OFGEM DISTRIBUTED ENERGY REVIEW

REVIEW OF ARRANGEMENTS FOR DISTRIBUTED (DECENTRALISED) ENERGY

1. Executive Summary

a) ***there is a need for action to combat climate change***, in respect of which decentralised energy has a central role in London and the UK to increase the efficiency with which energy is produced and used;

b) ***the Mayor's Climate Change Action Plan***, re-enforced by the Further Alterations to the London Plan and the forthcoming statutory Climate Change and Energy Strategy set a key target, being that 25% of London's energy supply will be met by decentralised energy by 2025 and more than 50% by 2050;

c) ***the decentralised energy market is now principally policy driven*** and its structure and economics differ very substantially from those of centralised generation and supply of electricity;

d) ***there are serious market barriers which prevent decentralised energy from expanding*** to meet the climate change targets required of it. The market barriers are all matters which involve the interface between decentralised energy and the market for large scale, centrally generated electricity production, namely –

i) for all but the small schemes (which currently have licence exempt status), the costs and burdens associated with licensable status in respect of electricity supply and distribution. A report identifying the costs and burdens has been produced by consultants Campbell Carr and is attached;

ii) the cost of standby and top – up (imported) electricity to decentralised generators and the price offered by licensed suppliers for exported power;

iii) the arrangements with licensed electricity suppliers for the transport of licence exempt electricity between decentralised energy sites;

e) ***there is an urgent need for reform of the electricity regulatory and licensing system***, so that medium size and larger decentralised energy schemes do not have to

participate in a market structure which is not designed for them, but at the same time fully protecting consumers;

f) ***some of the issues have been with us prior to and since the Energy White Paper of 2003*** which underlined the objective of levelling the playing field for smaller supply and distribution; but four years on the issues remain with us unresolved. A more radical approach is therefore required;

g) ***the remedial action is as follows –***

i) the Class Exemptions Order is retained, but its scope in respect of domestic consumers increased to a practical maximum of licence exempt electricity distribution and supply of 5MW(e) per site. The same maximum will apply to the transport of electricity from each licence exempt generation site to other licence exempt sites on a licence exempt basis;

ii) decentralised energy schemes making a supply of more than 5MW(e) but not more than 100MW(e) to be subject to a special electricity supply and distribution licensing regime, designed to protect consumers, but maintaining decentralised energy as invisible to the central electricity market system and enabling arrangements for the transportation of up to 50MW(e) between one or more sites to be put in place ;

iii) Ofgem is strongly supported in its investigation of the pricing of power exported / imported by decentralised generators and it should investigate the feasibility of placing a condition in licensed suppliers' licences to secure this;

h) ***the importance of protecting consumers by means of competition is recognised*** and we are pleased to work with Ofgem regarding the possibility of including in the decentralised energy supply and distribution licence practical and enforceable terms which enable third parties to gain access to consumers on decentralised energy sites on a fair basis.

2. Background.

This paper is prepared by the London Climate Change Agency for presentation to the Department for Business Enterprise and Regulatory Reform (DBERR) and the Office of Gas and Electricity Markets (Ofgem) in their joint review of the regulatory and market arrangements for distributed generation.

The London Climate Change Agency (LCCA) was set up to transform London into a leading low carbon sustainable world city. The LCCA is a company established and wholly owned by the London Development Agency whose role includes contributing to sustainable development within London and within that, the development of sustainable energy.

a) climate change – the need for action

Climate change is the most serious environmental threat facing the world. It is vital that London, as one of the world's wealthiest cities and also being especially vulnerable to the impacts of climate change and also the UK as a whole, takes the necessary action.

Recent evidence has shown that the UK targets set are not going to be met on current policies alone and further action is urgently needed to ensure that London and other dense urban areas are provided with energy systems to enable the challenge to be met.

b) centralised energy – substituting greater thermal efficiency for London and the urban environment

The average thermal efficiencies of UK centralised power stations are as follows –

Coal	36%
Gas	46%
Nuclear	38%

The efficiencies of power stations are so low because most of the energy generated is heat which is rejected into the atmosphere through station cooling towers or water cooling systems. There is a total 9% loss of energy in the grid transmission and distribution networks taken together (transmission 2%, distribution 7%), so that by the time the electricity reaches our buildings under 33% of the energy in the fuel burned is delivered as useable energy. In addition, further fuel is then burned to heat our buildings.

Quite apart from the other serious issues associated with that level of waste, the targets set for London would be impossible to achieve without the use of a form of energy generation of far greater thermal efficiency.

Energy can be generated, distributed and supplied locally through distributed or decentralised energy schemes. Distributed or decentralised energy technologies such as Combined Heat and Power (some using renewable fuels) can achieve efficiencies of 85% to 90% simply by recovering the heat that is generated as a by product of electricity generation to heat and cool our buildings. This displaces gas and electricity consumption through conventional boilers and chillers and supplies local electricity with little or no losses.

Local generation, distribution and supply on private wire district energy schemes can deliver more affordable energy services to customers connected to these systems who pay less for their energy services, partly because of the much greater efficiency with which the fuel is converted into useable energy.

c) distributed generation or decentralised energy?

'Distributed generation' is the term usually used to describe any electricity generation which is connected directly to the electricity distribution network, as opposed to being

connected to the national electricity transmission network. However, particularly in the context of community energy schemes, the more accurate term which better recognises their distinctive characteristics, is 'decentralised energy'. As described below, these schemes are not only characterised by being directly connected to an electricity distribution network. They also provide heat, may also include cooling and other energy services, including energy efficiency measures, to the locality in which they are situated. They are specifically promoted by the London Government to realise the carbon savings that can be made by their efficient production and supply of energy and use of renewable fuels. They form an important plank of London's Further Alterations to the London Plan and the Mayor's Climate Change Action Plan.

d) decentralised energy in Woking

Woking Borough Council, including its ESCO – Thameswey Energy Ltd, has implemented a series of decentralised energy systems over the last 15 years. These systems operate on individual private wire networks under the Electricity (Class exemptions from the Requirement for a Licence) Order 2001 (the 'Class Exemptions'), trading surplus electricity between sites across the local distribution network under an enabling agreement for exempt supplier operation with EDF Energy plc. Taking this approach was key in making the scheme economically viable which could not have been achieved if the electricity had been sold to a licensed supplier.

Since the Council implemented its energy efficiency and environmental policies in 1990, it has achieved a 51% reduction in energy consumption, a 44% reduction in water consumption and a 79% reduction in CO_2 emissions in its own corporate buildings and housing stock. Complimenting the reduction in energy consumption, the council receives more than 93% of its electrical and thermal energy requirements from on site low or zero carbon decentralised energy sources, as well as tackling fuel poverty in its housing stock.

e) the scope of this paper

This paper does not set out to address the whole scope of distributed generation. Ofgem's Discussion Paper no. 2 presented to the Distributed Energy Working Group identifies four key settings within which distributed generation arises, three of which are principally concerned with commercial and non domestic demand.

The fourth setting is, as explained below, central to the London Government's policies for climate change and relates to distributed generation in the setting of providing energy and energy services to multiple customers (many of whom are domestic energy consumers) who have no business connection with each other and occupy separate premises in a local area. These may be referred to as community energy schemes. In addition to important issues relating to the prices received or paid in respect of the export or import of power which community energy schemes have in common with the other key settings for distributed generation, there are other important barriers which afflict community energy schemes in particular. These barriers arise out of the high proportion of energy production supplied to domestic consumers. This may often cause such schemes to be unable to rely on the Class Exemptions and cause medium sized and

larger schemes to be exposed to the licensing and market requirements which are applicable to and designed for large, centralised electricity generation and supply.

3. The Role of Decentralised Energy in London

Because of the need to reduce the carbon content in the provision of heat and cooling as well as electricity, decentralised energy has a key role in London's climate change policies.

a) London's emissions of carbon dioxide – the Mayor's Climate Change Action Plan

London's electricity and gas consumption causes emissions of 35 million tonnes of CO_2 per annum, amounting to 75% of London's total emissions. This is set to grow by a further 15% by 2025 if nothing is done to tackle this. A key target in the Mayor's Climate Change Action Plan is that 25% of London's energy supply will be met by decentralised energy by 2025 and more than 50% by 2050.

The actual delivery of low and zero carbon decentralised energy systems in London is a priority which the Mayor has re-enforced by the Further Alterations to the London Plan and the forthcoming statutory Climate Change and Energy Strategy will carry forward. The current electricity regulatory system represents a serious barrier to achieving the Mayor's targets, because of the scale of the schemes required (see paragraph d) below).

b) The Further Alterations to the London Plan

The Further Alterations to the London Plan set out the Mayor's targets for reducing carbon dioxide emissions within London. The Mayor will work towards a long term reduction of 60 per cent by 2050 and for the intervening period, the Mayor will and the London Boroughs and other agencies should seek to achieve the following minimum reduction targets against a 1990 base –

15% by 2010
20% by 2015
25% by 2020
30% by 2025

In the context of new developments, the Mayor will and the London Boroughs should in their DPDs (inter alia) prioritise decentralised energy generation, including renewables.

The Mayor's Climate Change Action Plan, published in February 2007, sets a target to reduce London's CO_2 emissions by 60% below 1990 levels not by 2050, but by 2025, on the basis that CO_2 emissions must be reduced to that level for CO_2 levels to be stabilised at 450ppm and catastrophic climate change avoided.

c) The Mayor's statutory strategy

The Mayor's powers and duties to act in relation to climate change will be strengthened under specific statutory duties proposed under the Greater London Authority Bill. This includes an obligation on the Mayor to propose and publish a London climate change mitigation and energy strategy, to contain proposals and policies relating to minimising emissions of carbon dioxide from the use of energy in Greater London.

d) Scale

The scale of the CCHP (Combined Cooling Heat and Power) and CHP (Combined Heat and Power) schemes implied by the targets will necessarily be larger than many community heating schemes established in London in the past and is already proving to be so in the case of schemes currently under development. Developers are required to consider a site wide approach (rather than just schemes confined to individual buildings) and also the linking of new developments into existing schemes already serving heat, power and cooling demands in the locality. This means that the quantity of electricity supplied to domestic consumers in all but the smaller schemes will exceed 1MW(e) , the ceiling which in practice applies under the Class Exemptions for the supply and distribution of electricity on a licence exempt basis to domestic consumers.

The effect of exceeding that ceiling is the compulsory acceptance of the burdens of joining the electricity market systems applicable to large scale centralised electricity supply and distribution. These are described in paragraph 7 b) below and Annex 4.

4. Decentralised Energy as a Policy Driven Market

Decentralised energy schemes operate to produce and supply not only electricity, but heat, cooling and other energy efficiency services. This is mainly in response to demand for energy in the form which reduces the carbon content by means of efficient energy production, in combination with measures taken to reduce the energy consumption in the buildings to which the energy is provided, or to construct those buildings for low energy consumption.

Although there are established community heating and decentralised energy schemes (including Woking, Nottingham, Sheffield, Southampton and the Barkantine scheme in London) which were created mainly through the individual dedication or foresight of

their promoters, the decentralised energy market is now strongly policy driven. Assertive policy measures established by the Mayor in London have already been referred to. In addition, in the United Kingdom as a whole Government policy initiatives drive the demand for decentralised energy, including –

a) amendments to Planning Policy Statement 1, identifying measures to reduce the carbon footprint of new developments;
b) Part L of the Building Regulations and objectives to be met in respect of new developments;
c) the Energy Performance in Buildings Directive and the certification of the energy efficiency of buildings;
d) the (currently voluntary) Code for Sustainable Homes;
e) the Co-Generation Directive;
f) the End – Use Efficiency and Energy Services Directive.

5. The Physical Characteristics of Decentralised Energy Schemes

Decentralised energy schemes share similar physical and engineering characteristics.

a) serving a defined locality

the schemes provide decentralised energy to a locality delineated either by the boundaries of a defined site or by a network of private (licence exempt) wires dedicated to the scheme and connecting the energy generating plant and the premises served by it;

b) on-site infrastructure

in addition to an electrical distribution network which in the case of new developments are normally be dedicated to the scheme, the installation includes a network of hot water pipes between the energy generating plant and the premises served by the scheme, to provide heat usually in the form of hot water to the premises served by the scheme. In some cases chilled water for cooling via heat fired absorption cooling (not electric cooling) can also be provided;

c) import and export of electricity

in respect of electricity, there is a connection between the generating plant and the licensed electricity distribution network operated by the local Distribution Network Operator, through which stand-by / top-up power is imported and electricity in excess of the requirements of the site is exported;

d)' heat led'

the energy generating capacity of the scheme is typically 'heat led', that is to say the capacity of the plant is sized so as to meet the heat / cooling requirements of the scheme. Any shortfall or excess in generated electricity is imported or exported as

necessary via the connection point with the local electricity Distribution Network Operator's network;

e) managing heat and electricity loads

an objective of a scheme is to assemble a distributed energy site where the balance of heat and electricity demand from different premises to be served by the scheme and differing fluctuations in demand for heat and power from the premises (combined with thermal storage capacity) enable the generating plant to be sized for optimum economic performance and carbon reduction which usually entails the plant operating with high efficiency and the minimum of import and export of electricity;

f) Exempt Supplier Services

in the case of some schemes (notably Woking) decentralised energy sites are linked, either through private wires or by means of an arrangement with a licensed electricity supplier, to enable electricity to be imported / exported directly from one site to another, without need for the electricity to be sold to and re-purchased from a licensed supplier, with the resulting costs (see paragraph 7 c) below);

g) size

decentralised energy schemes may be designed and sized so that the electricity demand from domestic consumers served by the scheme does not exceed the practical limit applicable under the Class Exemptions, in order to ensure that the supply and distribution of the electricity to consumers is exempt from licensing. Maintaining its licence exempt status insulates the scheme from the costs and risks associated with operating within the electricity market structure applicable to large scale, centralised electricity generation and supply. The exception is the purchase by the scheme of standby and top-up power and the exporting of excess electricity. The imported power will be purchased from a licensed electricity supplier and will reflect electricity market costs; so also will exported power, except where it is transported to another licence exempt distributed generation site, where some of these costs may be avoided through the use of Exempt Supply Services.

However, economic and engineering considerations mean that the size of schemes will grow (see paragraph 3d above).

h) potential for carbon reduction

As explained and demonstrated elsewhere, (paragraphs 2b) and 6c)) there is substantial potential for CHP / CCHP schemes to reduce carbon emissions by using the heat that would normally be wasted. However, not only will carbon emissions be reduced by the recovery of heat but as the size of CHP technology increases, there are efficiency gains to be had. Typically, a 1MW(e) plant would have an electrical efficiency of circa 33% but a 5MW(e) plant would have an electrical efficiency in excess of 43%.

6. The Commercial Structure and Economics of Decentralised Energy

The commercial structure and economics of decentralised energy differ very substantially from those of centralised generation and supply of electricity.

a) commercial structure

A developer, local or public authority will usually commission a decentralised energy scheme from an energy services company (ESCO). That company may in some cases be a joint venture between a developer or public sector body and an energy services company. The shareholders may also include residents of the locality served by the scheme.

The ESCO will design, finance, build and operate the scheme and assume the financial and operational risk and agrees to make the required energy services available by means of a long term contract between it and the developer or an appointed management company. Under that contract, the ESCO undertakes to offer the energy services to individual consumers on the site on pre-set terms, including price.

A simple diagram of the relationship between the main stakeholders, the developer, ESCO and the consumers is attached as Annex I.

In addition, there are other principal contracts upon which the scheme relies. These include:-

(i) Connection and Technical Agreements with the local electricity Distribution Network Operator;
(ii) contracts for the installation of the decentralised energy plant and equipment;
(iii) contract for the supply of fuel (whether gas or a renewable source);
(iv) standby/top-up and electricity export contracts with a licensed electricity supplier;
(v) in some cases an agreement with a licensed electricity supplier for the carriage of electricity produced by the decentralised energy scheme to one or more other scheme sites in the same or different ownership. Such an agreement relies upon Condition 53 of the Standard Licence Conditions for electricity supply which requires a licensed supplier, if asked by a producer of licence exempt electricity, to facilitate its transport by means of the local licensed electricity distribution network to another licence exempt site. There is scope for removing unnecessary barriers of scale which affect the value of this facility, for which see paragraph 7 c) below.

b) revenue base

The revenue of decentralised energy schemes arises principally from the following –

(i) payments made by energy consumers for heat/cooling and electricity supplied to them. Typically, the electricity tariff will be linked to a basket of available electricity tariffs from licensed electricity suppliers, often incorporating a discount or confined to a lower quartile of the average of such prices and guaranteed as such. Heat and cooling is commonly linked to gas price, that being the prevailing cost driver behind the provision of thermal energy in other markets;

(ii) revenue earned from the provision of energy efficiency services, such as providing insulation in housing and other energy saving measures.

(iii) proceeds from the export of electricity, together with Renewable Obligation Certificates (if renewable electricity) and Climate Change Levy Certificates (if renewable electricity or Good quality CHP).

Depending upon the social needs of the locality, the tariffs charged and the energy efficiency measures offered may be designed to address fuel poverty.

c) cost base

Principally on account of the small scale of the energy generating units involved, the unit cost of the electricity produced in decentralised energy schemes is normally substantially higher than that produced by large scale grid connected electricity plant. However, this is offset by avoided costs which arise through the generation and supply of the electricity being both embedded and licence exempt. The attached schematic diagram (Annex 2 – source: Ofgem, Domestic Competitive Market Review, April 2004) demonstrates the make-up of the unit costs of and suppliers' margin on electricity supplied to domestic consumers through the centralized electricity supply and generation system.

In the example given in Annex 3, some 32% of the total cost of supply of centralized supply, is avoided cost to decentralized supply, notably –

i) distribution and metering;
ii) transmission;
iii) Renewables Obligation;
iv) Energy Efficiency commitment;
v) BSUOS.

The decentralized energy supplier will to an extent incur its own costs in substitution for some of those incurred in the centralized supply of electricity, notably on site distribution costs, metering and billing. However, as is apparent from Annex 4, those costs are generally lower on account of the decentralized energy provider's licence exempt status (assuming the scheme falls within the current Class Exemptions). That is also true of some supply costs included within the remaining 'unavoided' 68% of cost itemized in Annex 2 or are contributed to by the decentralized energy provider's thermal energy supply business (see below and Annex 3).

The outcome will vary according to the load profile of the consumers used for establishing the commodity price of electricity for the purposes of the comparison. Commercial electricity consumers with high consumption will typically pay a lower commodity price in comparison with domestic or small business consumers.

The cost comparison is strongly influenced by the cost of the energy generation plant on the decentralised energy site, its associated operational costs, billing and a range of other costs, also being costs attributable both to electricity supply and delivery of heating and cooling to energy consumers within the scheme. The inter-relationship between the thermal energy and electricity cost/revenues is illustrated in schematic form in the attached spreadsheet (Annex 3).

Unit costs would be difficult to establish on a generic basis, short of extensive financial modelling of different forms of scheme, reflecting different electrical and heat loads, fuel source, type of energy generating equipment installed and a range of other matters. We doubt the usefulness of that approach, certainly at this stage. However, there are thresholds of size where the economics and effects in carbon reduction work best. Our research indicates that 5MW (e) is such a threshold, but there are others further up the scale of size.

For the purposes of this paper we believe it sufficient to demonstrate, as the facts indicate –

i) that the cost structure of decentralised energy schemes is fundamentally different from that applying to licensed centrally generated and supplied electricity ;
ii) that structure includes avoided costs attributable to the licence exempt status of the electricity supplied which, although they may vary from scheme to scheme, form an important element in their economic viability;
iii) the value to decentralised energy schemes of these avoided costs will be seriously eroded if larger schemes involving substantial numbers of domestic consumers continue to be regulated in a way that requires them to share costs associated with the market for centrally generated and supplied electricity. These burdens are described in paragraph 7 b) below.

d) a different energy market requiring separate regulatory status

It follows from the above that key factors in determining the regulatory status of the supply and distribution of electricity in the decentralised energy market, are as follows –

i) the electricity is supplied and distributed as part of a bundle of energy services which as a whole satisfies a demand from occupiers of buildings for low or zero carbon energy performance on or in a given site or locality;
ii) the decentralised energy services are demand led, increasingly driven by energy policy;
iii) the energy and related services are provided to customers as part of a single business, the principal elements of which are economically interdependent, in particular the simultaneous production and supply of electricity and thermal

energy (see Annex 3) [interdependence between thermal energy and electricity supply costs and revenues in decentralized energy schemes];

iv) decentralised energy schemes bear a higher unit cost of electricity production than large scale centralised electricity generation and supply. These are off-set by lower costs associated with the decentralised status, providing a scheme has licence exempt status (see Annex 2 and paragraph 6 c) above) [cost base].

As is demonstrated below, the key to providing a level playing field for decentralised energy within the regulatory regime lies in finding satisfactory solutions to the following cost barriers. They are all matters which involve the interface between decentralised energy and the market for large scale, centrally generated electricity production and supply, namely -

i) for all but the small schemes (the practical limit being electricity supply of 1MW(e) or less to domestic consumers) the costs and burdens associated with licensable status in respect of electricity supply and distribution;
ii) the cost of standby and top-up (import) of electricity and the price offered by licensed suppliers for export;
iii) the arrangements with licensed electricity suppliers for the transport of licence exempt electricity supply between decentralised energy sites.

They are examined in more detail below.

7. Threats and Barriers to the Growth of Decentralised Energy

This paragraph addresses threats and barriers to decentralised energy which arise out of the economic regulatory structure within which it operates and in particular the licensed electricity supply market. Planning and other barriers, although important, fall outside the scope of this paper.

a) import and export costs of electricity

Ofgem raises in its discussion papers whether generators of distributed energy receive a fair price for the electricity exported to licensed electricity suppliers (relative to the balancing, administrative and other costs incurred by those suppliers); and whether electricity which decentralised generators purchase as top-up or standby is fairly priced (again, relative to the costs incurred by the licensed suppliers who supply it to them).

The answers to these questions, as implied by Ofgem's papers involve, in the case of both import and export, detailed examination of licensed electricity suppliers' costs and the commercial attractiveness of sales to and purchases from decentralised generators of electricity, relative to other sources of demand and generation to which the licensed suppliers have access. These are questions to which Ofgem itself, through making enquiries of licensed suppliers and others is in the best position to find answers.

However, it is important that the justification for the current prices offered or charged to decentralised energy generators is investigated and Ofgem's interest in the issue is strongly endorsed.

There are some general observations that can be made –

i) in the context of decentralised energy schemes, the quantities of electricity required to be exported or imported are relatively small. It is perhaps straightforward for licensed electricity suppliers to explain that the balancing risk, administrative and other costs make such small packages of electricity an unattractive purchase and they are discounted for that reason. However, licensed electricity suppliers are natural consolidators and it is uncertain how far these dis-attractions in reality reduce the actual value of the power purchased;

ii) a similar point may apply in the case of the pricing of electricity purchased by decentralised generators from licensed suppliers. Perhaps simplistically, in terms of risk and administrative costs from the licensed supplier's viewpoint, the difference between export and import from or to a site merely amounts to the acquisition of a negative rather than positive demand.

Ofgem is strongly urged to make progress on these issues. However, the special burdens associated with smaller generators and suppliers operating in the NETA / BETTA market have been with us since the inception of NETA. These are referred to in paragraph 8 below.

Knowledge of the history of investigation into these barriers relating to import costs and export prices lends to the belief that although investigating pricing relationships with licensed electricity suppliers is a valuable exercise, it will not resolve the underlying problem. That lies in resolving the effects of medium size and larger decentralised energy schemes being required to participate in a market structure which is not designed for them.

b) costs, burdens and other barriers to decentralised energy schemes flowing from the requirement that medium and large size decentralised energy schemes be licensed for the supply and distribution of electricity

Attached as Annex 4 is a paper dated September 2007 prepared by energy consultants Campbell Carr Limited – 'Comparative Costs of Operating On-Site / Private Wire Distributed Energy Systems on a Licensed rather than Licence Exempt Basis'. The report was commissioned by the London Climate Change Agency.

The report examines and summarises the market and associated costs of establishing and operating a licensed electricity supply business and a licensed distribution business (as an Independent Distribution Network Operator). It deals also with the extent that the embedded benefits relating to distributed energy are or may be eroded by electricity supply and distribution being undertaken on a licensed basis.

Reference in particular should be made to the tables in paragraphs C1 and C2 of the report which summarise the costs relating to establishment and participation in the electricity supply market for two sizes of decentralized energy scheme, namely 5MW(e) and 50 MW(e). The report identifies substantial costs in both cases which are not applicable to licence exempt electricity supply, in particular combined internal and external costs in respect of –

i) a small scheme (5MW(e))	- on establishment	– £ 77,626 - £151,226
	- in operation	- £ 274,634 annually
ii) a large scheme (50 MW(e))	– on establishment	- £ 152,826
	- in operation	- £ 2,583,296 annually

The report recognizes critical mass as a key factor in the viability of electricity supply on a licensed basis. In particular –

' In our opinion, a stand –alone licensed supply business operating on a customer base of 5000 domestic and relatively few commercial and industrial consumers and trading in the mainstream market is not sustainable for the long term.'

'such a transfer [to the licence threshold]requires the supplier to invest in knowledge, skills and equipment that are specific to the main market, but are not required for the core business of supplying consumers with energy from the local generator. Once in the market, there are very few cost elements that are directly scaleable to the number of customers or the volume of energy supplied.'

c) transportation of electricity between decentralised energy sites – Exempt Supply Services

Reference is made in paragraph 5(f) above to Exempt Supply Services. These are services provided by licensed electricity suppliers to facilitate the transport and supply through the public distribution network of electricity generated by a decentralised generator for transfer to another site for supply there on a licence exempt basis. Licensed electricity suppliers are under an obligation to supply these services under Condition 53 of the Standard Licence Conditions for electricity supply. They have hitherto not been greatly used, other than in the case of the Woking and one other decentralised energy scheme; but as schemes proliferate Exempt Supplier Services may be expected to come into increasing prominence as the opportunities for trading electricity between decentralised energy sites increase. The availability of these services can be predicted to have an important part in sustaining the economics of decentralised energy.

The ability of decentralised energy providers to trade electricity between sites is a valuable facility to which Exempt Supply Services give them access. This is because those services enable electricity to be transferred from one decentralised energy site to another, without the licensed electricity supplier who arranges its transport taking ownership of the electricity. The decentralised energy provider pays a fee for the service

provided. The fee charged enables the licensed electricity supplier to recover its costs, including use of system (DUOS charges) levied by the distribution network operator, balancing and other costs incurred; but since the licensed supplier arranges only for the transport of the electricity between the sites and does not purchase or own it, the licensed supplier levies no purchase or sale margin, thus saving the operators of the decentralised energy sites involved substantial cost.

There is however a barrier to decentralised energy providers being able to use Exempt Supply Services to re-distribute surplus electricity between licence exempt sites. The problem, again, is a matter of scale. The Class Exemption limits small scale supply to 5MW(e), of which not more than 2.5MW(e) may be supplied to domestic consumers. This may be lower if the decentralised energy generator relying on the exemption has, or any of its affiliates has other interests in electricity supply or distribution outside the site in question. Exempt Supply Services Agreements with licensed suppliers contain the same limitation, keeping the flow of licence exempt electricity over public wires to the same de-minimis level. Electricity transported above that level is deemed purchased by the facilitating licensed supplier and re-sold by it at the destination site. This not only amounts to a substantial increase in cost to the decentralised energy generator but is distortive, since the delivery of the exempt power between the sites is being charged to include costs that the licensed electricity supplier has not incurred.

8. The Need for Reform

That measures are needed to facilitate the development of decentralised energy within the electricity regulatory and market framework is not doubted.

The Review of Distributed Generation of May 2007 states –

'*the complexities and associated costs facing small generators in fully participating in this market and the obligations that suppliers have to meet to trade across public networks, are significant discouragements to DG.*'

The objective of the Review is clear –

'*We want to see DG compete on a level playing field alongside conventional alternatives.*'

We see the measures to achieve that as containing four elements –

i) relieving medium size and larger decentralised generation schemes (notably those involving the supply and distribution to domestic consumers of more than 1MW(e)) from the burden (as licensed electricity suppliers) of participating in the electricity market systems, on condition that the scheme satisfies specific criteria;
ii) measures to ensure that licensed electricity suppliers do not discriminate against decentralised energy generators regarding the terms upon which

suppliers offer to purchase electricity exported by decentralised energy generators or supply top-up or standby electricity;

iii) raising the cap on the quantity of electricity permitted to be exported under Exempt Supplier Services arrangements from one decentralised energy site to another or others, to facilitate the economic exchange of decentralised energy between sites;

iv) the Class Exemptions should be amended to enable medium and not only small sites to fall within it. This change could be done rapidly, pending putting into effect the more complex measures referred to above.

These measures are described in more detail in paragraph 9 below.

The solution cannot be confined to adopting measures to improve the working of the electricity market system.

The costs and burdens flowing from a requirement that the on site electricity supply activities of decentralised energy generators (above a de minimis level) be carried out on a fully licensed basis is explained in paragraph 7 b) above. The May 2007 Review of distributed Generation recognises the weight of this burden –

'*Licences also require the licensee to be a party to the relevant industry codes, which are technically complex and therefore require significant expert resource to understand and comply with; the kind of resource that the smaller distributed generators do not have.*'

A paper produced by Stephen Littlechild (former Director General of Electricity Supply) in June 2005 also recognises these barriers. [Smaller Suppliers in the UK Domestic Electricity Market; Experience, Concerns and Policy Recommendations].

As already recorded in this paper, we strongly endorse Ofgem's intention to investigate these barriers, but simply because the structure of BETTA is designed for large players trading large power volumes, there must necessarily be limits upon how much can be achieved towards levelling the playing field only by means of making the existing market system work better. That there are such limits to this approach is self evident as a matter of history. Similar issues relating to the absence of a level playing field for small electricity generators and suppliers had been raised prior to the publication of the Energy White Paper of 2003.

For example, page 47 of the 2003 White Paper –

'It is vital that NETA does not discriminate against smaller generators, including CHP. Some changes have already been made. We expect Ofgem to continue to work with smaller generators and Elexon to ensure that the administrative procedures for the Balancing and Settlement Code under NETA are fully accessible to smaller generators. We will work with Ofgem to keep these developments under review since the existence of a level playing field for smaller generators, including CHP and renewables, is essential if our ambitious targets are to be met…'

Four years on, the issues remain with us unresolved, notwithstanding the efforts then in hand and since. It is plain that a more radical approach is required. That approach must

be to secure that decentralised generators are able to operate as small decentralised energy schemes do at present, namely outside the centralised market system, but at the same time ensuring that consumers are protected.

9. The Measures Required and Action Needed

The objectives described in paragraph 8 above can be made effective either within or outside the licensing framework, but in our view the use of the licensing framework is preferable and on large schemes is the best vehicle for securing the required degree of protection for consumers. However, we also see changes as necessary to the existing Class Exemptions order. The burden of change is that we do not see a licensing procedure as appropriate for small schemes. We see that cut off point as 5 MW(e) per site rather than a limit of 2.5 MW(e) over-all for domestic consumers, as at present. The aggregation rules as described below serve no useful purpose, either for consumer protection or the industry. The measures needed are as follows, but would apply only to qualifying combined heat and power and renewable decentralized energy schemes –

a) the Class Exemptions order

The Class Exemptions order (the Electricity (Class Exemptions from the Requirement for a Licence) Order 2001) should be retained, but subject to the following changes –

i) because of the rules requiring aggregation of all activities in electricity supply and distribution (including affiliates) for the purposes of the exemption for small suppliers and distributors, the usual practical limit relied upon is that applicable per site (or set of private wires) of 1 MW(e). The Order should be amended, so that the limit is 5MW(e) per site without the requirement to aggregate, as described above;
ii) the Order also restricts the quantity of licence exempt power that may be transported between sites (using Exempt Supply Services, as described in paragraph 5c) above). The Order should be amended to provide for up to 5 MW(e) to be transported from each licence exempt generation site to other exempt sites, similarly without application of the aggregation rules described above;
iii) the drafting of the Order is notoriously opaque. The Order should be reviewed to introduce more certainty of interpretation.

b) accommodating schemes supplying or distributing more than 5 MW(e) to domestic consumers

i) decentralised energy schemes involving the supply of more than 5 MW(e) and not more than 100 MW (e) should be subject to a special electricity supply and distribution licensing regime. The form of licence may in principle follow the new shorter form of Standard Licence Conditions recently settled by Ofgem. However its key feature would be that the licensee would not be obliged to become a signatory to the Balancing and

Settlement Code, the Master Registration Agreement or other agreements or codes applicable to supplying or distributing electricity as the case may be;

ii) it follows however, that as at present the licensee would not be able to supply electricity other than within a decentralised energy site, or buy or sell electricity within the market system. As currently applies to unlicensed suppliers of electricity on decentralised energy sites, any dealings in electricity off site would require the participation of a licensed supplier;

iii) for the purposes of defining eligibility for a decentralised energy supply licence or distribution licence, the activities licensed would be those activities covered by the Class Exemption order. The difference therefore between a decentralised energy supplier or distributor relying upon the Class Exemption order or this supply / distribution licence in respect of any site or set of private wires, would be one of scale only;

iv) the form of licence would contain specific consumer protection provisions (see below)

c) transport of electricity between decentralised sites by licensed decentralised energy suppliers *through the use of Exempt Supply Services*

Licensed decentralised energy providers would be permitted to transfer power between sites, using the existing Exempt Supply Services, up to a maximum of 50 MW(e) per decentralized energy site, the current export limit per licence exempt generation site.

d) the prices offered by licensed electricity suppliers for electricity exported from a decentralised energy site and the price offered by them for imported electricity

As already stated in this paper, we see the investigation of the pricing of power in these circumstances as a matter for Ofgem who have the resource and access to information to make progress on the question.

Ofgem's objective should be to secure that the cost of the power purchased by decentralised generators / suppliers or the price offered for exported power by licensed suppliers, should not materially vary from prevailing wholesale prices, except insofar as any additional specific cost is incurred. Those costs (if any) need to be agreed and defined with licensed suppliers, in consultation with decentralised energy providers.

Ofgem should investigate the feasibility of placing a condition in licensed supplier licences to secure this.

It is acknowledged that the preparation of a new form of licence and revision of the existing Class Exemption order is a substantial task. We are prepared to assist by providing further input on the proposed terms of a decentralised energy supplier's licence and distribution licence and to assist in the revision of the Class Exemption order, in respect of which we have already done work.

10. Competition and Consumer Protection

a) competition

Competition is relevant in two contexts in relation to the decentralised energy market. The first is that competition assists in protecting consumer interests. The second is maintaining and increasing competition within the decentralised energy market itself which is currently inadequately populated with energy services companies actively participating in it, including in particular smaller and middle size companies.

The first (competition for the protection of consumers) is principally a matter for the proposed special decentralised energy suppliers licence referred to above. The second (maintaining and increasing competition in the decentralised energy market) is in our view substantially dependent upon Ofgem implementing proposals in line with those suggested in this paper.

b) decentralised energy supply licence terms – protection of consumers.

i) the licence terms should include reference to all matters of conduct already contained in the Standard Licence Conditions for electricity suppliers; including rights of entry, enforcement of payments due, circumstances in which a consumer may be disconnected;

ii) the current Class Exemptions order contains provisions enabling Ofgem to set maximum prices under some conditions. These should be explored for relevance in respect of the terms of the decentralised energy supply licence;

iii) we are pleased to work with Ofgem regarding the possibility of including practical and enforceable terms in the licence which enable third parties to gain access to consumers on the decentralised energy site in order to provide a competing supply. This issue would need to be examined in detail, partly because the energy offered by a competing supplier must conform to the low or zero carbon standard set for the site. In addition, the decentralised energy provider's electricity which has been displaced by the electricity now provided to a consumer by the third party supplier, must be capable of being supplied to an alternative customer, without bearing additional costs through export onto the public network.

However, it should not be overlooked that the promoters of decentralised energy schemes generate competition in the process of selecting their preferred contractor and operator who is required to commit to pricing structures for the power and thermal energy to be provided to consumers during the term of the agreement.

c) competition between decentralised energy suppliers

The issues raised in this paper are about securing the viability of an emerging market (decentralised energy supply) by ensuring that it is not burdened by costs and market complexities that are inappropriate. The more those burdens are allowed to persist, the fewer participants there will be in that market and the less competition within it will be

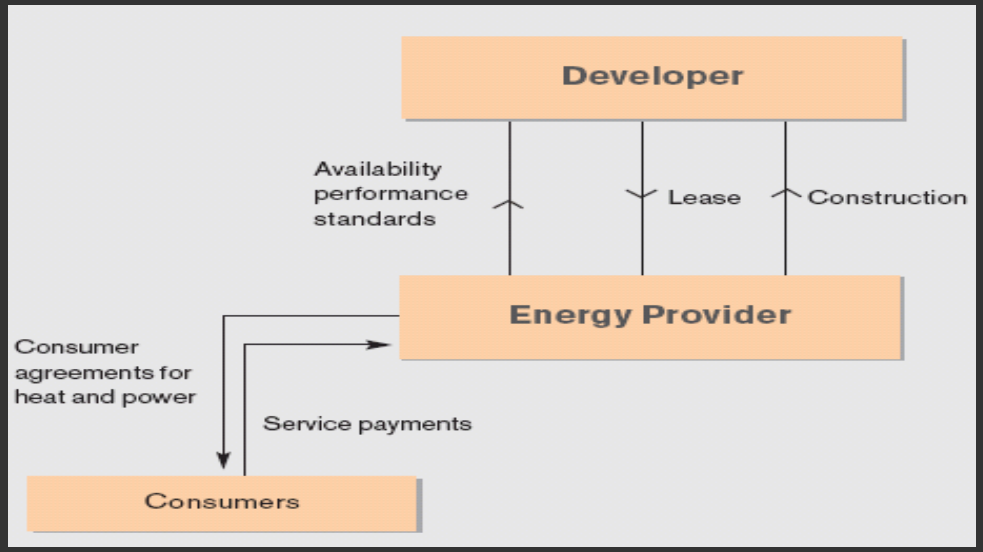
generated. Apart from the climate change considerations, that neither helps consumers nor is consistent with Ofgem's duties to promote competition.

Robert Tudway
Senior Policy Advisor Climate Change

Allan Jones MBE
Chief Executive Officer
London Climate Change Agency

ANNEX 1

Nabarro Commercial Structure



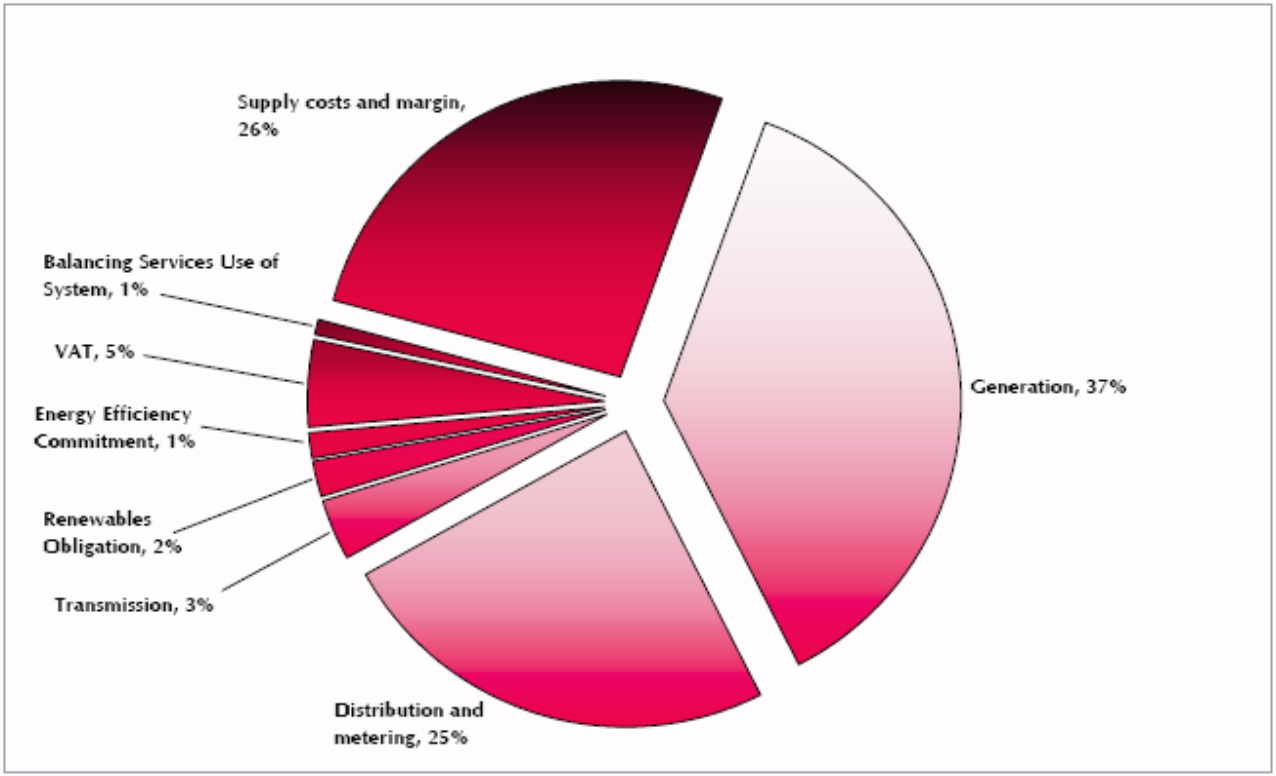
Note: the energy provider may negotiate for a capital contribution from the developer, possibly based on any infrastructure cost saved by the developer as a result of the on-site heat and power provision

This diagram is copied from the submission made to the DTI / Ofgem in December 2006 by NABARRO Energy Group on the Ofgem / DTI review of distributed generation'

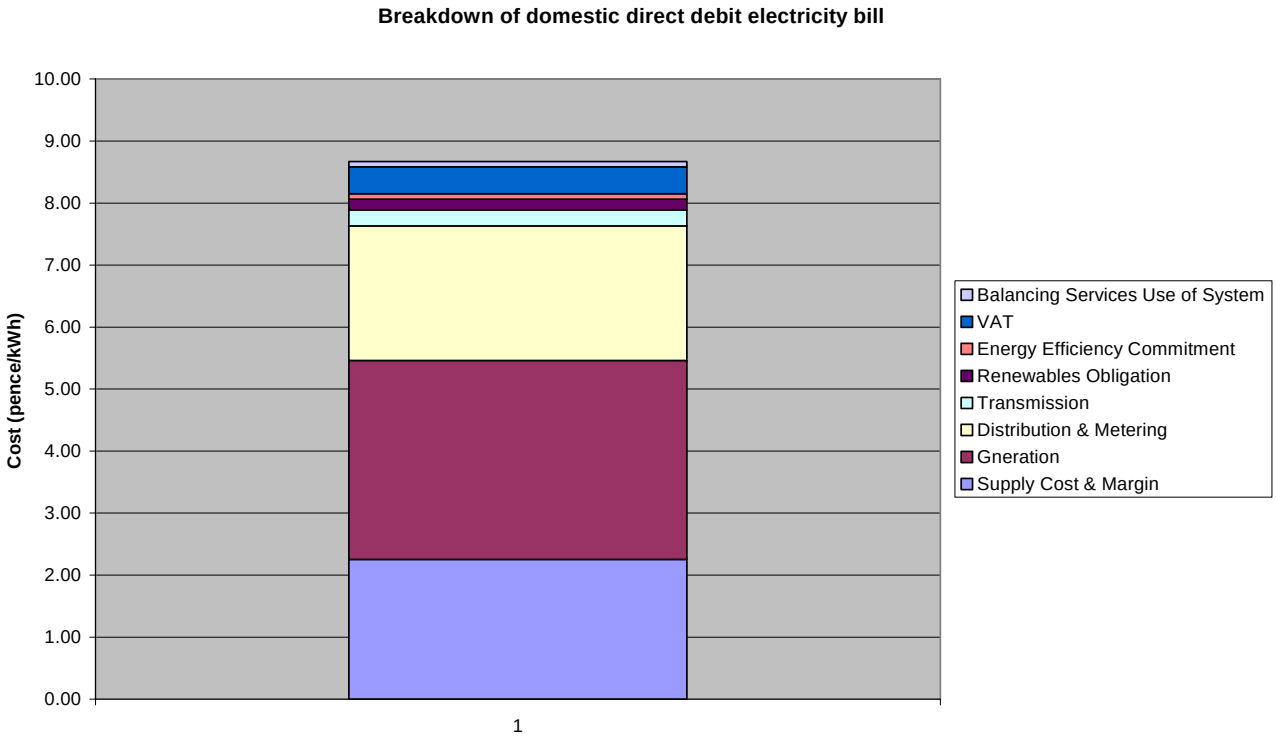
The energy services provider may negotiate for a capital contribution from the developer, for the difference between what the ESCO can finance from the economics of the scheme and the actual cost of the scheme which may be greater than any infrastructure cost saved by the developer as a result of the on-site heat and power provision.'

ANNEX 2

Figure 4.2: Breakdown of domestic direct debit electricity bill



Source: Ofgem


Breakdown of domestic direct debit electricity bill
Cost (pence/kWh)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1
Balancing Services Use of System
VAT
Energy Efficiency Commitment
Renewables Obligation
Transmission
Distribution & Metering
Gneration
Supply Cost & Margin

Source: Ofgem, 'Domestic Competitive Market Review, April 2004

		p/kWh
Supply Cost & Margin	26.00%	2.25
Gneration	37.00%	3.21
Distribution & Metering	25.00%	2.17
Transmission	3.00%	0.26
Renewables Obligation	2.00%	0.17
Energy Efficiency Commitment	1.00%	0.09
VAT	5.00%	0.43
Balancing Services Use of System	1.00%	0.09
Total	100.00%	8.67

The average unit cost

www.dti.gov.uk/energy/

ANNEX 3

Inter-relationship between Electricity and Heat Costs

energy efficiency – electricity and heat

The example in this Annex is based upon an assumed overall energy efficiency (conversion of the energy content of the fuel into electricity and heat) of 70% [effic. 0.7]. The electrical efficiency is assumed to be 30% and the thermal efficiency 40%.

electricity

Assuming 1 kWh of energy input at 30% conversion to electricity, the electricity produced will amount to 0.3 kWh. If we assume a fuel input cost of 2p/kwh then the marginal cost of generating 1 kWh would be 6.67p

If we add to this the marginal operation and maintenance cost of 1.5p/kWh then the total marginal cost of generating 1 kWh of electricity would be 8.17p

heat / cooling

The heat output (representing 40% of the conversion of fuel into useable energy) in generating 1 kWh of electricity is determined by multiplying the unit electricity output by the heat to power ratio i.e., 0.4/0.3x1 = 1.33 kWh per kWh of electricity generated.

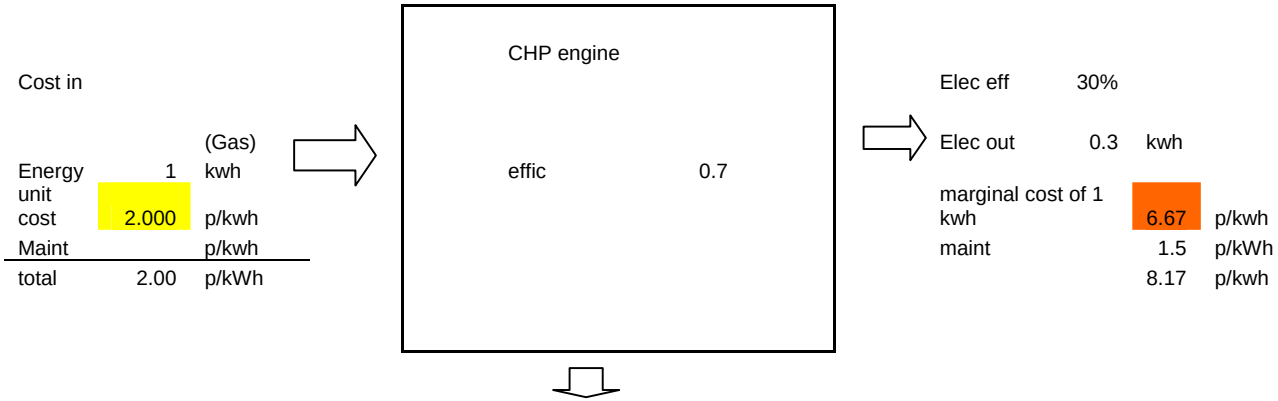
It is assumed that the value of the heat revenue is equal to the cost of 1 kWh of heat produced by means of a domestic boiler operating at 75% fuel efficiency then there is a total cost per kWh of 2.67p for domestic heat. The heat revenue from CHP in generating 1 kWh of electricity is therefore 1.33 kWh x 2.67 p/kWh = 3.55 p.

It is assumed that the scheme operator can charge a maximum sum to consumers of an amount equal to the avoided cost to consumers of obtaining their heat from the alternative conventional source, which in this case equals 2.67 p/kWh or 3.55 p/kWh per kWh of electricity generated.

combined effect

The effect of combining these two income streams is that if 4.62p (8.17- 3.55) is charged for 1 kwh of electricity and 3.55 p is charge for 1.33 kWh of heat then the marginal cost of running the machine to produce 1 kwh of electricity will be covered.

The difference between the cost of producing 1 kWh electricity and the market price *of electricity* would be the income taken by the operator to pay for his other administrative costs and recover the capital.



For every 1 kWh of electricity, you produce	1.33333	kWh of heat
The heat income for every I kWh of electricity	3.55556	p
Therefore the marginal price of electricity would be	4.61111	p/kWh

Comparative Costs of Operating On-Site/Private Wire Distributed Energy Systems on a Licensed rather than Licence Exempt Basis

A report for the London Climate Change Agency

September 2007

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Contents

A Introduction 5

B General Approach 5

C Summary of Costs 6

C.1 Establishment Costs of a Licensed Supplier 6

C.2 Operating Costs of a Licensed Supplier 7

C.3 Establishment Costs of a Licensed Distributor 8

C.4 Operating Costs of a Licensed Distributor 8

C.5 Embedded Benefits 9

D Establishing a Licensed Supply Business 10

D.1 Licence Application 10

D.2 Balancing & Settlement Code (BSC) Accession 11

D.3 Balancing Mechanism 12

D.4 Grid Code 12

D.5 Master Registration Agreement (MRA) Accession 12

D.6 Supplier Agent Agreements 14

D.7 Distribution Use of System Agreements 14

E Operating a Licensed Supply Business 14

E.1 Settlement Liabilities 14

E.2 MRA Costs 16

E.3 Network Charges 17

E.4 Supplier Agent Costs 18

E.5 Other Licence Obligations 19

E.6 Critical Mass Considerations 20

F Establishing a Licensed Distribution Business 20

F.1 Licence Application 20

F.2 Balancing & Settlement Code 21

F.3 MRA 22

F.4 Distribution Code 23

F.5 Grid Code 23

F.6 Contract Out Option 23

G Operating a Licensed Distribution Business 23

G.1 Ofgem 23

G.2 Balancing & Settlement Code 24
G.3 MRA 24
G.4 Metering Point Administration Service 25
G.5 Distribution Code 25

H Embedded Benefits 25

H.1 Identification 25
H.2 Principal Avoided Costs 26

Document History

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Whilst the information contained in this report represents our opinion and best estimates, Campbell Carr Limited accepts no liability for actions or investments made on the basis of this report.

Introduction

The approach adopted in identifying and evaluating the costs is that of a prudent operator of an enduring business. Therefore, some of the costs are those incurred to manage the risk of the obligations arising from the licensed activity or acting as a trading entity in the market.

We have assumed that a distributed energy project consists of a licence exempt generator, a localised (possibly private) network and a supplier of electricity to final consumers who are not all the owner of the project i.e. not entirely self-supply and some of whom are domestic consumers. We also assume it is the intention that the network of consumers and the generator are of roughly similar size in energy terms so that whilst not a closed system, the project is largely self-sufficient such that imports or exports from/to the outside system represent a minor element of business.

The maximum level for a Class A licence exempt supply given in the Class Exemption Order[1] is 5MW of which not more than 2.5MW can be to domestic consumers. A peak demand of 2.5MW equates to approximately 2500 domestic customers under the assumed average approach generally used by the industry[2]. A similar limit of 2.5MW to domestic consumers applies to a Class A exemption from a distribution licence. However, the exemptions relating to 'on-site' supply and private distribution networks (Class B - distribution, Class C - supply), which relate more appropriately to a distributed energy project, have a lower limit of 1MW to (approximately 1000[2]) domestic consumers.

General Approach

The costs have been itemised as 'external', where cash amounts are paid to other organisations, 'internal', where the cost is estimated in terms of hours to complete the task, or 'credit' where there is an impact on working capital because funds are tied up in posting credit.

The basis of the identified cost is that which is incremental due to licensing. Clearly some activities are common to the business regardless of licensing, albeit at differing cost levels, and these are either not included or have been deducted from the costs shown.

For evaluation purposes, we consider two cases. The primary case is a project supplying 5MW (23,500MWh)[3] to 5,000 domestic customers. The secondary case is 50MW supplying 235,000MWh to domestic consumers.

We have assumed that the enterprise has within it, or at its disposal, sufficient industry knowledge to be aware of and to successfully complete the tasks in the correct order and in a timely manner such that the cost of errors and omissions can be omitted from this analysis. However, some of the processes contain iterative steps. Experience suggests a single iteration is unrealistic even with expert support, so some allowance has been made for such iterations. For evaluation purposes, we have assumed the required degree of industry knowledge is available as an individual employee at an effective rate of £450 per day. The time taken to administer the processes has been included as an internal cost at a daily rate of £150. If the provision of the industry knowledge is an external cost, i.e. consultancy advice, the daily rate is unlikely to be less than £850 especially if the project is located in London. Whether through consultancy or an internal expert, the organisation will need to inform itself of the processes and commitments it is entering into when establishing the licensed business. This will require a further managerial overhead to which we have assigned the consultancy rate.

[1] Schedules 3 and 4; The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001; SI3270.
[2] We suspect a metered actual concurrent peak would give a somewhat lower number.
[3] Average UK domestic consumption is approximately 4700kWh pa DUKES, 2005

Summary of Costs

This section represents a summary of the costs identified in sections 0 to 0 where explanation of their derivation can be found.

Establishment Costs of a Licensed Supplier

Small Project (5MW)

Activity	Section	External cost	Internal cost	Credit
Obtaining a licence	0	£1,300	£9,900	None
BSC entry	0	£3,050	£4,625	None
Balancing mechanism	0	None	None	None
Grid Code	0	None	Negligible	None
MRA entry	0	£31,701 - £101,701*	25,700 - 29,300	None
Agent agreements	0	£0	£900	None
DUoS agreements	0	£0	£450	£1,000
Total		**£36,051 - £106,051**	**£41,575 - £45,175**	**£1,000**

* Could be shared with licensed distribution business.

Large Project (50MW)

Activity	Section	External cost	Internal cost	Credit
Obtaining a licence	0	£1,300	£9,900	None
BSC entry	0	£13,050	£5,475	None
Balancing mechanism	0	None	None	None
Grid Code	0	None	Negligible	None
MRA entry	0	£101,701*	£30,050	None
Agent agreements	0	£0	£900	None

DUoS agreements	0	£0	£450	£10,000
Total		**£106,051**	**£46,775**	**£1,000**

* Could be shared with licensed distribution business.

Operating Costs of a Licensed Supplier

Small Project (5MW)

Activity	Section	Annual External Cost	Annual Internal Cost	Rolling Credit
BSC	0	£5,300 + imbalance	£11,400	£15,500
MRA	0	£1,500	£900	None
Network charges	0	£185,000*	£900	None
Agent costs	0	£5,000	£150	None
Licence obligations	0	None	£900	None
RO buyout if generator not eligible	0	£63,584	None	None
Total		**£260,384+**	**£14,250**	**£15,500**

* Illustrative example (see section for derivation)

Large Project (50MW)

Activity	Section	Annual External Cost	Annual Internal Cost	Rolling Credit
BSC	0	£38,700 + imbalance	£15,000	£46,500
MRA	0	£14,600	£23,400	None
Network charges	0	£1,850,000*	£900	None
Agent costs	0	£5,000	£150	None
Licence obligations	0	None	£900	None
RO buyout if generator not	0	£635,666	None	None

eligible				
Total		**£2,542,946+**	**£40,350**	**£46,500**

* Illustrative example (see section for derivation)

Establishment Costs of a Licensed Distributor

Activity	Section	External cost	Internal cost	Credit
Obtaining a licence	0	£3,100	£5,400	None
BSC entry	0	£10,500	£3,275	None
MRA entry	0	£10,001 - £100,001	£12,350 - £15,950	None
Distribution Code	0	None	£900	None
Total		**£23,601 - £113,601**	**£21,925 - 25,525**	**None**

Operating Costs of a Licensed Distributor

Activity	Section	Annual External Cost	Annual Internal Cost	Rolling Credit
Ofgem	0	£500	£13,500	None
BSC	0	£3,000	£2,150	None
MRA	0	£5,100	£900	None
MPAS	0	None	£37,500	None
DUoSA	0	None	£1,350	None
Total		**£8,600**	**£55,400**	**None**

Embedded Benefits

The following is an example of annualised embedded benefits.

Cost Elements	Section	Licensed	Licence Exempt
Transmission Network UoS	0	£5,000	None*
Balancing Services UoS	0	£4,100	None*
RCRC	0	Negligible (+/-)	None*
ELEXON Charges	0	£1,100	None*
Distribution Losses	0	£185,000	£2,100
Distribution UoS	0	Only on imports/exports at DUoS tariff	Only on imports/exports at contract price
Energy costs		Imbalance prices	Generator fuel cost + Top-up price

* Some element of this will be included in the price paid for top-up energy.
These benefits are evaluated on the basis of the following assumptions:
The generator is produces 26,140 MWh per year and its line loss factor to the GSP is 5%
Consumers (23,500 MWh per year) have an average line loss factor from the GSP of 8%
Losses within the energy project are 2%
Energy priced at 7p/kWh
Assumed imbalances to be 0.75% of generation on average.

The costs identified in this section relate to the setting up of a GB supply business licensed to supply domestic consumers in the context of a single distributed energy project.

Licence Application

A letter of application, using the template provided, must be sent to Ofgem, who must publish a notice of application. The prudent operator should make his application requesting a restriction to the area of the distributed energy project in order to avoid the costs associated with a countrywide coverage (see various below). Ofgem places the onus on the applicant to make a case for any licence restriction or exemption and will make a determination based on the application. This means there could be internal cost incurred by the distributed energy project if the initial request requires modification in order to receive approval. On granting the licence, Ofgem will again publish a notice that it has done so. The supplier must be fully compliant with the licence immediately. The domestic supply licence application fee was £1150, but was reduced to £450 on 1st August 2007[4]. The internal cost could be negligible, but 1-2 mandays should be budgeted for servicing any request for clarification or modification.

External cost: £450 Internal cost: £900

Codes of Practice

Standard domestic supply licence conditions require the production of codes of practice stating how the supplier will protect vulnerable groups whilst exercising the rights and complying with the duties under the licence. This requirement is not applied to non-domestic licences. There are at least seven such statements or codes including:

- Procedures for site access
- Efficient use of electricity
- Code of Practice on (non) payment of bills
- Code of Practice on use of pre-payment meters
- Provision of services for pensioners, the chronically sick and the disabled
- Provision of services for customers who are blind or deaf
- Complaint handling procedures

These codes must be submitted to energywatch for review and approval as part of the application process. It is likely that the review process will be iterative as there is no published model on which to base these documents. However, it is understood that energywatch is generally helpful and offers a standardised approach. Clearly, composition of these documents can be time-consuming, given that they stem directly from detailed corporate policy across a number of business functions in some cases and require significant specialist knowledge. We would expect this area to require not less than 20 mandays and require an external manday.

Copies of these codes must be available on request to consumers, although they may not readily be offered. The common least cost solution to this is to retain the electronic version of the documents and to produce them in hardcopy only when required. Therefore the printing cost of these documents can be considered negligible.

External cost: £850 Internal cost: £9,000

[4] SI 1972/07 The Electricity (Applications for Licences, Modifications of an Area and Extensions and Restrictions of Licences) Regulations 2007

Balancing & Settlement Code (BSC) Accession

A condition of the licence is that the supplier must become a party to the BSC. A licence exemption does not prevent a supplier acceding to the Code, but it is unlikely that participation in the BSC would be an integral part of a distributed energy project business model. ELEXON provide assistance to new entrants and will assign a member of the customer support team to the applicant.
Joining the BSC is achieved by completing an accession form, a funds accession form and an accession agreement which must be submitted to ELEXON together with an application fee of £500. For the supply activities of a distributed energy project, the registration requirements are relatively simple and can be completed in 1 manday. Education will require 1 external manday.
External cost: £1,350 **Internal cost: £450**

Interfacing with Settlement

BSC trading parties must have a communications link with central systems. Two options exist: a 'high grade' dedicated physical line service for large users, and a 'low grade' internet based service for smaller users such as a distributed energy project supplier. The selection of the interface service is notified on the accession form (see above). There is no direct charge for the low grade service which includes the required security software. There will be a small administrative overhead (<0.25 manday) installing the software on an appropriate PC and configuring the file management.
Internal cost: £50
In the case of the larger project, the 'low grade' service would be considered insufficient. The 'high grade' service has an initial fee of £10,000 and installation would incur an internal cost of 2-3 mandays.
External cost: £10,000 **Internal cost: £1,350**

Authorisations

The supplier must formally authorise individual personnel for a number of controlled activities. In a small organisation it is reasonable for an individual to be authorised for all activities. Ensuring full coverage and company director sign-off for the initial authorisations requires about half a manday.
Internal cost: £75

Qualification and Registration

The supplier must complete qualification testing to prove his communication links with central systems. A test set requires half a day and must be booked in advance. The supplier must register his party identifier and his balancing mechanism units (BMU). As a supplier, he will receive a default set of 14 - one for each regional grid supply point group (GSP group). These must also be registered into the market domain dataset (MDD). The size and voltage connection of the generator in the distributed energy project are likely to mean that it is desirable to register the generator under Supplier Volume Allocation (SVA) rules and so have an in-built netting off of the generation and supplied energy within the project. This is also likely to be the cheaper solution. Registration is likely to require 2-3 mandays of effort.
Internal cost: £1,350

Accreditation and Certification

The supplier must demonstrate that he can communicate effectively with central systems. As a small participant, a distributed energy project supplier will be deemed as a low risk to

settlement and therefore will not incur a fee for certification. Supplier accreditation for the BSC normally runs on a similar timeframe with accreditation for the MRA as the communication procedures are similar. The directly attributable costs are likely to be 5 mandays, with other costs shared with the MRA accreditation (see below). In addition it would be prudent to allow 2 external mandays for education.
External cost: £1,700 **Internal cost: £2,250**

Performance Assurance

The Performance Assurance Framework has within it a number of charges that can be applied to suppliers where they are found to be performing below stated standards. This arrangement was established to improve data management standards, which continue to be a focus of BSC audit attention, across the industry. Compilation of the reports would be simple for a distributed energy project as it will only exist within one GSP group, however, the reports must be set up in the precise format (1 manday).
Internal cost: £450

Credit

The BSC has a methodology for calculating the amount of credit that is required. At start-up, it is possible to avoid posting credit with the Funds Administration Agent by registering an initial demand capacity of zero against the BMUs.

Balancing Mechanism

The Balancing Mechanism is the real-time market for energy balancing operated by the grid system operator. Participants offer variations on their planned activities such that the system operator can buy the increments and decrements to ensure the system balances. As a supplier, active participation in the balancing mechanism is optional. For a distributed energy project it is unlikely to be attractive given the network connection level and that it is likely to be balancing its own position. Therefore, the costs of communication links with NGC incurred by large participants can be avoided.

Grid Code

A licensed supplier must be subject to the Grid Code which is managed by National Grid (NGET). Accession to the Code is made through the Connection and Use of System (CUSC) Agreement.

Connection and Use of System (CUSC) Agreement

This agreement is for the use of NGET's transmission network. As a licensed supplier it must be signed, even though the purpose of a distributed energy project is about not using the transmission network. The application form must be completed and sent to NGET.
Internal cost: £negligible

Master Registration Agreement (MRA) Accession

A condition of the licence is that the supplier must become a party to the MRA. A licence exempt supplier cannot be a party to the MRA. The supplier must submit a completed application form and a confidentiality agreement, together with evidence of the licence (or its application) and £1 in respect of its share in the MRA Service Company (MRASCo).
External cost: £1 **Internal cost: £50**

Data Transfer Service Agreement (DTSA)

The Data Transfer Service is a closed communications network over which all formal messages for customer registration and metering data are passed. The service is managed by Electralink. In order to use the service, a supplier must accede to the DTSA by signing an Accession Agreement and a Local User Agreement. The number of customers associated with a distributed energy project mean that the least cost 'remote user service' will be all that is required. This takes the form of a PC and modem using a dial-up facility over a telephone line. Details of the required connection are submitted using the application and connection form and the site summary form.
There is no longer a connection charge for the remote service. Form completion and managing the installation will require 1 manday of effort.
Internal cost: £150
For the larger supplier case, the gateway would need to be at least the 'low volume' specification. There is no initial fee but installation and form completion are likely to require 3 mandays.
Internal cost: £450

Interfacing with the Data Transfer Service

Software is required to handle the large volume of dataflows to and from the DTS. The recognised industry leader, and almost the standard, is the Utilisoft product which at entry level costs around £100,000. This software will interface with the customer management and billing system[5]. Using proven software with its automation of many of the processes offsets both the cost of accreditation and operational staffing costs. However, this software is likely to be over-specified for the small supplier operations of a distributed energy project. Alternative bespoke solutions are not likely to be less than £30,000 to build. These costs could be shared with the distribution business if that too is licensed, but are shown here for the stand-alone case.
External cost: £30,000 - 100,000 **Internal cost: £900 - 4,500**
For the larger supplier case, the Utilisoft product is probably necessary given the volume of messages.
External cost: £100,000 **Internal cost: £4,500**

Accreditation

Accreditation into the MRA is not trivial. It involves the inspection and assessment of systems and procedures using set scenarios in near-live conditions. From initiation to successful completion can take several months. Operational procedures must be drafted and tested before initiating the accreditation assessment. This will take not less than 20 mandays to produce documentation of sufficient standard to be approved. Staff operating the procedures must be sufficiently trained to successfully carry out the scenario tasks (4 mandays). Some of the scenarios have an elapsed time exceeding 28 days, although they can be performed in parallel with the other scenarios and none require full-time attention. The accreditation testing process will require not less than 40 mandays including process management meetings etc. assuming no major re-runs. In addition 2 mandays of consultancy should be budgeted. The latest version of the MRA Agreed Procedure for Entry Assessment and Re-Qualification (MAP 05) became live on 23 August 2007, it is intended to reduce the resource requirement of the accreditation process. Obviously it is too early to make an objective assessment of this.
External cost: £1,700 **Internal cost: at least £24,600**

[5] These systems would be in place regardless of licensing and so are not included in our costing.

For the larger operation, the internal cost will increase due to the greater number of staff involved. An additional 10 mandays at the administrator rate should be included.
External cost: £1,700 Internal cost: at least £26,100

Supplier Agent Agreements

Electricity supply operates on a contractual 'supplier hub' principle. The consumer contracts with the supplier who appoints agents to maintain the meter, collect meter readings and to process those readings into Settlement. This means that a supplier must have contractual arrangements with a meter operator, a data collector and a data aggregator for each metering point for which he is the registered supplier. These three roles are duplicated for the two measurement classes of customer (half hourly and non-half hourly). Whilst for a supplier seeking national coverage of all consumers this can mean a significant number of contracts to negotiate and administer, the distributed energy project may only need one or two contracts. Most agents will have standardised contracts and as a small customer the distributed energy project may have little scope for negotiation. Selecting agents and establishing contracts will require about 2 mandays of effort assuming that in the unlicensed supplier case these data services are internal activities.
Internal cost: £900

Distribution Use of System Agreements

An unrestricted domestic supply licence holder must offer terms of supply to *any* domestic consumer requesting supply. Therefore, in order to avoid breach of this requirement, a distributed energy project operating under such a licence should have in place distribution use of system agreements (DUoSA) with every distributor, not just the local distributor where the energy project is located. The prudent operator should apply for a geographically restricted licence such that only one DUoSA is required, potentially with the licensed distribution function of the distributed energy project. The agreements normally require 60 days credit cover to be provided. As a small supplier, the amount of credit should be less than £1000. Being standard documents, there is no real scope for negotiation, so only 1 manday may be required for establishment.
Internal cost: £450 Credit: £1000
The larger supplier will face a similar situation but due to its larger volume, it will be required to post greater credit.
Internal cost: £450 Credit: £10,000

Operating a Licensed Supply Business

Settlement Liabilities

Energy Imbalance

BSC trading parties are cashed-out on their energy imbalances. This means that any energy that is not covered by own generation or a notified contractual arrangement will be exposed to system buy/sell prices. The licensed supplier and wholesale market participant, the distributed energy project has three options for managing the price risk of any shortfalls or surpluses in its own generation:

- contract with another party using Energy Contract Volume Notification, or
- use SVA meter sharing with another supplier, or
- take the default energy imbalance prices.

The unlicensed supplier would probably enter into a 'top-up and spill' arrangement with another supplier to manage the imbalances of the energy project. The cost of such an arrangement is outside the regulatory remit. It is not possible to evaluate the cost of this, or indeed of energy imbalances, as they both depend on how the project is designed and operated rather than the licensing position per-se, therefore they have been excluded from further analysis.

To use the first option, the project would buy top-up energy under contract with another party, the supplier will be required to post credit with that party. This can be 90 days at full value which for a 1MW peaking contract would be in the region of £30,000.

Managing the energy price risk requires specialist knowledge and would be an important role within the licensed operator. Whilst the small energy project could have relatively simple management systems, the larger supplier case would need to commit resources to manage and administer the position. We estimate this requirement to be 12 mandays a year.

Imbalance prices are fixed at settlement day +28. Credit must be posted with the Funds Administration Agent to cover likely imbalances. Supplier credit is calculated using a price of £37/MWh, the aggregate BMU declared capacity, and a load factor of 60% over 29 days. For a net capacity of 1MW this equates to approximately £15,500. The larger supplier would probably need to post more based on a larger margin than 1MW. These values can be reduced on appeal (they usually are).

In addition there is a Settlement balancing item, Residual Cashflow Reallocation Cashflow (RCRC) which reallocates money proportional to trading parties' credited energy such that Settlement clears financially. Commonly known as the 'beer fund', this item is usually very small in £/MWh terms and can be positive or negative. Included for completeness, it is not significant to a distributed energy project.

External cost: variable depending on imbalances **Credit cost: £15,500**

For the larger supplier case there is an additional cost.

Internal cost: £3,600 **Credit cost: £46,500**

GSP Group Correction

This is really a balancing item on the energy accounts to make Settlement clear to zero in energy terms. It is a scaling factor applied to non-half hourly metered supplier volumes. They are calculated for each iteration of settlement and so can produce differing settlement bill values in potentially different directions (although reducing in magnitude) for the same settlement day. The final reconciliation run is 14 months after the settlement day occurred. Whilst not a specific cost, it can affect cashflow and, due to the final reconciliation being greater than a financial year, will require provisioning in corporate accounts. However, in the London zone the correction is on average only about 1% so for the distributed energy project this variance will have a very low materiality.

ELEXON Charges

The supplier will incur a number of charges:

- The main funding share will be small as the distributed energy project will represent only a very small proportion of energy in Settlement. We estimate this will be less than £100 per year.
- The Supplier Volume Allocation (SVA) funding share will again be small as the distributed energy project will represent only a very small proportion of energy supplied in the UK. We estimate this will be less than £1000 per year.
- The base Balancing Mechanism Unit (BMU) charge of £1,200 per year is a registration based fee (for the set of 14 regardless of use) and is unavoidable.

- The base monthly charge equating to £3,000 per year is also a registration based fee and is unavoidable.
- The SVA half hourly metering charge of £1.25 per registered meter per month will not be significant as the distributed energy project is only likely to have a small number of these for some of its industrial and commercial consumers.

It should be noted that the first two cost elements above are based on a share of energy in settlement. If the project manages its risk by minimising its net position, either through meter sharing or internal energy management, these costs can be avoided or minimised. Our estimates in this respect are conservative so in practice the costs could be lower.

External cost: £5,300 per year **Internal cost: £900 per year**

In the larger project case, the share of ELEXON changes will be more significant.

- Use of the high grade communications link at £26,400 per year.
- Main and SVA funding shares about £7,000 per year.

External cost: £38,700 per year **Internal cost: £900 per year**

Performance Assurance

Due to the amount of energy supplied and the number of metering points involved with a distributed energy project, the majority of charges will not be significant (and its impact on the overall market performance will be negligible). However, there is a late submission fee of £25 per report per day late which can become significant as there are a number of reports due each month. Producing the reports in submitting in a timely manner would be simple for a distributed energy project once the templates are set up, requiring approximately 0.5 mandays per month.

External cost: Avoidable **Internal cost: £900 per year**

BSC Compliance

In addition to complying with the Performance Assurance Framework, the supplier will have to maintain an operation that is compliant with the BSC and its subsidiary documents. Active participation in the change processes is optional and most small operators choose to avoid a potentially large cost to them for little direct return. Whilst Code modifications that will have significant impact on a distributed energy project are likely to be few and infrequent, changes to relevant subsidiary documents are both more numerous and frequent. Those which have a material impact on normal operations will still be few, but there will be a cost in monitoring the changes and recognising those that do have an impact and being able to react accordingly. As a minimum, this cost is likely to be 1-2 mandays per month.

Internal cost: £9,600 per year

MRA Costs

Exception handling

Servicing a supply business requires a number of staff to handle customer enquiries on technical and billing issues. We have assumed that for a small licensed supply business the incremental cost of handling the messaging through the DTN will be small as the staff would be required to service an unlicensed business. At the larger supplier scale, administering the messages and resolving exceptions would require separate resources to the frontline customer services. We estimate this to be 50 mandays per year.

For the larger supplier case:

Internal cost: £22,500 per year

DTN costs

The DTN costs are small. The remote user service has an annual rental cost of £480. For a very small supplier with 1000 metering points the annual charge is £81.72 and a data traffic cost would be less than £50. For the larger supplier case the annual rental would be about £5,000 with £4,100 in charges and a traffic cost of £500.
External cost: £1,000 per year
For the larger supplier case:
External cost: £9,600 per year

MRA Charges

The costs of administering the MRA are recovered from suppliers and distributors. Each supplier pays a share of the costs based on his share of the number of metering points registered. As a very small supplier, the materiality of these charges will be small at less than £100 per year (2007-8 budget indicates £92 per 1000 metering points).
External cost: £500 per year
For the larger supplier case:
External cost: £5,000 per year

MRA Compliance

A supplier must maintain his operation to be consistent with the MRA. Whilst many of the changes will have little or no impact on a distributed energy project, there will be an administrative overhead in monitoring proposed changes, participating in consultations and dispute resolutions and maintaining compliant systems. As a minimum, this task is estimated at 1-2 mandays per month.
Internal cost: £900 per year

Network Charges

Transmission Network Use of System (TNUoS) Charges

As a result of being a CUSC signatory, the licensed supplier will be liable for TNUoS charges. The demand side charging is currently in two parts: a capacity charge for half hourly metered consumers, charged on the average metered demand during the three 'triad' half hours[6] of peak demand on the transmission network, and an energy charge for non-half hourly meter consumers based on the consumption between 16:00 and 19:00 every day. The demand charge rate varies by GSP group. Taking the London GSP group as an example, the 2007-8 rates are £22.164365/kW and 2.710106p/kWh. The charge is levied at the BMU level, so by netting off against the generation within the distributed energy project it is possible to avoid some or all of this charge as an 'embedded benefit'. It would be prudent to budget 1 manday per year for internal organisation to ensure the costs are avoided.
External cost: Avoidable **Internal cost: £450**

Balancing Services Use of System (BSUoS) Charges

Similarly resulting from CUSC, BSUoS charges are levied for each settlement period. For the year 2006-7 BSUoS averaged about £0.95/MWh. This will be charged on the energy volume at the BMU level. Again by netting off with the generator it is possible to avoid some or all of this charge as an 'embedded benefit'. . It would be prudent to budget 1 manday per year for internal organisation to ensure the costs are avoided.
External cost: Avoidable **Internal cost: £450**

[6] Between November and February inclusive. The 'triads' must be separated by at least 10 days.

Distribution Use of System (DUoS) Charges

Whether a private network exists for the distributed energy project or not, there will be at least one connection to a licensed distribution network operator and therefore DUoS charges will be incurred. These charges will vary in value and structure depending on whether the project is net exporting or importing energy. As these charges will occur in one form or another and are not a function of the supplier being licensed, they are not itemised here.

Distribution Losses

The area of distribution losses is currently the subject of change proposals. There has also been a recently approved change to account for generation losses, although such loss factors have yet to be seen.
A licensed supplier is deemed to take delivery of embedded generation at the GSP. Losses are applied to the output of the generator to account for the delivery point. Separately, losses are applied from the GSP down to the consumer meter at a rate of 8-10%. If both generator and consumer are connected at relatively low voltages then the aggregate losses could represent a significant proportion (e.g.15%) of the energy generated. The unlicensed supply business of a distributed energy project will only incur the actual losses associated with its physical delivery which are likely to be far lower (e.g. 2%) and full distribution losses only on its imports and exports from outside the project.
By way of illustration, a generator associated with 5,000 domestic consumers needs to produce 26,650MWh in order to deliver 23,500MWh to those consumers if that energy is accounted for in settlement (assuming 5% generator losses to the GSP and 8% consumer losses from the GSP). However, if the energy does not pass through settlement (i.e. the unlicensed case) then only the engineering losses (assume 2%) are incurred. This makes a net loss attributable to settlement of 2641MWh, which at 7p/kWh can be valued as a cost of £185,000 before offsetting generation fuel cost. The same relationship scaled to 50,000 consumers gives a cost around £1.85M, although the argument for such a structure is not as strong.
External cost: £185,000 per year
For the larger case supplier:
External cost: £1.85M per year

Supplier Agent Costs

As a licensed supplier and party to the BSC and the MRA, the metering and data agents used must be accredited and themselves operating under the BSC and MRA. The cost for data collection and processing into Settlement for a half-hourly read meter is around £200 per year. These would be installed for larger industrial and commercial consumers (>100kW maximum demand). Non half-hourly metering data costs are significantly lower, especially where automated meter reading (AMR) systems are employed. These charges will vary according to the size of customer and frequency of meter read.
An unlicensed supplier operating within a private network would be able to maintain and read his own meters without the need for formal accreditation of those activities. However, the meters at the connection points to the public network would need to be registered as consumer meters to a licensed supplier and be managed in accordance with the BSC and MRA by accredited agents. For 1000 metering points of various size consumers, we estimate the incremental cost of using external accredited agents would be around £5,000 annually with an additional manday to service billing and appointments.
External cost: £5,000 **Internal cost: £150**

Other Licence Obligations

Renewables Obligation

The Renewables Obligation (RO) requires licensed suppliers to acquire certificates (ROCs) in proportion to the energy they supply, or to pay a buyout fee for any shortfall against the Obligation. Unlicensed suppliers are not covered by the RO. A distributed energy project whose generation fuel source is renewable should be able to obtain more than sufficient ROCs from its generator to meet its supplier obligation. In addition to the cost of ROC acquisition or buyout, there is an administrative overhead for suppliers. Suppliers must transfer ROCs into their account on the ROC registry and then redeem them by 30th September each year in order to avoid the buyout. In the preceding July they must inform Ofgem of the supply volume that sets their obligation volume. Failure to notify or to pay by the prescribed date and time can be considered by Ofgem as a breach of the licence. Assuming the submissions are made correctly and on time, the RO should only cost the small supplier 1-2 mandays of effort per year.
However, if the distributed energy project generator was not eligible for ROCs (e.g. gas CHP) then there will be an external cost in either acquiring ROCs or paying buyout. The Obligation for 2007-8 is 7.9%. On the basis of ROC prices achieved in the July eROC Auction[7] this would cost £89,360 in the case of the small project and £893,350 for the larger supplier before any recycling of buyout funds. This recycling of the buyout divides the buyout revenue proportionally across all ROCs redeemed. It could produce a small net benefit to the supplier over just paying the buyout. In addition there would be an internal cost in purchasing the ROCs of a manday. If the buyout option was exercised, the respective costs would be £63,584 and £635,666, which would increase with inflation. We have used these buyout values as a near approximation for both buyout and compliant cases.
External cost: £63,584 per year Internal cost: £300 per year
For the larger case supplier with non-RO generator opting to buyout
External cost: £635,666 per year Internal cost: £300 per year

Energy Efficiency Commitment

The supply business of a distributed energy project is not likely to be subject to the Energy Efficiency Commitment as it only applies to suppliers providing energy services to over 50,000 domestic premises[8].

Climate Change Levy

The licence requires suppliers to administer the Climate Change Levy and any exemptions on behalf of industrial and commercial consumers. This will include the processing of Levy Exemption Certificates (LECs) and consumer exemptions. It may be possible to source sufficient LECs from the generator within the distributed energy project if it is eligible under either the renewables or CHP rules. The supplier must declare usage of the LECs to Ofgem and maintain records for HM Revenue and Customs. Whilst the Levy could still apply to the consumers, it is not clear whether an unlicensed supplier would have to administer the system in the same way. Administration for less than 100 customers would require about 2 mandays per year.
Internal cost: £300 per year

[7] NFPA Press release 17 July 2007
[8] SI 3392/2004 The Electricity and Gas (Energy Efficiency Obligations) Order 2004

Fuel Mix Disclosure

Licensed suppliers are required to disclose the fuel mix of their energy sources and this must be conveyed to all of their consumers. For the most part this should be just a minor administrative task. The distributed energy project can use Renewable Energy Guarantees of Origin (REGOs) or a generator declaration from the project generator to evidence its fuel sources. This evidence must be lodged with Ofgem by midday on 31st July in order to qualify. This should be no more than 1 manday per year and the printing cost of a disclosure statement to go with consumer invoices once a year.
Internal cost: £300 per year

Critical Mass Considerations

Establishing and maintaining a licensed supply business is characterised by significant upfront costs in terms of systems and staffing that are only recoverable in a market that features large incumbents. There are marked economies of scale in what is essentially a process driven service where customer loyalty is difficult to create and the revenue margin only increases through repetition. In our opinion, a stand-alone licensed supply business operating on a customer base of 5000 domestic and relatively few commercial and industrial consumers and trading in the mainstream market is not sustainable for the long term. We have assigned the direct staffing costs to the tasks identified, but obviously such staff are permanently employed and so an overhead should be applied to realise the actual costs that would be incurred.
It is possible to identify step-changes in the cost structure as the operation is scaled through being unlicensed, just above the licence threshold, to reaching a critical mass. The most marked of these changes is at the licensing point because of the obligations and implied service levels that stem from being a licensed participant. Such a transfer requires the supplier to invest in knowledge, skills and equipment that are specific to the main market, but are not required for the core business of supplying consumers with energy from the local generator. Once in the main market, there are very few cost elements that are directly scalable to the number of customers or the volume of energy supplied.

Establishing a Licensed Distribution Business

A single company cannot hold both a supply licence and a distribution licence. However, two subsidiaries of a common parent company can each hold one of the licences. The distribution licensee must be financially ring-fenced and maintain regulatory accounts. Clearly some of the additional costs associated with being licensed would be recovered through charges to the external users. However, the customer base is unlikely to sustain full recovery.
A consequence of a distribution network becoming licensed is that all consumers on that network become open to competition. Whilst is would be expected that in pure energy cost terms the distributed energy project would offer the cheapest option, the economies of scale of the large suppliers may have the effect of eroding the customer base (and therefore the economic viability) of the distributed energy project.

Licence Application

The licence application process is the same as for a supply licence (see 0 above). On 1st August 2007 the electricity distribution licence fee increased from £1250 to £1400 (see footnote [4] above). The internal cost of application could be negligible, but 1-2 mandays should be budgeted for servicing any request for clarification or modification.
External cost: £1400 Internal cost: 900

Codes of Practice

Standard distribution licence conditions require the production of codes of practice stating how the distributor will protect vulnerable groups whilst exercising the rights and complying with the duties under the licence. There are at four such codes:

- Procedures for site access
- Provision of services for pensioners, the chronically sick and the disabled
- Provision of services for customers who are blind or deaf
- Complaint handling procedures

These codes must be submitted to energywatch for review and approval as part of the application process. It is likely that the review process will be iterative as there is no published model on which to base these documents. We would expect this area to require not less than 10 internal mandays and 2 consultancy mandays.
These codes must be available on request. The common least cost solution is to retain the electronic version of the documents and to produce them in hardcopy only when required. Therefore the printing cost of these documents can be considered negligible.
External cost: £1,700 **Internal cost: £4,500**

Balancing & Settlement Code

The accession and registration under the BSC is separate because the distribution licence holder is a different legal entity from the supplier. Therefore some duplication occurs.

Accession

Accession to the BSC for a licensed distribution system operator is the same as for a supplier. The registration is separate because the distribution licence holder is a different legal entity from the supplier.
External cost: £500 Internal cost: £450

Interfacing with Settlement

The processes involved in interfacing with settlement are virtually the same as for a supplier (see 0 above).
Internal cost: £50

Authorisations

The distributor must formally authorise individual personnel for a number of controlled activities. In a small organisation it is reasonable for an individual to be authorised for all activities. Ensuring full coverage and company director sign-off for the initial authorisations requires about half a manday.
Internal cost: £75

Qualification and Registration

Qualification testing follows a similar procedure as for a supplier, although the exact nature of the tests differ due to the different messages involved. Registration is likely to require 2-3 mandays of effort.
Internal cost: £1,350

Metering Point Administration Service (MPAS)

The distribution licence requires the provision of a metering point administration service (known as MPAS or SMRS) for all consumer (and generator) metering points on the network. This service maintains a registry of all suppliers and agents servicing each metering point. It also holds a history of previous registrations. Whilst the distributed energy project would maintain an asset register and a customer database, these would have to be enhanced by a registry of the required standard to provide an acceptable MPAS. For such a small number of metering points it would be possible to develop a suitable database for about £10,000 and 3 mandays.

External cost: £10,000 **Internal cost: £1,350**

MRA

A condition of the licence is that the distributor must become a party to the MRA. A licence exempt distributor cannot be a party to the MRA. The accession process for a distributor is the same as for a supplier (see 0 above), but concentrate on the MPAS aspects.

External cost: £1 **Internal cost: £200**

Data Transfer Service Agreement (DTSA)

The Data Transfer Service is a closed communications network over which all formal messages for customer registration and metering data are passed. The service is managed by Electralink. In order to use the service, a distributor must accede to the DTSA by signing an Accession Agreement and a Local User Agreement. Given that the MPAS service has an availability requirement, the gateway would need to be at least the 'low volume' specification. Details of the required connection are submitted using the application and connection form and the site summary form. There is no connection charge. Form completion and managing the installation will require 3 mandays of effort.

Internal cost: £450

Interfacing with the Data Transfer Service

Software is required to handle the large volume of dataflows to and from the DTS. The recognised industry leader, and almost the standard, is the Utilisoft product which at entry level costs around £100,000. Using proven software with its automation of many of the processes offsets both the cost of accreditation and operational staffing costs. However, this software is likely to be over-specified for the small supplier operations of a distributed energy project. Alternative bespoke solutions are likely to be less than £10,000 to build. These costs could be shared with the supply business if that too is licensed, but are shown here for the stand-alone case. Internal costs would be higher with the bespoke option as the development must be managed.

External cost: £10,000 - 100,000 **Internal cost: £900 - 4,500**

Accreditation

Accreditation into the MRA is not trivial. It involves the inspection and assessment of systems and procedures using set scenarios in near-live conditions. Operational procedures must be drafted and tested before initiating the accreditation assessment. This will take not less than 10 mandays to produce documentation of sufficient standard to be approved. Staff operating the procedures must be sufficiently trained to successfully carry out the scenario tasks (2 mandays). The accreditation testing process will require not less than 20 mandays including process management meetings etc. assuming no major re-runs. The latest version of the MRA Agreed Procedure for Entry Assessment and Re-Qualification (MAP 05)

became live on 23 August 2007, it is intended to reduce the resource requirement of the accreditation process. Obviously it is too early to make an objective assessment of this.
Internal cost: at least £10,800

Distribution Code

Each licensed distribution company must maintain a Distribution Connection and Use of System Agreement that is compliant with the Distribution Code. This document must be maintained and made available to all suppliers wishing to supply electricity to customers who are connected to the company's network. There is a proforma Distribution Connection and Use of System Agreement that can be used. The cost of compiling the document should be 1-2 mandays.
Internal cost: £900

Grid Code

As an independent distribution network operator (iDNO), the distributed energy project is very unlikely to be directly connected to the transmission network. It does not appear that becoming a signatory to the CUSC and Grid Code is mandated from the licence. Indeed, Laing O'Rourke Energy is an iDNO, but it is not listed as a system user under the CUSC.

Contract Out Option

Operation and Maintenance

Instead of becoming licensed itself, the distributed energy project may consider contracting out the operation and maintenance of its wires network to a licensed operator. At present, the contracted-out service market is very small and prices will depend very much on the exact nature of the network. Whilst some of the former regional distribution businesses offer such a service, there are also independent operators in the market such as Independent Power Networks and Laing O'Rourke Energy.

MPAS

The licensee does not have to provide the MPAS service himself and can contract with a service provider (including another distributor). Given the number of metering points on a distributed energy project network, the cost of establishing and operating a stand-alone service will far outweigh the contracted out option, especially if the service provider is already accredited. At present, the contracted-out service market is very small and opaque. The quoted prices for such a service provision will depend heavily on the number of metering points relative to the existing business

Operating a Licensed Distribution Business

Ofgem

Licence Fees

Ofgem charges a licence fee based on the number of connected customers on 30th September of each year. The Ofgem cost recovery method allocates costs to distribution companies according to their proportion of the total connected customer number. However, the distributed energy project is likely to fall below the de-minimis level applied to the allocation and so would incur the minimum fee of £500 per annum.

External cost: £500 per year

Regulated Business

There is a significant administrative overhead in managing a regulated business. In addition to the accounts prepared under company law, a licensed distribution company must prepare regulatory accounts for submission to Ofgem. The business must operate within Ofgem's price control regime. At a minimum for such a small operation, we estimate this will require 30 mandays of effort per year.
Internal cost: £13,500 per year

Balancing & Settlement Code

ELEXON Charges

A distributor will normally only incur the base monthly charge levied on all acceded parties equating to £3,000 per year. Metering charges can be avoided if the entire network is embedded in a regional distribution network and the metering at the connection point is registered in SVA.
External cost: £3,000 per year

Maintenance of Market Domain Data

The main ongoing settlement requirement from a distributor is to maintain the line loss factors within the market domain data. Other elements requiring less administration are time pattern regimes, standard settlement configurations and meter timeswitching codes, although the majority of these are not modified once established. Line loss factors are normally reviewed annually and submitted for inclusion. We estimate this task to require not more than 2 mandays annually for a distributed energy project.
Internal cost: £900 per year

BSC Compliance

The distributor must maintain an operation that is compliant with the BSC and its subsidiary documents. As a non-trading party, active participation in the change processes is optional and most operators choose to avoid a potentially large cost to them for little direct return. Code or subsidiary document modifications are unlikely to have significant impact on distributors. There will be a small cost in monitoring any changes that do have an impact and being able to react accordingly. This cost is likely to be around 0.25 mandays per month.
Internal cost: £1,250 per year

MRA

Compliance with the MRA requires the provision of an MPAS. However, as this is a service it has been itemised separately.

DTN costs

The DTN costs are small. The low volume gateway service has an annual cost of about £5,000. For a very small distributor with 1000 metering points the annual data traffic cost would be less than £50.
External cost: £5,050 per year

MRA Charges

The costs of administering the MRA are recovered from suppliers and distributors. Each distributor pays a share of the costs based on his share of the aggregate number of metering points registered. As a very small distributor, the materiality of these charges will be small at less than £50 per year
External cost: £50 per year

MRA Compliance

A distributor must maintain his operation to be consistent with the MRA. Whilst many of the changes will have little or no impact on a distributed energy project, there will be an administrative overhead in monitoring proposed changes, participating in consultations and dispute resolutions and maintaining compliant systems. As a minimum, this task is estimated at 1-2 mandays per month.
Internal cost: £900 per year

Metering Point Administration Service

This is a service with set hours of availability during which it would need to be manned. Whilst not necessarily occupying staff on a full-time basis, it technically requires coverage on all business days. This would equate to a minimum of 1 man-year, but could be offset by staff doing other administrative tasks.
Internal cost: £37,500 per year

Distribution Code

The Distribution Connection and Use of System Agreement must be made available to all suppliers wishing to supply electricity to customers who are connected to the company's network. The document must be issued and countersigned to form the contract between the distributor and the supplier. Each event can be half a manday. The document will be reviewed annually 1-2 mandays per year.
Internal cost: £1,350

Embedded Benefits

Identification

The standard framework of the wholesale electricity market has a notional delivery point to a supplier at the exit point from the transmission system - the Grid Supply Point (GSP). It envisages that all energy flowing from a generator connected to a distribution system will flow up towards the GSP. If a supplier purchases energy from an embedded generator, then there is a partial displacement of his energy purchased from the transmission system at the GSP. In reducing his energy take from the main wholesale market, the supplier can avoid some of the costs associated with that market. Embedded benefit is a generic term applied to these avoided costs. It should be noted that whilst these benefits occur due to the generator, they are only realised as avoided costs of the supplier in his capacity as the registrant of the meter. In practice, this mutual benefit is recognised by a degree of sharing the benefit between generator and supplier.
In the case of the distributed energy project, the generator and the supplier exist in tandem with the express intent that the energy is both generated and supplied locally, possibly conveyed over a private network and entirely outside the wholesale electricity market operation. In this sense, the embedded benefits are wrapped up within the design of the

project as the supply function is not exposed to the wholesale level costs that it would be avoiding.
If the supply function was licensed, then it could become exposed to the wholesale market costs identified in section 0 above for the entirety of its supplied energy volume.

Principal Avoided Costs

These are covered in more detail in the operational costs of a licensed supplier section above, but are summarised here.

TNUoS

An embedded generator producing energy during the winter evening peak and at triad periods will net off the supplier's GSP group demand and reduce its net off-take against which the supplier is charged.

BSUoS

Each MWh generated by an embedded generator will net off against the supplier's GSP group off-take, reducing the BSUoS charge.

RCRC

By netting off supplier offtake, the charge base on which RCRC is calculated is reduced. However, if RCRC is a rebate then this becomes an embedded disbenefit.

ELEXON Charges

By netting off embedded generation against a supplier's demand, ELEXON funding share charges are reduced.

Distribution Losses

This is different from the previous benefits in that it is only realised through the physical netting-off point. A licensed supplier can only realise the benefit if the netting-off point is at the generator meter (i.e. the consumption is on-site). An unlicensed supplier with a private network can net-off at the connection point to the public network.

DUoS

In a similar manner to distribution losses, the unlicensed supplier can avoid some of the DUoS charges by netting-off. However, there is still a net position of import and/or export of energy from/to the public distribution network.