High Energy Users and renewables

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Remote net metering and other policy measures to help British industry control energy costs and participate in the transition to a low carbon economy.

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This report is an expansion of an earlier discussion paper for the REA .

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Executive summary

Many high energy intensity businesses are experiencing considerable pressure on their cost base which, in the short to medium term, is likely to be affected by the various measures introduced to encourage Britain's transition to a low carbon economy·

The CBI has argued that such industries need assistance in relation to this transition. The purpose of this report is to suggest regulatory reforms that would allow high energy users to more directly participate and benefit from their own renewable energy generation facilities (whether they are off-site or on-site) and thereby more actively control their future energy costs. The reforms suggested are designed to encourage the flow of new capital to the sector and to be at low or minimal cost to the taxpayer/consumer.

If a high energy user wishes to generate its own renewable electricity, but is unable to host the generation equipment on-site (or bring the power to the site via a private wire network) it is at a significant disadvantage. It must sell the renewable power it generates at wholesale prices (around £45 MWh), yet buy the power it needs at retail prices (£65 to £75 per MWh depending on the deal negotiated, which prices also include balancing transmission and distribution).[1]

Whilst the energy-intensive user may (via a sell and buy back contract) become eligible for the financial incentive to encourage renewable electricity generation (i.e. ROCs), the overall reward is less that if it were it to generate renewable electricity on-site. Onsite generation benefits from displacing energy at retail prices , without the requirement to sell electricity through discounted power purchase agreements (PPA's). As incentives degress, this discrepancy is likely to become more significant.

The proposal described in this paper - ***Remote Net Metering*** - enables energy intensive users that cannot physically host renewable generating capacity, to use the grid as if it were a private wire, i.e. where they own remote renewable generation assets they would only pay for net usage

1 Circa August 2011. Prices for illustration only and subject to fluctuation . wholesale price income will be affected by discounts charged by suppliers as part of ppa arrangements. Retail prices based on a review of quarterly Decc statistics for large industrial energy users. Transmission distribution and balancing costs vary depending on location and the intermittency of the power source.

of energy and the costs of balancing top up, transmission and distribution.

There are no regulated contracting forms available on the market that achieve this objective and it may be necessary to introduce a new license condition on electricity suppliers requiring them to provide this service. The proposals made could also be modified to facilitate direct contracting between high energy users and third party renewable generators.

A model for remote net metering could build on the existing regulated for exempt arrangements supplies or the direct PPA contracts offered by some suppliers to allow renewable generators to contract direct with customers. As an alternative to regulation suppliers could be encouraged to adopt a code of practice to promote Remote Net Metering to high energy users. [2] Not all suppliers offer a direct PPA service at present and there is usually a requirement for the consuming business to be a customer of the supplier concerned .

Under Remote Net Metering (see fig 1) it is proposed that high energy users would be able to request an offer from any supplier whereby they would only pay the retail electricity prices for the net electricity consumed. Such contracts would be subject to competition.

High energy users would receive full renewable incentive benefits and would be provided by the supplier with administration, balancing, top up and transmission and distribution services at appropriate cost after allowing for any embedded benefits.

Measures would be designed to be compatible with CfdFits proposed under the EMR in such a way that the benefits of remote net metering are not lost.[3]

The establishment of a remote net metering market, allowing high energy users to own and manage their own sources of production,

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2 Ofgem would consider the appropriate allocation of costs e.g. in respect of the socialisation of transmission and distribution costs- perhaps taking account of distance to the general market (rather than intensive energy user). In this way there would be an incentive to site projects in areas with excess consumption.

3 Under the EMR cfdFIT the adjustment to wholesale would still be by reference to the average wholesale price (I.e. not the retail price displaced by the netted off generated electricity).

would have the advantage of bringing new sources of capital into the industry. It would allow high energy users to more directly control their costs and benefit from increased savings as energy prices rise where plant is owned or part owned by them.

The encouragement of Remote net metering would also have the advantage from a public policy perspective, of bringing forward the point at which grid parity is reached: allowing financial incentives over time to be reduced or removed altogether. The proposals themselves have no additional cost to the taxpayer consumer.

Ideally the contract structures would also be available to industrial renewable consumers who wished to originate renewables from independent third parties .This would increase the availability of PPA's to generators, as intensive energy users may well be willing to offer higher long term fixed prices than utilities, to enable them to control long term energy price exposure. This in turn would facilitate the provision of capital to generators who remain in the RO system (up to and post EMR).

It is suggested that remote net metering contract forms for high energy users would also have provision for demand management (or restriction of supply) which could be combined with smart metering services .

Depending on the position of the generation plant savings in the order of £3 to £10 per Mgw/h could occur, with the added benefit that the high energy user would be insulated against (and indeed may benefit from) rising costs either by reason of its physical hedge or by reason of a fixed price renewable ppa with a third party generator if it prefers that route.

To further encourage investment it is also proposed that the carbon savings arising from the switch to renewable generation be deducted in the calculation of any CRC tax liability (or, in the case of energy users covered by CCA agreements used in the determination of rebates).

In addition higher initial capital allowances could be considered to encourage high energy users to invest directly in renewables generation capacity.

These measures could be introduced in the Autumn statement in anticipation of regulatory reform to promote Remote Net Metering.[4]

4 In addition to encouraging remote net metering it also suggested that consideration be given to encouraging the embryonic market for direct PPA's between renewable energy generators

With a vibrant remote net metering market it is quite conceivable that it would be common place for a major steel or chemical works to own and directly benefit from an offshore wind farm or biomass plant as a means of achieving both low carbon production and controlling its energy costs.

and consumers , as a means of improving competition for PPA's given the relatively small number of suppliers in the market place.

Figure 1. Simple illustration of high energy user which owns renewable generation equipment on a remote site. The high energy user consumes 100 units of electricity and generates 75 units of renewable electricity.

Without **net metering**

The high energy user pays for 100 units of electricity ***at retail price*** and sells 75 units of electricity ***at wholesale price.*** It also earns 75 units of premium (e.g. 75 ROCs): less supplier PPA discount

With **net metering**

The high energy user pays for 25 (rather than 100) units of electricity ***at retail price.*** It also earns 75 ROCs.

Plus …
The high energy user pays the supplier for the service of

- balancing /aggregating its demand (if necessary)
- wheeling the power across the network
- engaging in sell and buy back agreement (in order that the renewable output is ROC-eligible)
- providing top up

The high energy user would also get CRC tax offset or CCA rebate for carbon saved on substitution of previous power supply (less REGO sacrifice cost).

It would also obtain any embedded benefits if power was transmitted only through the local distribution network. [5]

5 Under these arrangements the intensive energy user not only receives the market norm rate of return for renewables investment but also achieves benefits or a proportion (in this case 75 per cent) of its energy usage of circa £3 to £10 mwh depending on the precise circumstances. These can arise from saving on supplier PPA discounts on sale of electricity, reduction in supplier margin on purchase , embedded benefits, discovery of buying inefficiencies and profits earned on project above cost of consumer WACC. For astute buyers already trading wholesale savings may be only £1 to £3.

1 Background: the high energy users dilemma

High energy intensity industries form a critical part of the UK's industrial landscape. They include the chemicals, steel, cement, aluminum, glass paper and ceramic industries.

Typically these industries will seek to reduce their exposure to the Climate Change Levy (CCL) by energy efficiency and other measures under Climate Change Agreements (CCA's) and by trading of allowances under the EU emissions trading scheme (ETS). Other industries covered by these arrangements include water companies, which use large amounts of electricity in their pumping stations, some extractive industries such as the china clay industry - and the fossil fuel power generators.

Other high energy businesses are covered by the Carbon Reduction Commitment (CRC) Energy Efficiency tax, and include high technology businesses such as communications companies operating server and data farms- which are seeing high levels of growth in their energy consumption due to the internet. They also include large retail chains where energy bills can be significant when all sites are aggregated and where carbon intensity influences customers' perceptions. Local and central government and other public sector bodies such as universities also face similar issues as large collective users of energy.

The CBI, whilst supporting the move to a low carbon economy has concerns over the cumulative Impact on traditional intensive energy industries. In its report 'Protecting the **UK's** essentials: a blueprint for energy-intensive industries' it states:

> "The UK's energy-intensive industries are at risk of being undermined by increases to their energy costs. Without mitigating action, damage to their competitiveness could endanger their chances of remaining in the UK. If we do not secure the future of these industries, we will be forced to import what we should be exporting."[6]

6 climatechange.cbi.org.**uk**/.../cbi%20**energy**%20report%20aug%2011.pdf

Many climate change detractors also argue that the costs of decarbonising the energy system make the UK less competitive with those countries not facing these costs of the same order e.g. China and India and the US.

The CBI report comments that the introduction of a carbon price floor may be a step too far for the most energy intense industries, quoting wholesale costs for energy in excess of £130 per MWh (extrapolating DECC figures) by 2020 and specifically identifying the components of that cost based on an extended Renewables Obligation, the CCL, the carbon price floor, the EU ETS and the CRC.[7]

The danger for the renewables industry is that it is cast as a burden on business in the UK, rather than a key component of the transformation of the UK to a vibrant low carbon economy-improving the UK's competitive position as a provider of low carbon goods and services. It is important for the renewables industry to recognize the challenges faced by energy intensive businesses.

The purpose of this report is to put forward constructive suggestions as to how changes could take place in the regulatory environment which assist those industries -allowing them to more actively participate in the ownership and deployment of renewables for their own use, thereby capturing the financial rewards provided to the sector, reducing their long term exposure to rising energy costs.

In its reaction to the dilemma the CBI report makes several recommendations. Those related to renewables are referred to below, (using the numbering in the report)

2 That a rebate be granted for energy intensive industries on the carbon price floor carbon price floor based on measures undertaken to improve energy efficiency under their climate change agreement.

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7 For example the Taxpayers Alliance also complains that many large utilities have profited from free allocations under the ETS and about the impact of renewables policy on energy bills in general. . Many of these arguments fail to take account of the savings likely to occur as energy costs rise. The oil price at circa $100 a barrel is already well above the $80 a barrel that underlies most projections, and whilst in the short term gas prices are relatively low wholesale electricity prices are likely to rise at a rate greater than inflation particularly if economic growth is resumed.

4 The facilitation of bulk buying by groups of energy intensive users

5 The promotion of financial payments for demand management.

9 Further support for CHP plants.

11 The use of green investment bank monies to fund industrial efficiency programmes.

12 The encouragement of the use of waste heat.

13 More explicit linkage of waste and energy policies to remove the barriers to recycling waste as fuel.

Whilst there is much to be commended in the CBI report from a renewables perspective, we suggest that a more radical solution be considered - **Remote Net Metering .**

This low cost intervention in the existing regulatory framework for the supply of electricity would be used as a policy tool to encourage the rapid transformation of the UK's high energy users into low carbon energy users.

We discuss traditional net metering in Section 2 and its shortcomings for high energy users and set out the details of our proposals for remote net metering and the impact it would have in Section 3. Additional measures to assist high energy users wishing to use renewables are set out in Appendix 1.

2 Net metering: the benefits and the barriers

Traditional net metering

Net metering is most often discussed in the context of on site solar PV, whereby users benefit from a reduction in their electricity costs as a consequence of their use of on site power production, displacing purchased electricity. In many countries to incentivise deployment, a feed in tariff is paid to the consumer.

In the UK for small-scale deployment, households and business consumers benefit from reduced energy costs, a feed in tariff and a deemed or metered payment for exports of surplus power to the grid[8]. For large scale deployment on site generation in the UK benefits from Renewable Obligation Certificates (ROCs) and CCL exemption[9] in addition to the sale of electricity at wholesale prices.

In countries where net metering has been applied with a suitable feed in tariff or other incentive, take up has been high, with large flows of capital into the sector typically financed by consumers or businesses themselves and third party finance providers, with little finance provided by energy utilities or government.

This has also been the case in the UK, where the speed of take up for PV has been rapid. In relation to other technologies such as wind and anaerobic digestion, farms are becoming fruitful areas for deployment.[10]

A critical advantage of net metering is that that the investment decision is influenced by the retail price of electricity displaced rather than at the

8 50 per cent of production is deemed to be exported at 3p per kwh a discount on the current wholesale price. . For < 5mw schemes Tariffs are payable in accordance with a published scale for MCS certified installations.

9 Given an appropriate sell and buy back agreement with a supplier and installation of an Ofgem accredited meter.

10 There are a wide variety of finance providers for solar PV , with Barclays recently announcing a £100m fund for on farm renewables taking advantage of the small scale feed in tariff.

wholesale price – especially in the case where the generating plant is sized below usage, as tends to be the case with solar[11.]

In sunny countries with high energy costs, this, given the sharp downward trend in solar technology costs, is likely to lead to relatively early grid parity i.e. the price at which installation costs are funded by avoided electricity purchase costs alone. The time at which grid parity is achieved is highly significant to policy makers as it offers the prospect of renewable support mechanisms being reduced or becoming self-financing (if they are left in place to provide credit support).

In solar grid parity is relatively imminent in Italy ; with current trends indicating it could be achieved in parts of the UK for medium sized commercial installations by 2016 to 2019 depending on wholesale electricity price assumptions[12.]

Net metering for high energy users

In the case of high energy users the benefits of net metering are often not available as the site (or sites) which consume electricity are often not suitable for accommodating large scale renewable energy generation infrastructure.

To date the involvement of industrial high energy users in renewable energy has usually taken place only on sites where typically, waste to energy or biomass renewable energy projects can be accommodated within the private wires curtilage of the industrial plant concerned[13.] Waste or biomass feedstock tends either to be sourced from that industry or sourced elsewhere.

Examples include:

- Ineos Chlor's waste to energy CHP at Runcorn

11 This relates to displaced own consumption, exported electricity continues to be at the wholesale price.

12 See lead article : "The low carbon transition to the grid parity age" p 5 issue 26 of Ernst and Young's renewable energy country attractiveness indices .

13 i.e. within a private wires network controlled by the business: crossing onto the grid even for a short distance, takes the electricity concerned out of the pure own generation model . In the gas network this issue is dealt with by a different structure for shorthaul distribution.

- Diageo/Dalkia's distillery biomass plant at Cameron Bridge
- RWE/Tullis' biomass plant at Markinch[14]
- Anglesey Aluminium Metal Renewables biomass plant .[15]

The use of combined heat and power is ideally part of such facilities- although there are challenges in relation to the interaction of government Incentives .

Should a high energy user have on its own site a plant sized below or matching its own consumption needs, then it is able to save the cost of electricity that would otherwise be purchased and sell the instruments relating to renewable support (i.e. the ROCs) separately with power exempt from CCL if renewable.

To obtain the ROCs and CCL exemption it needs to have a sell and buyback agreement with a supplier and it is also likely to negotiate a top up and balancing agreement with a supplier; with terms for export a critical part of the negotiation if a plant is sized
above own use, or if a business is able to restrict its demand to take advantage of high short term prices. Under these arrangements savings in the order of £8 to £12 per mgw/h can be achieved.

Unfortunately the situation is less straightforward for a high energy user wishing to take advantage of renewable energy it generates on a site remote from its place of consumption i.e. where power has to be transmitted across the grid rather than through private wires.

Here the investment case is influenced by the wholesale price of electricity plus incentives, rather than the displaced cost of energy purchase plus incentives. This disparity will become more significant as the value of support measures degress.

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14 The specific power purchase agreements (PPA's) for these plants. have not been examined. . The Markinch plant for examples replaces Tullis existing coal fired power station and will export two thirds of its capacity with RWE entering into a 20 year supply agreement to Tullis for its own needs: source RWE website.

15 An aluminium smelting plant was previously closed at this location due to rising energy costs. The power from the new biomass facility will be used by the retained melt plant with the surplus exported to the grid.

Usually a high energy user owning a renewable plant sells the electricity generated on the same basis as any other independent generator. It then independently purchases its electricity from its supplier at the normal price it is able to negotiate. Although it achieves a financial hedge from renewable generation, the revenue streams accruing to it only reflect the wholesale price of electricity.

Compared to on site generation its investment case is worsened in that it will suffer the difference between its purchase price of electricity and the wholesale price (further reduced by a discount in the order of 10 per cent on that wholesale price by reason of the supplier granting it a PPA). [16]

Nowithstanding these disadvantages some high energy users have followed this route: for example

- Pennon has energy costs in its water subsidiary Southwest Water whilst earning significant profits from the sale of landfill gas electricity through its waste subsidiary Viridor

- BT plc intends though its Wind For Change project to generate up to 25 per cent of its electricity needs on land own by itself and third parties.

- Ikea has recently announced the purchase of a12.3 mgw wind farm following on from similar purchases in Germany and France.

It is possible to improve the financial position and provide a more clear contractual connection between the renewable generation and use, if a direct PPA is be negotiated with a supplier providing a netting off the wholesale electricity purchased from the supplier with that generated from the remote own generated site.

16 In providing a long term PPA the utility is taking on a credit risk, measured by its own rating agencies, and for intermittent power will incur balancing costs..This disadvantage does not occur in jurisdictions with a fixed PPA such as Germany. It is not clear to what extent suppliers will charge a discount or fee for managing the Contract for difference exposure (Cfd) arising from the new large-scale feed in tariffs proposed under the Electricity Market Reform (EMR), should the wholesale market be insufficiently liquid for bankers to accept arrangements without PPA's.

This arrangement has been used by retailers for example who wish to obtain renewable energy from third parties direct in some cases for reasons of traceability and also to fix long term prices. Generators have been able to obtain long term prices in excess of those that would normally be available from a supplier PPA, with business consumers trading off a higher short term price for the benefit of capping their exposure to future price rises[17].

In this circumstance the generation company enters into a PPA with the entity which would also have a back to back contract for difference agreement with the electricity supplier which would net off the amount of electricity provided to it against its own supply to the consumer subsidiary. Various adjustments would also take place for transmission and distribution charges. Not all suppliers provide this service and there is a requirement for the consumer to be a customer of the supplier which may cause a difficulty if generators wish to originate their own counterparty who habitually contracts with a different supplier.

One major supplier explicitly markets such arrangements on its business website providing credit for the electricity generated sleeved into the supply agreement at the wholesale price , for the supply volume[18]. Whilst this type of arrangement is welcome under the current regulatory framework it does not provide the full financial advantages envisaged under full remote net metering.[19]

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17 For example on 5 December 2008 Sainsbury's purchased electricity from a wind farm using direct PPA arrangements negotiated with a supplier by Utliyx. http://www.utilyx.com/index.php?option=com_content&view=article&id=33:ppa-procurement&catid=44&Itemid=118.

18 RWE Npower specifically refers to this service on its website. . http://www.npower.com/Large-Business/Generating-energy/Selling-power/Third-party-netting/index.htm. A limited number of other suppliers also provide this service . Options include using contracts for difference to establish a long term fixed PPA, with the generation contract executed with the supplier , and payments to /from the consumer and generator used to maintain the fixed transfer price. Alternatively the contract with the generator is maintained by the consumer with a further sell and buy back PPA between the supplier and the customer achieving the fixed price. Fees are charged for this service with balancing costs higher for wind than biomass for example.

19 Very large energy users (e.g. with a energy consumption of 50gwh /100gwh plus per annum may choose to trade their energy requirement as a commodity in the wholesale energy market, using their own trading desks and would be well placed to deal with their own renewable energy generation if they went to the expense of obtaining their own supply licence. It is suggested

It is also technically possible in the limited case of small generation plants (below 5MW) to take advantage of the exempt supplier rules where self supply and supply to other customers is involved where power is transmitted through the local distribution network rather than the National Grid. In this case the exempt supply services are provided by a single nominated supplier (the historical regional electricity company).

A limit of 2.5mw applies to supplies to domestic customers. Under these arrangements the nominated supplier provides exempt supply services to such generators dealing with industry data requirements distribution and balancing, and the sale of surplus power: the agreement would also need to be accompanied by a sell and buyback arrangement to ensure full ROC and recycle recovery.

Further exempt supply arrangements can apply for larger schemes under a derogation to supply licence condition 11.2 so long as they can be agreed with a relevant supplier. [20]

In the next section we suggest that rather than rely on the current piecemeal and incomplete set of measures , full remote net metering

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that regulated remote net metering arrangements would designed to obviate the need for such costly measures and to make the benefits available to users with much lower requirements. The majority of high energy users still use annual or biannual whole of energy contracts which commit them to specific prices with some choosing to use trading services provided by brokers who trade on an aggregated basis.

20 Alternative arrangements need to be in place with a third party licensed supplier that is a signatory to the industry codes for the scheme to operate in the competitive market and allow consumers to switch energy supplier. Although this carve out was announced by Ofgem in February 2009, follow up guidelines were not promulgateted and it was not made obligatory on suppliers to offer these services. Together with changes in the supply licence terms (post 2007) which removed the obligation on suppliers to provide back up or top up services , there has as a consequence , been less incentive for such schemes to come into operation at cost effective rates and as a consequence take up has been relatively poor. Cornwall Associates and others have written on the difficulties experienced by distributed generators seeking to take advantage of exempt supply services in their *Energy Perspective Issue 276 April 2011*. This experience points to the need for greater regulation by Ofgem to further assist development of the distrbution and generation and remote net metering market.

should be made available on a routine and transparent basis to all significant intensive energy users wishing to invest in their own plant.

3 Remote net metering - a proposal

It is proposed that in order to facilitate greater direct participation in renewables by high energy users that a transparent regime for **remote net metering** be introduced and subject to regulation.

This would allow high energy users owning remote renewable electricity generation plants to net off generated power at the retail price, after deduction of regulated charges for administration, transmission and distribution costs, balancing costs and taking account of any embedded generation benefits. *See fig 1. Executive Summary*. These benefits would also be available for users wishing to aggregate multiple sites (for example retail and government and other multiple site businesses).

The arrangements put in place would be similar to those whereby a supplier assists a generator in making an exempt supply or under direct PPAs.

It is suggested that under remote net metering arrangements , an intensive energy user could undertake exempt self supply from a remote renewable (or high quality CHP) generating plant) irrespective of whether transmission is required through local distribution or national networks.

To improve competition all suppliers would be required at the request of the generator to provide exempt supply services including transmission, the provision of data to the networks balancing, top up and RO sell and buyback arrangements.

Initially full benefits of remote net metering could be made conditional on full ownership of the generation facility by the high energy user or approved co ownership (e.g. with other high energy users, financial partners or utilities).[21]

21 For example it could be a precondition that the high energy user should have a minimum equity interest of 51 per cent (allowing financial or other parties e.g. utilities or aggregating specialists to partner in the arrangements) . It is also suggested that consideration be given to the attribution of generation capacity by reference to relative equity interest for shareholdings less than 51 per cent. For example in the case of large scale 1000 mw offshore wind farms which may be too large for ownership by a single intensive energy user: ownership of say 10 per cent of the farm however could allow a self supply remote net metering arrangement for 100mw to be put in place. This also

Suppliers could also be required to make regulated direct PPA contract forms available to high energy users wishing to contract direct with independent third party renewable generators on a more open market basis than the current welcome but restricted provision.

Where an industrial user also wishes to supply electricity and (ideally heat) to consumers local to the point of generation then the existing exempt supply arrangements would apply to those third party customers.

As part of **remote net metering** arrangements suppliers would also be required to set out the basis on which they would pay for restriction of demand (or curtailment of supply) to facilitate balancing; which could be combined with smart metering and energy efficiency services. New supplier entrants may well emerge to provide these services and the regulatory regime may require review to facilitate a broadening of the market.

It is suggested that Ofgem would be involved in the regulation of remote net metering and would provide input into the arrangements for reasonable balancing transmission and distribution charges. Current regulations in relation to distributed generation exempt supply would also be reviewed to allow simplification of the current contractual arrangements for direct PPAs and to ensure that appropriate competition occurs for the provision of exempt supply services.

Depending on the position of the generation plant savings in the order of £3 to £10 per Mgw/h could occur, with the added benefit that the high energy user would be insulated against (and indeed may benefit from) rising costs either by reason of its physical hedge or by reason of a fixed price renewable PPA with a third party generator if it prefers that route.

It is suggested that the encouragement of direct investment in renewables by high energy users via **remote net metering** would have the following advantages:

- it would enable heavy energy users to obtain a financial hedge against rising energy costs and benefit fully from the incentive mechanisms made available to the renewables industry and

would facilitate several intensive energy users to participate in a consortium with say a utility.

improve their ability to fix energy prices over the longer term by reason of direct ownership of energy generation capacity;

- it would enable heavy energy users to reduce their carbon footprint by means of direct physical action rather than offset;

- if combined with demand management smart metering and energy efficiency measures it would enable them to more actively manage their energy costs – and facilitate network management.

Other advantages

- it would significantly broaden the flow of capital and investment into the sector which at present is dominated by utilities and financial institutions; with many banks and institutions willing to fund industrial users renewable energy generation plants if they do not wish to deploy their own capital;

- it could enable government and local authority participation in the renewables market by allowing them to more easily obtain the benefits from large scale energy from waste projects using municipal waste (especially where there is not an industrial user in the locality);

- it could act with other complementary measures act as a major driver for on site and community combined heat and power schemes;

- it would be likely to promote regional solutions which would increase the spread of distributed generation strengthening the grid;

- it would relieve capital pressures on utilities and enable them to further evolve their business models into the provision of energy management services. It would also attract new entrants into this market broadening choice;

- by focusing the investment decision on the retail price of displaced electricity it would in the medium term bring forward grid parity and the time when support measures could be reduced or removed for specific technologies as costs decline.

Under this approach high energy users (with financial and other partners if they require) would become producers as well as consumers

of electricity fundamentally, affecting their attitude towards energy creating opportunity where there was once cost.

It would not be inconceivable on this basis for a major steel or chemical works to own and directly benefit from an offshore wind farm or for local businesses to own stakes with local authorities in community heating projects using municipal and trade waste as feedstock for energy from waste plants.

As set out in Appendix 1 it would also be helpful to allow carbon savings from renewable energy to be offset against the CRC or to provide rebates under CCA agreements.

Additionally as a short term measure to promote growth and investment higher initial capital allowances could be considered solely for high energy users investing in renewable generation··

A tranche of green investment bank support could also be made available to provide debt finance to pathfinder projects.

These measures could be introduced in the Autumn statement in anticipation of regulatory reform to promote **Remote Net Metering** if fiscal budgets allow.

The **Remote net metering** reform proposed in this report has the advantage of providing the prospect of a further stimulus to low carbon investment, whilst reducing long term cost pressures on high energy users without in itself requiring any further cash from the taxpayer/consumer .

Appendix 1: Other measures required to help high energy users

Interaction with EMR

The proposals for cfd feed in tariffs under the EMR would also need to be reviewed to ensure that the ability of high energy users to save energy costs by displacing electricity at retail rather than wholesale prices would be preserved whether for on site or offsite generation. This would involve the top up (or down) Cfd payment being calculated relative to the reference wholesale price as envisaged by the EMR proposals contained in the white paper . The white paper envisages that a generator selling at a wholesale price above the reference average would achieve higher reveneues as an encouragement to intelligent dispatch and a self supply arrangement involving netting off would be an analgous position. It would be important that any enabling legislation did not have the effect of capping revenues to that of the Fit as otherwise the incentive for net metering (whether on or off site) would be lost.

Interaction with CRC

A further difficulty for high energy users which requires addressing relates to the CRC. As it is currently formulated neither business (nor government-related) users are allowed to claim the carbon savings arising from any on site or indeed offsite renewable energy generation which displaces their own energy consumption. Instead they are required to deem that self supply occurs at the UK grid mix: the logic being that they have sold the carbon saving by reason of their sale of the rocs to a supplier (unless the associated ROCs and LECs are surrendered- which it is uneconomic to do) .

This treatment contrasts with the rules for accounting for greenhouse gases under the UN protocol where carbon savings are taken into account. It also ignores the RO's primary role as a capacity building incentive designed to compensate for additional technology costs which forms the bulk of its economic value (rather than the carbon saving).

Ironically high energy users which are not part of the CRC can gain benefit for renewable generation under the ETS in respect of fossil fuel generation displaced.

In the US the surrender of a REC, a relatively low value equivalent of the nil valued UK certificate of energy origination the REGO, does not prejudice the receipt of the prime capacity building incentives the production tax credit for wind and biomass and the production tax credit for solar. To this extent UK high energy users are disadvantaged as the whole of the ROC has to be foregone .

When the CRC was merely a recycling mechanism this treatment was irritating to a number of businesses and did lead to a number of companies stating that their investment programmes were adversely affected. The CRC's adverse impact on levels of business investment in renewables is likely to have been increased now that the CRC has become a tax. [22]

The government is aware of the need to simplify measures relating to low carbon and has undertaken to ensure that any CCA or EU ETS site would be automatically exempt from the CRC scheme. It would be helpful to high energy users if carbon savings arising from renewable generation owned by a CRC user could be taken as a carbon saving for the purpose of calculating CRC tax-this exemption would occur for both on site and off site i.e. remote renewable energy generation.[23]

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22 Technically it would be possible to avoid double counting by requiring a renewable generator wishing to retain the credit to retain the certificate of renewable energy generation origin ('REGO'), currently such certificates are transferred as part of a PPA for nil value. . See p20 *let the people invest: a report by climatechangematters limited for Transform UK* which estimates that £500m to £1billion of additional renewables investment could be generated annually if the restriction on CRC offset could be removed and remote net metering more actively facilitated .

23 In the US Google separately either invests in renewable energy generators or enters into long term PPAs with third party renewable energy generators : with the PPA's sized to match the consumption of specific datafarms . Where it has a PPA relationship it sells the associated wholesale electricity back to the market (sometimes at a small net loss in the early years) retires the associated green credits RECS typical value .01c/kwh to enable it to log the datafarm as carbon free. . In the US the retirement of a REC which is the equivalent of the UK/European REGO has no affect on the ability of the investing generator to claim production tax credits or investment tax credits as the primary US renewables support mechanism structure separates federal capacity building incentives from state renewables portfolio standards which incentivise a certain proportion of electricity to be sourced from renewables. Source :Google's *Green PPAs: what how and why april 29 2011 revision2.*

Accordingly the CRC would be modified to allow retention of rocs and deduction of carbon savings on the basis that REGOs are retained by the user and not made available to the supplier..[24]

Interaction with CCA

For a transitional period, as suggested by the CBI, high energy users subject to ETS or CCA, not in the CRC could be given a rebate against the carbon price floor based on the carbon saved from their renewables investment or energy efficiency savings under their climate change agreements.

Use of capital allowances

Additionally high energy users could be granted capital higher initial capital allowances for investments in renewable plant (up to the level of their energy requirement).

Distributed energy

The various policy measures affecting on site and community combined heat and power schemes should be examined to ensure that adequate incentives are in place to capture both the heat and power element of energy produced and to facilitate[25] the easy operation of ESCOs over private wires grid or a combination of both. It is not clear that current financial incentives are sufficient to finance pipes for heat for example.

Regulatory complexities can make it difficult to set up ESCO's for the provision of power and heat from waste to energy plants located at nearby heavy energy industrial users sites, but requiring transmission through either the local distribution network or the grid. The regulations for distributed generation require further simplification to enable this.

Such schemes are critical in the case of biomass (waste) if full advantage is to be taken off the heat by product from power produced. To date few large scale projects use heat effectively where surplus to the energy generators requirements.

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24 REGOs could be valued at ..005p per kwh (similar to the price of a US REC) and feed in prices /roc prices be adjusted accordingly

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Appendix 2: Glossary of terms used in this report

CCA climate change agreements whereby intensive energy users agree to various energy efficiency or carbon reduction measures in order to obtain rebate on their climate change levy liabilities (65 per cent soon to be 80 per cent).

CCL climate change levy. The levy placed on the business use of fossil fuels and other taxable commodities by Treasury. At present receipts are recycled to provide a 0.3 per cent NI rebate to all businesses. Renewables are exempt from the levy and a levy exemption certificate **(LEC**) is provided

CRC carbon reduction commitment now renamed the CRC energy efficiency scheme is a mandatory requirement .designed to cover organisations not subject to the ETS if they have at least one half-hourly electricity meter (HHM) settled on the half-hourly market or their total half-hourly electricity consumption exceeded 6,000 megawatt-hours (MWh) during 2008. Participating organizations will be required to purchase allowances for each tonne of carbon they emit at circa £12 per tonne.from April 2012; monies will be retained by the Treasury.

EMR the suite of policy measures proposed under the electricity market reform set out in the white paper published on 12 July 2011

Esco energy supply company an special purpose company formed with the specific purpose of supplying electricity and possibly heat to a defined set of customers usually in a local area.

ETS The EU emissions trading scheme: an international cap and trade scheme whereby large emitters of carbon dioxide within the EU must monitor and annually report their CO_2 emissions, and are obliged every year to return an amount of emission allowances to the government equivalent to their CO_2 emissions in that year. They may purchase allowances from other scheme members or from overseas under JI/CDM mechanisms .The first trading period EU ETS phase I lasted until 2007 and the second phase lasted from 2008 to 2102. Both were characterised by large-scale issuance of free allowances to many heavy emitters some of whom made windfall profits. Under phase III of the scheme adopted in April 2009 and applying from 2013, carbon allowances are allocated on more consistent criteria with at least 60 per cent of allowances auctioned by 2020: in the UK there is to be 100 per cent auctioning in the power sector. Access to international permits will be limited to 50 per cent. Allowances have traded as high as €30 per carbon tonne (circa 2006) but have since fallen back to €12, partly due to the favourable allocation of allowances, but also due to the impact of the recession reducing activity in for example the steel industry (and more controversially the relocation of such manufacture to cdm territories). Prices of €30 to @45 euros per tonne are regarded by many commentators as essential for the scheme to be fully effective in promoting investment in low carbon

technologies. The introduction of a **carbon price floor** as set out in the EMR from 2013 goes some way to address this issue. At a rate of £15 per tonne rising to a target price of £30 per tonne by 2030, the effect of the floor is to top up the ETS price to the benefit of Treasury , with the shortfall used to set the level of CCL or fuel duty.

FIT The small scale feed in tariff providing fixed payments varying by technology for small scale electricity generation under 5 MW. Due to the fast take up of large scale solar farms a fast track review occurred which greatly reduced the attractiveness of solar tariffs greater than 50kw and improved rates for anaerobic digestion. Tariffs are due to be further reduced from April 2012.

CfdFIT the large scale long term feed in tariff contracts proposed under the electricity market reform whereby op up or deductions will occur on the price of electricity achieved on wholesale markets to a published fixed tariff: The top ups or deductions reflected in **cfd** contracts for difference (similar to those that operated under the pre **NETA** (new electricity trading arrangements) electricity pool. A degree of short term market risk will occur as cfd's will be paid out on average wholesale prices which may not necessarily be that achieved by an individual project. Proposals have been made to reduce the reference periods for highly intermittent technologies such as wind to reduce the degree of trading risk.

PPA Power purchase agreement; an agreement between a generator and supplier governing the terms on which electricity is supplied and setting out the responsibilities of the generator to the supplier.

REGO a Renewable Energy Guarantee of Origin (REGO) certificate provided to a generator, which states where and how the power was produced confirming its status as renewable.

RHI The renewable heat incentive feed in tariff introduced for business and other users from October 2011 (domestic is to follow a year later).

RO Renewables Obligation order which came into effect in April 2002 and places an obligation on UK suppliers of to source an increasing proportion of their electricity from renewable sources. Equivalent schemes were introduced in Scotland and northern Ireland in 2005. Suppliers meet their obligations by presenting sufficient Renewables Obligation Certificates (Rocs). Where suppliers do not have sufficient Rocs to meet their obligations, they must pay an equivalent amount into a fund, the proceeds of which are paid back on a pro-rated basis to those suppliers that have presented Rocs. The arrangements proposed under the EMR for the introduction of a CFd FIT will allow existing projects to continue under RO arrangements to the expiry of their 20 year term: after 2027 the onligation will cease and a default price used..

ROCs Renewables obligation certificate a green certificate issued to an accredited generator (including an own use generator) for eligible renewable

electricity generated in the UK and supplied to customers within the United Kingdom by a licensed electricity supplier

sell and buy back contract a contract with a supplier to purchase renewable energy and to sell it back to an on site renewable generator allowing ROCS to be registered and therefore claimed.