Department of Energy & Climate Change

Call for Evidence: Tackling Non-Financial Barriers to Gas CHP

February 2015

URN 15D/023

Any enquiries regarding this publication should be sent to us at heatstrategy@decc.gsi.gov.uk.

Contents

Executive summary

1. Natural gas fired Combined Heat & Power (CHP) is an energy efficiency technique that can be implemented by a wide range of organisations to save on their combined gas and electricity bills and reduce carbon emissions. Although decarbonisation of the electricity grid will reduce the carbon saving benefits of gas CHP over time, the Department projects that operation of gas CHP will continue to deliver carbon savings until the early 2030s. Our analysis suggests that gas CHP will become increasingly cost-effective under current policies between now and 2020, driven largely by changes in energy prices. However, research suggests that there are a number of non-financial barriers which might reduce or prevent deployment.

2. This Call for Evidence seeks evidence to confirm or correct the barriers identified by DECC's research and evidence on the effectiveness of the following potential measures to address these barriers.

    a. A **Guidance Service** to support organisations considering CHP projects from initial evaluation of potential through to commissioning and operation.
    b. **Funding for Feasibility Studies** to enable organisations, in particular Small and Medium Enterprises and Local Authorities, to access technical expertise and resource to consider the feasibility of CHP in their operations.
    c. A **Best Practice Sharing Forum** to exchange and disseminate best practice amongst CHP developers.
    d. Detailed **Best Practice Guidance** documentation covering the range of stages in assessing and developing a CHP project.
    e. Detailed **Case Studies** on CHP in a range of sectors to provide potential developers with clear examples of the successful implementation of CHP in an analogous context, and the benefits it is delivering.
    f. **Awareness Raising Workshops** to make potential CHP developers aware of the technology, its benefits and the support available for projects.

3. We would welcome evidence and views from stakeholders on the effectiveness and likely take-up of similar measures, implemented either in respect of CHP or other technologies, in the UK or in other countries. This evidence will be used to inform costing of potential measures and inform decisions on which, if any, to take forward. Evidence could range from formal research to individual perspectives. Useful types of information include the following (this is not an exhaustive list);

    - Government, commercial or academic research studies
    - Formal evaluation of policies
    - Statistics on take-up and/or cost of previous policy measures
    - Your experience of the barriers faced by organisations considering and developing CHP projects

- Your experience of the effectiveness of previous policy measures at addressing similar barriers and supporting the development of CHP or other projects
- Examples of policies which have been effective at addressing similar barriers in other countries or other policy contexts than CHP

4. You will not necessarily have evidence or views to submit on all questions, we encourage organisations to submit responses to as many or as few of the questions as they wish.

5. Although this Call for Evidence is focussed on gas CHP and not biomass or Energy from Waste CHP, it is likely that any measures implemented to address non-financial barriers will also be accessible to biomass and Energy from Waste project developers.

Who should respond?

We would welcome responses to this Call for Evidence from;

- any organisations who have implemented, or who have potential to implement, natural gas fired CHP to supply their energy needs,
- organisations involved in delivering gas CHP projects for customers
- academics and consultancies who have conducted studies into non-financial barriers to deployment of gas CHP or the effectiveness of measures to address these barriers.

CHP is an applicable approach to meet energy demand in a wide range of settings including providing heat and power to public buildings, commercial buildings e.g. warehousing, retail premises, hotels etc, heat networks and to industrial processes in chemicals, food and drink, paper and pulp, oil and gas etc sectors.

Call for Evidence Question: Your details
1. What is your name?
2. Please provide your contact details (e.g. phone, email and/or address)
3. What organisation do you represent?
4. What sector of economic activity is your organisation involved in?

General Information

Issued: 09 February 2015

Respond by: 30 March 2015

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Reference: URN 15D/023 – Call for Evidence: Tackling Non-Financial Barriers to Gas CHP

How to respond:

Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome.
Electronic responses to the above email address are preferred, however, you may also respond in hardcopy, to the above address, if you prefer.

Confidentiality and data protection:

Information provided in response to this Call for Evidence, including personal information, may be subject to publication or disclosure in accordance with the access to information legislation (primarily the Freedom of Information Act 2000, the Data Protection Act 1998 and the Environmental Information Regulations 2004).

If you want information that you provide to be treated as confidential please say so clearly in writing when you send your response to the Call for Evidence. It would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded by us as a confidentiality request.

1. Introduction

1.1. This Call for Evidence is of relevance for business and public sector energy consumers and for Combined Heat and Power developers. It seeks evidence on potential measures to overcome non-financial barriers to the development of new natural gas-fired CHP plant (hereafter referred to as “gas CHP”). Gas CHP can be used to meet heat and electrical demands in buildings and in industrial processes (at temperatures of up to a maximum of around 450°C).

1.2. Gas CHP offers useful near-term carbon savings and is also likely to deliver significant energy cost savings for business users. DECC is therefore keen to see deployment of more gas CHP. Our analysis suggests that gas CHP will become increasingly cost-effective under current policies between now and 2020, driven largely by changes in energy prices. However, we have identified a number of potential non-financial barriers which might prevent deployment of this CHP capacity.

1.3. The non-financial barriers were identified from qualitative research involving a relatively small sample of organisations and have, therefore, been treated as indicative. **We would welcome evidence and views from stakeholders to confirm or correct these barriers**.

1.4. This Call for Evidence also discusses potential measures to address these barriers. DECC currently has little evidence on the effectiveness of measures to address the non-financial barriers identified. **We would welcome evidence and views from stakeholders on the effectiveness and likely take-up of similar measures, implemented either in respect of CHP or other technologies, in the UK or in other countries.**

1.5. Useful types of evidence would include the following;

- Government, commercial or academic research studies
- Formal evaluation of policies
- Statistics on take-up and/or cost of policy measures
- Your experience of the barriers faced by organisations considering and developing CHP projects
- Your experience of the effectiveness of specific measures in addressing similar barriers and in supporting your development of CHP or other projects
- Examples of policies which have been effective at addressing similar barriers in other countries or other policy contexts than CHP

1.6. This Call for Evidence is focussed on non-financial barriers to gas CHP and potential approaches to address them. Responses should focus on these issues. The Call for

Evidence is not seeking views of broader government policies such as the implications for gas CHP of Electricity Market Reform policies, Carbon Price Support etc.

2. Background

What is Combined Heat and Power

2.1. CHP is an energy efficient technique whereby fuel is converted into both useful heat and power (usually electricity) in a single process. It can deliver fuel and carbon savings of up to 30% relative to generating heat and power separately from the same fuel. It does this by reducing the proportion of energy rejected as waste heat compared to separate power and heat generation (Figure 1). To do this CHP needs to be sited close to the heat load it will supply or to a heat network. The energy savings translate into cost savings for recipients of heat and power from the CHP. In addition to the energy savings, organisations generating their own electricity using CHP avoid various costs levied against retail electricity prices, and may benefit from a number of financial incentives, further increasing savings to their energy bills.

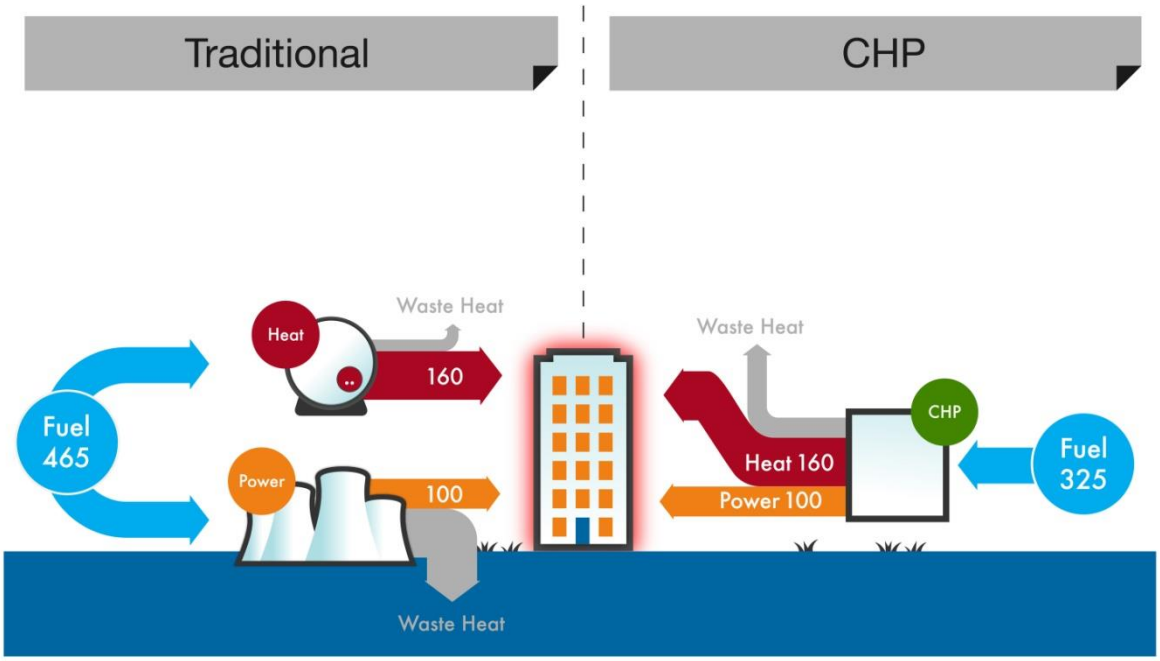

Figure 1. Sankey diagram showing energy saving from CHP

2.2. CHP covers a range of different technologies, fuels and applications. This Call for Evidence is concerned with the full range of gas CHP technologies and applications, examples of which are discussed below. Although this Call for Evidence is not focussed on biomass or Energy from Waste CHP, it is likely that any measures implemented to address non-financial barriers will also be accessible to biomass and Energy from Waste project developers.

Example CHP Applications

2.3. CHP covers a huge range of sizes, with the size of plant depending on the size of heat demand. It can supply heat either as hot water for space and water heating, or as steam for industrial processes at temperatures up to around 450°C. CHP is suitable in principle for any applications up to this temperature, but sufficient duration of heat and power demand and a suitable ratio of heat:power demand[1] are likely to be critical in determining whether CHP is cost effective in a particular application.

2.4. CHP also covers a range of different technology types. The key gas CHP technology types are summarised below;

- **Reciprocating engine CHP** – typical in CHP plant below 10 MW electrical capacity, where heat is required as hot water rather than as process steam.
- **Open Cycle Gas Turbine CHP** – typical in CHP plant up to around 50 MW electrical capacity where heat is required as steam.
- **Combined Cycle Gas Turbine CHP** – typical in CHP plant over 50 MW electrical capacity where heat is required as steam.

2.5. Small CHP schemes tend to be relatively standard, off-the-shelf “packaged” CHP products, supplying electricity and space and water heating for a building. Larger schemes (more than a few megawatts) are generally more bespoke, tailored to the specific heat and electricity demand of the customer. The following generic examples are intended to illustrate typical CHP applications.

[1] Surplus electricity can always be exported to the grid, but economics strongly favour CHP applications where the bulk of the power produced is used to meet on-site demands. Heat storage can be used to smooth heat demand

Packaged, reciprocating engine CHP

- **Commercial**
  - A 100 kW CHP supplying electricity and space and water heating for a swimming pool and leisure centre.
  - A 250 kW CHP supplying electricity and space and water heating for a large retail premises.
  - A 300 kW CHP supplying electricity and space and water heating for a large hotel.
- **Industrial**
  - A 250 kW packaged, reciprocating engine CHP supplying electricity and hot water for washing (and other) processes in food manufacturing.
- **Public Sector**
  - A 100 kW CHP supplying electricity and space and water heating for a school.

Larger reciprocating engine CHP

- **Industrial**
  - A 3 MW CHP supplying electricity, space heating and CO_2 (from cleaned exhaust) to a large greenhouse operation growing tomatoes.
- **Public Sector**
  - A 1 MW CHP supplying electricity and pace and water heating for a hospital.
  - A 4 MW CHP (with multiple engines) supplying electricity and space and water heating, via a heat network, to buildings on a large university campus.

Open Cycle Gas Turbine CHP

- **Industrial**
  - 10 MW CHP supplying electricity and process steam to a chemicals manufacturing process

Combined Cycle Gas Turbine CHP

- **Industrial**
  - A 50 MW CHP supplying electricity and process steam to a large paper mill with surplus electricity exported to the grid.

Existing Benefits Available to CHP

2.6. Gas CHP is eligible for a range of existing benefits depending on the specifics of the project. An eligibility condition for the CHP specific benefits is that the CHP is certified to the CHP Quality Assurance (CHPQA) programme and meets its minimum performance requirements on an annual basis. These requirements are intended to ensure that CHP delivers at least a 10% energy saving compared to separate heat and power generation from the same fuel. CHP which meets CHPQA requirements is referred to as Good Quality CHP. The relevant benefits include the following;

i. Enhanced Capital Allowances: 100% of capital investment on Good Quality CHP can be offset against corporation tax or business income tax liability in the tax year in which the investment was made.[2]

ii. Climate Change Levy: The Climate Change Levy (CCL) is a levy on energy (including natural gas and electricity) supplied to commercial, industrial, agricultural and public sector energy consumers. Good Quality CHP is exempt from CCL costs on all fuel used and on any electrical output consumed on-site or supplied directly to known customers. CHP users within organisations liable to CCL therefore benefit from lower CCL costs than if they used gas boilers and grid electricity to meet their heat and power demands.

iii. Carbon Price Support: Carbon Price Support is a levy on emissions associated with fossil fuel use in power generating plants with a capacity of more than 2 MW. Good Quality CHP is exempt from Carbon Price Support costs in respect of emissions associated with heat and, from 1st April 2015, in respect of emissions associated with power generation for on-site consumption or for supply to neighbouring parties under a supply licence exemption.

iv. Business Rates: Embedded Good Quality CHP plant and equipment is exempt from business rates.

v. Capacity Market: The Capacity Market is the UK's mechanism for ensuring adequate flexible electricity generating capacity exists to meet demand during times of electricity system stress. Gas CHP, like other gas fired power generating capacity, is eligible to participate in the Capacity Market.

2.7. One further important economic benefit of operating gas CHP to supply on-site electricity demand is that such operations are not liable to the various obligations and charges on retail electricity suppliers e.g. for meeting renewable energy targets, ensuring adequate flexible generating capacity, and use of the transmission system. Organisations operating CHP to supply their own electrical demand therefore avoid these costs.

2.8. CHP operators can also generate value by participating in a range of commercial electricity market services such as National Grid's Balancing Mechanism, Short Term Operating Reserve or, in the case of exporting CHP, operating during Triad peak demand periods by reduced Triad fees.

CHP Potential & Deployment

2.9. A quantitative study '*Bespoke Gas CHP Policy – Cost curves and Analysis of Impacts on Deployment*'[3] revealed that, at 2012 energy prices, most potential new CHP capacity would require additional financial support to become commercially cost-effective.

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[2] Not available for organisations whose primary business is power generation.

[3] https://www.gov.uk/government/publications/bespoke-natural-gas-chp-analysis

However, the analysis also demonstrated that around half of the potential new CHP capacity would be commercially cost-effective[4] under current policy by 2020 at projected energy prices. Figure 2 shows a 2020 supply curve from this study.

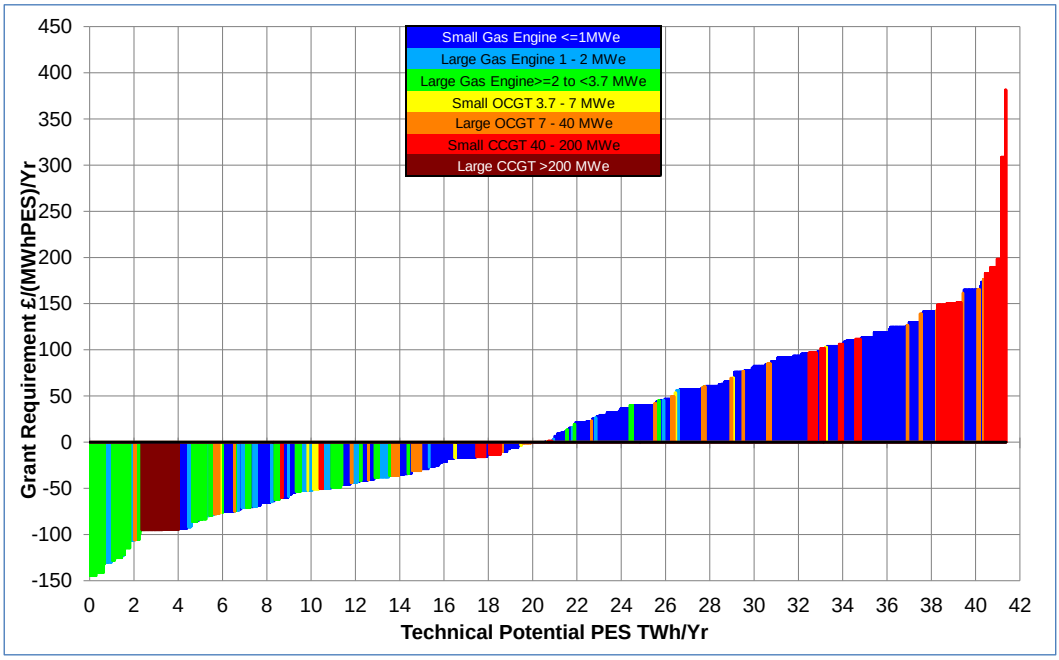


Figure 2. Potential New CHP 2020 Supply Curve

2.10. The x-axis shows total energy saving potential from the potential new CHP ordered from the lowest to highest cost capacity. The y-axis shows additional financial support (in the form of a grant per unit of projected energy saved) which would be required for the CHP to be commercially cost effective. The bars below the x-axis represent CHP which is commercially cost effective under current policy[5] and projected energy prices. The potential new CHP capacity is shown banded by size (electrical capacity) of project.

2.11. The model used to produce these supply curves categorises potential CHP in various industrial and building sectors. Sites with potential for CHP are categorised into 35 sectors, with each sector divided into 2 groups – sites within and sites outside the EU-Emissions Trading Scheme (EU-ETS). It was calculated that the potential additional cost effective CHP in 2020 is 3,335 MW electrical capacity, with 45% of this within the EU-ETS and 55% outside the EU-ETS.

2.12. Figure 3 provides the distribution of the cost effective new CHP capacity according to different technology and size ranges. The largest proportion of the potential (30%) is attributed to small (≤1 MW electrical capacity) Gas Engine CHP, followed by large (2-3.7 MW electrical capacity) Gas Engine CHP and large (>200 MW electrical capacity) Combined Cycle Gas Turbine CHP (16%). The smallest share (3%) is attributed to small (3.7-7 MW electrical capacity) Open Cycle Gas Turbine CHP.

[4] Meeting 18-25% (post tax real) required rates of return, depending on sector

[5] These supply curves do not include the effects of Capacity Market participation and revenue and hence may understate the proportion of potential new CHP which is cost effective under current policy

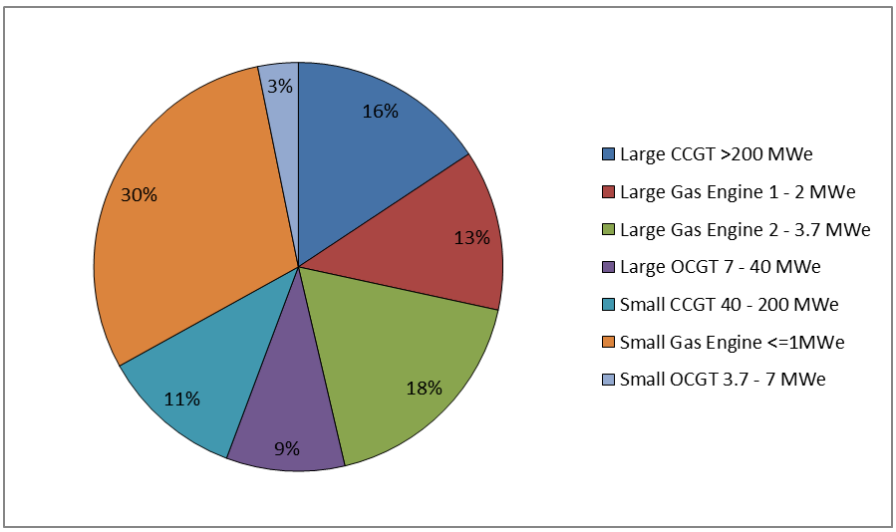


Figure 3. 2020 cost-effective potential CHP according to different technology and size ranges.

2.13. Figure 4 provides the distribution of the potential cost-effective CHP according to the percentage of electricity exported by the CHP. CHP within the 0-10% export band make up the largest share of the cost-effective potential capacity (62%), followed by those within the 10-20% export band (26% of cost-effective potential) and those within the 30-40% export band (11% of cost-effective potential). In other words the cost effective potential is predominantly CHP plant which exports little (or none) of the power it generates to the grid, but uses most of it to meet on-site electrical demand.

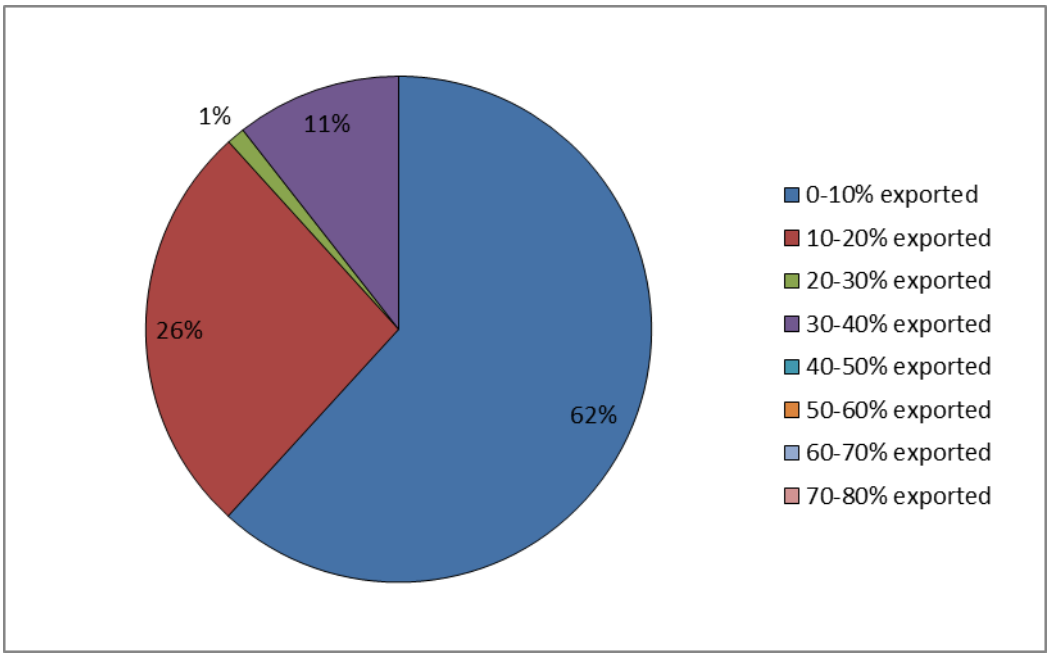


Figure 4. Total Power Capacity of the potential cost-effective CHP according to percentage of the electricity export.

2.14. Figure 5 provides the distribution of cost-effective potential CHP across various economic sectors. It can be seen that the majority of the potential is attributed to the Chemicals sector (60%) followed by the Food & Drink sector (26%).

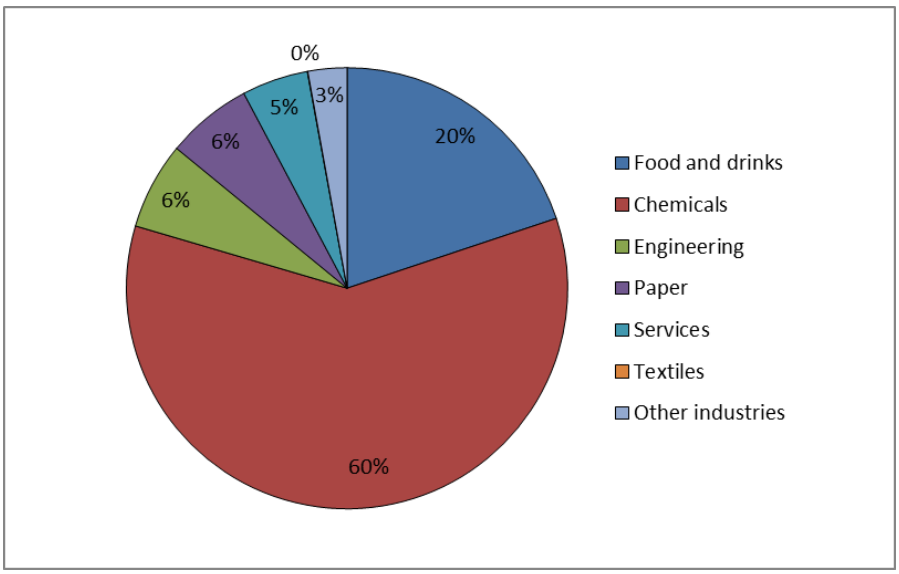


Figure 5. 2020 potential cost-effective CHP broken down by sector.

2.15. Potential for CHP supplying Heat Networks is not included in the above figures, but was assessed separately in '*Bespoke Gas CHP Policy – Cost curves and Analysis of Impacts on Deployment*'. The estimated cost-effective potential for CHP supplying Heat Networks in 2020 was 1,975 MW. This cost-effective potential comprised on CHP, up to 6 MW electrical capacity in size, supplying small Heat Networks, with a high proportion of electricity sold to local customers rather than exported to the grid. This cost-effective potential figure should be treated with caution as it considered the cost-effectiveness of the CHP in isolation rather than the cost effectiveness of the CHP plus Heat Network as a whole. Although Heat Networks are clearly a significant potential growth area for CHP they are not considered in detail in this Call for Evidence as the Heat Network Delivery Unit already exists to address non-financial barriers to Heat Network development.

2.16. Historic growth in CHP capacity was relatively strong through the 1990s, when economic conditions for natural gas fired powerplant in general were relatively favourable. Capacity continued to grow subsequently, but at a slower rate (Figure 6).

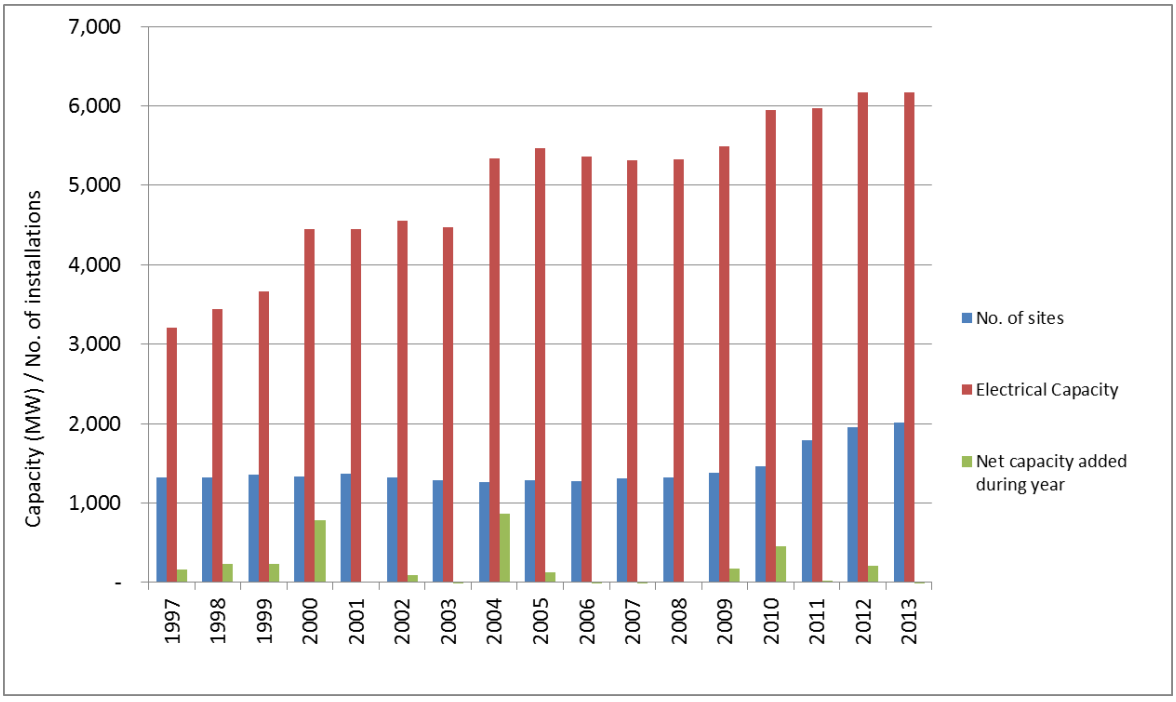


Figure 6. Historic Growth in UK CHP Capacity (Source: Digest of UK Energy Statistics 2014)

3. Non-Financial Barriers to Investment in Gas CHP

3.1. To better understand gas CHP investment decision-making and to examine whether there were specific barriers to investment in gas CHP DECC commissioned Ricardo-AEA, BRE and UCL to conduct qualitative research on this subject[6]. The research covered organisations in Chemicals, Food & Drink, Paper & Pulp, Local Authorities, Retail & Warehousing, Education, Health sectors and Energy Service Companies (ESCos). It targeted an equal number of organisations who had, and had not, invested in CHP.

3.2. Detailed qualitative interviews were conducted with 49 organisations investigating their knowledge and awareness of CHP, their investment decision-making processes, reasons why they had, or had not, invested in CHP, their operational experience with CHP and potential barriers to future investment in CHP.

3.3. Financial performance of gas CHP projects was noted as being the primary reason for investment in gas CHP by most organisations, although expectations on financial performance varied across sectors. In the public sector, much lower financial returns were considered acceptable, especially if the project delivered additional non-financial benefits e.g. carbon reduction, fuel poverty alleviation etc.

3.4. Most interviewees identified the existence of 'senior champions' within an organisation to be important in promoting gas CHP. This message came both from those who do have CHP capacity, where it was seen as having driven investment decisions, and from those who do not have CHP capacity where the **lack of senior champions was seen as a barrier**.

3.5. CHP investment was noted by interviewees as being "opportunistic", occurring only when investment decisions were required in new or replacement heat capacity.

3.6. Small & Medium Enterprises (SMEs) and public sector organisations interviewed noted that **lack of technical resource and expertise** was a barrier to pursuing CHP opportunities. Interviewees noted that this lack of expertise prevented them both from developing projects themselves and also from making informed decisions about procuring CHP services from consultants and ESCos.

3.7. ESCos and Utility companies were the only interviewees willing to engage in any 3rd party heat and electricity supply arrangements more complex than simple arrangements to spill surplus power to the grid. Other organisations noted that energy generation was not a core activity and felt they lacked the skills to become (exporting) energy generators. There were also concerns that contractual energy export obligations might limit the flexibility to operate their CHP in the best manner to support their core activities. However, a high proportion of those with existing CHP did spill surplus power to the grid. Some interviewees mentioned difficulties and delays in obtaining Distribution Network connections as having been a problem. Others mentioned the low value of exported

[6] Factors affecting the uptake of gas CHP - December 2014, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/388981/Factors_affecting_the_uptake_of_gas_CHP_Final_v6.pdf

power as being a disincentive to export. These issues may seem of limited relevance for cost-effective CHP potential as, based on the above quantitative analysis, this is primarily non power-exporting CHP. However, DECC's modelling[7] suggests that participation in Capacity Market auctions (which are open to both exporting and non-exporting CHP) may be critical to the cost effectiveness of around 400 MW of CHP capacity by 2025. The disinclination to participate in energy supply arrangements may also imply a **disinclination on the part of new CHP developers to participate in Capacity Market auctions**. This could be a barrier to a significant proportion of cost-effective CHP potential.

3.8. Amongst organisations that had not considered CHP, **lack of understanding of CHP and the available benefits** featured fairly highly as a reason for not having considered CHP. Experience of ESCos suggested that customer awareness of CHP was quite mixed.

3.9. Interviews with public sector and small businesses, where the CHP market is still developing, suggested organisations are looking for central Government to provide education for senior decision makers, support for technical assessments/feasibility studies and financial support to overcome inertia and bring forward projects.

3.10. In addition to the barriers identified from the qualitative research, DECC's supply curve modelling suggests one further potential barrier. The 2012 supply curve modelling shows that only a limited proportion of the CHP potential was cost effective under 2012 energy prices. It is only under projected 2020 energy prices that around half of the potential becomes cost effective. There may therefore be **pre-conceptions about cost effectiveness of CHP** that will need to be overcome to deliver the cost effective potential.

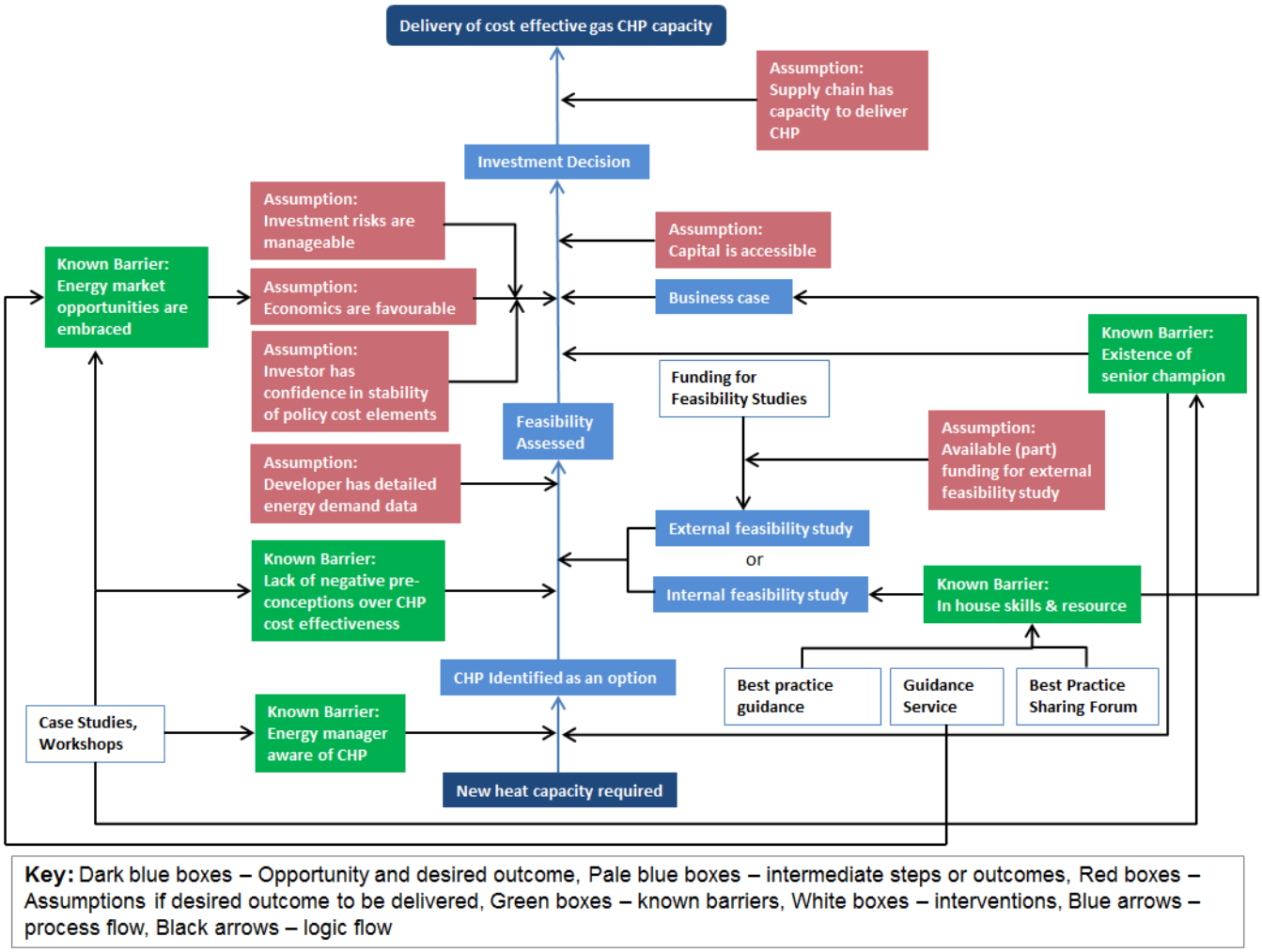
Call for Evidence Question: Barriers
5. Are the above barriers correct and complete?
6. Are there other barriers to gas CHP?
7. Which of the barriers has the greatest impact in preventing investment in gas CHP?

[7] See Figure 20 of Bespoke Gas CHP Policy – Cost Curves and Analysis of Impacts on Deployment – December 2014, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389069/RAEACostCurves.pdf

4. Potential Measures to Address Non-Financial Barriers

4.1. DECC has identified a range of potential measures which we believe could be effective in addressing the non-financial barriers identified. These measures have been identified by reviewing current and past measures to promote CHP and other energy efficiency techniques. A multi-criteria decision analysis approach, involving three assessment panels of officials and stakeholders, was used to review the potential measures identified and shortlist those most likely to be effective for CHP, given the indicative barriers identified from our qualitative research.

4.2. The logic map in Figure 7 below shows the CHP investment decision process, the barriers that apply at the various stages of this and the potential measures which might address the barriers. The map also shows other assumptions which would need to hold true for investment decisions to proceed.



Key: Dark blue boxes – Opportunity and desired outcome, Pale blue boxes – intermediate steps or outcomes, Red boxes – Assumptions if desired outcome to be delivered, Green boxes – known barriers, White boxes – interventions, Blue arrows – process flow, Black arrows – logic flow

Figure 7. Gas CHP Policy logic map

Call for Evidence Question: Logic Map
8. Are the assumptions (red boxes) in the logic map accurate?
9. Are there other assumptions which would need to hold true for investment to occur?

4.3. The potential measures to address the indicative barriers are described below, along with case studies of similar past policy measures. Considering all of these measures as a package, we would welcome responses on the following questions.

Call for Evidence Question: Package of Potential Measures
10. Are there any key policy design considerations which are likely to be critical to the success of these measures?
11. Are you aware of evidence on the effectiveness of similar types of measures in other nations or other policy contexts?
12. Is there any commercial or sector/trade body delivery of these measures already? What should Government's role be in each of these measures, should it; - Lead on delivering these measures; - Support sectoral associations in delivering these measures; or - Leave commercial services and sectoral associations to deliver these measures? Which of these delivery routes would lead to the greatest uptake of the measures and why?
13. What level of take-up of these measures might be expected? How many organisations / projects might make use of the measures? Are you aware of any evidence of the level of resource required to deliver similar services?
14. What proportion of organisations which did access these measures might proceed to deployment of CHP as a result of them i.e. projects which would not have been deployed in the absence of this support? Is there evidence on this from similar past/current policies?
15. What types of factor might prevent projects which did access these measures from proceeding to deployment of CHP?
16. Would joint Government/industry funding of these measures be viable? If appropriate, what contribution to costs might your organisation be prepared to make?
17. What would be the estimated cost to your organisation to access support under these measures e.g. for staff time, administrative costs and inconvenience?
18. Are there any measures which might be dropped from the package without significantly reducing its effectiveness?
19. Would the package of measures be applicable to all types of CHP, and if not why not? What might broaden the applicability of the package?
20. Might the package of measures distort competition within sectors utilising CHP?

Guidance Service: This measure would involve a Government-funded Guidance Service to guide potential CHP developers through the process of assessing and developing a CHP project and accessing available Government financial support. This would probably be delivered by a third party body contracted by Government. The CHPQA programme already includes a Helpline and email advice service, which is widely used by the CHP operators, although this service primarily handles factual queries regarding technical requirements and eligibility for different forms of financial support. An expanded advice service might offer guidance on, and critical review of, all aspects of CHP project development e.g. technical specifications, financial support available to a particular CHP scheme, risk management, how to participate in Capacity Market auctions.

This measure would be similar to the guidance provided by HNDU to Local Authorities regarding heat network projects and/or Environmental Agency Relationship Managers. An extended Guidance Service might be promoted during awareness raising workshops to make potential CHP developers aware of the guidance available.

Call for Evidence Question: Guidance Service
21. Is a Guidance Service likely to be effective in; - overcoming lack of LA and SME technical resources and expertise; and - helping encourage CHP developers to engage in energy market opportunities, including participating in the Capacity Market?
22. What type of skills and expertise would be most important for a Guidance Service delivery body to possess?
23. Are there any design features of the contract for delivering this measure, which would be critical to its success?

Funding for Feasibility Studies: This measure would involve Government funding being provided for businesses and public sector organisations to procure external consultancy studies on the feasibility of CHP in their operation. Funding is likely to be competitively allocated and cover a proportion, rather than the full costs, of studies. This option would be similar to Heat Network Delivery Unit support to Local Authorities or Carbon Trust funded energy efficiency audits. This option might also include generic guidance from Government on how to commission a high quality feasibility study. Assessment of applications and allocation of funding might be delivered either by central Government or contracted out to an external delivery body.

A feasibility study will assist organisations with development of a bespoke comprehensive study which will include evaluation of potential energy and environmental savings and detailed technical specification of a specific CHP installation. It will also provide financial cost benefit analysis including Government support options available to the organisation developing a particular CHP scheme.

Call for Evidence Question: Funding for Feasibility Studies
24. Is Funding for Feasibility Studies likely to be an effective way of overcoming lack of LA and SME technical resources and expertise e.g. by enabling this expertise to be outsourced?
25. Would a requirement for matched funding (or a significant contribution to total costs) from applicants significantly reduce take-up? What proportion of costs might your organisation be willing to contribute?
26. What criteria would be most critical in competitively assessing applications for funding for feasibility studies?
27. What level of take-up of Funding for Feasibility Studies might be expected? What proportion of Feasibility Studies might proceed to deployment of a new CHP plant? Are you aware of any evidence of the level of resource required to deliver similar services?
28. What would be the estimated administration and inconvenience costs for your organisation of submitting a competitive application for funding for a Feasibility Study?
29. Are there any design features of the delivery body/contract which would be critical to its success?

Case Study: Heat Network Delivery Unit

As a part of the Government's decarbonisation strategy, it was announced in March 2013 that a 'Heat Networks Delivery Unit' (HNDU) would be established. The main aim of the HNDU is to encourage and enable Local Authorities in England and Wales to undertake pre-commercial development of heat networks. HNDU provides a combination of grant funding and/or guidance for all pre-commercial stages of project development leading to the preparation of a business case.

HNDU has a budget of £9 million for grant funding. This is being allocated on a competitive basis, through a series of application rounds. Local authorities can apply for funding for up to 67% of the external costs of a project. In the first three rounds more than £7 million has been allocated to 91 Local Authorities across 122 projects.

HNDU funding of heat mapping and energy master-planning allows Local Authorities to explore and prioritise heat network opportunities through a simple techno-economic assessment. Feasibility and detailed project development studies funded by HNDU look at the technical design, financial modelling, commercial structures and, contractual arrangements for a single network in increasing detail. These studies help Local Authorities to review each project phase and make a decision on how, or whether, to proceed to the next project stage.

Best Practice Sharing Forum: An industry or Government-led forum for the exchange of best practice. This might, for example, meet quarterly with meetings being used to;

- present operators' and developers' own CHP case studies
- present changes, and best practice, on how stakeholders are engaging in and generating value from;
    - new or revised Government policies
    - new or revised commercial services and opportunities
- share lessons learned from developing and operating new CHP projects
- provide networking opportunities for further sharing experience

The forum could either have physical or virtual (webinar) meetings. A secretariat would support the running of the forum arranging meetings, agendas and commissioning presentation material from participants.

Participants would be encouraged to publicise more widely within their own organisations and sectoral associations, the energy and carbon savings they are achieving via use of CHP.

Case Study: Retail Energy Efficiency Taskforce

The Retail Energy Efficiency Taskforce was a Government–Industry body set up to explore the barriers to greater energy efficiency and to help spread best practice of leaders in energy efficiency to other organisations in the retail sector. The inception meeting of the Taskforce was held on 24th September 2013 and it concluded its work in late autumn 2014.

The Taskforce met quarterly to discuss and agree overall energy efficiency priority areas. Members of the Taskforce were encouraged to commit to practical steps to improve energy efficiency and to share experience on the opportunities and barriers to energy saving within the sector.

Call for Evidence Question: Best Practice Sharing Forum

30. Is a Best Practice Sharing Forum likely to be effective in;
    - overcoming lack of LA and SME technical resources and expertise; and
    - in encouraging organisations to engage in energy market opportunities (including participation in the Capacity Market)?

31. Would a single forum be most effective or separate fora for different sectors?

32. What would be the most effective medium for a forum e.g. physical meetings, webinars etc

Best Practice Guidance: This measure would involve creating up to date, detailed, best practice guidance documents covering all major stages of CHP project development and operation. These might cover the following areas;

- an introduction to CHP
- initial CHP opportunity assessment
- undertaking/commissioning detailed CHP feasibility studies
- financial assessment of CHP projects, including valuing available benefits
- procuring CHP
- CHP operation & maintenance arrangements

A portfolio of guidance documents is likely to be developed over time. This might involve a stakeholder steering group prioritising subjects and a contractor developing draft guidance for stakeholder review and comment prior to web publication. This might run for several years to build up a portfolio of key guidance documents and then continue at a lower level of activity to keep documentation updated. Awareness-raising of new publications could be via the Best Practice Forum or Workshop routes and/or presentations at industry, public sector and energy efficiency events.

A further extension of this measure might involve the development of more formal documentation such as industry Codes of Practice or Standards for CHP development, operation & maintenance.

Call for Evidence Question: Best Practice Guidance
33. Is detailed Best Practice Guidance likely to be effective in overcoming lack of LA and SME technical resources and expertise?
34. What up to date Best Practice Guidance already exists and is publicly available? What subject areas does this cover and what gaps are there?
35. What would be the most effective medium for Best Practice Guidance e.g. would online publication be sufficient or would hardcopies also be required?
36. Would development of Codes of Practice or Standards for CHP be feasible and more effective than Guidance documents? What evidence exists to support the feasibility and benefit of such an approach for CHP?

Publication of Case Studies: This measure would involve detailed monitoring and evaluation of individual CHP projects covering a range of different sectors / applications. Detailed case studies, probably written by a single contractor for consistency, would be published online and disseminated via presentations at Best Practice Fora, Workshops and/or relevant industry events. These would cover the performance of the plant, any problems that had arisen and how these had been or could be overcome. The monitoring might be delivered by the case study contractor, with the costs being met by Government, thus providing a free independent evaluation and recommendations to the CHP operator as an incentive for them to volunteer for case studies.

Participants in recent CHP Outreach events have highlighted case studies in analogous settings as persuasive in encouraging them to consider CHP opportunities. It is anticipated that this measure would involve building up a portfolio of case studies over time, covering the range of sectors and applications. A programme of case study development might be informed by priorities set by a stakeholder steering group and

availability of volunteer projects. Shorter case studies drafted by the CHP developer themselves are not covered by this option, but might be included in material shared under a Best Practice Sharing Forum.

Call for Evidence Question: Case Studies

37. Are detailed Case Studies likely to be effective in;
    - Raising awareness of CHP?
    - Encouraging engagement in energy market opportunities including participation in the Capacity Market?
    - Overcoming pre-conceptions about the cost effectiveness of CHP?
    - Creating Senior Champions for CHP?

38. Might commercial confidentiality prevent organisations volunteering to act as Case Studies? What might be effective in overcoming this?

Case Study: Energy Efficiency Best Practice Programme

ENERGY EFFICIENCY

The Energy Efficiency Best Practice Programme was a Government initiative which ran from the late 1980s to 2000 to advance and spread good practice in energy efficiency by providing independent, authoritative advice and information on energy efficiency measures. The programme was delivered by the Energy Technology Support Unit (part of what is now Ricardo-AEA), the Building Research Establishment and the Carbon Trust. It was targeted at energy consumers (and in particular at energy managers) in industry, the public sector and commercial buildings. Combined Heat & Power was one of the established technologies promoted by the programme.

The CHP related activities delivered under the programme included workshops, site visits, detailed case studies of operational plant, best practice sharing fora and free, detailed best practice guides covering the following subjects;

- introduction to CHP
- developing small scale CHP projects
- developing large scale CHP projects
- financial appraisal of CHP projects
- environmental benefits of CHP
- Operation & Maintenance arrangements for CHP

Around £0.5m pa funding was provided for the above activities. In its latter phases the programme funded bespoke energy audits for organisations.

An industry steering group provided advice on the programme of activity and setting of targets for energy savings delivered and CHP capacity growth under the programme.

Awareness Raising Workshops: This measure would involve a programme of workshops or webinars for organisations with potential to adopt CHP. Workshops might be delivered in a range of different locations and targeting specific economic sectors. Workshops will present the opportunity for potential developers to learn about CHP technologies, potential energy savings and support mechanisms available for CHP applications using conventional and renewable fuels. Workshops would also present CHP case studies and include site visits to see a particular CHP scheme in operation. Information regarding other measures e.g the Guidance Service, Guidance Documents as well as an introduction to CHPQA programme will also be presented to the attendees. The CHPQA programme already includes limited activity of this type, but currently limited to around 3 events per annum and focussed only on public sector organisations in recent years.

Call for Evidence Question: Awareness Raising Workshops

39. Are Awareness Raising Workshops likely to be effective in;
    - Raising awareness of CHP?
    - Encouraging engagement in energy market opportunities including participation in the Capacity Market?
    - Overcoming pre-conceptions about the cost effectiveness of CHP?
    - Creating Senior Champions for CHP?
40. What skills and expertise are likely to be most important in a successful delivery body for Awareness Raising Workshops?
41. Are you aware of evidence on the level of resource likely to be required to deliver an effective programme of Workshops e.g. number and size of workshops, number of locations etc?
42. What would be the most appropriate medium for delivering Awareness Raising Workshops e.g. would these be best delivered as webinars or physical meetings?

A workshop programme might also include activities targeted at senior decision makers such as presentations at specific pre-existing events attended by senior management e.g. industrial events and conferences, Local Authorities meetings.

Call for Evidence Question: Other issues
43. Might any of the measures identified have unintended adverse impacts on you or other organisations?
44. Are you aware of any external factors not identified above which might compromise the effectiveness of these measures?
45. Are you aware of any other policy measures which might be more effective in addressing barriers to CHP than those listed here? What evidence is available on the effectiveness of such measures?
46. Is there anything which government can do to help facilitate the market in developing solutions to correct these barriers in future?
47. Is there any evidence of bias against CHP and in favour of simpler technologies in the energy contracting/consultancy supply chain?

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