs passed through to consumers are minimised" (Telegraph 2014b).

Suppliers, in turn, tend to organise themselves such that these costs can be passed on to customers in the most cost efficient manner – especially as suppliers have little control over them. For this they need to have organisational structures (including more IT) in place to manage the costs and pass them on as quickly as possible (Interviews 1, 6, 9 and 14). In addition costs can be passed on with a significant time lag, especially for domestic non-half hourly metered customers, thereby requiring suppliers to hold high levels of free cash to pay costs before passing them on (Interview 1). Suppliers that best manage the flow of indirect costs onto consumers have a competitive edge, and because scale of business can be an advantage smaller market players find it harder to spread these costs. The greater the volumes sold, especially on a per customer basis, the more possibility for spreading the cost of maintaining such systems. What this also means is that managing these costs becomes another business function for suppliers – requiring considerable systems and focusing corporate attentions that might be better used elsewhere. Added together the costs associated with codes and licenses, as they currently stand and especially when combined with wholesale market access and collateral costs discussed below, provide another barrier to entry for new suppliers (Interviews 1, 7 and 9; CMA 2014a).

Given the emphasis on economic efficiency in energy regulation and the degree to which direct costs cannot be controlled incumbent suppliers have concentrated on reducing other costs over which they have do have some control, i.e 'indirect costs'. As a reminder, indirect/controllable costs include: sales and marketing, customer service, bad debts, supply costs, HR costs, corporate recharges – including costs, metering asset and meter reading costs (SSE 2014c; EDF 2013). It is worth noting here that according to the consolidated segmental statements of the six incumbent energy companies indirect costs amount to a low percentage of total operating costs – between 8 and 13%.[55] There are pressures to keep such costs to a minimum – not least given their overall answerability to parent companies looking to maximise financial returns. Recent Citigroup analysis claims that it will be the energy company with the highest (controllable) 'admin' costs per customer that will lose most market share if the market continues the trend started in 2014 and becomes more competitive (Coates et al 2014: 1).

Although it cannot be claimed that low operating costs per customer in each instance results in low customer service satisfaction, generally speaking it is understood that certain (expensive) systems

[55] Links to 2013 consolidated segmental statements for each of the big 6 can be found on Ofgem's website at: https://www.ofgem.gov.uk/ofgem-publications/89139/energycompaniespublish2013consolidatedsegmentalstatements.pdf

need to be in place to provide certain levels of customer service (call centres especially).[56] As seen in section 2.3 above, customer satisfaction with service levels from incumbents is low (in absolute terms and compared with satisfaction with independent suppliers) (Ofgem 2014e; CMA 2014a; Which 2013). One industry executive has claimed that customer service issues for some incumbents have been related to issues around switching to new IT systems (Interview 11). There have also been recent problems with some suppliers charging customers based on incorrect gas meter-readings, overcharging customers, holding onto balances when customer try to switch, mis-selling, inaccurate billing and handling complaints badly (CSE 2014a: 16; see also Energy Spectrum 2014). This rather infers that incumbent suppliers may have under-invested in this area – although one aspect of E.ON's current corporate strategy is to continue cutting controllable costs (PWC 2014: 14). Such difficulties experienced by consumers with incumbent suppliers might continue to provide an opportunity for new market entrants to take market share.

Taken together, therefore, the impact of code compliance on costs has not just been to erect barriers to entry for new entrants. Given that such a high proportion of costs are not controllable suppliers have only been able to cut back on those operational costs that relate to service standards thereby further alienating consumers/voters, and certainly not helping trust in supply companies. In addition, the embedded emphasis on security within industry codes can help us to understand why suppliers have stressed that from their perspective the delivery of reliable energy supply is paramount (Ward et al 2014: 25). To recognise overtly the emphasis on security within codes, in particular above any commitment to sustainability, is one way of understanding how energy governance hierarchies work in practice to constrain sustainable change. One detailed analysis of demand measures in the UK has observed that, as currently set out, codes do little to incentivise DSR - suppliers feel that security of supply is best assured through (more) generation (ibid: 25). This might, however, also reflect the role played by suppliers under vertical integration and the interests of generation units within incumbent energy companies.

Although questions of which actors can set, review and revise codes are to be covered in future IGov working papers, it is worth noting here that code reviews lie ostensibly in the hands of industry, in the form of industry-led Code Panels, and Ofgem (Interviews 1; Kuzemko 2014). Originally codes were considered part of industry 'self-governance' (CMA 2015e: 3), and this is referred to as the "industry-led" approach to code change (Energy Spectrum 2015a: 3). Overall a high number of codes relate to networks rather than markets and so are dominated by network companies and the Big 6 (Lockwood 2014). Code Panels, furthermore, tend to contain a majority

[56] SSE is a rare example of relatively higher customer satisfaction levels (current satisfaction is 50% which places it ahead of the other incumbent suppliers) but lower domestic operating expenses per account (RWE 2013).

of representatives from incumbent energy companies (Interviews 1 and 5; see also CMA 2015a: 44). This may be one explanation as to why Ofgem have noted that:

> "…the industry-led approach to code change is appropriate for delivering incremental, non-contentious changes to operational procedures, but is not suited to delivering significant reforms, particularly … those that may not be in the interests of incumbents" (Ofgem in CMA 2015: 44).

Ofgem can suggest changes and does have veto powers over decisions taken by Code Panels – but has rarely used them. In addition Ofgem, since 2013, does have some ability to take the lead on complex code modifications through the Significant Code Review scheme (CMA 2015e: 3).

Both Elexon and Ofgem have recently criticised current code systems – Elexon have noted that there are too many codes and suggested that they should be rationalised (Energy Spectrum 2015a: 3), whilst Ofgem have placed heavy emphasis on the fact that there are no binding timescales for decision-making on code reforms (Ofgem 2015a). These are certainly weaknesses of relevance but we are more interested here in why codes have not been changed specifically to embed a greater emphasis on sustainability. Indeed many codes were set up originally to support supply security in the days early after privatisation but they have proved hard to profoundly change over time (Interviews 1 and 5).

What is important here, in relation to significant reforms such as those needed to pursue a more sustainable agenda, is that code panels are not currently set up to consider sustainability in their decision-making about change. For example, the BSC Panel may consider sustainability during processes of amending codes but it is not a 'set criteria' (Interviews 1 and 7). Set criteria, by which BSC modification proposals are judged, are:

- Efficient, coordinated and economical operation of the GB transmission system
- Promote effective competition in generation and supply
- Promote efficiency in implementation of balancing and settlement arrangements
- Compliance with European regulation

If code panels are to be maintained as the gateways to code change then set criteria should include specific efficiency and sustainability guidelines – and should incumbents should not hold the majority of positions on panels.

#### *4.2.1.3 Codes, Credit and Collateral Costs*

There are two broad areas covered here that are relevant to suppliers: collateral requirements under code agreements and liabilities that arise under government low-carbon support schemes (supplier obligations). These rules and codes can be complex and subject to change, both through industry modifications and through government, code authorities and regulators (Cornwall Energy 2014e: 8). Collateral can take the form of:

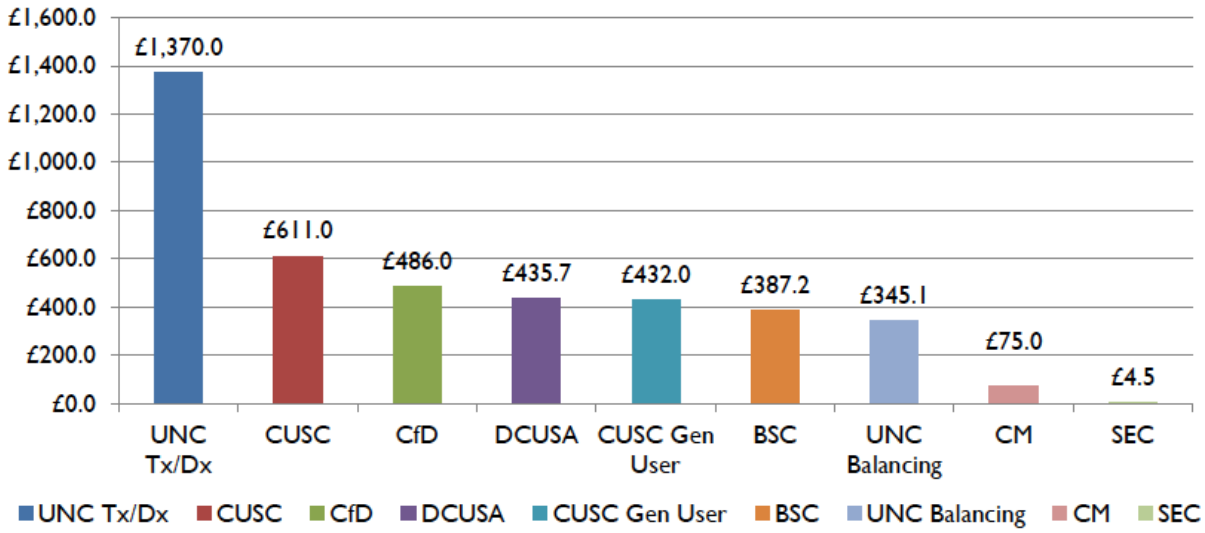
- Letters of credit

- Cash calls/Reserves
- Mutualisation (arrangements to share credit risk) and/or parent company guarantees

Collateral liabilities according to codes and financial (trading) rules can prove substantial for all suppliers but in particular they can act as a barrier to entry and/or expansion for independents.

Being a party to codes, including the BSC, CUSC, DCUSA and UNC, as well as under certain supplier obligations, to do with the Capacity Market (CM) and Contracts for Difference (CfDs), suppliers must agree to certain GB energy market credit and collateral arrangements (see Cornwall Energy 2014d and 2014e). Collateral is required under the terms of the CUSC, DCUSA and UNC because the use of networks is paid in arrears. Smaller independents, below the 250,000 customer de minimus, do not have to face collateral liabilities associated with supplier obligations/policy costs but they do face, often substantial, trading and code collateral liabilities (see below). The size of collateral lodged under various codes across the whole industry, measured as of year-end 2013, was an astonishing £4.2 billion (Cornwall Energy 2014e: 16) – see Figure 5 for a breakdown of collateral lodged against each code. Costs incurred under the Smart Energy Code (SEC) are yet to be fully established – but suppliers are likely to face further liabilities here (Cornwall Energy 2014e: 11).

**Figure 5: Average annual framework collateral 2011-13 (£/m)**




*Source: Cornwall Energy 2014e: 17*

Clearly, therefore, the amounts tied up in collateral are very high – and the heaviest burden sits with suppliers (CMA 2014e: 21). What is important to consider is not only the amounts of money tied up in credit notes and cash reserves, but the cost of the various credit instruments. In the instances that suppliers, i.e. vertically integrated incumbents, can use parent company guarantees as collateral their costs will be lower than those without such support structures behind them (ibid: 21). However, incumbents must post letters of credit and/or cash reserves under the terms of the

BSC and UNC where credit instruments are limited. Credit arrangements are a barrier to entry for new entrants given the degree to which their start-up position will affect their cost of credit, i.e. without an established financial track record credit costs will be higher than for incumbent competitors. In particular transmission and distribution activities that are more credit-intense present problems for new market entrants given that they typically cannot access unsecured credit allowances (ibid: 21).

Under the terms of the BSC there is a requirement for suppliers to meet certain credit rules, ostensibly to ensure that they are able to meet potential liabilities under the BSC if/when in imbalance (CMA 2015c: 5). There is no mandatory requirement to post credit so in the unlikely event, for a new market entrant, that they manage to always be perfectly balanced then they would not need credit in place (ibid). But in the event that they are not balanced they need to post credit or face penalties (including expulsion). These arrangements encourage small suppliers to adopt very risk-averse positions and to over-collateralise in order to ensure that they do not face penalties and/or are not expelled from the Code (ibid: 6). Of the £4.2bn lodged against codes £383m of it is lodged to meet BSC requirements, and of that £159m is lodged by small suppliers (Cornwall Energy 2014e: 16).

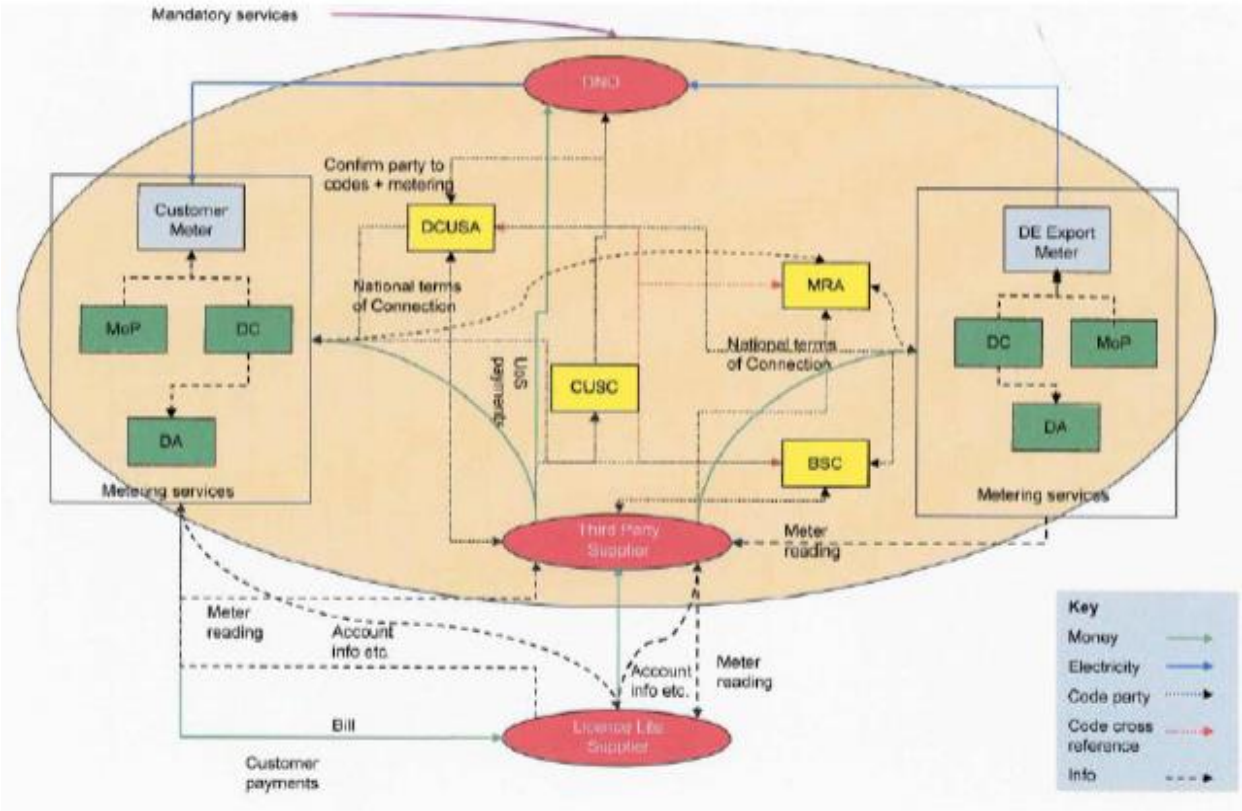
### 4.2.2 Licence Lite and White Label

*This section describes Licence Lite and White Label contracts and analyses the degree to which they have been useful in helping more innovative suppliers avoid the heavy licence commitment outlined above. White Label contracts have been growing in popularity in supply markets and have now been signed by a number of small suppliers whilst Ovo is using an amended version to set up new supply arrangements with a number of Local Authorities (LAs). The thinking behind these alternative arrangements has been that if licence conditions can be altered for small suppliers (and generators) then this could not only encourage the all important (to Ofgem and CMA) competition, but also the possibility for more small scale, distributed energy to grow in the UK (Ofgem 2009; Ofgem 2015b).*

Given the degree to which regulatory commitments and compliance were already understood to constitute a barrier to entry in 2009 Ofgem announced alternative arrangements, Standard Licence Code (SLC) 11.3, 11.4 and 11.5, most often referred to collectively as Licence Lite. In this way Licence Lite is one rule change that has been designed with enabling one aspect of D3, DE, in mind. Under SLC 11.3 a small supplier could, under Licence Lite, apply for a full supply licence but then apply to Ofgem for a direction relieving it of its obligation to become a direct party to SLC 11.2 codes (the requirement that the supplier must be a signatory to codes) (Walker Morris 2012; Ofgem 2015b). SLC 11.4 and 11.5 lay out Ofgem's guidance in terms of the process for requesting a direction, they type of information required, and criteria that Ofgem will use to determine whether

to make such a direction (ibid). Ofgem may issue this guidance as long as arrangements are in place for a fully licensed, 'senior' supplier, or Third Party Licensed Supplier (TPLS), to discharge code compliance on behalf of the small supplier or distributed energy scheme (Ofgem 2015b). The key relationship in this instance then becomes that between the TPLS and the small supplier or DES and the TPLS/'senior' supplier. The 'senior' supplier provides the small supplier with market interface services but they still have to commit to all the usual contractual obligations under SLC 11.2 (see Figure 6 below).

**Figure 6: A supplier service agreement**




Uptake of Licence Lite by suppliers has so far been zero, although the Greater London Authority (GLA) has made an application to Ofgem for a Licence Lite they have not yet identified a 'senior' supplier or entered into supplier service agreement to the regulator's satisfaction (Cornwall Energy 2014c: 5; see also Ofgem 2015b). Some have observed that it remains unclear exactly what terms should appear in the contract between a small supplier or DES and a TPLS for conveyance services (Walker Morris 2012). Another critique is that although the full costs associated with industry code compliance can be avoided a Licence Lite supplier will still need to cover significant costs (Cornwall Energy 2013). This is because a Licence Lite supplier still has other supply licence codes to comply with (including the Smart Energy Code) which cover, for example, interactions with customers, standards of conduct and the need to monitor and record complaints (see Figure 2). In addition they would still need (scalable) systems to ensure licence compliance; quoting,

pricing, tender and offer management, credit vetting, customer management and billing and, importantly, data flows between the Licence Lite holder and the TPLS (Cornwall Energy 2015c: 6). Hence Licence Lite has been labelled, by some, as 'too heavy for most' (Walker Morris 2012). Beyond these problems experienced by potential Licence Lite holders there is another downside of LL in that, given the requirement to use a 'senior' supplier, it could serve to further prop up incumbent suppliers. Ofgem have been receiving questions over the usefulness in practice of Licence Lite, as currently designed, as well as greater levels of interest from City groups and it has, in response, opened a new consultation in 2014 (Ofgem 2015b). One interviewee suggested that the GLA is still interested in launching a service under Licence Lite, but is working to first get various changes made (Interview 5).

One further option for small suppliers is the White Label service where the white label party is not independently licensed (Walker Morris 2012; CMA 2015: 6). Here a potential entrant achieves retail presence as an energy supplier through having an arrangement with an incumbent/existing retail energy supplier to supply the energy to retail customers on its behalf. White Label arrangements are currently being used by Sainsbury's Energy, through Centrica, and M&S Energy, through SSE, but this option gives limited flexibility on pricing and removes some of the control from the brand being used – as well as placing consumers at arms length from the small supplier (Walker Morris 2012).

As mentioned in section 2.3 above, Ovo have been working with a number of local authorities (LAs) in order to allow LAs to offer supply locally via new contracts that are similar to white label agreements but more flexible. The LA, and its customers, sit on Ovo's books, the contracts are far less onerous than Licence Lite and the LA has responsibility for branding their supply offerings and for deciding which tariffs will suit their locality. In this way Ovo get to increase customer numbers (with the aim of getting to 1m), and hopes to gain access to customers that might otherwise be non-switchers and/or sticky customers. For these customers the priority is to get customers off pre-payment meters and onto lower costs and/or 'smart' pay as you go tariffs. Cheshire East Council have decided to brand their supply 'Fairer Power' and have decided on a tariff structure that includes low standing charges (Interview 15).[57] A trial by Cheshire East, conducted with council workers, resulted in an average saving of over £200 per customer (ibid).

Ovo are planning to enable the launch of one or two LA supply offerings per month for the remainder of 2015. This is certainly a new way for very small suppliers to enter the domestic market which should be closely watched – Cheshire East seek to provide a public service in energy and will be the first local authority led energy supplier in over 60 years. It is also worth

[57] For more information on Cheshire East see: http://www.ovoenergy.com/press-releases/2014/12/first-local-authority-led-energy-supplier-in-over-60-years/

noting that because the LA and its customers sit on Ovo books Ovo maintain all responsibility – as such these relationships are built on trust and partnership. Clearly, substantial changes made to the burdens of existing supply licences might well reduce the necessity for LL or for white label contracts.

### 4.2.3 Wholesale Market Access and Costs[58]

*Section 4.1.4 outlined a number of problems associated with how gas and electricity markets are governed, including VI, incumbency and transfer pricing, which have tended to have negative implications for electricity market liquidity and transparency. This section builds on some of the points made there but the analysis here moves on to focus on issues around market access and costs that arise from current market arrangements and governance and that erect barriers to entry and expansion to innovative independents. These include electricity balancing, trading rules and collateral levels for new, emerging companies.*

#### *4.2.3.1 Balancing Electricity Markets*

V As already outlined in section 4.2.1 gas balancing charges are much lower than those for electricity and, as such, balancing is not widely regarded as an issue for market entrants seeking to procure gas (CMA 2015b: 17). Electricity is very costly to store and generation has to match demand at all points in time, especially as insufficient generation to meet demand can result in blackouts (CMA 2014a: 4). In the UK the National Grid, as system operator, is responsible for ensuring that supply and demand are balanced in real time (CMA 2014a: 4; see also Interviews 1 and 5). The rules which govern balancing, and how imbalance prices are calculated, are set out under the Balancing and Settlement Code (BSC), one of the statutory codes that electricity suppliers must sign up to.[59] There are two important aspects of balancing that have relevance here: costs of imbalance (or imbalance charges) and the Balancing Mechanism (BM).[60]

Electricity market participants (generators and suppliers) face penalty charges if their notified contractual positions and their physical delivered or taken electricity do not match. The sum of the disparity between the two is called the 'level of imbalance', and this level is then used as a basis to calculate the charges they must face to cover the costs (to the National Grid) of keeping markets in balance (Cornwall Energy 2013). These charges, in gas and electricity markets, are often referred to as 'cash-out prices' and are designed to provide market participants with strong commercial

[58] For an in depth exploration of current issues with how the Capacity Market is designed and the difficulties experienced with bidding in for demand response see C. Mitchell's forthcoming IGov paper on Generators, Rules and Incentives.

[59] For information on how the BM works see Elexon: http://www.elexon.co.uk/knowledgebase/what-is-the-balancing-mechanism/.

[60] NB: the National Grid is planning to replace the current Balancing Mechanism with the European best practice 'Electricity Balancing System' in 2015.

incentives to balance their contractual and physical positions.[61] The BM is a residual pool, managed by the National Grid, where market participants can elect to signal their ability to deviate from their stated trades in terms of supply and demand without being exposed to imbalance (cash-out) prices. This market represents 3-5% of wholesale market volumes but is increasing as more variable (renewable) plant comes onto the system (Interview 1; Cornwall Energy 2013).

Many small suppliers, especially given the lack of liquidity already noted above, often start off by having to rely quite heavily on the BM for procuring electricity (Interview 9; Cornwall Energy 2013; Ofgem 2014a). This is an interesting point to consider given CMA claims that current levels of liquidity appear to be sufficient to allow independent suppliers to trade in the same way as incumbents (CMA 2015a: 22). In addition to liquidity issues identified by independents trading on exchanges, see below, also infers fees and credit requirements that new companies, with little trading track record, cannot afford. One interviewee claimed that, when starting out, they accessed most of their electricity through imbalance, using the System Operator (National Grid) as trader of last resort (Interview 9). This continued until before they had built their customer bases to a size that would allow them to trade elsewhere (ibid). Once operational, however, it has been estimated that small suppliers, on average, procure between 10 and 20% of their electricity through imbalance whilst the figure for the Big 6 is closer to 1-3% (Cornwall Energy 2013). What is more significant, however, for small suppliers is that prices paid for BM load are higher than prices on wholesale markets. Securing volumes on the BM is, therefore, (sometimes significantly) more expensive and infers higher costs for smaller companies, as well as implying benefits for vertically integrated incumbents that can more easily access markets (ibid; Thomas 2006: 593; Interview 9).

In terms of imbalances charges, those suppliers, large or small, that can most successfully predict demand are more likely to avoid imbalance, as well as be less likely to have to procure on the BM (Cornwall Energy 2013; Interview 6). The more visibility a company has of both generation (supply) and retail (demand) the more likely they are to avoid the high costs of imbalance (Cornwall Energy 2013). In-house trading, therefore, means that incumbent suppliers can, to a greater extent, avoid imbalance and associated costs. As Ofgem have argued "… a supplier is likely to face a degree of risk due to exposure to… the balancing market, particularly if it isn't vertically integrated." (Ofgem 2014a: 114). This can be seen as an aspect of current energy governance that incentivises VI. In fact some suppliers have responded to expensive imbalance costs either through bi-lateral contracting and/or VI (CMA 2014b: 9). As noted in section 4.1.4 above some new market entrants have argued that markets, as currently constructed, have driven them towards VI.

[61] For more information on cash-out prices and arrangements see: https://www.ofgem.gov.uk/gas/wholesale-market/market-efficiency-review-and-reform/cash-out-arrangements

As noted by one former incumbent company executive, the difference between companies was often in how they bought and this was, in turn, based on correct predictions of demand and supply (Interview 6). This is evident in the fact that, as noted in section 4.1 above, this is one of the main business functions still allocated to incumbent suppliers (along with the ability to decide prices charged to consumers). Some have argued that suppliers with small, but growing, portfolios of customers find it harder to predict demand and are therefore more likely to face imbalance costs (Which 2013: 27). Investing in demand systems, IT and associated teams, is therefore another large up-front cost that independents must face to succeed (see section 4.2.1). One small supplier estimated that they must then get 2/3,000 customers within a matter of months to cover cost of trading in the BM and to cover the IT costs associated with establishing demand prediction to avoid balancing charges. It should, however, be noted that once new suppliers have invested the considerable amounts required, in demand prediction IT and teams, they should be able to predict demand with similar margins of error to large suppliers (if their customer base is over a few thousand and if they can deliver similar retention rates) (Interview 1).

One recent report has highlighted the impacts of current electricity balancing rules on possibilities for more local forms of electricity trading (Cornwall Energy 2014c: 6-8) – with negative implications for local suppliers and the development of DE. The specific argument is that current arrangements are such that market entry is based on becoming a national supplier with no option to be a regional or local supplier (ibid: 7). Moreover:

> "The rules assume that trading parties are energy specialists, operating at scale probably on a regional or national basis and who can usually trade their positions on wholesale markets on a 24/7 basis." (ibid: 6)

This can severely limit choice to community developers in terms of supplying electricity locally – with the main option being FiT schemes.

There are further implications of current balancing rules for demand management, in particular DSR. BM rules tend to disincentive DSR because the risk is on suppliers if customers respond to a signal with lower demand. As we have seen current rules incentivise suppliers to dedicate considerable time and effort to accurately predicating what demand will be, also reflecting comments from suppliers above about their focus on getting generation to market. In the instances, however, that customers lower their demand suppliers may then face imbalance charges (Interview 1). In addition, BM price-calculations produce a 'bias' for suppliers to over-contract for generation (and be risk averse) and this further inhibits demand-side initiatives (CLNR 2013: 60; Ward et al 2014: 22). This is because penalties for suppliers of being long (demand) are less than those for being short through greater penalties for under-contracting through the system Buy price (CLNR 2013: 60).

#### *4.2.3.2 Credit, Collateral and Trading Rules*

This last sub-section on barriers to entry for independents covers certain rules around credit requirements and collateral and how they affect smaller suppliers – both with regard to pressures on set-up costs but also on cash flow requirements once up and running. Credit risk and the requirement to post collateral is a key feature of all commodity trading markets, and collateral and credit costs that amass here are in addition to those committed to comply with licence codes (see section 4.2.1.3). What becomes pertinent here is credit ratings, terms (costs) of credit available and the impact on and/or availability of cash flow. Clearly for incumbents or others with strong parent companies collateral for trading is less costly. For example, The Co-operative Energy told the CMA that it was not required to post cash collateral for energy trades because of its strong parent company guarantee from Midcounties (CMA 2015a: 14).

Bi-lateral trading and trading on exchanges are credit-intense activities. This is one reason whey new/smaller suppliers tend not to trade on exchange (Cornwall Energy 2014e: 21). Collateral and credit risk on uncleared trades on OTC markets (where 80% of electricity and 70% gas is traded) is between trading parties (Which 2013: 11; Cornwall Energy 2013). For bi-lateral trades credit arrangements will be set based on commercial negotiation between parties, the details of these negotiations being commercially sensitive and often bespoke (ibid: 12). Given that new suppliers lack credit and trading histories and established asset bases they represent a higher trading risk and are at a considerable disadvantage (Which? 2013: 27). Indeed, new market entrants face higher collateral charges than established/ex-monopoly suppliers - in some cases for every £1 sold generators require £2 in collateral payments from new entrants (Interview 9). One analysis has calculated that, added together, costs associated with code and trading collateral requirements for vertically integrated utilities at 4p/customer whereas for niche domestic market players the cost per customer is £2.60 (Cornwall Energy 2014e: 20).

For new market entrants the ability to manage such unavoidable costs through pricing of tariffs is limited – given their inescapable need to attract new customers at scale. Their ability to hedge risk is also compromised by difficulties with posting required amounts of credit to support trading at points further out on the maturity curve (ibid: 21). The more so because the further out a company wants to trade (to manage risk), the higher the collateral demanded and this has, according to some, been exacerbated by Ofgem's Retail Market Review and the move to longer-term (1, 2 and even 4 year) fixed deals (Interview 1). One relatively successful new market entrant, Utility Warehouse, has commented that buying gas has been complicated in that they initially didn't have a big enough balance sheet to hedge its exposure. They needed the balance sheet capabilities partly because of the high cost of collateral requirements (CMA 2015a: 13).

Clearly, once new suppliers have earned a credit rating/history collateral costs can come down – but initial costs serve as a significant barrier to entry for new market entrants as part of the overall cost of procuring generation – especially for companies that have no in-house generation (Interviews 6 and 9). Established, integrated suppliers can avoid paying these relatively high collateral costs given their established positions as trading partners and to the extent that they can procure in-house. Theoretically they do not always have to stand collateral and associated trading costs can be avoided on in-house trades - although given that segmental accounts do not provide us with these details it is hard to know how much in-house trading actually happens in practice. Industry insiders claim that traders are out to secure the best deal and would avoid losing money by purchasing from an inefficient internal generator (Interview 11). It is also worth noting however that, as currently designed, the terms of Contracts for Difference (CfDs) and the Capacity Market are expected to translate into higher collateral costs for all suppliers (incumbents and independents) (Interviews 1 and 9; Cornwall Energy 2014e: 19).

## 4.3 Supplier hub: policy costs and supplier obligations

*This section, with a particular emphasis on efficiency obligations, will assess in some detail how suppliers have in practice engaged with obligations and passed costs on – and with what implications for D3. Section 2.3 has already laid out the importance of supplier-consumer relations, and of encouraging more pro-active consumers, for enabling DR and DSR. This section suggests that current governance around efficiency and other environmental policies has done little to incentivise incumbent suppliers to enter into such relations, nor indeed create vibrant, new efficiency markets. Section 3.3 also makes the point that efficiency obligations have, through the delegation of responsibility to market actors, made suppliers responsible in practice for the deployment of important energy efficiency policies and soon also smart meters (Ofgem 2011: 13; see also Steward 2014). Questions are raised here about incumbent energy companies and their ability and/or willingness to work pro-actively toward the broader public good and deliver on efficiency policy objectives (see also Parag and Darby 2009: 3986; Rosenow et al 2013). Demand management currently remains outside their core business model. This problematic is sometimes expressed in terms of principal agent problems (IEA 2007a in Parag and Darby 2009: 3986).*

*This section first of all describes social and environmental obligations, exemptions and how act to operationalise these policies in practice. It also considers questions around how well efficiency policies have been implemented; who pays policy costs, and with what implications for supplier business models (in particular independents); who benefits from obligations as currently formatted (more on this in section 4.4). It outlines relationships in corporate practices between cost escalations and social policy/affordability are explored when considering obligation costs, pricing strategies and impacts on vulnerable consumers. It lastly considers smart meter obligations and their potential implications for D3 and how suppliers (incumbent and independent) may respond.*

### 4.3.1 Social and Environmental Obligations

Suppliers, under the conditions of their licences, have certain obligations with regard to environmental and social policies. Ofgem's "key priority" is to protect the interests of consumers past and present and they also have requirements to protect disabled, chronically sick, pension age and low-income customers. As such Ofgem requires *all* suppliers, under SLC 32, to report on their dealings with domestic customers – this is called social obligation monitoring (Ofgem 2012: 2). They must provide Ofgem with quarterly information about customer debt levels, supplier disconnection rates how many customers are on pre-payment meters and help for vulnerable customers (amongst other categories of information) (ibid; see Ofgem 2013c for full list). Clearly, all suppliers need to organise themselves such that this information is delivered on a quarterly basis.

Suppliers have commitments associated with operationalising a wide range of energy and environmental policies,[62] and in most cases there are costs associated with these policies that are passed on by suppliers to consumers (see Table 7).

**Table 7: Social and environmental policies that impact on domestic energy bills**

| Policy | Timeframe | Fuels covered | Purpose |
|---|---|---|---|
| **Taxation** | | | |
| Nuclear decommissioning | 2001 onwards | n/a | Support costs of nuclear decommissioning |
| Warm Front | 2001 to 2012 | | Primarily heating for low-income households |
| Renewable Heat Premium Payment | 2011 to 2012 | | Support for renewable heat (vouchers) |
| Coal aid | 1997 to 2010 | | Support for coal generators |
| CLG Decent Homes | 2001 to 2010 | | A government programme to increase efficiency standards of social housing |
| **Energy bills as a fee per household** | | | |
| NFFO (primarily supporting nuclear generation) | 1999 to 2019[9] | Electricity | Support nuclear generation |
| Energy Efficiency Standards of Performance | 1994 to 2002 | Electricity/ (Gas 2000/02) | Support the installation of insulation |
| Energy Efficiency Commitment 1 | 2002 to 2005 | Electricity/Gas | Support the installation of insulation (mainly lofts and cavities) |
| Energy Efficiency Commitment 2 | 2005 to 2008 | Electricity/Gas | |
| Carbon Emissions Reduction Target | 2009 to present | Electricity/Gas | |
| Community Energy Saving Programme | 2010 to present | Electricity/Gas | Support the installation of a range of measures in areas of deprivation |
| Energy Company Obligation and Green Deal | 2013 to 2022 | Electricity/Gas | Support the installation of a range of insulation (including solid wall) and heating |
| Warm Homes Discount | 2011 to 2014[10] | Electricity/Gas | Money off vulnerable households bills |
| **Energy bills as a fee per unit consumed** | | | |
| Renewables Obligation | 2002 onwards | Electricity | Supporting large-scale renewables |
| EU ETS (Emissions Trading System) | 2005 onwards | Electricity | Supporting emissions reduction for the largest emitters |
| Carbon price floor | 2013 onwards | Electricity | Ensuring the EU ETS operates effectively |
| Small-scale renewable FITs | 2010 onwards | Electricity | Supporting small and medium renewables |
| Smart meters | 2012 to 2021 | Electricity/Gas | Improving information on supply and consumer feedback |
| FIT CfD – Contract for Difference | 2014 onwards | Electricity | Supporting low-carbon generation through price guarantee |

[9] NFFO contracts are ongoing with some generators being paid until 2019
[10] Subject to approval for future funding in the next comprehensive spending review

*Source: Centre for Sustainable Energy (CSE 2012: 7)*

[62] For details of all these obligations and schemes see: https://www.ofgem.gov.uk/about-us/how-we-engage/engaging-industry/independent-energy-suppliers

There are a number of different categories here according to level of supplier involvement. For example, in some instances suppliers (with over 50,000 customers) are obligated to pass on costs associated with environmental policies, such as the FiT (Platt 2013: 23). In other instances their involvement is more complex, such as the Renewables Obligation Order which places an obligation on licensed electricity suppliers in the UK to source a proportion of their supply to customers from eligible renewable sources and to pass the costs of the RO onto customers (Ofgem 2013b: 6-8 and 22-24). Details of responsibilities that relate specifically to efficiency policy and to smart meters are covered in the next sub-sections.

Suppliers face a number of costs when complying with licences in these ways. Clearly they must pass on costs associated with each policy and they must face the cost of obligations themselves (which in the case of the ECO and WHD have been considerable), but they must also face expertise and compliance costs associated with delivering these legal requirements (CMA 2015a: 30). It is worth noting here that the Ofgem guidance for suppliers for just one obligation, the ECO, is 175 pages long (Ofgem 2014g). There are clear implications therefore for supplier cost structures and for complexities associated with operating as a supplier. Together environmental and social obligation costs represented, according to 2013 consolidated segmented statements of the Big 6, between 9.7% and 11.3% of total operating costs.[63]

It is also worth noting here that there are exemptions available from ECO, FiT and WHD obligations in the form of a set threshold below which suppliers are not obliged. As such, suppliers with under 250,000 combined domestic gas and/or electricity customers, or which supply under 400 gigawatt hours of electricity or 2,000 gigawatt hours of gas, are exempt (Ofgem 2015g: 23). In fact there are now only 9 suppliers in the UK currently above this threshold: British Gas, Co-operative Energy, EDF, E.ON, First Utility, RWE npower, Scottish Power, SSE, and the Utility Warehouse (which separated out from npower in 2013) (2015e: 4). Ovo Energy will join this list in 2015. This is one regulatory nod in the direction of better enabling independents in supply markets – indeed one independent supplier estimated that the cost of being able to comply with the ECO and WHD would be several million pounds (Ovo in CMA 2015a: 30). Both Utility Warehouse and Ecotricity have claimed that being below the threshold means that it is possible to pass on wholesale price reductions more quickly and therefore be more flexible and responsive to customers (CMA 2015a: 31 and Business Green 2015). As such, some argue that exception from social and environmental policy costs is one reason why new entrants started to gain market share in 2013/4 (Interview 5).

[63] See https://www.ofgem.gov.uk/ofgem-publications/89139/energycompaniespublish2013consolidatedsegmentalstatements.pdf

Some independents have therefore highlighted the concern that the additional costs associated with hitting the 250,000 threshold serve as a barrier to expansion (CMA 2015a: 30-32), which some refer to as the 'cliff edge' (Interview 16). The marginal cost of each customer over 250,000 is high which means that in practice some independents lack the incentive to develop a base in excess of the threshold (Ofgem 2014f: 9). As such, once the decision to expand is taken it is estimated that a supplier then needs to get to 700,000 customers very quickly in order to survive because of the impact on operational costs (Interview 9). Others have suggested that for this and other reasons an optimal target, once past 250,000, is 1m customers (Interview 15). In order to partially offset these kinds of impacts Ofgem have introduced a taper mechanism – but not for the FiT or WHD obligations - just for the ECO (see Ofgem 2014g: 23). Once a supplier hits the 250,000 customer level, and they supply more than 400 GW electricity or 2,000 GW gas, then they enter the taper mechanism which runs until the suppliers hits 500,000 customers at which stage they will be eligible for the full ECO obligation on all their customers. When they are in the taper mechanism a supplier's ECO obligation is calculated according only to a smaller proportion of the supplier's full (gas or electricity) market share as a percentage of the market as a whole (see ibid: 24 for a full explanation of how this is calculated).

One last implication discussed here relates to escalation of costs faced by consumers over the past few years. In the 1990s Non-fossil Fuel Obligation (which support nuclear) imposed high costs on bills, but in 2001 the cost of supporting nuclear power and decommissioning was moved to public finances to be recovered via taxation (CSE 2012: 2). In the early 2000s the EESoP was the only policy cost passed onto consumers via suppliers at a cost of £1/ customer per year. Until quite recently lower levels of costs passed on, combined with this less transparent means of passing on policy costs, have meant that the cost of obligations remained largely outside political discussions (and inter-departmental battles) about public spending priorities (CSE 2014a: 14).

This is, of course not the case now, partly because the number of environmental policies in place has clearly risen significantly over time, as have the costs associated with them. Although the costs associated with some environmental policies, i.e. the RO, FiTs and interim arrangements for CfDs, are included in the cap operated by the Treasury, the Levy Control Framework (NAO 2013: 4), this does not apply to the ECO or WHD. DECC estimated, in 2013, that costs associated with energy and climate change policies contributed to only 15% of the rise in average gas and electricity prices since 2010 (DECC 2013e: 8). Ofgem's Supply Market Indicator (SMI) shows that in December 2012 environmental and social costs represented a negligible proportion of an average dual-fuel bill, whereas by 2014 these costs represented 7% of an average dual fuel bill (Ofgem 2015c). There are different implications if we look at gas or electricity only bills, however. Cornwall Energy estimate that whilst social and environmental policies constitute up to 5% of a gas bill they constitute up to 15% of an electricity bill (Cornwall Energy 2015c). The SMI also estimates

that environmental and social costs by the end of 2016 will still amount to approximately 7% of an average dual fuel bill (Ofgem 2015f).

Beyond the implications for supplier businesses and consumers that costs represent there is also the question of how incumbents have responded to these policies in terms of business practice. Generally speaking, as already noted, policies have done little so far to disrupt the EUCo supply model. But, as one incumbent executive put it, to the extent that certain behaviours become mandatory – i.e. through the RO the requirement to buy certain amounts of renewable energy – some incumbents do then try to make the most of it. There are some offerings around the FiT (i.e. attempts to sell PV to consumers), and around the RHI in terms of selling heat pumps (Interview 16). None of these, however, are considered to be 'core competences'.

### 4.3.2 Energy Efficiency Obligations

*This sub-section analyses energy efficiency obligations - given the degree to which obligated suppliers have been responsible for implementing domestic efficiency policy and leading on from some of the issues raised in section 3.3.1 above.[64] The purpose is not to assess these obligations effects on consumers. This is because the success of efficiency policy in terms of reducing demand and/or increasing flexibility and response will be covered in a separate IGov working paper on governance and consumers (Hoggett 2015 forthcoing).[65] The purpose here is, however, to assess the ways in which suppliers have responded to these obligations and the implications (direct and indirect) for enabling D3. We argue here that incumbents seeming reluctance to be pro-active in this market, see ECO cut backs, combined with barriers to entry and expansion for independents results in a somewhat desultory approach in the UK to energy efficiency.*

Energy efficiency is the one aspect of D3 that has become an official EU and UK policy objective (as part of the 20-20-20) agreement (CSE 2014b: 5), albeit targets here are much looser than they have been for emissions reductions and for the percentage of energy produced from renewable sources (Kuzemko 2015 forthcoming). As we saw in section 2.1 gas demand overall has fallen since 2004, but falls in the domestic and services sectors have been far lower than those in industrial and electricity generating sectors. Increased demand for space heating in the domestic sector has grown substantially since 1970 whilst demand for cooking has fallen (Skea et al 2011: 16). Improved household efficiency is, as such, still a very important aspect of D3. Indeed it is estimated that in order to meet the UK's goal of reducing emissions by 80% by 2050 it will be necessary to reduce emissions from buildings to near zero by 2050 (CSE 2014a: 3). Energy

[64] For a full list of UK all energy efficiency policies directed at domestic and industrial and commercial consumers see forthcoming IGov working paper by Tom Steward 'Policies which drive improved efficiency/final energy demand reduction across all sectors (excluding transport).

[65] For other useful assessments of the effectiveness of UK energy efficiency policies see Parag and Darby 2009; Mallaburn and Eyre 2012; Rosenow et al 2013. For an evaluation of the ECO so far see CSE 2014b.

efficiency is, however, understood to be capable of solving more than one government objective. There are, for example, quite a few references in policy documents to the abilities of energy efficiency to solve all aspects of the 'Energy Trilemma':

> "Using energy more efficiently is critical to achieve our long-term energy and climate objectives. Energy efficiency creates savings for consumers, reduces GHG emissions, contributes to security of supply and helps economic growth" (DECC 2014f: 16)

Supplier obligations have been in place since 1994 (CSE 2014a: 13). There were a number of early rationales for making suppliers responsible for implementing domestic efficiency policy – not least given the UK's supplier hub model outlined in section 2.4 – suppliers are the inter-face with domestic consumers in energy markets. One interviewee has noted that suppliers actively lobbied to have a supplier obligation as this would, they understood, enable them to maintain some control over the process (Interview 5). Others have argued that another early idea behind the supplier obligation was that making suppliers responsible for costs would incentive them to keep the overall expense down (CSE 2014a: v). Lastly, because incumbent business models are volume oriented (Hannon et al 2014), it was therefore also understood that they would need to be obliged to implement energy efficiency. As will be discussed below, quite a few questions have emerged, however, about how useful this has, in practice, been for D3 (see Interview 1; Rosenow et al 2013; Parag and Darby 2009).

Supplier involvement in energy efficiency started small in 1994 when public electricity suppliers were asked to implement the first (of three) Energy Efficiency Standards of Performance (EESops) at an indicative cost of £1 per customer per year. The government increased targets, complexity and indicative costs, through each later set of obligations: the Energy Efficiency Commitments (EECs) (one to three) and Carbon Emissions Reduction Target (CERT) (Mallaburn and Eyre 2012; Rosenow 2012; CSE 2014a). Measures allowed within each of these obligations included higher cost, i.e. insulation, as well as low cost measure such as lighting and appliance upgrades. Partly as a result of these initiatives most homes now have adequate loft insulation and most with cavity walls have had them insulated. During the last years of CERT and CESP more than 45,000 cavity walls, almost 70,000 lofts and about 4,000 solid walls were insulated every month (Ofgem in Rosenow and Eyre 2015). For most recipients this was free of charge in the last years of CERT, and CESP (ibid 2015). Although there have been costs associated with these measures, estimates are that in 2020 households will pay on average 11% less on energy bills than without efficiency measures (DECC 2013e: 11).

Whilst there have certainly been successes there have also been some concerns with these obligations. Ofgem's review of compliance with CERT and CESP found that British Gas failed to comply with environmental obligations under CESP by the 2012 deadline. It had only met 62.4% of

its CESP targets by the end of 2012, and as a result has been fined £11.1m by Ofgem (the fine was to go toward helping vulnerable customers with energy efficiency) (Aglionby 2014).[66] A second concern was that the rate of 'deep refurbishment' i.e. measures for solid wall and/or 'hard-to-treat' homes) under CERT and CESP remained low (Rosenow and Eyre 2015). There emerged some conclusions that most of the potential for easier, lower cost, measures had passed – indeed by the end of CERT in 2012 it was understood that most un-insulated cavities and lofts in GB had been insulated to a reasonable level and most homes were using the compact fluorescent light bulbs (CFLs) that suppliers and their agents had given away (CSE 2014a: 9).

The ECO was implemented in 2012 and was split into three different obligations (ECO-CERO; HHCRO and CSCO) (Steward 2014b; ibid: 12). The ECO was unusual in that it dropped lower cost measures and focused on more expensive measures such as harder-to-treat cavities, solid wall insulation and heating system installations. This exclusion of lower cost measures has led some stakeholders to suggest that landlords and Local Authorities would be better positioned to install these measures than suppliers (ibid: 15; Interview 14). It has also been noted that this leaves a gap in efficiency policy whereby there are now no policies focused on energy efficiency lighting and appliance measures – but improvements continually in these areas (Rosenow 2012: 15). The ECO was also more complex than its predecessors – not least because of how savings were to be measured but also because of the need to link ECO with Green Deal to reduce subsidy costs. This created a significant increase in the administrative and data/IT requirements associated with delivering the ECO (CSE 2014a: 12). Unsurprisingly incumbents opposed the ECO given that most of the low hanging re-fit/insulation fruit had already been picked and costs associated with it were deemed to be too high (Interview 5).

From a D3 perspective problems associated with the ECO are disappointing. This is not least because the estimated emissions reductions required by the ECO, and Green Deal, are lower than those required in previous programmes (Rosenow et al 2013: 1195). Table 8 (below) shows the upward progression of supplier obligation costs over time. It has been estimated that prior to ECO the costs of efficiency obligations on bills was below 2%, but that ECO (in 2013) costs put closer to 5% on bills (CSE 2014a: 17). What is also significant, however, is that the ECO was designed to deliver considerably less (estimated) emissions savings, at approximately 30 TWh annually, than CERT which was designed to save approximately 104 TWh annually. Another design fault is that obligations do not require suppliers to implement measures with their own customers and, as such, suppliers have tended to target other companies' customer bases to avoid negative impacts on

[66] At the time of writing Ofgem are just starting to announce the results of its investigation into compliance with CERT and CESP – so far there has also been a fine for Drax (a generator) for meeting only 37% of its CESP obligations on time (Farrell 2014). It should be noted that British Gas did later fulfil its obligations under CESP – after the deadline had passed.

their own demand. This element of policy design also creates no focus for suppliers to work more pro-actively with customers (ibid: 26).

**Table 8: Chronology of supplier obligations**

| Name of scheme | Energy Efficiency Standards of Performance 1 | Energy Efficiency Standards of Performance 2 | Energy Efficiency Standards of Performance 3 | Energy Efficiency Commitment 1 | Energy Efficiency Commitment 1 | Carbon Emissions Reduction Target | Community Energy Savings Programme | Energy Company Obligation |
|---|---|---|---|---|---|---|---|---|
| Abbreviation | EESoP 1 | EESoP 2 | EESoP 3 | EEC 1 | EEC 2 | CERT | CESP | ECO |
| Period | 1994–1998 | 1998–2000 | 2000–2002 | 2002–2005 | 2005–2008 | 2008–2012 | 2009–2012 | 2013–2015 |
| Target (lifetime) | 6.1 TW h | 2.7 TW h | 4.9 TW h electricity & 6.1 TW h gas | 62 TW h | 130 TW h | 293 million t $CO_2$=494 TW h | 19 million t $CO_2$=47 TW h | 20.9 million t $CO_2$ 6.8 million t $CO_2$ lifetime savings notional heating costs of £4.2 billion |
| Implicit annual target (lifetime) | 1.5 TW h | 1.4 TW h | 5.5 TW h | 21 TW h | 43 TW h | ~104 TW h | ~15 TW h | ~30 TW h |
| Cost of the £48.1 million | £110 million (indicative) | £500 million (indicative) | £1.2 billion (indicative) | £5.6 billion (indicative) | £0.4 billion (indicative) | £2.9 billion (indicative) | programme | £101.7 million |
| Cost per household | £1 | £1 | £2.40 | £7.20 | £18 | £51 | £3 | £53 |
| Per cent of savings in Priority Group | 30% (expected, not compulsory) | 65% of expenditure (expected, not compulsory) | 67% of expenditure (expected, not compulsory) | 50% | 50% | 40%, 15% in Super Priority Group | Lowest 10% income decile in England and 15% most income deprived areas in Scotland and Wales | 25%, 20% in 15% most income deprived areas |

*Source: Rosenow et al 2013: 1195*

Despite energy efficiency policies in place and results achieved it is worth noting that the UK scores badly in reviews of energy efficiency in Europe (Energy Spectrum 2015b: 2-3). One review, undertaken by the Association for the Conservation of Energy, concluded that the UK was the 'Cold Man of Europe' – it ranked second from bottom on affordability of space heating, third from bottom on the share of household expenditure spent on energy and bottom in terms of the percentage of households in energy poverty (ibid: 3). As a reminder 25,000 excess winter deaths are reported in England and Wales every year and this compares badly with other EU countries.

#### 4.3.2.1 *Incumbents and obligations in practice*

Up until quite recently the only suppliers responsible for implementing energy saving measures were incumbents but now this group includes the Utility Warehouse, First Utility, the Co-operative Energy and (very recently) Ovo Energy. Most of the analysis here is based on incumbent practices so far in relation to obligations – it remains to be seen if suppliers that have more recently pass the threshold will enter more profoundly into efficiency markets through obligations. As will be seen in the analysis below, energy efficiency obligations are understood to have done little to challenge the EUCo model by incentivising incumbent suppliers to enter more profoundly into efficiency/energy saving services (CSE 2014a: 26). This is not to say that suppliers have made no efforts to become more involved in energy savings indeed some companies, British Gas in particular but also npower, had energy service offerings in the mid-2000s (Interview 14). This has included

acquisitions of insulation and heating companies (CSE 2014a: 15). British Gas, due to the fact that it has so many more customers than anyone else, has the most obligations/biggest targets to meet and has a reasonably well-developed boiler business as well as offering services such as 'Hive Active Heating' (British Gas 2015). See also SSE and business customers.[67]

Part of the thinking behind obligations was that by making suppliers responsible for efficiency policy it would incentivise suppliers to become more like ESCOs – promoting services to help people reduce and manage energy usage (Eyre 1998 in Rosenow et al 2013: 1196; see also CSE 2014: 16). What is important, however, in terms of understanding the affects of supplier obligations on incumbent businesses is that obligations have been designed according to the principal that, once policies have been set, market actors are largely free to select the best methods of meeting their emissions targets (Bertoldi Et Al 2013: 328; Rosenow et al 2013).
What this means is that incumbents have been able to choose how they implement energy saving obligations between the following delivery options:

- Bi-lateral agreements with installers (mainly insulation and/or boiler companies)
- Direct relationships with local authorities and registered social landlords
- In-house offerings
- Brokerage (CSE 2014b: 5)

Although there has been some in-house activity the dominant supplier model features an in-house team to deliver energy-saving obligations which is tacked onto the core supply business (CSE 2014a: 26). As one incumbent executive put it energy efficiency obligations, given that they are mandatory, are delivered only partially through their own headcount but mainly through large contractors (Interview 16). Those that had made more of an effort in the 2000s have been showing signs of retrenchment to core supply businesses albeit they maintain the obligation delivery team in place (CSE 2014a: 16). Part of the rationale behind choosing not to have a branded, in-house efficiency business was because households did not trust suppliers to be demand reducers, or trust them per se (CSE 2014a; 8 and 16; see also (Rosenow et al 2013: 1196). What this means is that incumbents, in general, have not built their business models around offering energy services to customers (CSE 2014a: 26). This is also apparent in the fact that energy savings obligation delivery has most often been focused on competitors' customers to reduce their sales volumes rather than their own (Interview 14). Incumbents, furthermore, rather than working to enable energy savings have instead been accused of increasing prices in order to offset reductions in demand that have taken place in gas and electricity since 2004 (Warren 2014).

[67] For example, see SSE Enterprise webpage: http://www.sseenterprise.co.uk/solutions-for-business/utilities/heat-networks/

Another reason why the EUCo model has not moulded itself towards energy services is that there has been a high degree of internal pressures to control the costs associated with meeting obligations (CSE 2014a: 26). These are costs over which suppliers have, as intended, some more control than some of the other direct costs associated with statutory codes and licences (see section 4.2.2 above). However, as already mentioned the costs associated with delivering ECO, including the cost of administrative resources required to report ECO requirements, are greater than previous obligation costs (CSE 2014a: 26). Albeit it should be noted here that in the past the costs of energy savings obligations have tended to be lower than initially expected (ibid: 9 and 14; Platt 2012: 22; Rosenow et al 2013: 1200; Interview 14). Indeed some claim that, certainly prior to ECO, suppliers were able to make money from energy savings obligations – partly because of higher than necessary delivery costs allowed by DECC but also as a result of hard-nosed commercial arrangements with third party contractors (Interviews 5 and 14).

Citigroup analysis has claimed that overall there is pressure for incumbents to keep reducing costs given increasing competition from incumbents and declining overall demand (Coates et al 2014). Others have claimed that in the current environment commercial pressures on incumbents to maximise profits, to serve shareholder interests, ensures that there is downward pressure on budgets to fulfil obligations and avoid 'unnecessary' costs (CSE 2014a: 17). This suggests an overall focus on cost rather than on thinking of more progressive means of delivering energy saving performance. This emphasis on costs makes it more likely that incumbents will go with the grain of existing business models as costs more to re-invent models or establish large new businesses within UK energy companies. Indeed it also implies that some benefits of keeping the cost of obligations low is returned to parent companies and shareholders rather than reducing customer bills. As it happens, any plans within an incumbent supplier to radically alter its business model would have to be approved by the ultimate parent company (see section 4.4 below) and a strong case would need to be made that it would be profitable (within the near term).

Given these arguments that most incumbent suppliers have viewed efficiency obligations more as a cost base than business opportunity then it is easy to understand the observation that a key success criteria for incumbents has been the *low cost* delivery of government projects/policies (Interview 8). The bottom line, from the perspective of this analysis, is that company profits and margins were revealed as being more important than improvements in UK energy efficiency. This would, of course, be an expected viewpoint for private, volume driven gas and electricity companies but not necessarily for government bodies tasked with delivering on efficiency targets.

#### *4.3.2.2 'Green Taxes' and ECO Changes*

Incumbent emphasis on controlling costs of obligations became more widely apparent in late 2013. At that time gas and electricity prices were rising well ahead of inflation and there was a good deal

of media and wider public objections – the politics of the Big 6 was becoming considerably hotter. Ed Miliband Labour had further raised the stakes through his announcement that, if Labour were to win the next election, they would implement a freeze on energy prices. Incumbents, however, argued that prices were rising because of the costs of environmental policies, the ECO in particular, thereby distracting from widespread talk of growing energy company profits and margins (Warren 2013; Citizens Advice 2014; Platt et al 2014). They also lobbied the Government to reduce the burden and Government's response was to make concessions through what amounted to a 50% reduction in the ECO (Warren 2013; Mason and Carrington 2013; Roberts 2013). This involved amongst other things reductions in CERO requirements to 2015 of 33%, the extension of ECO until March 2017, as well as allowing lower cost measures to be counted again (CSE 2014b: 6). Overall the estimated costs of ECO compliance fell from almost £1.4bn/year to nearer £800m/year as a consequence of these changes (Cornwall Energy 2014b: 2). This allowed the Government to claim that they had consumer interests at heart by reducing their bills through amending the ECO.

The irony of this move was not lost – one commentator observed that cutting the ECO involved a perverse logic given that it is the one programme that helps households to cut their fuel bills (Warren 2013). Aside from reducing the effectiveness of the ECO in terms of energy savings per annum there were other implications of these amendments and of the way in which price increases were framed as being the result of 'Green Taxes'. One issue was that by making it look like either incumbents or Government were in control of energy bills this sent a message to consumers that they had no control over their bills (Roberts 2013). Another issue was that reducing ECO requirements had a negative impact on the household energy efficiency industry. This industry had already had its ups and downs given the many changes in household efficiency policy – indeed there were already 7,000 fewer people employed in delivering energy efficiency in homes at the end of 2013 than there had been in November 2012 (Warren 2013; see also ECC 2014b). Heads of two insulation companies claimed that amendments to the ECO were having 'devastating' effects on the industry (Carrington 2013b; see also Interview 14). Other analysis has claimed that post the government review of 'green taxes' the market for ECO measures first stalled and then collapsed whilst claiming that such knock on effects only further raise the cost ultimately if qualified providers are not available in sufficient quantities (CSE 2014b: 7).

Such actions on behalf of suppliers, and government, in response to public concern about rising prices is clearly disappointing for those that would like to see greater commitment to demand management. Within this context it is also interesting to note recent calls by Scottish and Southern Electricity (SSE) for the supplier obligation to be removed and for ECO/Green Deal to be paid for through general taxation (SSE 2014). This clearly contrasts with earlier efforts by incumbents to keep control of efficiency measures and how they affect their businesses through having supplier

obligations. This statement has been echoed by the most recent Eurelectric, the union of the electric industries, report which also argues against costs being passed through suppliers onto customer bills (Eurelectric 2014). What this points to is a politics of energy where price is now such a sensitive topic that it can not only overshadow but also trump other issues such as demand management. It also points to a continuation of the politics of energy whereby Government continues to make concessions towards the Big 6 suppliers because of their central role (under current governance conditions) in policy implementation and their assumed capabilities to invest in new energy.

These findings are significant if consider again the notion that what consumers (as voters) experience at the hands of the gas and electricity industry is important both politically and in terms of trust - see section 2.4.3 above. They see far less of other energy system costs (i.e. network costs) and as such generation, transmission and distribution companies are relatively less politicised. The Big 6 suppliers, in turn, by arguing that high prices are about cost of policies have distracted the discourse away from their own actions which have been less than ideal and which have alienated customers. Their strategies for increasing prices, complaints from customers, poor performance in customer surveys all point towards incumbent supply businesses that have not been treating some domestic customers fairly. In these ways they are also alienating voters from the energy industry and feeding into a political melting pot on pricing. The war on pricing that was being waged in late 2013/early 2014 has had a directly detrimental effect on energy efficiency policy in the form of ECO amendments.

#### 4.3.2.3 *Vulnerable Customers and Fuel Poverty*

Section 4.4 below deals in more detail with questions about how incumbent suppliers have distributed costs (through pricing strategies), and the impacts this may have on more vulnerable customers as well as on overall trust in energy suppliers. This section raises some distributional issues specifically with regard to energy saving policy costs. Here we add to this list of pertinent issues holding demand management back regressive cost distribution and observations that, as currently socialised, costs tend to increase fuel poverty and add to political tensions around energy saving policies (especially when labelled as ‘green taxes’). In section 2.3 it was clearly stated that IGov is interested in demand management but also in an affordable transition to a lower demand system. Affordability is important, as a reminder, within this analysis not only because of equity and fairness, but also because public sensitivities to price rises have so recently been translated into lower commitment to energy savings.

Part of why policy costs are unevenly distributed lies in the hands of policymakers. DECC takes specific action to reduce the transitional impact of government policy on energy intensive businesses – with reasoning given that these companies face strong international competition and

their ability to compete might be hindered by high energy costs (DECC 2013e: 5). DECC achieves this reduction in impact through measures (compensation for costs) worth about £250m in the current spending Review period, with further support due to continue into 2015/6. Energy intensive industries receive an up to 90% discount on the CCL and Government is also seeking to remove these industries from the costs of CfDs (ibid: 5). As a result domestic and SME customers, and non-energy intensive businesses, shoulder a higher proportion of costs.

The idea was initially, however, to avoid regressive cost impacts (CSE 2014a: v), but the domestic customer base contains some of the most vulnerable energy customers. Prior to the ECO energy savings obligations were designed such that certain quantities of measures were targeted at vulnerable households. For example CESP, introduced alongside CERT in 2009, focused on delivering deeper retrofit in low-income areas (CSE 2014a: 9). The ECO was the first energy saving policy, however, explicitly designed to tackle fuel poverty –through the Affordable Warmth target, CSCO and rural safeguards (Platt et al 2012: 24; Rosenow et al 2013: 1200; CSE 2014a: vi). Indeed the ECO replaced the Warm Front in England (though not Scotland or Wales) which had been funded through general taxation (Rosenow et al 2013: 1195; CSE 2014a: 1). In this way suppliers had become responsible for passing on the costs of two of the main policies for reducing fuel poverty (the ECO and the WHD) onto consumers. It is somewhat ironic that all customers should be shouldering this burden given that direct links had been made between the cost of energy and fuel poverty in policy-making circles (CSE 2012: 5).

Because the ECO specifically targets hard-to-treat homes it is therefore is a high cost energy efficiency measure (all previous ones specifically targeted minimum cost energy savings) (DECC 2012d: 26; Rosenow et al 2013: 1198; see also Platt et al 2012). Furthermore, a small percentage of households are expected to benefit from the cost efficiencies inherent within them, albeit some who benefit may be most in need of assistance, whilst costs are borne (albeit not equally) by all customers (Rosenow et al 2013: 1196). For example the ECO was originally designed to enable improvements to 125,000 to 250,000 fuel poor households whereas around 3 million households are fuel-poor (Platt et al 2012: 25). As such one analysis has estimated that the most regressive effects will be on those on the lowest incomes who do not received measures through the ECO (or Green Deal) (ibid: 24). There are a number of ways in which costs and benefits are not borne equally. Firstly, recent analysis has found that consumers with electric heating (i.e. 11% of all domestic consumers) pay 19% of the total cost of policies whilst they receive only 7% of the benefit (Preston et al 2013). This is because the bulk of ECO costs pass through electricity rather than gas bills but evidence also suggests that ECO measures have been skewed towards homes heated by gas rather than (more rural) off-gas areas (CSE 2014b: 7).

It also appears that incumbents have an incentive to charge legacy (sticky) customers more than others as they are less likely to switch as a result of price increases (Rosenow et al 2013: 1200). Sticky customers, as already outlined above, are more likely to belong to vulnerable user groups and ECO outcomes in this way more regressive (ibid: 1200). Although there are licence conditions in place that should ensure that suppliers offer tariffs that are reflexive of costs recent research has claimed that these requirements are not being effectively enforced (Platt 2012; Rosenow et al 2013). There is, in addition, no obligation to show the cost of energy efficiency obligations separately on domestic customer bills (CSE 2014a: 14), which may leave customers unaware of these costs. Such discrepancies in terms of uneven cost distributions might not be noted in analyses conducted by Ofgem and DECC as environmental and social policy costs are measured as percentages of dual-fuel rather than single-fuel bills.

There are others that argue that suppliers not well placed to implement high cost ECO measures. Although original thinking was that because suppliers have access to domestic customer data they would be best placed to implement supplier obligations. However the kind of data required to identify low-income and vulnerable households is not typically held by suppliers – as such they now need to get data from the Department of Work and Pensions and/or Local Authorities to identify vulnerable/low income households (Interview 14). This is why some argue that energy savings schemes that focus on the fuel poor would be better off being implemented via Local Authorities and social/private landlords (CSE 2014a: vi). Furthermore, it appears that some installers are now asking for contributions, up to £500, towards some of the higher cost measures - money which is often being paid by low-income household and which may be paid out of benefits (Interview 14). Altogether such actions raise the burden of cost for some of those that are least able to afford it. To an extent, therefore, the way in which aspects of efficiency policy has been designed and implemented serves, instead of improving fuel poverty, to exacerbate it for some households.

All in all, making supplier companies, which are not noted for their ‘softer’ customer service skills (Interview 1), obligated for efficiency policy and obliged to ‘help’ vulnerable customers has perhaps not been the best choice. Under this model customers can become mere receptacles of costs and are portrayed as having little control over their bills or having much possibility for interactivity with suppliers. There are, of course, other ways of implementing energy efficiency policy. See, for example, the KfW Bank in Germany which is directed to provide low cost (as low as 1%) loans for small and larger scale efficiency measures. In addition vulnerable heat customers are better protected in Germany – i.e. those out of a job do not have to pay for heating raising questions of whether improved UK welfare provision would better underpin the transition to a more demand oriented, sustainable energy system (Kuzemko 2014c).

Another solution, that has been suggested elsewhere, is to change the incentives on large suppliers by structuring obligations differently. This could involve an average customer demand reduction obligation which would require suppliers to reduce existing average customer consumption by a set percentage per year (or over a 5 year period) (CSE 2014a: viii). Suppliers would have to focus on their own customers and this could, in turn, improve the market attractiveness of low-consumption households (ibid: 36-7). This would furthermore give suppliers an incentive to understand their customers' energy-use patterns in detail and to develop tailored approaches to demand reduction. This would necessitate both smart meters and quite substantial improvements on current systems of domestic customer profiling where customers are placed into general categories rather than analysed according to actual usage.

### 4.3.3 Smart Meter Obligations

*Much is expected of smart meters, despite the many delays in their nationwide rollout. Most claims refer to better enabling consumer demand response and awareness of electricity and gas usage patterns. This section explains smart meter obligations and their potential benefits in some detail, but goes on to claim that they are a necessary but not sufficient condition for greater demand management. This is partly because more governance changes will be needed in order to enable greater and sustained consumer demand response and reduction.*

Large suppliers, under the supplier hub principle, have responsibility for the provision and maintenance of all smart metering equipment in the consumer premises but also for the roll out of smart meters (Ofgem 2011: 13; DECC 2014g: 1). Initially the government did not legislate for a nationwide roll-out because they had hoped that suppliers would adopt smart meters by themselves (Interview 10). The decision to pursue a nation-wide roll-out of smart meters was taken back in 2006 and passed into legislation in 2008, but still has not started in earnest. EU legislation, as part of the 20-20-20 package, states that 80% of homes should have smart meters by 2020.

Although some see this as an example of suppliers in an unregulated market failing to innovate, whilst others point to the fact that some incumbents had long started trialling and installing smart meters (Interview 16). Information supplied to DECC by the Big 6 suggests that the number of smart and advanced meters installed in domestic and non-domestic properties will more than double to around 2m in 2015 (Cornwall Energy 2015: 5).[68] Current estimates, according to the Data and Communications Company (DCC), are that the smart meter programme will go live either in July 2016 or 3 months later. It appears as if the 2020 completion date remains in place, although there are mounting questions as to whether this is achievable now with such a delayed start date (Gosden 2014). Clearly 2020 is more achievable the more suppliers install smart meters prior to the official roll-out programme launch.

[68] One interviewee has

Although there will be costs associated with the roll-out of smart meters (estimated at a total of £10.93bn), which consumers will ultimately pick up, there are also a number of financial benefits expected – most it is estimated will accrue to suppliers (£8.26bn) (DECC 2014f: 2). For example, suppliers (on aggregate) are expected to save £2.97bn on the cost of site visits and £1.19bn in reduced inquiries and customer overheads (ibid). Other financial benefits are expected to accrue to consumers through lower energy consumption (£5.73bn).

There are other benefits expected in terms of the UK's ability to meet policy objectives – not least in terms of enabling greater demand management. It is expected, for example, that the provision of smart energy meters will enable better information about patterns of use across networks which, in turn, will aid in network planning and development – including future smart grids (DECC 2014f: 2; see also Lockwood 2014). Clearly the financial benefit expected to accrue to consumers is based on the assumption that usage will be more accurately measured and that householders will be able, and willing, to use smart meters as a tool for demand reduction and/or response. There are other more aspirational (high tech) products which can be better enabled through smart meters, for example British Gas's 'HIVE' products or npower's 'NEST', that link with 'apps' on smartphones or tablets to give consumers more information about and control over heating and electricity use (Interview 16).

Smart meters are also an important requirement for suppliers to be able to offer more time-of-use (ToU) or rising step tariffs (see section 4.4 below) which, if set properly, are expected to incentivise consumer demand response and ultimately lower peak demand for electricity. One company official has, however, suggested that RMR limits to the numbers of tariffs that suppliers can offer will mean that a niche product, like ToU tariffs, are less likely to be offered as incumbents will have to stick to core market offerings (Interview 16). Although, as also mentioned in section 4.4, it should be noted that existing ToU tariffs for economy-7 and -10 customers have been set by incumbents in such a way that little demand response has so far been achieved.

Taken together these possibilities mean that smart meters should in theory "create a market environment that supports the efficient system-wide use of demand-side-response" (Ofgem in Lockwood 2014: 69). There is another incentive inferred here for domestic consumers to take on a more interactive relationship with their usage, bills and their supplier. All in all, it is expected that smart meters if used properly could finally enable suppliers to become more consumer and demand driven, although it has also been noted that further governance changes would need to be made for this to happen – not least in that half-hourly settlement of electricity balancing should be introduced for the domestic sector (Platt et al 2014: 10; Interviews 5, 14 and 16). Smart meters are, as such, a necessary but not sufficient condition for greater DSR.

### *4.4 Distribution of Costs and Benefits*

*This section on the distribution of costs and benefits of the current energy system explores in more detail the highly political question of which groups of people and/or sections of society benefit from current energy governance and corporate practices in the UK. There is a related question, however, about what benefits are or can be gleaned from corporate practices in energy systems – and whether these are (or can be) harnessed to meet public policy objectives such as climate mitigation and demand management. This, in turn, has to do with governance assumptions about the role of companies in society and whether they can deliver positive societal outcomes such as policy objectives but answers must relate to what type of corporation is being discussed.*

As already outlined in section 3.3 above there has for some time been an assumption that the private sector (if incentivised correctly) can deliver important energy services as well as be an active part in meeting some climate mitigation objectives (see Mazzucato 2013: 195).[69] What this paper has already outlined, however, are the ways in which various aspects of energy governance (codes and licences; market design; decisions to allow VI) have tended to reward scale, reinforce incumbent market power and erect a number of barriers to entry for more innovative gas and electricity suppliers.

*This section reveals further direct and indirect impediments to D3 in the UK. In sum it is claimed here that current energy governance, including tariff and pricing rules, allows for:*

- *a paucity of pricing structures that would either stimulate demand reduction or protect vulnerable customers - thereby further alienating domestic consumers that are considered by many to be an important part of realising long-term DR, DSR and DE;*
- *the achievement by incumbent suppliers of higher margins from sticky (sometimes vulnerable) customers – i.e. these customers in effect shouldering a higher burden of system costs. This outcome is important when considering assumptions outlined in section 2.3 about the significance of how supplier-consumer relations are conducted to successful D3 and sustainable transformation more broadly;*
- *the distribution of financial benefits by incumbent suppliers to parent companies and (indirectly) shareholders, in the form of dividend payments and/or share buy backs, as opposed to greater reinvestment in business model redesign and demand management.*

[69] Mazzucato draws on the work of Karl Polanyi to critique the 'Laissez Faire' model of market governance arguing that markets will not run the world optimally if we just leave them alone. She argues that there need to be ongoing and in-depth, public-private interactions to support innovation. She also critiques what she calls the 'socialisation of risk and privatisation of rewards' where tax receipts are used to bail out private sector companies, but the receipts from those companies in more profitable times are paid out to shareholders.

This is as much about how companies are incentivised by current governance but also about regulations and rules not specifying particular tariff types that might better support active customer responses in the form of demand reduction or flexibility. *Questions of how costs and benefits are distributed are important to ask at times like this when energy systems are supposed to be transforming, and companies (markets) have been assigned a role that is central to this process. We need to be specific about which companies are delivering or are capable of delivering climate mitigation, how governance can better incentivise those that are not, and (importantly) how it can support those companies whose business models enable aspects of D3.*

### 4.4.1 Distribution of Costs: Tariffs, Sticky Customers and Demand Engagement

*This first of two sub-sections in 4.3 deals mainly with questions of how costs of doing business in energy markets are distributed to consumers via suppliers – with a particular focus on unequal treatment of 'sticky' domestic and SME customers, on affordability and price and tariff rules and regulations. It is worth bearing in mind here observations made in section 2.3.3 about the importance of inter-relations between suppliers and consumers and, especially, how they are conducted. Active, engaged and rewarded consumers are important to enabling demand responses in the market but aspects of (especially) incumbent pricing and tariff practices are understood here to act against the emergence of this type of supplier-customer relationship. In addition, this paper treats (often disgruntled) customers as voters - growing distrust in incumbent suppliers, partly as a result of various pricing behaviours, has political implications to the extent that it can become harder to use suppliers as a route for effective policy implementation.*

#### *4.4.1.1 Background to Pricing and Tariffs*

That pricing for all energy suppliers is important is clear - prices are one of the two principal vehicles through which suppliers can make profits (the other being to cut costs) (see section 2.2). Prices paid by consumers are taken here to include the various costs of doing business outlined in sections 4.1 and 4.2 but also the supplier profit margin. As already made apparent in section 4.1.3, one of the few functions maintained by incumbent suppliers within overall energy businesses is setting prices. When prices rise in excess of costs, of course, incumbent suppliers can make money – prices achieved for supplying gas and electricity can also to an extent determine profitability for in-house generation. Indeed some financial analysis, when putting together profit models for incumbents, makes the assumption that suppliers would seek to raise prices to offset falling demand in the event of greater energy efficiency (Coates et al 2014: 2). This may explain why although incumbents aggregate volumes fell by 13% between 2007 and 2013, revenues grew by an impressive 37% and profit (EBIT margin) trebled (CMA 2015d: 5). Such results have led some to claim that incumbents overcharge customers by between £3.7bn and £4bn annually (Warren 2014; Meyer 2014).

Prior to liberalisation prices for gas and electricity were regulated, but by 2002 prices had been deregulated for business and domestic customers (still regulated elsewhere i.e. USA) (see Davies et al 2014). By 2013, however, there were growing concerns about, in particular, the domestic pricing schemes of incumbents (see Labour 2013: 9; Ofgem 2013g). Arguments were that pricing systems were confusing, for example Labour noted that there was a system of over 900 tariffs in place making it hard for customers to actively engage in the market. Switching numbers had been falling and there were concerns about incumbents in effect having access to a largely 'captured market' (Labour 2013: 9). Ofgem, following its Duty to protect consumers, responded to these concerns through the Retail Market Review and a series of licence changes designed to create "Simpler Tariff Choices" for domestic consumers (Ofgem 2013g; see also CMA 2015b: 26). One of the principal changes was the, somewhat controversial, decision to limit the number of tariff choices that a consumer would face to four for gas and four for electricity. There was little in the Review, however, aimed at protecting future customers by aligning tariffs with demand (see section 4.3.1.3 below).

Gas and electricity prices overall have been rising, for example dual fuel prices have risen from £450 for an average nominal household in 2004 to £1,400 in 2013 (Ofgem 2014a: 65). The latest full year figures (i.e. up to 2013) collated by Ofgem show that domestic prices have been rising faster than costs which is reflected in improved aggregate profitability for incumbents across domestic and business market segments (Ofgem 2014f: 4). At the end of 2013, start of 2014 a lot of public and political attention was paid to these high and rising prices – indeed some research suggested that the average household energy bill has risen by 168% from 2004 to 2014 (uSwitch 2014). The current 'State of the Market Assessment' observes that there have been certain market conditions (for example VI and transfer pricing) in place that have allowed tacit price co-ordination between incumbent gas and electricity companies (Ofgem 2014a: 45). These observations echo other scholarship that has asserted that VI and 'in-house' trades have together reduced the pressure on incumbents to pass cost savings on to consumers (Mitchell 2014a; Platt et al 2014). The State of the Market assessment also claims that incumbent price announcements appear to be aligned and often in excess of cost rises – a sign of "tacit co-ordination" between incumbents (ibid: 45; see also BBC 2013). There are further concerns that incumbents tend to raise prices quite rapidly when wholesale costs rise, but then lower prices with a longer time lag after wholesale prices drop (Cornwall Energy 2015b: 10).

Public sensitivity to such price movements, amongst other actions, have not only led to current market reviews but they have also led to growing public distrust of energy companies and talk of 'corporate greed' (see Carbon Brief 2013). Recent media reports have suggested that the government has opened an investigation into whether sectors, such as utilities, are taking sufficient action to ensure that consumers benefit from recent falls in wholesale prices (Cornwall Energy

2015b: 10). The Scottish Energy Minister recently wrote to incumbent energy companies to seek reassurances that lower costs would be passed on whilst Labour has been calling for fast track reforms to allow the regulator greater powers to force energy companies to lower prices in response to wholesale market falls (Cornwall Energy 2015: 1; BBC 2015).

#### *4.4.1.2 Equity, Affordability and Lack of Competition*

There are, however, also differences in how costs are distributed through pricing policies between and within market segments – depending on the customer's tariff. In section 4.1.3 it was observed that legacy customers, especially 'sticky' ones, have been valuable to incumbent suppliers but the focus here is on how these (and other customers) are treated in respect of tariffs, allocation of costs and subsequent implications for customer relations and affordability. Clearly, as seen in above sections, all suppliers are contractually obliged to pass on a variety of industry costs to consumers, but suppliers maintain discretion in deciding the means through which (direct and indirect) costs are distributed amongst consumers.

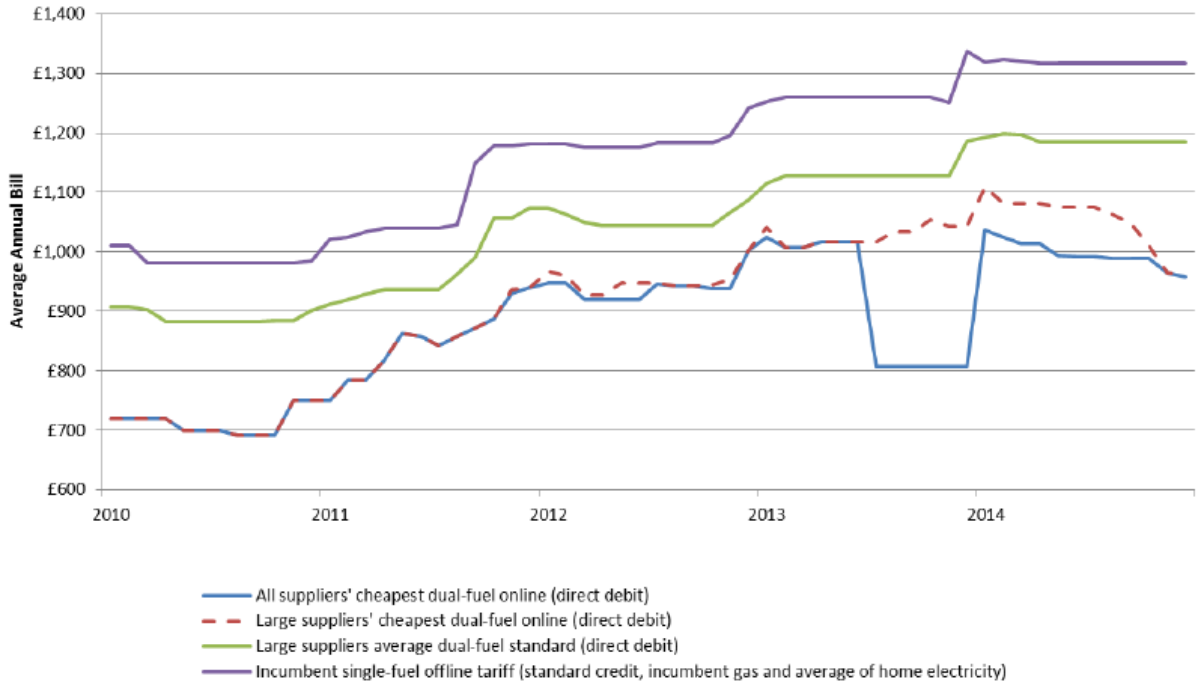
Given that high volume (business) customers have greater bargaining power in relation to smaller volume, domestic and SME consumers, the industrial and commercial market is understood to be competitive (CMA 2014a; Ofgem 2014a). Domestic and SME customers, and in particular those that do not switch, are considered to be far less price elastic (see also Rutledge 2010b: 217). One study has observed, as an example of how smaller volume consumers have fared less well historically, that post privatisation costs did fall but prices for residential customers less so – from 1998 to 2003 residential prices fell 8-17% whilst wholesale prices fell 40% (NAO in Thomas 2006: 593/5/**7**; Wilks 2013: 129; see also Pollitt 2012: 11-12). This pattern was also observed in a 2003 House of Commons report which noted that since NETA was introduced, in March 2001, although wholesale prices had fallen 20%, with similar reductions for industrial and commercial customers' pricing, domestic electricity prices fell only between 1 and 2% (HC 2003: 7-8). More recent reports claim that large businesses also see an almost immediate pass through of lower wholesale costs (Cornwall Energy 2015b: 3). Differentiating tariffs according to volumes in this way tends to reward the higher volume over the lower volume customer – but reflects the greater buying power of energy-intensive users as well as government protections and exemptions for these users.

Section 4.3 above claimed that incumbents still have large numbers of sticky, domestic customers and it is now also apparent that 41% of SMEs have also never switched supplier and remain on variable tariffs (CMA 2015b: 41-2). This section also made the claim that incumbents have benefitted from having legacy customers bases which include high numbers of inert or 'sticky' customers – not least in that inactive customers provide weak incentives to compete on price (CMA 2015a). Indeed incumbent tariff structures on aggregate tend to disadvantage these 'sticky' customers thereby creating uneven cost distributions within customer groupings (Ofgem 2008 and

2014a; IPPR 2014). This may be why average incumbent margins differ between groups. One CMA report observes that the average incumbent margin over a 5 year period for the I&C sector was 2%; in the domestic sector the margin was 3.3%; whilst for SMEs the margin was a staggering 8.4% (CMA 2015d: 8). It is interesting to note that costs for SMEs are lower across most categories, but prices paid (see below) can be quite high (ibid: 14).

Domestic, and SME, customers of incumbents tend to be either on a standard variable tariff (SVT), on a fixed price, fixed term contract, or (for domestic only) on economy 7 tariffs (CMA 2015b: 25). There are 4.3 million households on or economy-7, or pre-payment (PPMs), meters and they pay significantly more per unit than customers on fixed tariffs that also pay by direct debit (Davey 2014).[70] PPMs are more expensive to serve relative to volumes demanded and 'cost-reflectivity' rules mean that they must pay more despite being often less able to pay, although disconnection for non-payment is very difficult (Interview 1).[71] Domestic customers that pay the most tend to be on an SVT for a single fuel (i.e. gas or electricity), or on PPMs, and those that pay the least are duel-fuel, direct debit customers (Ofgem 2015a: 3) – see Figure 7.

**Figure 7: Comparison of prices of a selection of single-fuel and dual-fuel bills**




*Source: Ofgem 2015a: 3*

[70] An economy-7 tariff offers discounts for usage during a 7 hour period at night. This rate is optimal for households with storage heaters, but many on economy-7 (and economy-10) tariffs do not have storage heaters (Ipsos 2012: ii).

[71] One new report analyses the impacts on economy-7 customers not having access to the lowest prices: https://foodpovertyinquiry.files.wordpress.com/2014/12/food-poverty-feeding-britain-final.pdf

Duel-fuel, direct debit customers are generally those that at some point switched, or have become customers post privatisation. Differential treatment is evidenced in the fact that incumbents still charge substantially more to those customers retained from when they were a monopoly compared to customers who have switched (Ofgem 2008 and 2014a; IPPR 2014). As an example, in December 2014 a consumer on a single-fuel tariff, on standard credit with their incumbent supplier could have saved up to £350, or 27%, by switching to the cheapest online duel-fuel deal available at that time (Ofgem 2014a: 3). But what is important to note is that SVT revenues per kWh are higher than for non-standard tariffs – by 12% for electricity and 13% for gas (CMA 2015b: 27). Margins for domestic and SME SVT customers are also higher than those on duel-fuel or fixed tariffs, indeed SVT prices have risen in excess of energy, network and policy costs (Ofgem 2014a: 27-8). Indeed Ofgem's new head, Dermot Nolan, has recently claimed that over 15 million households have not switched supplier, that they are paying over the odds as a result, and that Ofgem has failed these customers (Nolan in Webb 2014). As already mentioned in section 4.3 'sticky' customers also tend to bear the brunt of policy costs associated with supplier obligations (Rosenow et al 2013:1196).

This is understandable in profit terms from an incumbent's perspective but disadvantaging smaller volume clients when supplying a vital service has other social and political implications. There appears to be a higher level of public and political awareness of such practices, although it should be noted that a House of Commons report as far back as 2003 recognised that sticky, domestic customers were charged more than other user groups (HoC 2003: 7-8). This is where the customer-supplier relationship, under the supplier hub model, and *how* they are conducted become crucial to understanding implications for enabling D3. Inert customers do nothing to enable DR and customer experiences of uneven pricing and tariff practices further exacerbate distrust of incumbent suppliers. This makes incumbent suppliers less than ideal as positive vehicles of government sustainability policies (see also section 4.3 above).

Given that a high proportion, furthermore, of PPM and SVT customers are vulnerable energy users (Rosenow et al 2013: 1196; Platt et al 2014: 22), distributing costs in this uneven manner, and using sticky customers to subsidise new, lower-tariff switchers has implications for energy affordability and poverty (see Ofgem 2015a: 4 on uneven distribution). Because energy is an essential service with few substitutes pricing, and service, levels have become key public concerns (Ofgem 2015a: 4). Affordability is still a real and current issue given recent reports that show the numbers of customers in debt to incumbents rising, that show high levels of avoidable winter deaths, and that claim that fuel poverty is expected to rise again (Energy Spectrum 2015b and 2015e).

At a time when energy systems need to transition sustainably vulnerable customers should not have to shoulder high burdens in order that energy companies maintain/grow margins but should be protected. Indeed tariff rules, instead of focusing on reducing numbers of tariffs, could be altered to ensure that vulnerable customers do not have to pay higher prices than other users and that demand measures are better encouraged through tariffs (Citizen Advice 2014b: 5). In other countries, such as the US, prices are regulated (sometimes using a 'default service') precisely in order to avoid impacts on vulnerable users that are, like most of us, dependent on essential gas and electricity services (Mitchell 2014b). The default service sets a margin that suppliers can make, thereby in one sense limiting the impact of supplier profits on customers. Such tariff and/or pricing rules, combined with greater energy efficiency, might enable a more equitable transition. As seen in section 2.3 above, Ovo and some LAs are currently trying to reach more vulnerable energy users in order to get them off high cost (often also pre-payment) tariffs and onto more affordable tariffs. More could also be done to strip out unnecessary energy system costs – for example by improving balancing and trading rules (see Mitchell 2015 forthcoming).

#### 4.4.1.3 *Tariffs and Consumer Demand Responses*

Clearly market rules that allow incumbents to benefit from inert customers, whilst rewarding higher volume business users mean that incentives for incumbents to engage customers have been low. To the extent that incumbents do engage this is largely by offering lower priced tariffs when seeking to attract new customers. There are, however, other ways of engaging customers through tariffs that can enable DR and/or DSR. For example, rising block tariffs where the first block of consumption is charged at a (very) low rate with prices rising in subsequent blocks used and, thus, with level of consumption. These not only incentivise DR through pricing but also are understood to be more equitable in that the first block can be priced at low rates thereby improving affordability for vulnerable households.[72] Despite a motion led by Labour in the House of Commons in 2008 the UK has not yet adopted and/or mandated a rising block tariff system.[73]

Other tariff structures, that include a smaller standing charge and greater price variability according to units used, also tend to incentivise customers to use less. Some independents, like Good Energy and Ebico, offer low standing charges to domestic customers – in fact Ebico's standing charge is zero (uSwitch 2015). Some LAs, like Cheshire East Council, that plan to offer supply services through Ovo are also designing tariffs with low standing charges (see section 2.3 above). Again, it is widely understood that energy markets that can incorporate greater demand management will enable better affordability for customers as well as fairness and security (see for example Citizens Advice 2014b). Household DR implies lower use with associated downward

[72] See: http://www.hedon.info/TariffsForRuralGridElectrification
[73] This was Early day motion 2342 - see http://www.parliament.uk/edm/2007-08/2342

pressure on energy bills, whilst DSR and overall reductions in demand for gas and electricity can lead to lower system costs and therefore (if passed on) lower bills (ibid).

Time-of-use (ToU) tariffs are also sometimes referred to as possible methods for suppliers to incentivise customer load shifting/demand flexibility (Ipsos 2012; Ofgem 2013f; CLNR 2013; Sustainability First 2013; see also Interview 16). The emphasis here is on incentivising customers to switch usage outside of the peak demand period by charging less during specified (according to supplier) times (CLNR 2013). There are two main types of ToU tariff – static and dynamic (Ofgem 2013f: 25; CLNR 2013: 50-54). Static tariffs set fixed times (off peak) during which it is cheaper to demand electricity, whereas dynamic tariffs can communicate prices to customers closer to 'real time' (Ofgem 2013f: 17). Some I&C customers, that have meters which take ½ hourly meter readings, are already being offered ToU tariffs. (Ofgem 2013: 17; Sustainability First 2013: 7). I&C customers contribute to around 16% of evening peak.

In terms of domestic customers ToU tariffs currently offered are of a static nature. As of 2012 it was estimated that 19.5% of domestic customers, or 11% of total GB electricity demand, were on ToU tariffs and 76% of these customers were economy-7 or economy-10 customers (Ipsos 2012; CLNR 2013: 5). Economy 7 and economy 10 tariffs customers will have had meters installed with the capability to measure consumption during hours set by the supplier (UK Power 2015). There seem, however, to have been some complaints and issues associated with the operation of ToU tariffs in practice. For example, because prices for use outside the specified 7 or 10 hours are considerably higher even than standard variable tariffs a customer would have to use more than 35% of their electricity during specified hours to make any savings (see for example npower 2015). This has, of course, to do with how suppliers structure the tariff and it is, therefore, interesting to note that it has been estimated that only 50% of ToU tariff users have deliberately responded to current price incentives by running appliances during the specified cheaper time periods (Ipsos 2012: ii).

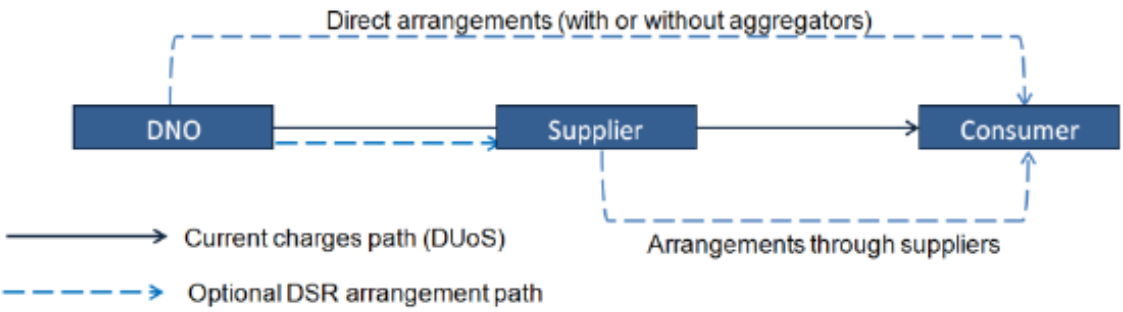
This may have something to do with the fact that not every household that has an economy 7 or 10 tariff is necessarily suited to having one. Such tariffs are particularly suited to households that use storage heaters rather than gas central heating (because they can store up when electricity is cheap at night and then distribute heat during the day or as required) but Ipsos found that only 25% of customers on ToU tariffs actually have storage heaters (Ipsos 2012: vii). This same report finds that only certain customers are suited to ToU tariffs – for example those that have the time and inclination to think about optimum strategies or that are motivated in some other way, i.e. by being off-grid. As such this report concludes that ToU tariffs are only suited for specialist groups of consumers (ibid: ix; see also CSE 2014d: 2). In addition, some have observed that ToU tariffs are relatively unsophisticated versus other (rising step) tariff structures that can be better tailored to

individual customer usage (Interview 5). This is partly because in the past ToU tariffs have been set to reflect supply – for example ToU tariffs were used to increase night time electricity use in order to make best use of constant nuclear supply (ibid). They might also, however, be used (if price levels were set correctly) to encourage usage patterns to make more use of higher night-time wind levels.

There are other barriers, however, to suppliers using ToU tariffs including the fact that most domestic and SME customers do not have meters that can measure usage according to specific times (Pooley et al 2013: 57). Domestic customers tend to have meters that record units at a single rate and suppliers cannot easily obtain a cost-reduction benefit for such customers. One report claims that without the ability to gain time-related data suppliers are currently incentivised to discourage customers' consumption to deviate from the average load profile shape as this would increase suppliers' risk of higher payments for imbalance energy (Pooley et al 2013: 57). This is one of the reasons behind the UK's decision to roll out smart meters that are capable of measuring consumption more accurately (see section 4.4). There have already been some trials, for example by EDF Energy, of more responsive domestic ToU tariffs using smart meters (Pooley et al 2013: 58). The trials concluded that impacts in terms of DSR were positive whilst DR impacts were "unproven but probable" (Sustainability First 2013b: 13). Other reports claim a future incentive for suppliers to engage domestic customers in DSR will be the need to balance in markets (Ofgem 2013f: 12), section 4.2.4.1 explained that current balancing rules contain a bias towards suppliers over-contracting and so those rules would have to change for that incentive to work better.

Some are suggesting, in future, that suppliers should be by-passed and that distributors may be able to have direct DSR arrangements with consumers (see Figure 8) (CLNR 2013: 61; see also Lockwood 2014: 68).

**Figure 8: Possible DSR arrangement paths**:




*Source: CLNR 2013: 61*

There is a strong potential role for aggregators here (CLNR 2013: 65), but (incumbent) suppliers currently have customer information and almost all domestic customer contact. DNOs do have

contact already with some HH consumers (CLNR 2013: 64). Again this might require further governance changes – not least within DNO licences to govern direct consumer relations.

### 4.4.2 Distribution of Benefits

*Having considered how costs have been distributed this section poses questions about the benefits of the current energy system and how they are distributed. The emphasis here is on financial benefits given that for most, but by no means all, companies profits and returns to shareholders and other investors are the principal focus of the business. This has a number of implications – one being for how we analyse UK incumbent suppliers. These companies perform functions within energy value chains but also cash flow and/or profit generation for parent companies. Value, in financial terms, is extracted from the supply company and may not stay in the UK – albeit other benefits include the fact that gas and electricity companies employ thousands of people as well as provide a certain quality and security of energy supply (as commodity) to households in the UK. The inference here being that this could be done in ways that also better enables D3 whilst improving affordability – not least by better enabling entry and expansion of independents that are motivated by enabling sustainability in energy markets and/or have ownership structures that allow them to so.*

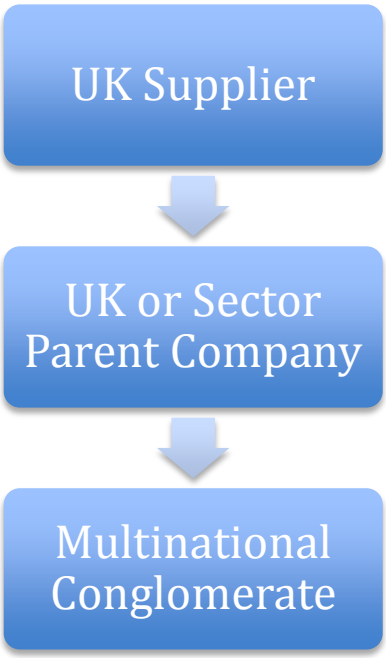
#### *4.4.2.1 UK Suppliers as Part of Large Multinationals*

A recent discussion paper on 'non-traditional business models' (NTBMs), produced by Ofgem, differentiates between energy companies in the UK according to value proposition, motivation and organisational structure (Ofgem 2015d: 12). Here we are interested in organisational structure and motivation – who owns suppliers, what return they expect in return for their investment and where profits accrue. What is important about organisational and ownership structures is that different owners, be they Local Authorities, Co-operative groups, governments or private investors, will expect different (kinds of) returns from their holdings – a point to which we return at the end of this sub-section. Most shareholders in listed companies expect a financial return commensurate with risks taken.

The ownership structures of UK incumbent energy companies are highly complex – with the relative exception of SSE. Whatever Conservative ideas may have been about creating a nation of popular share ownership, current ownership structures, as a result of liberalisation and various phases of M&A through the 1990s and 2000s, could not be more different (Coates et al 2014; Rutledge 2010b; Thomas 2006). UK incumbent electricity and gas suppliers have for some time all been wholly owned subsidiaries of vertically integrated, UK energy holding companies. In turn, four of these, EDF, E.ON, Scottish Power and RWE npower, have in turn been subsidiaries of large,

multinational utility companies (see Figure 9 below – the arrows indicate the direction of profit flows).

**Figure 9: Indicative ownership structure and direction of profit flows for 4 incumbents**




If we look in further detail at one example, EDF, we can see that the situation is highly complex, far more so than Figure 9 indicates. EDF's UK gas and electricity supply business is part of the EDF Energy Group, which is 100% owned by EDF UK Ltd., which is in turn owned by EDF International, and this is owned by the multinational conglomerate EDF SA based in Paris (see Appendix 1: EDF ownership structure). EDF SA has 11 subsidiary companies, each of which has further investments which are either wholly or part owned – one of which is EDF International. EDF International, in turn, has 17 further subsidiaries. What this means is that EDF's UK supply business is but one piece in a very large and complex puzzle and it is 4 times removed from the 'ultimate' parent – EDF SA. It turn, it is also noteworthy that EDF SA is 85% owned by the French government which has vested interests in the development of nuclear power given that it remains a core French industry. Of the other 'big 4' UK utilities, E.ON, RWE/npower and Scottish and Southern, their parent companies are owned by a far wider variety of shareholders. A large percentage of shareholders are institutional investors (for example pension funds) but some are retail investors. In terms of geographic distribution, some shareholders are classed as international whilst some, often a majority, are classed as domestic according to where the company is based.[74]

[74] See for example E.ON's shareholder breakdown: http://www.eon.com/en/investors/stocks/shareholder-structure.html.

Of the two UK incumbent suppliers that are not owned by overseas energy conglomerates, SSE and Centrica, each of these is wholly owned by a UK holding company along with other assets. SSE is the least complex in terms of ownership structure, whilst Centrica (British Gas's UK parent) is itself a multinational company of considerable size with holdings in up and downstream assets in a wide variety of geographical locations. As seen in section 2.3 above, there have been pressures on large utilities to change and this has, so far, resulted in some organisational structure changes.

Utility company structures are, however, starting to change. RWE has, for example, started to organise itself along pan-European sector lines such that it now has Europe-wide renewables, generation (gas, coal and nuclear) and trading business segments (Interview 16). Whilst supply still remains part of the UK holding company, RWE nPower (owned in turn by RWE Germany), there are plans for it to become part of a pan-European supply segment. What remains the same, however, is that UK incumbent suppliers are not stand-alone companies. They pass profits and cash flow (where possible) back to parent companies; parent companies are heavily involved in setting budgets, hurdle rates and UK suppliers must fit in with the overall business strategy decided by large multinational parents.

What becomes necessary, given these observations, is to consider UK incumbent supplier companies not just as stand alone businesses in their own right (see also section 4.1.3 above), but in relation to UK and multinational parent companies that have limited capital but a range of other investment options at any point in time. In terms of this relationship there are two principal points to be made. The first point is that cash and profits flow back to parent companies, indeed, the EUCo model has evolved over the past decades to deliver steady financial returns to investors (Energy Spectrum 2015c: 18).[75] Each UK gas and electricity supplier will also have an internal budget agreed by the holding company and will have to meet certain agreed hurdle rates in order to secure investment (Interviews 6, 11 and 16). This has clear implications for how suppliers then structure their businesses and what choices they are at liberty to make – specifically in that their choices may also have to coincide with what plans holding (or parent) companies have not just for them but also for other parts of the value chain or of the international business (see also section 4.1.3).

The second is that although incumbent suppliers, as argued in section 2.3.3 above, loom large in the imagination of UK consumers they are, in the eyes of multinational parent companies, just a functional part of wider business portfolios (or value chains). Parent companies have certain amounts of capital at their disposal and actively make decisions about *where and when they want*

[75] One interviewee claimed that, given the amount of capital already invested in UK (generation), the parent company had agreed to accept negative cash flow from the UK holding company.

*to invest* (Interviews 2 and 6), and this includes decisions about *whether* to re-invest in the supply business and/or distribute profits back to shareholders. Without stronger incentives to invest, for example, in customer demand reduction in the UK parent companies, given so many other investment options, will invest elsewhere. Such decisions about where to allocate capital can be about making distribution decisions within the existing business portfolio (i.e. how to split allocations between gas and electricity trading, generation or supply businesses) and between investing in the existing portfolio or in new assets. As argued in section 4.1 preferences for many holding companies have been to invest in trading and generation over the past decade or so – not in supply.

UK incumbent suppliers, and the choices available to them, therefore need to be understood also in terms of their function within the wider conglomerate and as relative to the multinational and/or UK parent company's whole business portfolio. This has clear advantages in terms of risk management for multinational parent companies and for UK incumbent suppliers whose parent companies can provide financial backing and reduce credit risk (and costs)– but it can work the other way around if funds are *not* made available to supply businesses to evolve their structures or value proposition, or in the instances that margins are realised elsewhere (for example as discussed in 4.1.3 in the generation arm). Further disadvantages of such organisational structures are that:

> "It demands that the organisation is managed to deliver steadily increasing profits and this creates a difficult environment in which to grow new businesses and develop new markets" (Energy Spectrum 2015c: 18)

This can be offered as one explanation why, for example, large German incumbents (E.ON, RWE, ENBw and Vattenfall) did not invest heavily in renewables – only 4% of German renewables are owned by the German 'Big 4'. In the early years of the FiT they considered renewables to be 'niche' businesses that would not make a sufficiently significant difference to the overall portfolio (Interview 13). Now, of course, a decade or so later E.ON is restructuring its business around new (renewables, customer solutions and distributed energy) and old energy businesses.

As such, when considering the ability of corporates to deliver D3 in the UK, it can be claimed that there are some organisational advantages of independent suppliers over incumbents. Although they face far higher risks, not least in terms of barriers to entry and higher costs of capital, if they manage to establish and grow their businesses they can be operationally more independent and flexible. Many, as argued in section 2.2, have motivations and value propositions in line with DR, DSR and/or DE and ownership structures that to a greater or lesser degree reflect these motivations (Ofgem 2015d). Another advantage of the organisational structures of some independents, for example Ebico, is that they are specifically not-for-profit. Ebico has 50,000 customers but no share capital and it is free therefore to reinvest all profits either back into growing

the business or into alleviating energy poverty – often through efficiency schemes.[76] Local Authority and City energy schemes also fit into the category of being able to reinvest all profits rather than being answerable to parent companies or shareholders.

*4.4.2.2 Dividends, share buy-backs and investment in UK D3*

This section returns to the claim made in the previous section that privatised, incumbent utilities have been designed to provide steady investment returns to shareholders (see also CSE 2014a: 17). Although it is clear that European utilities, and their share prices, have come under a lot of pressure over the past few years, UK suppliers have been improving their profitability. As already argued in section 4.3.1 above the supply arms of UK gas and electricity companies have on aggregate seen improving profit margins – and for 5 out of 6 incumbents prices have risen in excess of costs. For example aggregate supply profit margins have trebled from approximately 1% in 2009 to 4% in 2013 (Ofgem 2014f: 7; CMA 2015d: 5).[77] There was some variety amongst incumbents - in 2013 British Gas had the highest margin at 6%, but EDF's margin was negative partly due to problems experienced when rolling out new customer information systems (ibid: 8). What this makes clear is that, with the exception of EDF, incumbents have been generating profits from their UK supply businesses – on aggregate in 2013 they made £1.55bn. Combined generation and supply profits in 2013 for all incumbents were approximately £2.8bn (ibid: 5).

Above we have noted that profits from supply businesses accrue to UK parent companies and then in some instances onto multinational parent companies overseas. All these parent companies must, however, compete for capital in highly competitive (especially post crisis) financial markets and it is this competition in the market for capital that creates pressures to grow profits and/or manage costs in individual business segments (Interview 8; see also CSE 2014: 17). As such parent utilities need to stay attractive to existing and potential shareholders, but these investors face active choices about which companies (and sectors) are more attractive at any point in time. Shareholders can divest themselves of any stocks they consider to be 'underperformers' – if enough shareholders sell a company's stock the value of shares falls and this in turn makes financing of the company more expensive. Listed, parent utilities are answerable to their holders of capital, the share price matters and some company CEO's, consequently, feel the pressure. One CEO of a small, publically listed utility claimed that shareholder pressures (and share price) lead to his habitually keeping an eye on moving 'ticker tapes' of the company spot price on screens (Interview 2).

Shareholders, in turn, when making investment decisions place a great deal of emphasis on returns versus investment risks taken, improving profit performance year on year (often as

[76] See Ebico's website for details: https://www.ebico.org.uk/about-ebico
[77] These are measured as EBIT (or operating) margins.

measured by earnings per share (EPS) growth), whether a company's stock represents value for money and on dividend returns (Interview 12).[78] Historically utilities used to have an advantage in that they were considered to be relatively low risk but given regular recent regulatory and policy changes, however, the risk profile of utilities has been changing. There are certain financial market drivers at play here: one is that many private market investors like pension funds, and electricity companies, are not designed to be high risk takers but will take a certain level on if the estimated returns are high enough (Interviews 2, 5 and 12). One way of attracting investors and/or rewarding shareholders within this environment, therefore, has been by offering generous dividend pay-out ratios (between 5.2% and 7.8% for the Big 6 in 2012). In fact one UK energy company has claimed that their strategy is to deliver annual growth in the dividend payable to shareholders (SSE 2014a). Utilities defend these decisions by pointing to the fact that keeping shareholders on board and maintaining the share price contributes to a lower overall cost of capital – which should better enable future investments, but can also be used to defend against corporate takeover (Interview 11).

There are other routes for distributing returns back to shareholders – for example Centrica's £500m share buy-back scheme of 2014. Such schemes reward shareholders by giving them a fixed market price should they chose to sell their shares but also rewards those that maintain holdings of Centrica given that, by reducing the overall number of shares outstanding, buy-backs increase the amount of earnings-per-share and, potentially also, the value of each share. The decision to pursue a share buy-back scheme relates to Centrica's, British Gas's parent company, choice not to pursue nuclear interests with EDF Energy but it was also specifically motivated by the need to "… return surplus capital to shareholders" (Centrica 2014). This is clearly money that they are choosing not to invest elsewhere within their considerable portfolio of companies or, indeed, in creating new business models to build (for example) new customer services, distributed energy or demand management.[79]

The argument that share buy-backs and high dividend policies are counter-productive to innovation, especially at times when governments are seeking energy system transformations, is widely recognised (see Mazzucato 2013: 25-27; Lazonick and Mazzucato 2013). This analysis notes that monies have been increasingly distributed, in energy but also other sectors, back to shareholders whilst private sector R&D in new technologies has been falling. One obvious point to reiterate here is that the over-riding corporate incentive in privatised markets is the maximisation of

[78] Earnings per share (EPS) is one of the key metrics used to assigned a value to a company's shares by City analysts and pension fund managers. Shares in companies where EPS are growing (as they do when the number of shares decreases) are more attractive than shares in companies where earnings per share are falling.

[79] Some insights into what market investors expect from investments in corporations derive from the eight years that the author spent working in UBS equity sales as an inter-face between shareholders, many of which were pension fund managers, and companies looking to raise capital and maintain shareholder relations.

profits. This is not to say that senior management in some of the incumbent parent companies are not per se interested in 'greening' their businesses – just that driving profits is relatively more important because of this wide range of active market incentives and pressures and that decisions for considerable capital investment lie outside the supplier business unit. Some suppliers appear less than interested (Interview 3), but where companies do have sustainability teams in place these are often small and must convince colleagues that changes also make 'economic sense' given that profits are primary drivers (Interview 6).

What this means is that current UK gas and electricity market governance does not provide sufficient incentives to cause parent companies of incumbents to lower dividends and allocate more capital towards investment in UK sustainability markets. What it means in practice is that under current market constructions either new incentives need to be created to enable more demand innovations, such as greater market rewards for demand management (see Mitchell 2014), or barriers to entry need to be lowered and/or removed in order to allow new, companies to better develop D3 markets and services. The EUCo model contrasts openly with the organisational structure of some independents that are openly motivated by enabling aspects of D3. Some independents, for example Ecotricity, have been set up to be 'not-for-dividend' – openly recognising that profits distributed to shareholders are not then re-invested in innovating in and improving energy services through providing low carbon electricity. Ecotricity partly finance their investments in green energy through receipts from customer bills, but they also finance themselves by issuing 'Ecobonds' direct to investors.[80]

# 5 Conclusions

Put simply this paper argues that policy and regulatory incentives have not yet been great enough either for the Big 6 to significantly include demand management within their ongoing practices, nor has there yet been sufficient support for or space created for new, more innovative market entrants. In this way the governance of UK gas and electricity suppliers may be doing more to constrain and hinder demand innovations in energy markets than to facilitate it.

By assessing energy governance defined in a broad sense and by linking policies, regulations and rules with supplier practices it has been possible to paint a picture of the many ways that governance relates to outcomes in supply markets, including those that constrain as well as enable D3 innovations. A more obvious approach to understanding better inter-relationships in practice between governance and demand side innovations might have been to assess each demand side

[80] See Ecotricity website: http://www.ecotricity.co.uk/about-ecotricity/ecobonds

policy or regulation on its own merits (or groups). At IGov, however, we have taken this more holistic, if perhaps more complex, approach because we feel that it can provide a deeper understanding of how gas and electricity companies, upon whom so much responsibility for delivering fundamental energy services but also sustainable innovations has rested, are incentivised and how they behave. Clearly new demand, and other, policies are designed to incentivise and/or require market actors to work towards the delivery of UK efficiency and emissions targets but they do not operate in a governance vacuum. Demand policies provide incentives that operate within a louder cacophony of policy, regulatory and market signals from government, but also, in privatised markets, from shareholders and other holders of capital.

This is a much more complex approach but it has revealed that although there has been some improvement in UK demand (in particular in I&C sectors) the loudest signals for corporates coming from energy governance are neither demand oriented nor necessarily helpful to a demand agenda. Taking this approach has, in addition, required the reader to bear in mind certain broader but related notions:

- that customers are important to successful demand management;
- that demand management and affordability are inter-related in multiple (but not always positive) ways;
- that within current state-market structures trust in suppliers is important;
- that large energy companies have been delegated responsibility for implementing energy efficiency policies;
- that suppliers are what the majority of customers see of the energy industry;
- that customers are also voters, that high and rising prices are politically sensitive;
- that correct pricing and energy affordability can enable demand management;
- that historical governance decisions have structured markets such that gas and electricity companies serve holders of capital in preference to UK publics;
- that independent companies can (better) enable demand innovations

By taking this approach it has also been possible to identify what other specific corporate practices have been rewarded by UK gas and electricity governance and what implications (direct or indirect) this has had for demand management and transition more broadly. It has been shown here that governance broadly has structured markets such that:

- markets are overall supply oriented and centralised rather than distributed;
- incumbency and VI have sheltered the Big 6 from competitive pressures;
- scale and volumes have been openly rewarded;
- there have been barriers to entry and expansion for new (more innovative) independents (often in the form of costs faced);

- security of supply and the need to keep incumbents in profit have in some instances trumped demand management;
- innovations have focused on risk management and cost reductions but not demand management;
- tariff structures neither sufficiently support vulnerable users nor inspire demand reduction or response;
- financial returns and profit maximisation has become the primary motivation for incumbents

Moreover profits and/or economic efficiencies realised by incumbents have been returned in greater amounts to holders of capital and large customers rather than used to lower prices, improve customer service or, indeed, invest in business restructuring to enable sustainability and/or demand management.

Some IGov comparative work, between governance and innovations in the UK and in Germany, Denmark and some US states, has revealed that other choices can be made and that other governance routes to D3 innovations are possible.[81] This is not to say that there are no problems and complexities associated with other choices, but to explore how and why they have been more successful in encouraging innovation, transition, new technology development and deployment. Governance elsewhere has shown that taking a greater leadership role, making more explicit commitment to transition over responding to the interests of large gas and electricity companies, and creating new (demand and or distributed energy) markets has been creating conditions within which some large corporates abroad are starting to change, with the most recent example being E.ON's restructuring announcement in December 2014. In many cases these companies are part of the same multinational corporations as many UK incumbents.

By making more explicit the links (above) between UK governance decisions, market rules and corporate practices this paper has provided some explanation as to why we have seen relatively little change to the EUCo model – especially in comparison to market alterations elsewhere. It is hard enough for large corporations to profoundly change given the degree to which they have developed and embedded practices that have allowed them to be successful in historical/existing market conditions. This has made incumbents less flexible and less able to respond to changing energy technologies and to deliver new political objectives such as climate mitigation. Because incumbents tend to find change difficult it makes it more important that those independents with innovative value propositions and greater flexibility should be allowed to expand to provide the new services needed. Energy governance that broadly supports incumbents and the EUCo business model might help European parent companies to stem losses, but they tend only to delay demand

[81] See the IGov website for various blogs and working papers on energy governance and demand/sustainability innovations in California, Philadelphia and New Jersey, Germany and Denmark.

and sustainable innovations in the UK. In this sense the UK loses out on new knowledge, opportunities to learn about new systems through doing as well as becoming a follower in demand innovations rather than a leader.

What this paper points to, therefore, is a need for a governance system that places a greater emphasis on the importance of demand management and that understands better how other aspects of energy governance inter-act with demand policies in practice. Future IGov papers will ask more questions about how these governance and market structures have been able to perpetuate themselves by examining in more detail the forces for continuity and change in UK gas and electricity markets. This can be done, for example, by analysing powerful actors to assess how and why they have constrained change – this would include understanding better the push and pull between new and old ideas, narratives and institutions within processes of energy system transformation. It can also be done by examining in more the claims made above that sustainability objectives are neither consistently nor deeply embedded across all areas of energy governance. Whilst formally energy policy is set towards achieving the trilemma of objectives, we can question why supply licences and statutory codes have little inbuilt motivation to pursue sustainability and suggest changes both in what codes are for but also how they are set, reviewed and revised.

Such tendencies to focus narrowly also impacts upon possibilities and criteria for change. As already mentioned above the ongoing reviews of the supply market are not measuring the success of markets against climate mitigation or demand management criteria but against narrowly set competition metrics (Ofgem 2014a; CMA 2015b). This is one example of objectives, or mandates, built into institutions having an effect on how markets can be assessed as it is written into Ofgem's mandate that the only recourse for full review is to the CMA as competitive markets were Ofgem's first and primary duty (Cornwall Energy 2013). From this perspective then competition in markets is the desired outcome but not sustainability or demand innovations. For example, some of the issues raised in sections 4.1 and 4.2 coincide with issues raised in the CMA's energy market investigation, such as liquidity and transparency, but which the CMA now seems minded to not accept as theories of harm (CMA 2015b). We maintain, however, that these issues remain problematic – partly because we are looking at the whole picture and partly because we are interested in direct and indirect impacts on demand management. Competition is, additionally, not necessarily understood here as the solution to all energy market troubles, indeed we are interested here in competition only to the extent that the more innovative independents are being constrained and the less innovative incumbents supported by existing energy governance. What also seems to be clear in that in order to really understand conditions within UK supply markets, such possibilities for independents to enter and or expand, we need to take into account the combined effect on suppliers of all barriers – any one obstacle might not prove prohibitive but as a collection they do prove difficult to surmount. The CMA arguably, by assessing each theory of harm separately,

misses the point which is that independents in practice experience multiple impacts, on cost structures and business models, of collective barriers to entry and expansion.

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## Interviews

Interview 1. BSC Panel Member and independent energy consultant (July 2013)

Interview 2. CEO of small energy company; former incumbent energy company employee (February 2014)

Interview 3. Former member of incumbent energy company policy team (February 2014)

Interview 4. Former energy industry executive (March 2014)

Interview 5. Former UK Government advisor and BSC panel board member (March 2014)

Interview 6. Former incumbent energy company senior executive (March 2014)

Interview 7: Current Ofgem employee (March 2014)

Interview 8. Former incumbent company senior executive (March 2014)

Interview 9: Senior executive at independent supplier (April 2014)

Interview 10: Former DECC consultant (Various interviews 2014)

Interview 11: Former incumbent energy company senior executive (November 2014)

Interview 12: Former director in a UK investment bank (November 2014)

Interview 13: German energy efficiency academic and government consultant (June 2014)

Interview 14: Energy consultant and government energy advisor (March 2015)

Interview 15: Senior executive at independent supplier (March 2015)

Interview 16: Incumbent energy company senior executive (March 2015)

## Company Websites and Incumbent Consolidated Segmental Statements

Ovo: www.OvoEnergy.com

Good Energy: www.goodenergy.co.uk

The Cooperative Energy: https://www.cooperativeenergy.coop/

Ebico: www.ebico.org.uk

Fairer Power (Cheshire East energy): https://www.fairerpower.co.uk

Tempus Energy: www.tempusenergy.com

EDF: www.edfenergy.com

Centrica/British Gas: www.centrica.com

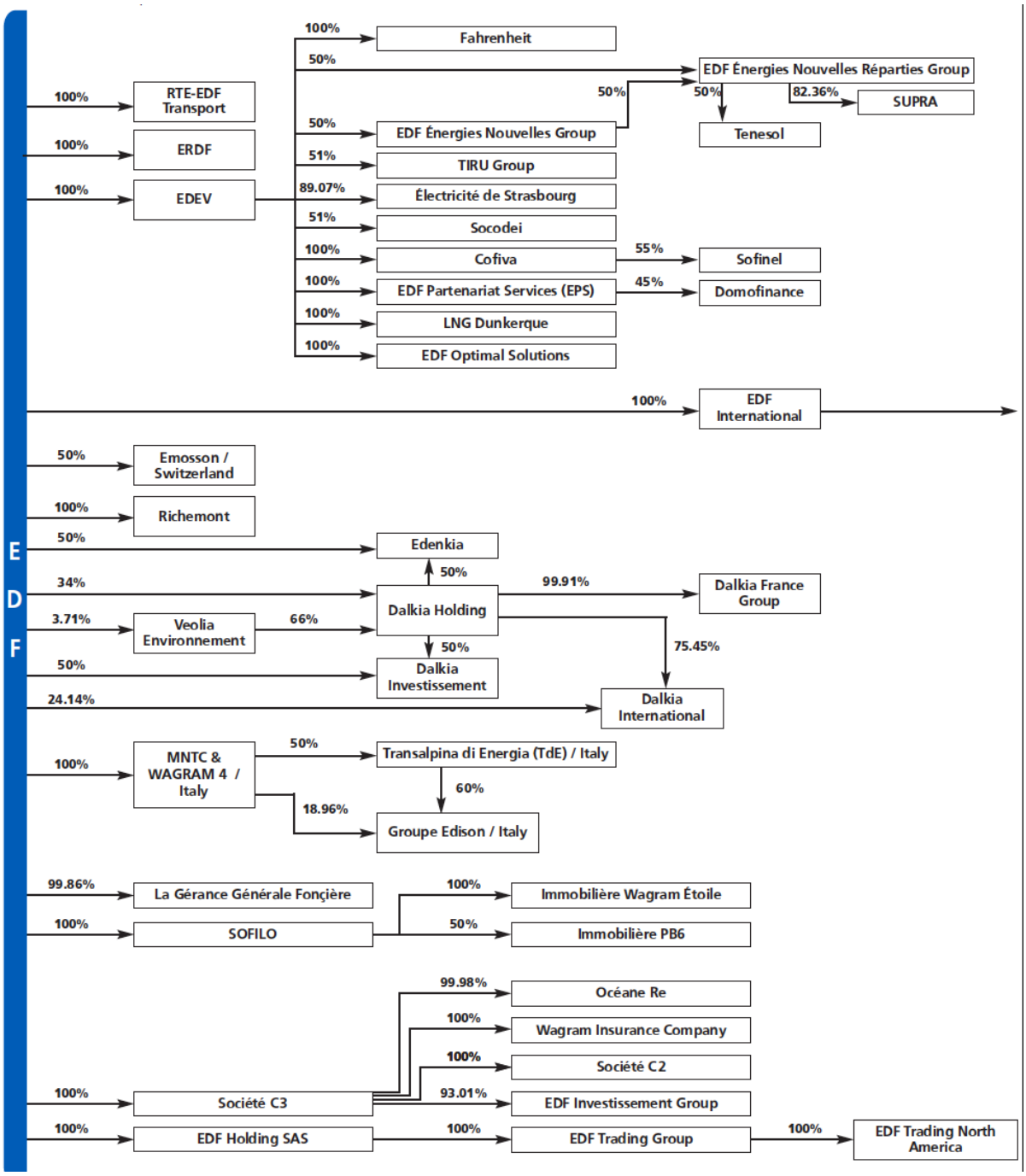
SSE: www.sse.com

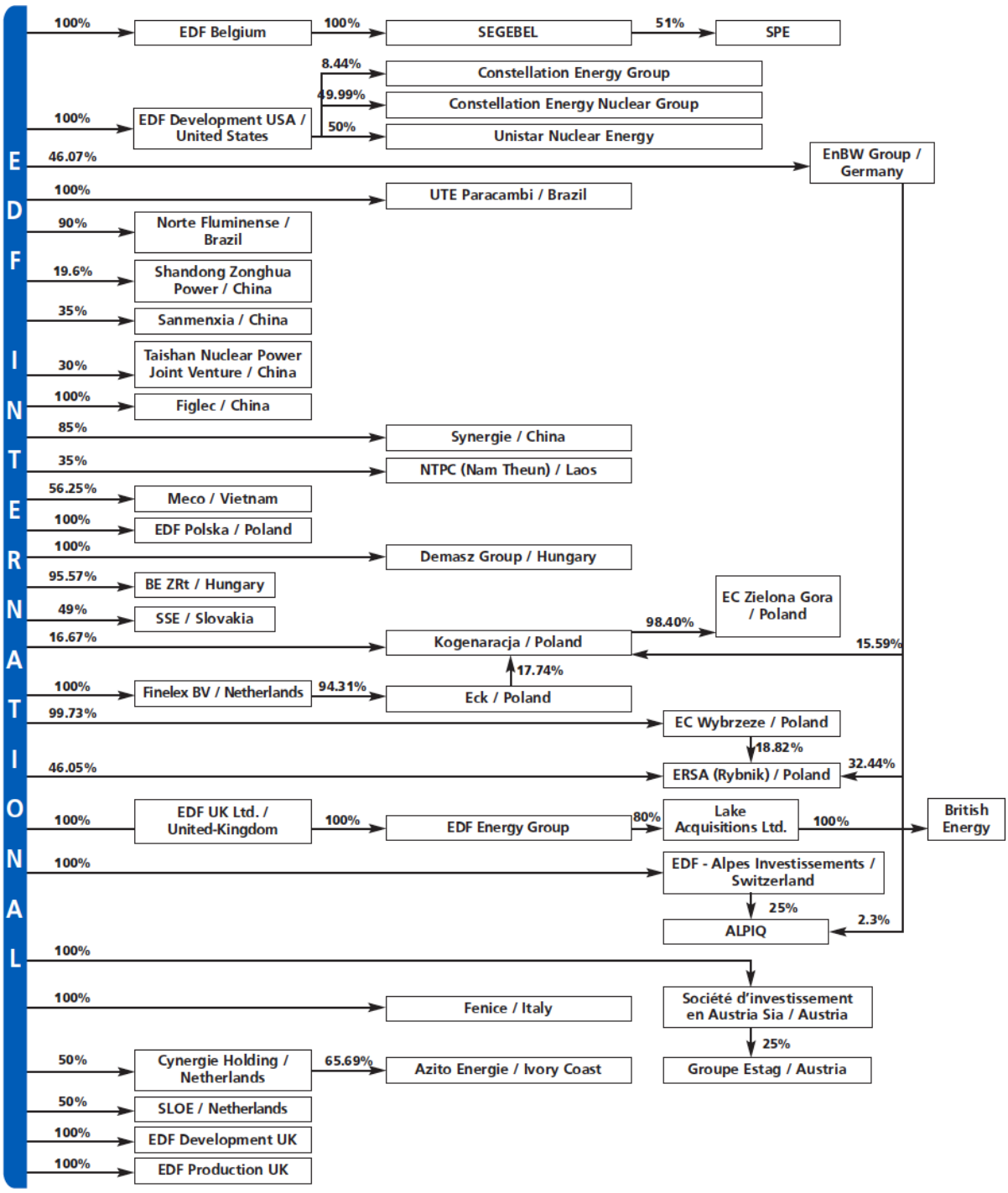
RWE npower: www.rwe.com

Scottish Power: www.scottishpower.com

E.ON: www.eon.com

## Appendix 1: EDF Ownership Structure




EDF INTERNATIONAL
100%
EDF Belgium
100%
SEGEBEL
51%
SPE
8.44%
Constellation Energy Group
49.99%
Constellation Energy Nuclear Group
100%
EDF Development USA / United States
50%
Unistar Nuclear Energy
46.07%
EnBW Group / Germany
100%
UTE Paracambi / Brazil
90%
Norte Fluminense / Brazil
19.6%
Shandong Zonghua Power / China
35%
Sanmenxia / China
30%
Taishan Nuclear Power Joint Venture / China
100%
Figlec / China
85%
Synergie / China
35%
NTPC (Nam Theun) / Laos
56.25%
Meco / Vietnam
100%
EDF Polska / Poland
100%
Demasz Group / Hungary
95.57%
BE ZRt / Hungary
49%
SSE / Slovakia
98.40%
EC Zielona Gora / Poland
16.67%
Kogenaracja / Poland
15.59%
17.74%
100%
Finelex BV / Netherlands
94.31%
Eck / Poland
99.73%
EC Wybrzeze / Poland
18.82%
46.05%
ERSA (Rybnik) / Poland
32.44%
100%
EDF UK Ltd. / United-Kingdom
100%
EDF Energy Group
80%
Lake Acquisitions Ltd.
100%
British Energy
100%
EDF - Alpes Investissements / Switzerland
25%
ALPIQ
2.3%
100%
100%
Fenice / Italy
Société d'investissement en Austria Sia / Austria
25%
50%
Cynergie Holding / Netherlands
65.69%
Azito Energie / Ivory Coast
Groupe Estag / Austria
50%
SLOE / Netherlands
100%
EDF Development UK
100%
EDF Production UK