

Governance and disruptive energy systems

(attached paper by Mitchell, Froggatt and Hoggett)

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New Thinking For Energy



Introduction

- Overview
 - Brief discussion of ‘conventional energy system’ and practice change
 - The Current Situation in GB electricity
 - New factors affecting the GB electricity system
 - Wider potentially disruptive influences elsewhere in world
 - Considers whether these influences / factors are strong enough to disrupt GB
 - Discussion on definitions
- Quite a clear story but lots of questions raised on the link between definitions, theories and practices.

Clarification: conventional energy utility model and system model

- Usually a large, ex State monopoly incumbent company;
- Millions of passive customers which the utility has little connection with;
- Sees itself working in supply focused, sales system
- Its business model is to at least maintain market share; tending to obtain economies by doing the same thing better and not doing / supporting anything which might open up the market to challengers; trying to keep its customers; where possible provide high dividends to reduce risk of hostile takeover
- The conventional system model is across value chain

Clarification: practice change

- There have been many institutional, regulatory and policy changes over the last 25 years or so
 - However, in most countries (but not all) there has been very little difference in practice change across technologies, the way networks are run, markets are organised, supply is sold, business models, the way customers behave etc
 - Of course, there is some , change but rarely is it sufficient to make an existential difference to the utilities
 - An example of this might be GB which has a climate change act; a commission on climate change and a target to reduce carbon by 80% by 2050. This all sounds great – but actually its made very little difference to practice
- This paper judges ‘disruption’ against practice change – main discussion of disruption, transition and transition later.

The GB electricity system is dominated by vertically integrated 'Big 6' incumbents in all parts of the value chain and in both gas and electricity

Table 5: Different arms which make up each of the six largest vertically integrated energy companies

Company	Exploration/ production	Generation	Trading	Retail	Net- work	Gas storage	Renewables
E.ON*	X	X	X	X		X	X
EDF		X	X	X		X	X
SSE	X	X	X	X	X	X	X
Centrica/ British Gas	X	X	X	X		X	X
ScottishP ower		X	X	X	X	X	X
RWE		X	X	X			X

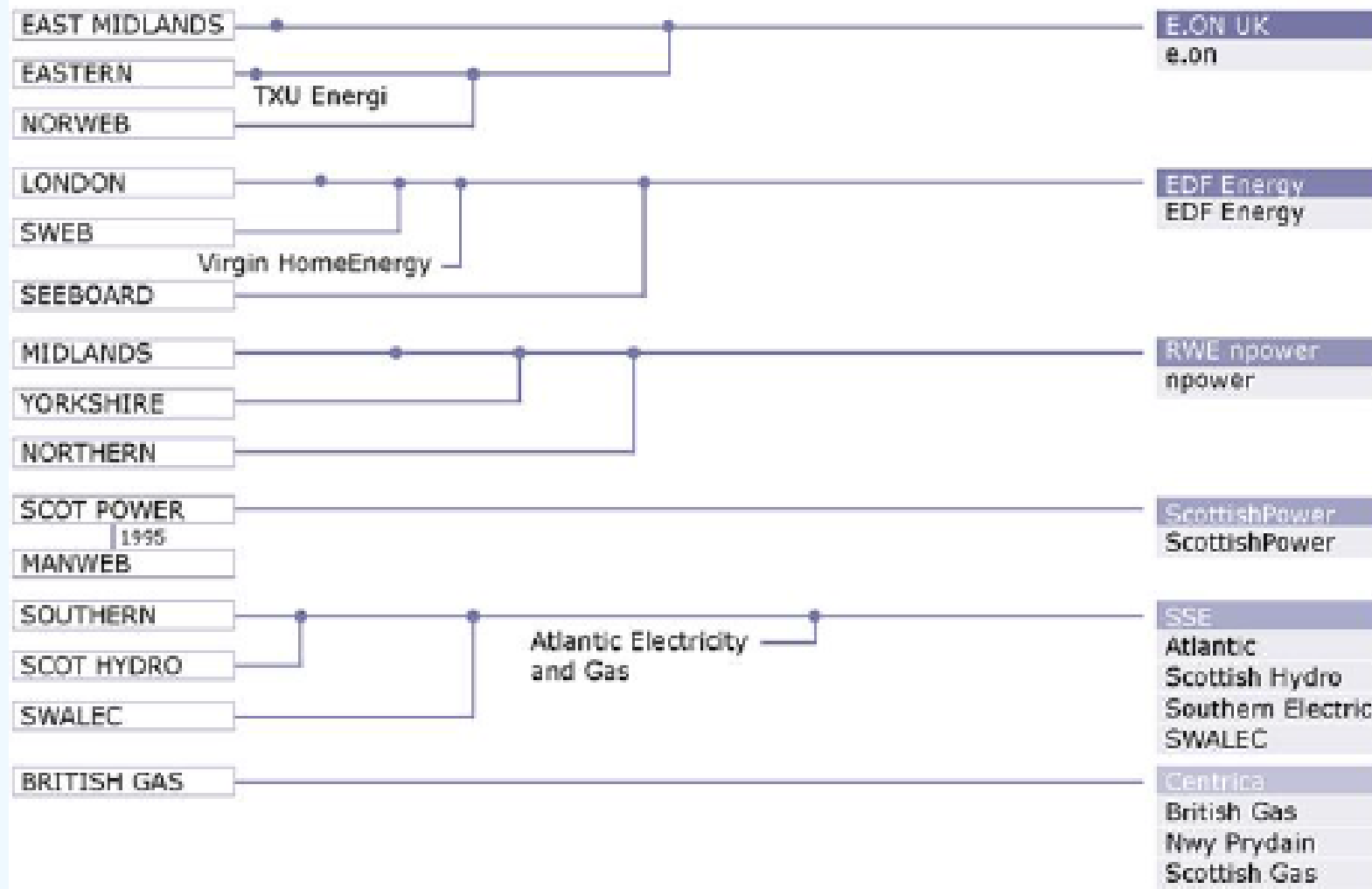
*E.ON operates each of the businesses listed (Exploration and Production, Generation, Trading, Retail, Gas Storage and Renewables) as an independent standalone business within the overall E.ON group, which must optimise its own position separately, and not on a vertically integrated basis.

Source: Q 115, Q 224

Source: Ofgem 2008

Figure 2.2: Consolidation of GB energy suppliers

Pre-liberalisation | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |

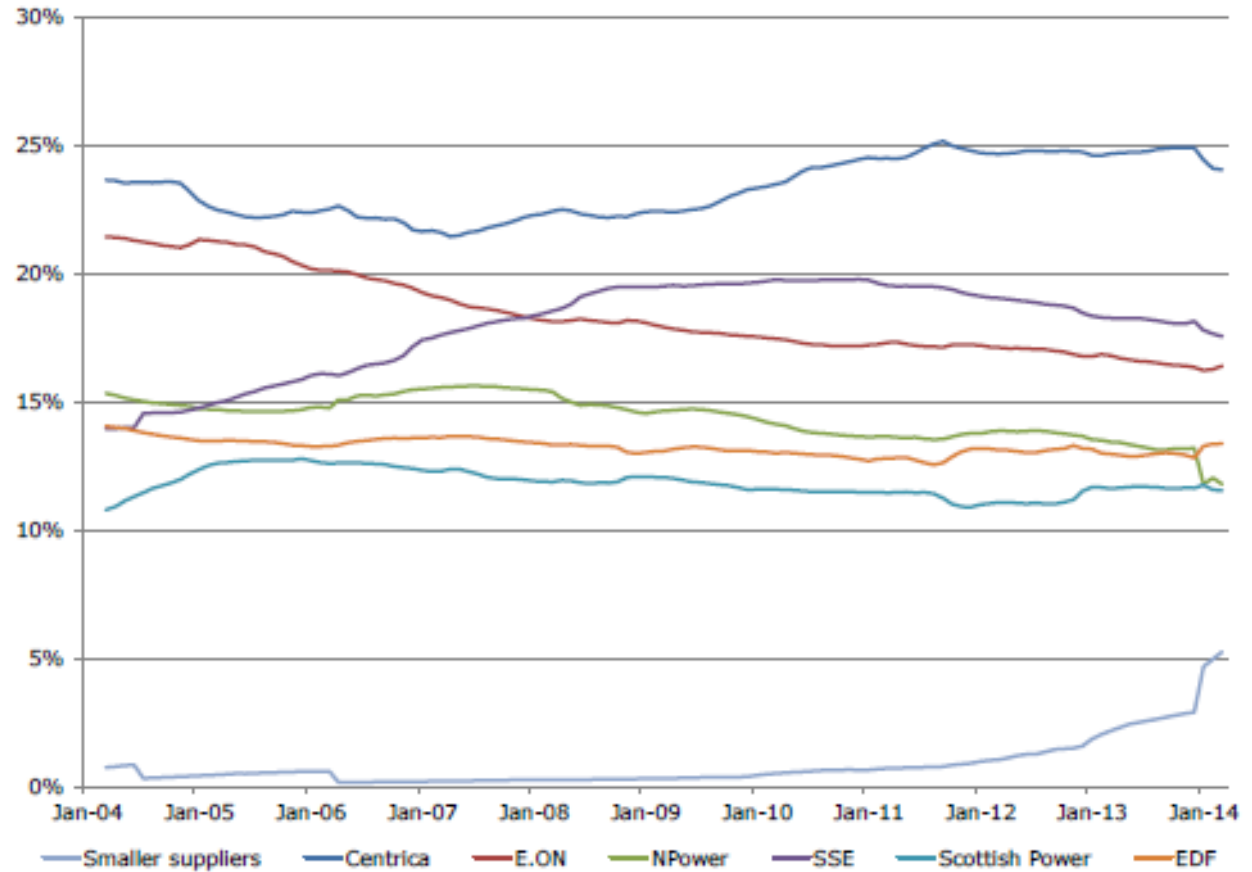


Source: Ofgem

Non Big 6 supply whilst increasing at the end of 2013 (in part stimulated by 'reset' speech) is still only 7.5% of electricity, less for energy

(Ofgem OFT 2014 Market Assessment)

Figure 3: Domestic electricity supply market shares



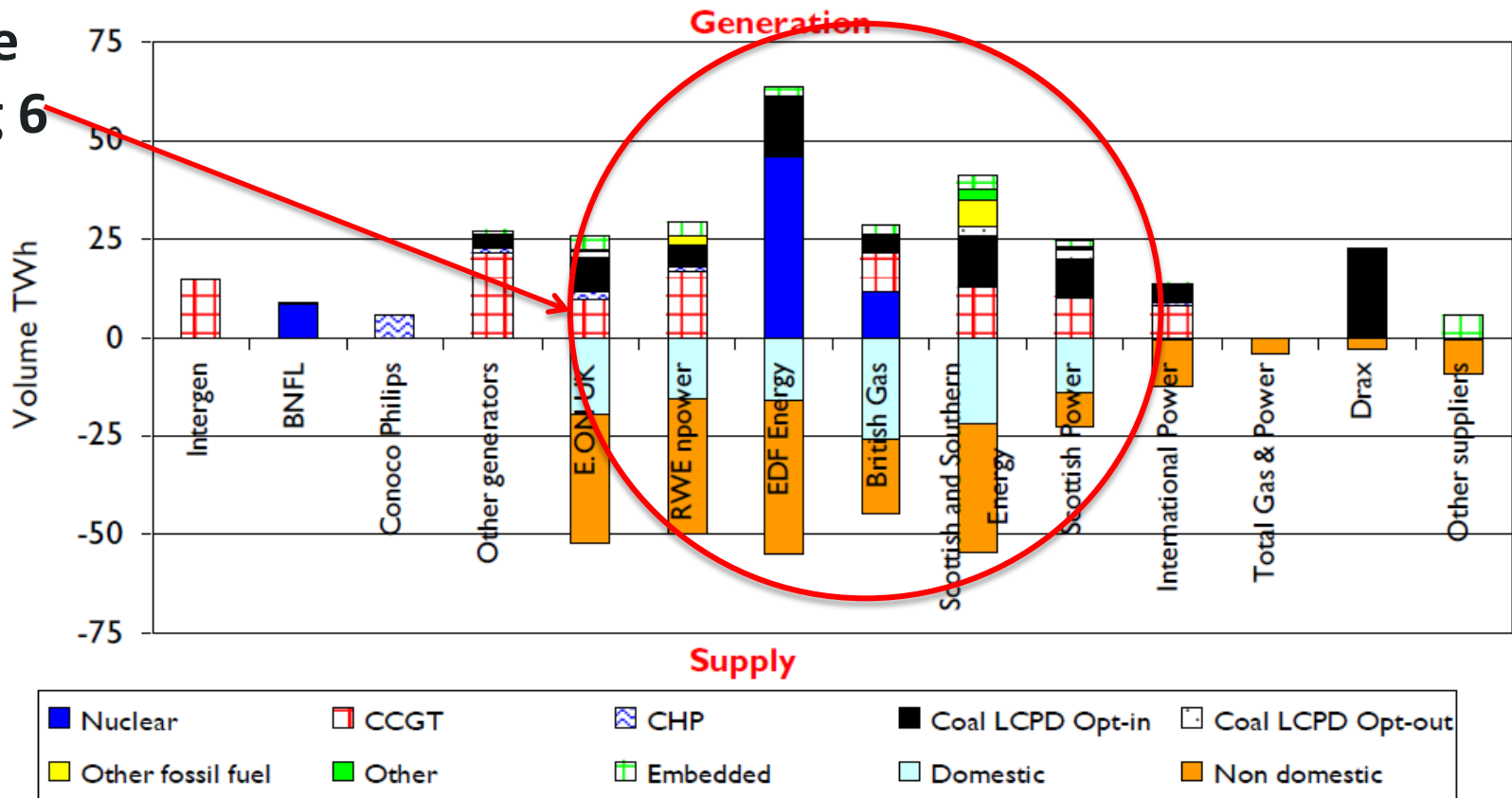
Source: Meter Point Administration Number (MPAN) data from Distribution Network Operators (DNOs)

Self-reinforcing governance is in place in GB to keep the Big 6 incumbents dominant

- Privatised structure designed as no-risk, no-fail for newly privatised companies
- Network incentives
- Electricity market rules
- Liquidity issues
 - Sticky customers
 - Within markets ie ability to buy and sell and transparency of electricity price
- Vertical Integration
- Codes and Licenses
- Supplier Hub Model

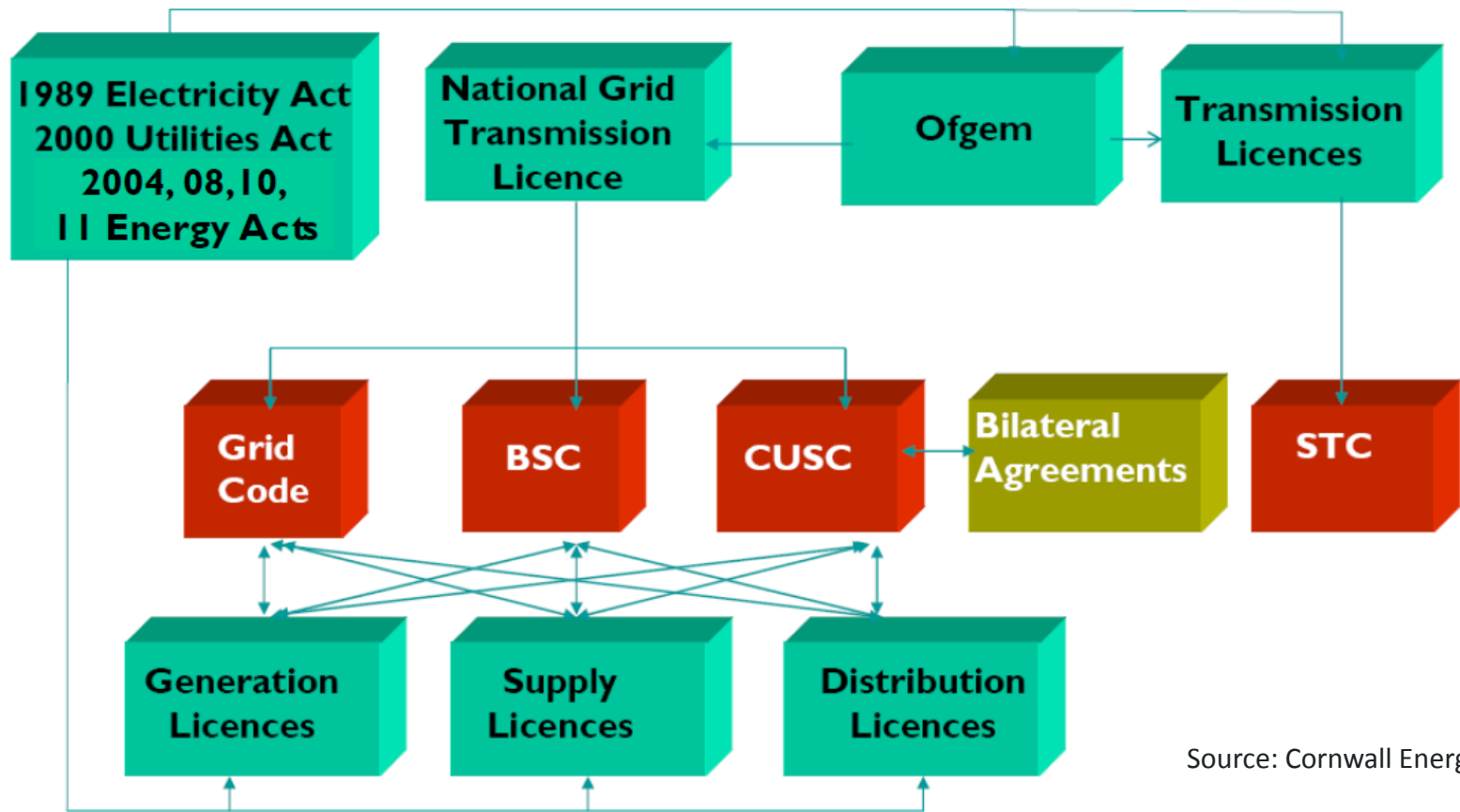
Example 1: vertical integration is encouraged by risks within bilateral electricity market but VI makes it more difficult for new entrants

The Big 6



Source: Cornwall Energy, 2013

Example 2: Industry Codes within electricity are not fit for purpose: unless they are totally transformed, innovation within the energy system will remain very constrained



Source: Cornwall Energy

Question for later: how does / can disruption occur in a self-reinforcing system biased towards the centralised utility model?

So not only is there self-reinforcing governance but current energy policy in Britain is also entrenching incumbents

- Electricity Market Reform (EMR)
 - Kicked off in 2010
 - About to be implemented 2014
 - 4 main new mechanisms
 - A carbon price support
 - Contracts for Differences to pay for low carbon
 - A capacity mechanism
 - Emission performance standards
- Huge literature – eg DECC, Treasury, Ofgem (energy regulator), House of Common Select Committee Reports and Submissions

Bottom line of EMR process:

- Nuclear pushed through
 - I find it impossible to understand (NB I am using those words thoughtfully)
 - EDF happy, other Big 6 not happy
- In my view, final details of market wide capacity mechanism are to assuage / buy off the other Big 5
- Conventional utility model still very much in charge
- Regulator and Government looking after interests of companies rather than customers – an alignment
- Regulator and Government overly focused on EMR and woke up at the end of 2013 to realise significant change had occurred in electricity systems around the world; and GB customers seriously dissatisfied

Current disruptive influence occurring in some places globally : need enough of 1-4 to make material difference and this not the case in GB

1. Falling renewable electricity prices
2. Zero marginal cost generation in electricity markets which are designed to choose fossil fuel electricity based on price
 - Reduces size of market to sell into for fossil fuels; Reduces peak prices; and therefore Reduces profits
3. Demand side bidding in markets also reduce size of market and peak prices
4. Obligations / targets can also reduce total market size and provide revenues to new investors (ie householders / communities)
5. 1-4 undermine conventional fossil fuel investment and provide opportunities for self-generation / new businesses providing available customers

IPPR, 2014:

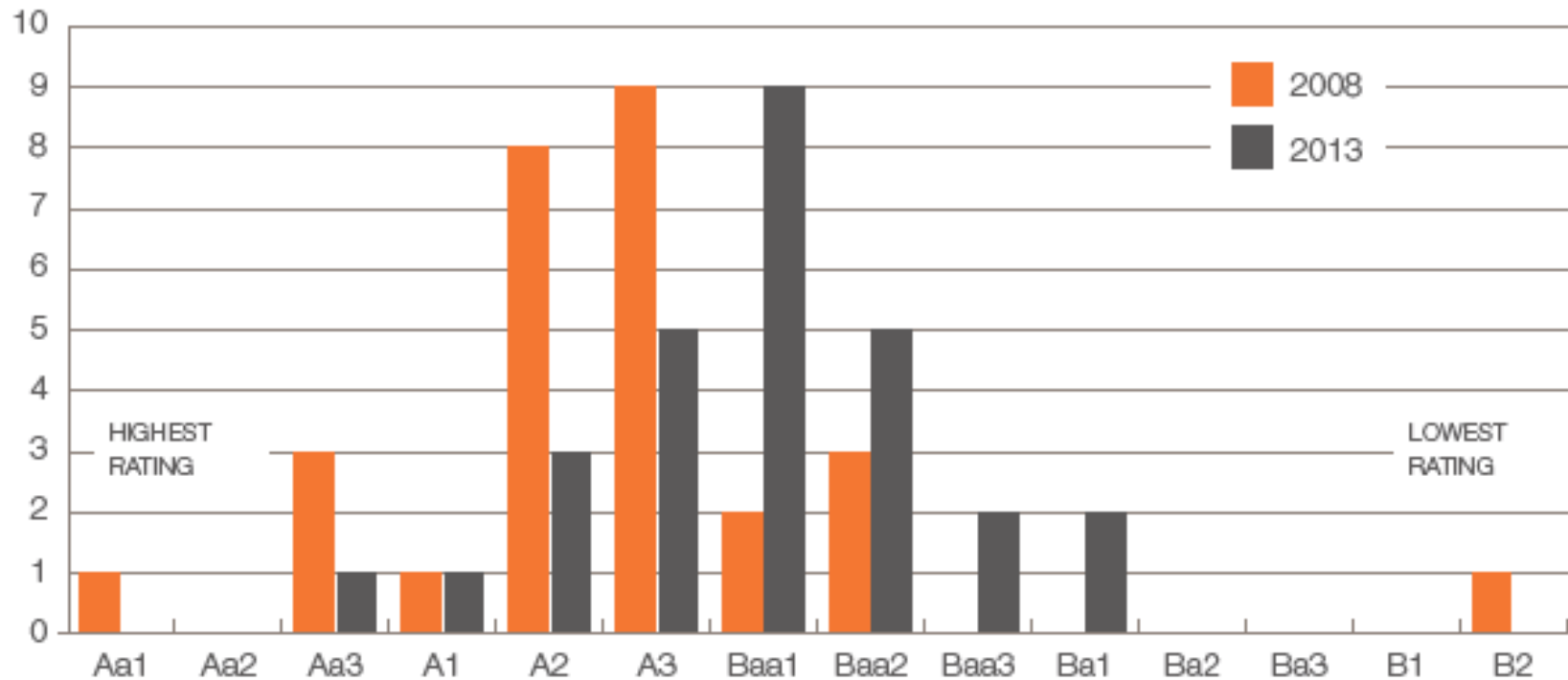
Figure 1.1
The falling value of European utilities



Source: Economist 2013

IPPR, 2014:

Figure 1.2
Downwards revisions in utilities' credit ratings



Source: Citi Research 2013

However, there are some factors challenging the conventional utility model in Britain (1)

- Household dissatisfaction and re-engagement with energy
- Political responses and CMA inquiry
 - ‘Reset’ speech
- Media
- Elections in Britain are adding to the politicisation of energy
 - Referendum on Scottish Independence
 - General Election 2015

Factors challenging the conventional utility model in Britain (2)

- Financial analyses (which are then reported in influential economic media (ie FT/NYT, Forbes, Economist etc) over the last year have come together to argue that the days of the centralised energy system are numbered, even if they are not in agreement about whether conventional utilities can survive

Near – term changes which Financial reports argue will add pressure to the conventional utility model

1. Falling renewable energy prices beyond photovoltaics
2. Falling energy storage prices
3. Greater take up of electric vehicles
4. Major roll-out of existing domestic and distribution network control / management technologies
5. Combo of 1-4 leads to possibility of new practices which might disrupt incumbents and structure
 - individual control and balancing of home and transport energy use; and
 - New apportioning of network control – ie altering relationship between transmission and distribution

Where does all this take us (1)?

- Low carbon policies have had limited material impact on electricity system practice and structure, except in a few countries. Generally, impact remains marginal to operation, design, basic structure and business models
- However, from a global energy system perspective, the hegemony that centralised power is unquestioningly ‘better’ has been broken
- This is not to say the conventional energy model and systems are not in control overall globally but there is a slow but steady move from centralised to decentralised.

Where does all this take us (2)?

- The conventional energy model is in trouble in some countries; and certainly in GB where the model is not really threatened the conventional utilities are trying to work out what their strategy / business model should be
- In GB, centralised incumbents are still in control but there are a number of factors weakening the bias towards the conventional utility model and system in GB
- A tipping point in support of decentralised energy systems has occurred within the Financial Analyses but this has not happened in any country
 - **To be discussed**

Definitional Issues: Electricity System Disruption

- What is disruption? Can disruption happen in a small area
 - ie can PV itself be said to be disruptive to a country even if there is little practice change? Would PV become disruptive once there was enough installed to cause peak prices to drop / revenues to fall / forced networks to be managed in a different way? / forced new business models and new entrants and new customer relationships
- Does disruption have to occur in a system sense so disruption has to be across social, economic, political / governance / institutional, technological areas before it can be said that disruption has occurred?
- How does disruption interact with transition or transformation? Does disruption have to be negative? If a system's practice changes significantly and quickly but calmly, is that a transformation rather than disruption?

Three questions:

- Are the institutions, rules and incentives in place and in support of the conventional energy system in many countries so strong that they will withstand the assault of the disruptive factors ie when is disruptive disruptive enough?
- From a GB perspective, will social, economic and technological change (sometimes internal / sometimes external) force change on the alignment in GB of the Government, Regulator and traditional utility model?
- Will change be disruptive or can it be transformative without disruption?