I M P A X

Report on a study into a proposal to alter the treatment of CHP under the Renewables Obligation

for

Department of Trade and Industry

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EXECUTIVE SUMMARY

Combined Heat and Power (CHP) is a method of generating electricity and heat together that can offer significantly greater fuel efficiency than conventional methods of supplying electricity and heat separately, and therefore environmental benefits.

Government seeks to provide support for CHP in a number of ways, but they are not thought sufficient to deliver the Government's target of 10 GW of electrical CHP capacity by 2010.

At present, even Good Quality CHP purchased from the grid and supplied to consumers is subject to the Renewables Obligation, and it has been suggested that it should be excluded from the calculation of a supplier's obligation. DTI commissioned Impax to carry out this study into a particular version of this proposal, in which the exemption is complemented by a compensating increase in the percentage obligation, so that the overall demand for renewables is maintained at the same absolute level of MWh.

Impax consulted representatives of twenty organisations with an interest in CHP or renewables or both, and this report analyses their views and identifies some qualitative issues surrounding the proposal.

The proposal would have a positive impact on overall CHP generation and investment. Some of the plant currently mothballed or run below optimal output would be used more. Investment would become more attractive, and some projects would proceed that would not proceed without this support, but it is unlikely that the impact would be enough for CHP to meet the Government's 10GWe target.

The Renewables Obligation can be insulated by the compensating increase in the obligation percentage in the proposal, though we have identified difficulties in implementing the proposed cap on the amount of CHP that can reduce suppliers' obligations. There are real concerns among the renewables community and suppliers, about increasing the uncertainty of ROC values, as CHP output would become one of the relevant variables; and about the risk that amending the RO in this way would reduce the market's faith in the future stability of the mechanism.

Basing the proposal on the Renewables Obligation would give the resulting support for CHP some odd features, in particular:

- The incentives are only for CHP electricity exported to the grid, and this would favour mainly larger CHP schemes.
- Many CHP schemes, built around steam supply and whose electricity is also contracted locally, avoiding transmission losses, would not benefit at all. The proposal would give them no extra incentive to run more or to build more.
- The effective subsidy for each MWh of CHP electricity would increase as the obligation level increased. There is no real logic for this increase, and there is a risk that if CHP investment took off, whether due to this proposal or evolving gas and electricity prices, the continuing increase in subsidy up to 2015 and possibly beyond could attract criticism.

Most of those we consulted, including most of those with an interest in CHP, would prefer the Government to develop a support scheme that is designed for CHP rather than this proposal.

1. Foreword

1.1 Mandate

The Department of Trade and Industry commissioned Impax to carry out a study into the views of developers and investors in the CHP and renewables sectors on a proposal to amend the Renewables Obligation so as to exclude from the base on which a supplier calculates its obligation any electricity sourced from Good Quality CHP, and to identify any qualitative issues surrounding the proposal.

1.2 Methodology

We identified a selection of stakeholders in the CHP and renewables industries to contact. The list (Annex A) included CHP developers and hosts, renewables generators and traders, financiers with an interest in the energy industries, and vertically integrated electricity companies who have both CHP and renewables capacity and who are involved with the Renewables Obligation as suppliers.

We contacted each and sent them a background note explaining the proposal and a list of questions on which we invited them to discuss their views with us. A few chose to send us written comments. The others we interviewed, either face to face or over the telephone.

The present report has been written on the basis of the input from those participants.

1.3 Structure of report

The remainder of this report

- sets out some essential background to the study
- explains the proposal and comments on its implementation
- analyses the views of
  - the CHP community
  - the renewables community
  - electricity suppliers
  - financiers
- discusses the findings, analyses some qualitative issues surrounding its implementation, and draws out conclusions.

2. Background and Introduction

CHP can save CO_2 emissions by generating electricity and heat from fuels more efficiently than conventional generation. CHP plants can also save on electricity transmission losses, as some or all of their output is generally used locally.

The 2003 Energy White Paper, *Our energy future – creating a low carbon economy*[1], confirmed a Government target of 10GWe of Good Quality CHP capacity being installed by 2010. Good Quality CHP is CHP generation that meets efficiency standards prescribed in the Government's CHP Quality Assurance programme.

The CHP Association (CHPA) has argued that CHP-derived electricity, being low-carbon, should not give rise to an obligation under the Renewables Obligation. The current exercise is to assess a specific proposal for assisting CHP by exempting electricity exported from a "Good Quality" CHP installation from the Renewables Obligation, while taking steps to maintain the overall demand for renewables generation.

The remainder of this section therefore provides essential background on CHP and on the Renewables Obligation.

CHP

CHP plants can be designed using a wide variety of fuels and technologies. Most CHP generation is from fossil fuels: in 2002, only around 2% of CHP generation was from renewable fuels.

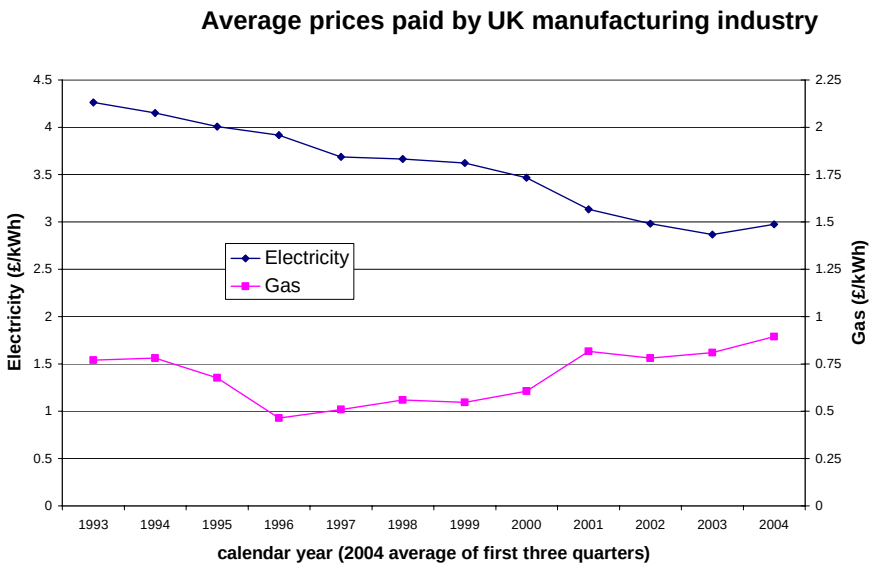
The environmental benefit of CHP is based on its high efficiency in converting input fuels to energy output. CHP electricity exported to the grid displaces conventionally generated electricity that will have used more fuel and have emitted more CO_2. CHP electricity used locally will provide extra environmental benefit by avoiding transmission losses. CHP heat output will displace other methods of raising steam or heat less efficiently. The environmental gain will be particularly great on those industrial estates where the alternative fuel for heat is fuel oil.

CHP plants typically have higher capital expenditure costs than similar-sized electricity-only plants based on the same technology and fuel, as extra equipment is needed for managing the heat. For the same reason, they also generally have higher maintenance costs. Against this, they save on costs by their higher fuel efficiency.

The decision to build a CHP plant will depend crucially on site-specific factors, in particular the demand from heat and electricity off-take from the industrial host, and the quality of that host.

Apart from site-specific factors, two of the key variables for CHP investment are the cost of fuel, typically gas for new plants, and the price of the key revenue, electricity. The difference between the two per MWh (making an assumption about the fuel-efficiency of generation) is often expressed as a "spark spread". This is illustrated in the following chart, which shows average costs to manufacturing industry of electricity and of gas since 1993. The gas prices are plotted on a scale twice as large as the electricity prices so that the gap between the two lines illustrates the reducing spark spread that would have faced a generator achieving 50% fuel efficiency.

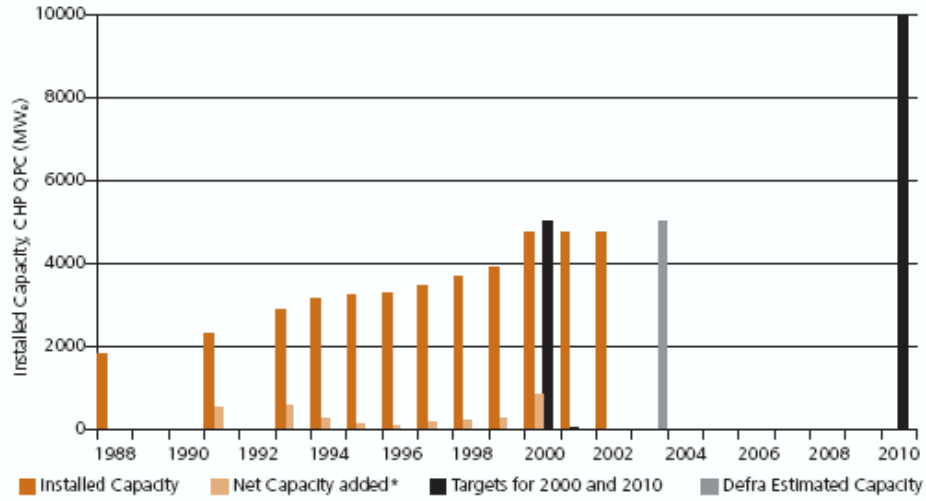
[1] http://www.dti.gov.uk/energy/whitepaper/ourenergyfuture.pdf



Source: DTI Quarterly Energy Prices, January 2005

In the 1990s, when electricity prices were high and gas prices low, the spark spread was enough to justify investment in gas-fired CHP to the extent that capacity roughly doubled between 1990 and 2000. With the introduction of NETA in 2000, the price of electricity dropped despite rising gas prices, cutting the spark spread to the point where little investment was economic. Recent increases in the electricity price have more or less matched rising gas prices, so that the spark spread has not increased significantly. And there has been very limited investment in new CHP capacity over the last four years. The following figure, taken from *The Government's Strategy for Combined Heat and Power to 2010*[2], of April 2004 illustrates this evolution of CHP capacity.

Figure 1. Good Quality CHP Installed Capacity and Targets



Source: Digest of UK Energy Statistics Chart 6.1 2003
*Net capacity added between reported years i.e. between 1988 and 1991, 1993 and 1991 and annually thereafter

[2] http://www.defra.gov.uk/environment/energy/chp/pdf/chp-strategy.pdf

Existing support for CHP

The DEFRA website[3] lists a number of measures to encourage CHP. The one that makes the most significant difference to CHP project economics at present is the exemption from the Climate Change Levy for Good Quality CHP fuel inputs and electricity outputs. This is worth up to around £4.30/MWh, though many of the best potential industrial hosts are in sectors where there are Climate Change Agreements, which benefit the industries by reducing the levy by 80% but thereby reduce the value of the incentive to use Good Quality CHP.

Some consultees believed that the EU Emissions Trading Scheme (EU ETS) would help CHP, though views varied on its significance. In principle, the effect will be to raise the price of electricity to reflect the value of carbon emissions from conventional generators. CHP generation, being more fuel-efficient, will emit less CO_2/MWh, and so will have a cost advantage.

The UK Government has announced that it will set aside some of its new entrants' reserve of carbon allowances for free allocation to new Good Quality CHP installations and plants increasing their Good Quality CHP capacity.

The Renewables Obligation

The Renewables Obligation (RO) gives each electricity supplier an obligation in MWh that is a specified percentage (rising each year) of its total electricity sales. The obligation can be satisfied either by submitting Renewables Obligation Certificates (ROCs) or by paying the buy-out cost of £30 (plus inflation since 2002) for each MWh. The fund created from these buy-out payments is divided between those who have submitted ROCs. A ROC is created for each eligible MWh of renewable electricity generated.

At present, the RO does not distinguish between CHP-generated electricity and any other electricity. Thus if a supplier purchases CHP electricity generated from fossil fuels (as most is), they will have the same obligation to submit ROCs as if they had bought less efficiently produced non-CHP fossil fuel electricity. The *Renewables Obligation Statutory Consultation*[4], published in August 2001, made this explicit in footnote 7:

> "Total sales by licensed electricity suppliers, as defined, include electricity from combined heat & power (CHP) generating stations. The Government is currently developing a strategy for the promotion of good quality CHP. The Government may decide that excluding electricity from good-quality CHP from the sales figures on which the RO is based is an important and cost-effective means of supporting CHP. In that case, we will issue a further consultation on this specific issue at a later date. We would anticipate, however, that any such change would not affect the total absolute level of obligation (total MWh) on suppliers as a whole."

The Renewables Obligation came into effect in April 2002, and is planned to last until 2026/27. DTI are currently carrying out a review of its operation, and this study is associated with that review.

[3] http://www.defra.gov.uk/environment/energy/chp/index.htm#measures
[4] http://www.dti.gov.uk/energy/renewables/publications/pdfs/energymaster.pdf

3. The proposal

The proposal is

a) electricity exported from a good quality CHP installation should not be counted towards a supplier's total supply for a year for the purposes of the RO

On its own, the impact of this would be to reduce the number of ROCs that suppliers had to submit, and thus reduce the incentive that the Renewables Obligation provides to invest in renewables. It has therefore been proposed that there should be a compensating increase in the obligation as follows:

b) in order to avoid this reducing the incentive to invest in renewables:

   i) The total CHP electricity exempted each year should be capped to a reasonable forecast level. Suppliers would be unable to exclude CHP-derived electricity after the point in the year when this cap was reached.

   ii) The obligation would be increased pro rata so that the same number of ROCs would be required in total as if there had been no exemption for CHP.

Thus if two suppliers sold the same number of MWh, the one who sourced more of his electricity from CHP generation would have a lower obligation, and would thus avoid having to procure ROCs, or to pay the buy-out price. There would therefore be an increased incentive for suppliers to use CHP-generated electricity.

The saving for a supplier who purchased a certain quantity of CHP electricity in a year would be equivalent to avoiding paying the buy-out price for the obligation that would have arisen on that quantity. The potential value of CHP electricity could therefore be expected to increase by an amount that would increase over time as the RO percentage increases. At 2004 prices, this would mean a CHP premium of around £1.70/MWh in 2005/06, £3.30/MWh in 2010/11, and £4.80/MWh in 2015/16.

Table 1 shows how the exemption could operate in 2010-11 when the RO would otherwise be 10.4% of electricity supply. With a cap of 20TWh of GQ CHP, the RO percentage would be increased to 11.1%.

Table 1: Example for market in 2010-11

Forecast total electricity supply	320 TWh
Renewable Obligation %age	10.4%
Renewable Obligation volume	33.3 TWh
Cap on exempted GQ CHP	20 TWh
Revised base if no compensating increase in RO	300 TWh
Revised RO %age to compensate	11.1%
Revised total RO volume	35.5 TWh
ROCs required if CHP cap met	33.3 TWh
ROCs required if CHP only half of cap	34.4 TWh

Table 2 illustrates how the exemption could work in 2010-11 for a supplier of 30TWh/year who purchases 1.5TWh of Good Quality CHP that year.

Table 2: Example for a supplier in 2010-11	
Total electricity supplied to consumers	30 TWh
GQ CHP electricity purchased in 2010-11	1.5 TWh
Base on which obligation calculated	28.5 TWh
Renewables Obligation in 2010-11	11.1% of 28.5 TWh
	=3.16 TWh

This increase in the Obligation will impose more of a cost on suppliers and therefore electricity customers. If there is enough Good Quality CHP to meet the cap, then the demand for ROCs will be the same as it would have been. If there is less Good Quality CHP, then there will be greater demand for ROCs, and one could expect the ROC price to be somewhat higher.

Implementation issues

In discussing the proposal with consultees, it became clear that successful implementation would require the resolution of issues around the cap on the amount of CHP that could be used to reduce the base on which the obligation was calculated.

As proposed, a global cap would be fixed at a number of GWh per year, rising in line with expected supply. This raises problems if there is a risk that the cap will be met. An individual supplier of electricity buying and supplying CHP and other electricity would have no way of telling during the year whether the sum of his CHP supply and that of all his competitors was approaching the cap. And if the cap was met 10 months into a year, a method would have to be devised for disallowing CHP electricity supplied thereafter – ie requiring ROCs or buy-out payments for the appropriate percentage of the amount supplied after the cap had been reached. This would reduce the value to the supplier of the CHP electricity retrospectively after he had contracted to buy it.

Such a system – with the possibility of the cap being reached – would severely limit the premium that suppliers would be willing to pay for CHP electricity. The cap would therefore have to be set at a level sufficiently high that there could be no risk of reaching it. The effect of leaving a safe margin would be to increase the overall cost of the RO to suppliers and therefore to electricity consumers.

It would be possible to keep the margin to a minimum by setting the cap, and therefore the increase in the RO percentage, for a rolling three years ahead. The lead time on CHP developments is around three years, and so it should be possible to forecast reasonably confidently a maximum output figure.

The cap will inevitably seem like a risk to suppliers, and therefore to CHP generators. The main alternative is to set the uplift to offset the maximum CHP generation expected, but not to have a cap. This would remove the risk to suppliers, and therefore maximise the benefit to CHP generators. But on the other hand, it would reduce the confidence to the renewables sector that the demand for ROCs would be protected.

4. Views of CHP stakeholders

4.1 Introduction

Ten of the consultees had some involvement in CHP. As well as two vertically integrated electricity suppliers with CHP capacity, there were six CHP operators, of whom five were also developers. Two of these latter organisations were also the major industrial steam hosts for their CHP plants.

Overall views on the proposals varied considerably from those who fully supported the proposal and believed that it would lead to a significant increase in their investment over time, to those who felt it would do little for them, as their interest was mainly in fully embedded CHP, so that an incentive focused on exported electricity would have no impact.

4.2 Impact on operation of existing CHP capacity

CHP operators explained that CHP investment was generally based on an assumption of very high output. Capital investment and maintenance costs are generally higher than for similar sized conventional generators, and so it is important to be able to contract to sell all of the output to achieve worthwhile project economics.

Many investments that were made when the spark spread was greater would not now be economic. Some have been mothballed; some continue to run, often because they have locked into long term heat supply contracts. Whether such plants generate over and above their contractual commitments will depend upon the technical flexibility of the plant and the current economics. Many plants are currently shut down or cut back for some of the time, particularly when demand is lower, overnight or in the summer.

	1999	2000	2001	2002	2003
Total Capacity (MWe)	3,912	4,729	4,732	4,849	4,879
Total electricity generated (GWh)	20,256	26,539	22,444	24,485	24,244
Capacity utilisation	59%	64%	54%	58%	57%

Source: Digest of UK Energy Statistics, Tables 6.4 & 6.5

If the current proposal was implemented, it would improve the effective price available for electricity to the generator, and would lead to some increase in output from existing CHP capacity. More work would be required to estimate the scale of this increase, but DTI figures, shown in the table above, show that capacity utilisation is less than 60%. Generally CHP operators would hope for a load factor of at least 90%, and if this could be achieved from existing capacity it would mean around an extra 14,000 GWh/year of CHP electricity from existing capacity.

As the new incentive for CHP electricity would grow over time, the amount of currently unused capacity that would come back into service could also be expected to build up over time.

All but one of the CHP operators told us that the change would probably affect the way they operated existing plant.

4.3 Impact on investment in new CHP capacity

All CHP projects are different, depending upon the specific requirements of their hosts for heat or steam. No consultee was in a position to say that the proposal would certainly cause them to invest in a specific amount of new capacity. Two consultees told us that they would be likely to invest in new CHP capacity, including by upgrading and expanding on existing CHP capacity, with this extra incentive. Most observed that it would improve the economics, but could not be sure that it would make enough of a difference to bring forward significant investments.

In the medium term, two consultees thought that the proposal would have more effect. They argued that there would be a need for extensive investment in baseload generating capacity over the next 10 years, as coal and nuclear plants were retired; that the replacement capacity would generally be Combined Cycle Gas Turbines (CCGT), and that if this proposal was in place, at least some of these would be likely to be sited near industrial sites where there a demand for heat, and built and operated as CHP plants.

Two consultees said that the proposal would have no effect on their investment plans, as it provided an incentive only for Good Quality CHP electricity that was exported. Many CHP schemes, particularly smaller ones, derive almost all of their revenue from sales of heat and electricity to their industrial hosts, with very little if any electricity sold to the grid. These CHP plants can provide the same or greater environmental benefits as plants designed to export a lot of their electricity output, and it could be seen as illogical to introduce an incentive that favoured the latter and not the former. We would probably have found more CHP producers with this view, except that we focused on the larger producers.

Overall, the general view was that over the next few years there would be a few more investments than there would otherwise be, where there were industrial hosts whose demand for heat and electricity made CHP particularly appropriate, but there would not be investment at a speed or on a scale to approach the Government's 10GWe target by 2010.

4.4 Other views from CHP stakeholders

One consultee suggested that the proposal would at least replace the value of the Climate Change Levy exemption. They expected the Levy to be discontinued in the next few years for two reasons: it was introduced to meet a 2010 target, and its objective – putting a value on the externality of greenhouse gas emissions – was now being addressed by the EU Emissions Trading Scheme.

One of the CHP-only consultees suggested that the RO was currently providing more than ample support for on-shore wind, and that any slight depression of ROC prices would have no real effect on its rollout. On the other hand, they argued, the RO is not bringing forward investment in less economic renewable technologies, and so a depression of the ROC price would not affect them. One respondent suggested that the proposal should be implemented without any offsetting increase in the percentage obligation, and that this would have no effect on renewables investment.

Two of the CHP-only consultees said that because of the need to set the increase in the Obligation percentage to a level higher than expected CHP sales, there would actually be benefits to the renewables industry in the shape of higher demand from suppliers and increased ROC prices.

Many CHP stakeholders saw the proposal as second best: they would prefer a scheme designed to support CHP, rather than an add-on to the Renewables Obligation. Others believed that linking to the Renewables Obligation was a plus point, as it seemed to have an assured future.

5. Views of renewables stakeholders

Eleven of the consultees had some interest in renewables, including three electricity suppliers with renewables portfolios, largely wind. Of the others, four are renewables developers and operators, three wind and one biomass. In addition, one of the CHP operators co-fires biomass and is developing a (non-CHP) biomass generating station. One consultee was a trader specialising in Renewables Obligation Certificates.

All the renewables consultees broadly accepted that the proposal as designed would mean that the direct effect upon the operation of the Renewables Obligation should be more or less neutral. The compensating increase in the renewables percentage should achieve the intention stated in the original statutory consultation, quoted on page 5, that the change would not affect the total absolute level of obligation (total MWh) on suppliers as a whole.

They all still had concerns under two main headings:

- The change would increase the complexity of the Renewables Obligation and uncertainty about ROC prices
- Making such a change to the RO could undermine confidence in the stable future of the RO

There was also a feeling that the Renewables Obligation was conceived and implemented with a clear purpose, namely to promote renewable generation, and that it would be inappropriate to use it to support a technology largely based on burning fossil fuels. They generally acknowledge that CHP can have environmental benefits, but believe it would be more appropriate for it to have a separate mechanism designed for the special features of CHP.

Complexity and uncertainty

On introduction, the Renewables Obligation was seen as novel and complex. Estimating the future value of Renewables Obligation Certificates requires understanding the rules of the RO and forecasting output from all eligible renewables. Over time, investors and lenders have learned to understand the RO and have been willing to provide money notwithstanding the complexity and the uncertainty of the value of future ROCs.

Introducing this proposal would increase the complexity of the RO mechanism, and would mean that the value of a future ROC could be affected by the number of MWh of Good Quality CHP that is sold onto the grid. Some consultees thought that the effect could be to reduce ROC prices. Three identified a particular concern that suppliers, in negotiating to buy renewable electricity under long term Power Purchase Agreements, would be able to use the extra complexity and uncertainty as a reason to offer less of the value to the generator.

Others believed that the increase in complexity and uncertainty would cause concern for only a short period, and that as the underlying value of the ROC would be protected by the system, and that the incentive to invest in renewables should not be directly affected.

Confidence in the RO

The renewables community is anxious to avoid any loss of confidence in the ROC market. In order to finance investments, a renewables developer will typically need to

demonstrate forecast income for at least 10 or 12 years ahead. Any suggestion that the RO might cease to exist, or might be changed radically, will make it more difficult to fund renewables projects.

Several consultees drew attention to the uncertainty caused by the DTI's current review of the Renewables Obligation. They welcomed the DTI's restrictions on the scope of the review in its Terms of Reference, which included the following paragraph:

> "Taking account of the importance of confidence in the stability of the renewables support framework, the Review will seek to avoid recommendations that undermine this confidence."

Most of the renewables consultees were concerned that inclusion of this measure would damage confidence and thus risk reducing investment in renewables. The strength of this view varied from those who believed that the risk would be minor and short-term (assuming the RO was otherwise stable in the medium to long term), and those who feared that any such change would inevitably have a serious and negative impact on investment in renewables.

6. Views of other consultees

6.1 Introduction

Four of the consultees have an interest as suppliers of electricity, all of whom also have renewables interests, and two of whom have CHP interests. Their views on CHP and renewables are reflected in the previous two sections.

Two of the consultees were from the finance community. Although they have interests in appraising or supporting projects or companies in the renewables sector, and would consider the CHP sector, their views are given here and they are not included in the previous two sections.

6.2 Views of suppliers

As suppliers, the consultees were concerned about the increasing complexity of managing the way in which they fulfilled their Obligation. Those who had both CHP and renewables capacity said that they believed that there should be more support for CHP, but that it should be by means of a separate scheme designed around the requirements of CHP. They thought that it was inappropriate to add to the complexity and uncertainty of the Renewables Obligation by implementing the current proposal.

One of those with no current CHP capacity argued that the ETS was a more appropriate measure for encouraging CHP. They suggested that the support could be increased if necessary either by a) insulating CHP from the reduction against forecast that is being imposed on the electricity supply industry, or b) basing a CHP installation's allocation on the emissions that would have occurred from the alternative method of generation (ie separate generation of heat and steam).

One supplier suggested that there was a risk that the proposal could have a disproportionate effect on suppliers who were unable to secure supplies of Good Quality CHP. They observed that most exported Good Quality CHP came from a limited number of suppliers, and thought there was a risk that this would be bought up by a small number of suppliers. A supplier who was unable to buy any CHP would simply be faced with an increased Renewables Obligation percentage. If this was met by paying the buy-out price, that supplier would incur extra costs that it would be unable to pass on, as its competitors with CHP supplies would not need to increase the cost to consumers.

In time, this should correct itself, as in those circumstances, the cost of ROCs should go down, but as most ROCs are committed through long-term Power Purchase Agreements, it could take some years for the market to adjust.

6.3 Views of financiers

Neither of the financiers consulted had any current experience of CHP investment. They confirmed that that the proposal, by increasing the price available for exported electricity, could improve the economics of a CHP project or company; but they were not in a position to comment on whether the sums involved in this proposal would be sufficient to make actual proposals financeable.

On the impact on the Renewables Obligation, one said that from an equity investment angle, any minor increase in the value of ROCs would more than compensate for the increase in complexity of estimating their future value. The other was more concerned about the possible increase in uncertainty not only about the value of ROCs but also about the future stability of the RO structure if the Government were to make such

fundamental changes in the system. As well as its direct negative effect upon investment decisions, the uncertainty could impede the development of liquid markets in ROC futures and other derivatives.

7. Conclusions and summary of findings

7.1 Case for more support for CHP

All of the CHP consultees believed that Government ought to be providing more support for CHP because of its higher fuel efficiency and consequent benefit for the environment. Most of the renewables consultees also supported this view.

There are other measures in place, of which the most significant is the exemption from the Climate Change Levy, but with current gas and electricity prices, new investment in CHP is limited to situations where there is a particularly good fit with the needs of the host.

For the next few years, consultees consider it unlikely that the EU ETS will make a significant difference, despite the suggestion of one supplier that it could be sufficient incentive. The market suggests that supply of free carbon allowances across the EU in Phase 1 (2005-07) has been generous, and the current price of a tonne of CO_2 is around than €8. Even if this were fully reflected in electricity prices, it would not give a significant advantage to CHP investment. Any investment in CHP now would need to be based mainly on revenues during Phase 2 (2008-2012) and beyond. At present there is no visibility of the likely allocations in Phase 2, and so no basis for investment, but it is possible that the EU ETS could evolve to give higher carbon prices that would give more significant support to CHP as a more carbon-efficient generation method.

No-one saw any likelihood of the Government achieving its target of 10GW of Good Quality CHP electricity capacity by 2010 under the existing regime. A number of CHP consultees suggested that it was inappropriate to have a target limited to electricity output and expressed as a capacity measure. As with renewables, the key benefit is CO_2 avoided by displacing other energy sources, and rather than capacity, CHP output – both electricity and heat – would be a better measure of this than electrical capacity.

7.2 The impact of the proposal on CHP

The scope of this study was limited to one particular proposal for a way in which Government could provide further support for CHP. As explained above, CHP operators' views on the impact of the proposal varied widely. Most believed that there would be an increase in output from existing under-utilised CHP capacity. As for new investment, two operators believed it was very likely that their organisations would invest in increased capacity, and two others said that it would improve the economics but were uncertain if it would make enough of a difference to justify a new project, and two said that it would make no difference at all to their plans. This diversity of views reflects the different way in which a measure limited to exported electricity would affect different CHP plants.

The impact would not be equal across CHP plants: many plants, especially smaller ones, have heat and electricity output that is contracted to industrial hosts, with minimal amounts of electricity being sold to the grid. This proposal would do nothing for them. If the Government is focused on its electricity capacity target, it could be argued that it is more important to concentrate on the larger CHP plants optimised for exporting electricity. But the environmental benefits may be as great in smaller plants, whose local supply eliminates transmission losses.

Even those who thought they would make investments in new capacity as a result of the proposal thought it unlikely that overall the proposal would bring forward enough new investment to meet the 10GWe target by 2010.

7.3 Impact on the Renewables Obligation

The proposal has been designed to insulate the renewables sector from the change in the definition of the baseline for suppliers under the Renewables Obligation. Nonetheless, there is concern in the renewables community that the proposal could have an effect on the value secured by renewables generators, because of the increasing complexity and uncertainty of the Obligation. The precise way in which the compensating increase is announced for future years will have an impact on the complexity and uncertainty arguments (see discussion of implementation issues on page 7).

Separately, the renewables community are concerned that any change to the Renewables Obligation will reduce confidence in the future stability of the scheme. No doubt there will be some changes to the Renewables Obligation coming out of the current DTI review. With or without this CHP proposal, there will be a package of changes, and DTI will need to explain why market-players should believe that the Renewables Obligation will have a stable future with no further amendments.

7.4 Overall conclusion

There is a consensus that something more should be done to improve the investment climate for CHP. In the current study, Impax is not looking at a range of possible measures, but only at the specific proposal for amending the Renewables Obligation in the way described.

Our conclusion is that it would have a positive effect both on output from existing CHP facilities, and on future investment, though no-one believes that it would be likely on its own to enable achievement of the Government's 10GWe target.

Bringing together the different sectors in this way, and using a mechanism designed for the particular circumstances of the renewables industry to support CHP, means that there would be some oddities in the way incentives would be distributed across types of CHP and over time.

The most important, already discussed above, is that by rewarding only exported electricity, it does nothing for smaller scale CHP plants supplying heat and electricity locally.

A further oddity is that the effective support (in £/MWh) would systematically increase, not because any need for increasing support over time has been identified, but as an accidental consequence of bolting CHP support onto the mechanism of the Renewables Obligation. If implemented in the next year or so, the support would start at around £2/MWh and increase to approach £5/MWh in 2015 (both in 2004 prices).

If the Government were to decide that to promote renewables further they would increase future Renewables Obligation percentages to 20% in 2020, then this would inevitably lead to a further increase in the unit benefit to CHP electricity exports.

If at some level a combination of this measure, and developing gas and electricity prices made CHP investment attractive again, then the continuing increase of the effective subsidy to CHP could be difficult to justify.

A clear majority of consultees, including all of the pure renewables stakeholders, and all of the suppliers, believed that it would be more appropriate to introduce a support

scheme for CHP that was designed for the needs of CHP rather than this adjustment to the Renewables Obligation. Half of the pure CHP stakeholders who expressed a view would also prefer something that would benefit all power produced by Good Quality CHP plants, not just the exported electricity.

ANNEX A: LIST OF CONSULTEES

Airtricity	Renewables Developer and Operator, and electricity supplier
Barclays	Bank
British Sugar	CHP developer, operator and host
British Wind Energy Association (BWEA)	Renewables trade association
Centrica	Electricity supplier, with renewables capacity
Charterhouse	Private equity house
Combined Heat and Power Association (CHPA)	CHP trade association
ConocoPhillips	CHP developer, operator and host
Dalkia	CHP developer and operator
Montagu-Smith	Fuel broker for CHP schemes
Derwent Cogeneration Ltd	CHP operator
E.ON/Powergen	Electricity supplier, with CHP and renewables capacity
EPR	Renewables Developer and Operator
Fred Olsen	Renewables Developer and Operator
NatSource	Renewables Obligation Certificate trader
Renewable Energy Systems	Renewables Developer and Operator
Renewable Power Association (RPA)	Renewables trade association
RWE/npower	Electricity supplier, with CHP and renewables capacity
Sembcorp	CHP developer and operator, and renewables developer and operator
Slough Heat & Power	CHP developer and operator

ANNEX B: CONSULTATION NOTE

COMBINED HEAT AND POWER & RO EXEMPTION

NOTE FOR INTERVIEWEES

Introduction

DTI have asked Impax to investigate the views of the CHP and renewables sectors on the proposal that electricity sourced from CHP plants should not be counted as part of the base supply for the purposes of the Renewables Obligation.

This note provides some background information and an explanation of the proposal, and lists a number of questions that we would like to cover as appropriate in each interview.

Background

CHP can save CO_2 emissions by generating electricity and heat from fossil fuels more efficiently than conventional generation. The CHP Association (CHPA) has argued that CHP-derived electricity should therefore not give rise to an obligation under the Renewables Obligation.

The current exercise is to assess a specific proposal for assisting CHP by exempting electricity exported from a "Good Quality" CHP installation from the Renewables Obligation.

The Renewables Obligation

The Renewables Obligation (RO) gives each electricity supplier an obligation in MWh that is a specified percentage (rising each year) of total electricity they have supplied. The obligation can be satisfied either by submitting Renewables Obligation Certificates (ROCs) or by paying the buy-out cost of £30 (plus inflation since 2002) for each MWh. The fund created from these buy-out payments is divided between those who have submitted ROCs. A ROC is created for each eligible MWh of renewable electricity generated.

At present, the RO does not distinguish between CHP-generated electricity and any other electricity. Thus if a supplier purchases CHP electricity generated from fossil fuels (as most is), they will have the same obligation to submit ROCs as if they had bought less efficiently produced non-CHP fossil fuel electricity.

The proposed RO exemption

The proposal is

a) electricity exported from a good quality CHP installation should not be counted towards a supplier's total supply for a year for the purposes of the RO

On its own, the impact of this would be to reduce the number of ROCs that suppliers had to submit, and thus reduce the incentive that the Renewables Obligation provides to invest in renewables. It has therefore been proposed that there should be a compensating increase in the obligation as follows:

b) in order to avoid this reducing the incentive to invest in renewables:

   i) The total CHP electricity exempted each year should be capped to a reasonable forecast level. Suppliers would be unable to exclude CHP-derived electricity after the point in the year when this cap was reached.

ii) The obligation would be increased pro rata so that the same number of ROCs would be required in total as if there had been no exemption for CHP.

Thus if two suppliers sold the same number of MWh, the one who sourced more of his electricity from CHP generation would have a lower obligation, and would thus avoid having to procure ROCs, or to pay the buy-out price. There would therefore be an incentive for suppliers to use CHP-generated electricity.

The saving for a supplier who purchased a certain quantity of CHP electricity in a year would be equivalent to avoiding the buy-out price for the obligation that would have arisen on that quantity. The potential value of CHP electricity could therefore be expected to increase by an amount that would increase as the RO percentage increases. At 2004 prices, this would mean a CHP premium of around £1.70/MWh in 2005/06, £3.30/MWh in 2010/11, and £4.80/MWh in 2015/16.

Table 1 shows how the exemption could operate in 2010-11 when the RO would otherwise be 10.4% of electricity supply. With a cap of 20TWh of GQ CHP, the RO percentage would be increased to 11.1%.

Table 3: Example for market in 2010-11	
Forecast total electricity supply	320 TWh
Renewable Obligation %age	10.4%
Renewable Obligation volume	33.3 TWh
Cap on exempted GQ CHP	20 TWh
Revised base if no compensating increase in RO	300 TWh
Revised RO %age to compensate	11.1%
Revised total RO volume	35.5 TWh
ROCs required if CHP cap met	33.3 TWh
ROCs required if CHP only half of cap	34.4 TWh

Table 2 illustrates how the exemption could work in 2010-11 for a supplier of 30TWh/year who purchases 1.5TWh of Good Quality CHP that year.

Table 4: Example for a supplier in 2010-11	
Total electricity supplied to consumers	30 TWh
GQ CHP electricity purchased in 2010-11	1.5 TWh
Base on which obligation calculated	28.5 TWh
Renewables Obligation in 2010-11	11.1% of 28.5 TWh
	=3.16TWh

This increase in the Obligation will impose more of a cost on suppliers and therefore electricity customers. If there is enough Good Quality CHP to meet the cap, then the demand for ROCs will be the same as it would have been. If there is less Good Quality CHP, then there will be greater demand for ROCs, and one could expect the ROC price to be somewhat higher.

Questions

Preliminary

1) What if any is your organisation's interest in CHP?
2) If appropriate, how much CHP capacity does your organisation currently operate?
3) What if any is your organisation's interest in renewables?
4) If appropriate, how much renewable capacity does your organisation currently operate?

Questions on CHP

5) Is it worth operating existing CHP under the current regime?
6) Can one invest in new CHP under the current regime? (If not, why not?)
7) What impact would the proposed RO exemption have on decisions about whether and how to operate existing CHP?
8) What impact would the proposed RO exemption have on decisions whether and how to invest in CHP?
9) Any thoughts on modifying the proposal?

Questions on impact on renewables

10) Views on investment in new renewables under current Renewables Obligation
11) What impact would the proposed RO exemption for CHP (with a compensating increase in the obligation) have on decisions to invest in new renewables
12) What impact would this change have on ROC values?
13) What impact would this change have on perceptions of the Renewables Obligation mechanism in the longer term?

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