

British Pump Manufacturers Pump Industry Association Sustainable Energy Strategy –(Update -April 2007)

EXECUTIVE SUMMARY

The BPMA represents the leading UK suppliers of liquid pumps, accounting for 85% of the UK market. Pumps are employed across all major energy consuming sectors including Water and Waste, Domestic, Government and Public Buildings and the Chemical/Petrochemical and Pharmaceutical Industries. Independent studies have shown that there is potential to save over one million tonnes of Carbon emissions a year by improving pump 'system' efficiency within the UK.

DEFRA has recently handed down a directive that specific targets for energy reduction for pumping systems have been set at 6TWh/a by 2020.

Over the past four years the BPMA has adopted a proactive position with regard to the reduction of energy consumption in pumps and systems, recognizing increasing government and public concern with regard to energy. The BPMA has been working with Future Energy Solutions (now AEA Environmental) to develop the pump system element of the UK governments Market Transformation Programme.

The BPMA led the development of three Energy Savings Guides for Europump which are used worldwide. In 2005 BPMA members financially supported the commissioning of an "options for action" report by SUSTAIN which led in 2006 to the formation of a focused BPMA Energy Group that developed an Energy Strategy, the retention of a Market Transformation consultant to turn the strategy into deliverables and the setting up of a pump energy specific website at www.bpma-energy.org.uk. A Future Energy Solutions representative sits on the BPMA Energy Steering Group to ensure short lines of communication to and from government.

Whilst there is some potential to improve pump design it is recognized that this would yield only on average about 4% saving in energy consumption. System-based measures offer the greatest potential where up to 37% savings may be made.

Work done by the BPMA within the Market Transformation Programme has established measures to affect energy savings in these pumping systems. The Market Transformation Actions are detailed in Briefing Note BNM08: "Developing supply chain initiatives to improve pump systems efficiency in the UK" a copy of which is posted on the website www.mtprog.org.uk

Delivering a systems based strategy approach to energy reduction depends on influencing the complete supply chain from manufacturer through consultants, contractors, distributors, installers and users and necessarily is complex and demands long term commitment.

The BPMA has developed a Strategy to deliver energy savings under the brand - **BPMA Better Pumping Practices** with a mission "**To Change the habits of Pump Users in the way that they purchase and operate pumps so that their energy consumption is minimised.**"

The objective of the strategy is to make a step change in the knowledge of pump users of the opportunities to reduce energy consumption in pumping systems, leading to improved purchasing practices and the introduction of pump system auditing as a continuous process to reduce energy consumption in operation within the installed base which is at least 10 times annual sales. Pump system auditing requires significant investment in time and must be carried out by skilled personnel. A core part of the strategy is the accreditation of suppliers with respect to their competence in pump selection, installation and post installation audit. Accredited suppliers will be able to display the BPMA Better Pumping Practices Logo.

The BPMA has limited resource but has made good progress due to financial support and the participation of its members. Although working on preparation of this strategy for 4 years the BPMA is only at the start of the implementation plan and the BPMA continues to seek assistance both financially to increase resources and in members time to progress these actions as quickly as possible.

Introduction

The BPMA represents the leading UK suppliers of liquid pumps, accounting for 85% of the UK market. Predominantly driven by electric motors accounting for 40% of the UK's electricity consumption, pumps are 32% of this (47TWh/year). Independent studies have shown that there is potential to save 1million tonnes of Carbon emissions a year by improving pump 'system' efficiency. BPMA members supply pumps across all major energy consuming sectors including Water and Waste, Domestic, Government and Public Buildings and the Chemical/Petrochemical and Pharmaceutical Industries. The BPMA is recognised by members and pump users as the voice of the UK pump industry and is highly influential within Europump the European Pump Trade Association.

Over the past four years the BPMA has adopted a proactive position with regard to the reduction of energy consumption in pumps and systems, recognizing increasing government and public concern with regard to energy. The BPMA has been working with Future Energy Solutions (now AEA Environmental) to develop the pump system element of the UK governments Market Transformation Programme. The BPMA led the development of three Energy Savings Guides for Europump which are used worldwide. In 2005 BPMA members financially supported the commissioning of an "options for action" report by SUSTAIN which led in 2006 to the formation of a focused BPMA Energy Group that developed an Energy Strategy, the retention of a Market Transformation consultant to turn the strategy into deliverables and the setting up of a pump energy specific website at www.bpma-energy.org.uk. A Future Energy Solutions representative sits on the BPMA Energy Steering Group to ensure short lines of communication to and from government.

DEFRA has recently handed down a directive that specific targets for energy reduction for pumping systems have been set at 6TWh/a by 2020. The BPMA has limited resources and the retention of an energy consultant had started to build some momentum in actions to deliver the potential energy savings that have been identified. The consultant was funded from July 06 to January 07 by the membership with an extension to this to the end of March by funding secured from AEA. With the end of this funding stream and the failed bid to the Carbon Trust it is an appropriate time to review the current options going forward bearing in mind that governmental pressures are unlikely to reduce.

Overview of the BPMA Energy Strategy

Whilst working with Future Energy Solutions (AEA) in responding to government agency communications it was made clear to the BPMA that action was demanded by government with a preference for voluntary agreements which if not adopted could and would be replaced by legislative measures which might act to the detriment of the industry. Legislative measures would most likely be directed at products rather than systems. Whilst there is some potential to improve pump design it is recognized that this would yield only on average about 4% saving in energy consumption. System-based measures offer the greatest potential where up to 37% savings may be made. Savings in Pump Systems can be achieved by:

- Design – ensuring appropriate velocities by selecting correct pipe diameters, and reducing turbulence by minimising use of sharp bends, valves and other restrictions. Minimising recirculation and bypass arrangements. Ensuring operating pressure is maintained at the lowest acceptable value.
- Pump selection – ensuring the correct pump is selected for the application such that it operates as near as possible to its best efficiency operating point (BEP).
- Controls – ensuring the pump is switched off when it is not doing useful work. Using variable speed or other controls in applications where there are varying flow rate or pressure requirements.

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Delivering systems based strategy approach to energy reduction depends on influencing the complete supply chain from manufacturer through consultants, contractors, distributors, installers and users and necessarily is complex and demands long term commitment.

The BPMA energy working groups developed a strategy within a framework branded as;

BPMA Better Pumping Practices with a mission "To Change the habits of Pump Users in the way that they purchase and operate pumps so that there energy consumption is minimised."

The objective of the strategy is to make a step change in the knowledge of pump users of the opportunities to reduce energy consumption in pumping systems, leading to improved purchasing practices and the introduction of pump system auditing as a continuous process to reduce energy consumption in operation within the installed base which is at least 10 times annual sales. Pump system auditing requires significant investment in time and

must be carried out by skilled personnel. A core strategy is the accreditation of suppliers with respect to their competence in pump selection, installation and post installation audit. Accredited suppliers will be able to display the BPMA Better Pumping Practices Logo. This will create a revenue stream for the BPMA and market opportunities to develop audit and service based business opportunities for BPMA member companies while reducing the energy consumption of pumps and systems.

To assist sustainability, strategic actions will be supported by the development of standards, guides and energy reduction tools whose use will be promoted to the supply chain.

The key elements of the BPMA Better Pumping Practices Initiative are;

1. The Development of Standards and Guides; for example - Purchasing, Site Testing and Auditing,
2. The development of Tools to assist pump selection and system auditing; Software, Diagnostics and Instrumentation
3. The Training and Accreditation of Pump Suppliers to Select, Install and Audit Pump Systems to minimize their energy consumption
4. Development and Delivery of Pump System Auditing Services
5. Better Pumping Practices Marketing and Promotion - Raising the awareness of Users and the Supply Chain of Energy Savings Opportunities and that reducing pump energy consumption makes good business sense for both the supplier and the user.
6. The delivery of Structured Training to Pump Users to create pull on the Supply Chain
7. The Dissemination of Best Practice and promotion of the BPMA Better Pumping Practices training modules as integral parts of Continued Professional Development in key industries.

The progress of these elements is depend on the resource that can be allocated to them and the BPMA continue to seek assistance both financially and in members time to progress these actions as quickly as possible. There follows further detail of each element and an estimate of the time required by BPMA staff, external support and BPMA members time necessary to deliver the work.

Priorities have been set for work packages and a continuous resource assessment is developing achievable plans to satisfy both the mtp programme and the development of business opportunities for members.

Elements of Better Pumping Practices Programme

1) The Development of Pump and Pump System Standards and Guides

[Start date, End Date:TBA]

[Target Audience: Suppliers, Installers, Purchasers]

This includes the development and delivery of the following enabling action actions and test and measurement standards:

- a) Pump Tendering Standard – For use by suppliers to present a common format for energy and life cycle information within tenders.
- b) Pump Purchasing Standard – For use by Customers and Procurement agencies
- c) Pump System Audit Guide – for use by the supply chain
- d) Pump Site Test Standard
- e) Pump Certification Standard - In order to guarantee the reliability of published pump performance data the BPMA endorses a pump certification scheme
- f) Pump Performance Classification Standard – Labelling In order to provide pump purchasers and users with suitable energy efficiency information the BPMA supports the development of labelling schemes for the following product types:
 - o Circulators
 - o End Suction Water Pumps
 - o Other Pump Types in due course

In order to develop labels for these products a performance measurement methodology will be defined. The performance labels will be assigned in grading scheme similar to that employed by (domestic lightbulbs / circulators...)

The BPMA also intend to promote best in class products and to this end an application will be made to include these product types on the ECA scheme.

- g) Inclusion of Pump Specific Actions in Building Regulations
- h) The development of Pump System Certification standards -In order to provide pump purchasers and users with suitable energy efficiency information the BPMA supports the development of pump system performance classification for pump systems used in the following applications:
 - o Water industry – potable water supply...
 - o Water industry – sewage plant...
 - o Industry and commercial buildings – heating circulator systems
 - o Industry and commercial buildings – water reticulation...
 - o Chemical Industry –
 - o Pharmaceutical industry -

(NOTE: Development of system performance classification methodologies will facilitate the introduction of formal purchasing standards...)

2. The development of Tools to assist pump selection and system auditing; Software and Diagnostics and Instrumentation *[Start date, End Date: TBA]*

[Target Audience: Pump Suppliers]

- b) Development of Pump Auditing Software – EU Version of PSAT
- c) Development of Intelligent Pump Auditing Strap

3. The Training and Accreditation of Pump Suppliers *[Start date, End Date: TBA]*

[Target Audience: Pump Suppliers]

The BPMA will create an Energy Training Academy. This is a mechanism to train and certify pump suppliers to Select, Install and Audit Pump Systems to minimize their energy consumption and to deliver energy efficient

solutions to their customers. Once trained certified suppliers and installers will adopt an energy code of practice and will be entitled to display the **BPMA Better Pumping Practices Logo**.

Suppliers will be required to complete the following training.

- a) Pumping Fundamentals one day training (current BPMA module1)
- b) Pump Energy Savings Opportunities one day Workshop (material as per users workshop .2)
- c) Pump System Audit Training – one day training plus carrying out a Case study audit to demonstrate competence.

The code of practice will be defined as...

(NOTE: The principles applied to the code of practice could be further developed into a standard which could be adopted into some form of formal procurement standard).

Carrying out Pump System Audits and implementing a robust Supplier accreditation scheme requires piloting and feedback and it is proposed that 10 Auditors are initially trained (free or with subsidy) – They will be available to carry out strategically important audits, to provide feedback to refining of the auditing training leading to publication and dissemination of case studies and best practices that will establish the sustainability of pump auditing and the development of business models for auditing companies. Training will include 3x1 days - Pump Principles, Energy Saving Opportunities and Auditing Techniques, plus practical work to demonstrate competence. Ideally 3 audits will take place in each of the strategically important, Buildings, Water Utilities and Chemicals Industries.

High Profile examples would be;

- Water and Waste – Thames Water , Severn Trent, Southern Water
- Buildings – District Heating – Major Shopping Centre – Universities and Hospitals.
- Chemical/Petrochemical and Pharmaceutical – Exxon, Pfizer, Astra Zeneca

In addition to training a guides will be produced for use by suppliers, E.g.' Site Pump Testing Standard', 'System Auditing Guide for Pump Suppliers', (See strategic action 1)

4. Development and Delivery of Pump System Certification & Auditing Services *[Start date, End Date: TBA]*

[Target Audience: Large pump users]

In order to maintain maximum efficiency of installed pump systems the BPMA supports the accreditation of pump users and certification of their systems. This requires users to have completed a 'Pump Energy Savings Opportunities' training course and to implement regular monitoring of their pump systems. Every three years the pump systems will be audited by an external auditor. The BPMA would provide this service either directly or through its network of accredited auditors.

(This could fall under the umbrella of The Carbon Trust Accreditation scheme or even the EU motor challenge program...?)

5. Better Pumping Practices Marketing and Promotion - *[Start date, End Date: TBA]*

[Target Audience: Pump Specifiers, Suppliers, Installers, Purchasers, End users]

Objective - Raising the awareness of Users and the Supply Chain of Energy Savings Opportunities and that reducing pump energy consumption makes good business sense for both the supplier and the user. (Includes action 7) The Dissemination of Best Practice and promotion of the BPMA Better Pumping Practices training modules as integral parts of Continued Professional Development in key industries.

The marketing programme can be scoped to fit resource and budget but was planned to include;

- A Launch event of the Better Pumping Practices programme to Major Pump User Journals, Professional Institutes and Trade Associations.
- A series of 8 articles covering key pump energy saving topics within journals with major pump user readership and lead articles in The Director and Financial Director magazines to sell LCC concepts to senior financial controllers and company leaders.
- A series of One hour presentations reviewing the Better Pumping Practices Programme and Pump Energy Savings Opportunities at general meetings of Pump User Trade Associations and key institutions regular meetings. (see appendix 1 for potential list of organizations)
- Production of a Brochure for the Better Pumping Practices training Programme and circulation of this through key trade journals, combined circulation of 100,000 copies.

- Maintenance of the existing BPMA-Energy.org.uk Website to showcase best practice and to link to other institutions websites.

After training of auditors and completion of a series of site audits it would be intended to hold an event to disseminate audit findings to pump users and BPMA members and to present the ongoing programme.

A further potential action would be to republish the series of articles and Case studies in a BPMA Energy yearbook/sourcebook which could be funded by advertising.

Incorporation of Pump Energy Training modules into Professional CPD's. – Institutions representing the Pump supply and User chain will be encouraged to include the BPMA energy workshop modules as an integral part of their own CPD modules available to their members

6. Structured Training to Pump Users to create pull on the Supply Chain *[Start date, End Date: TBA]*

[Target Audience: Pump Specifiers, Suppliers, Installers, Purchasers, End users]

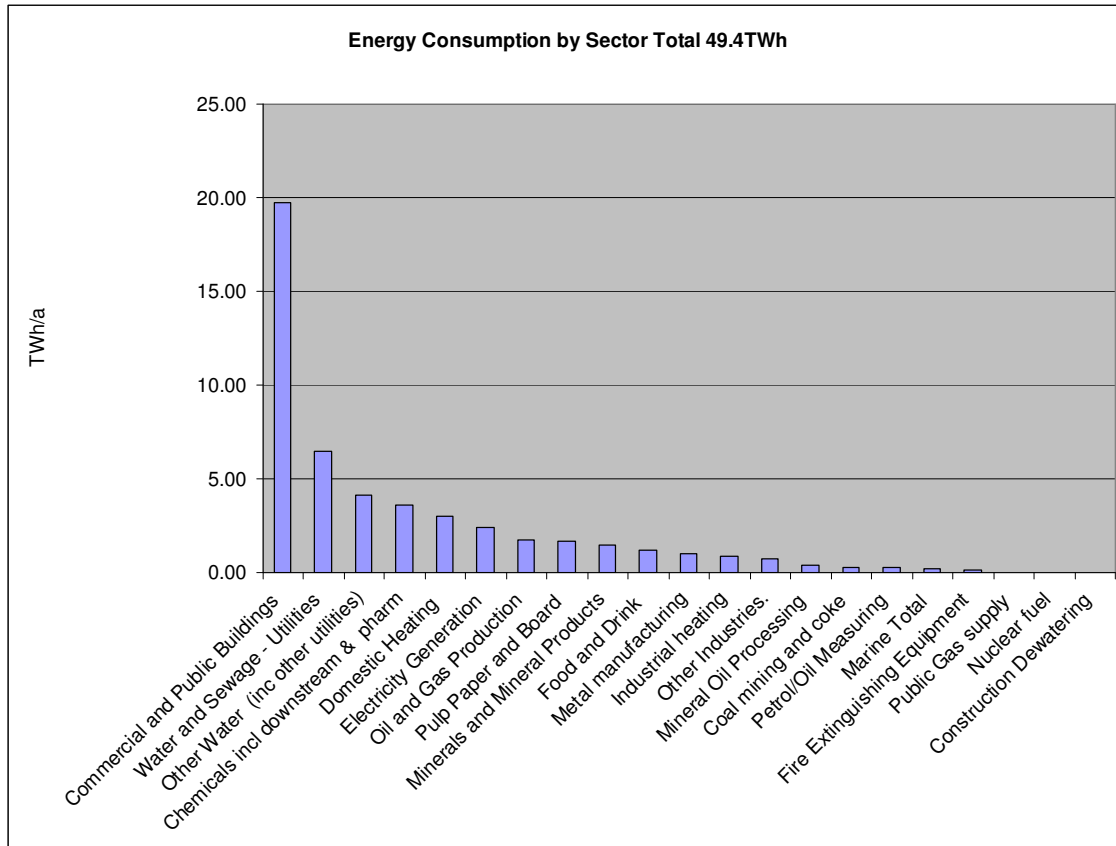
Objective - A one day workshop will be delivered in locations around the UK. It will provide essential information on how Pump systems may be better operated and energy consumption minimized. Although targeted at pump users the material will also be of interest to the complete supply chain. User attendees will be invited to participate as a case study in the strategic audit programme which will follow the training of auditors.

In addition to training a Pump Purchasing Guide will be produced for use by customers in their procurement activities (See strategic action 1)

Key Sector Activity.

In deciding on priorities for action a pump type based or an industry based approach is helpful.

The highest energy use is within Commercial and Public Buildings, far exceeding all other sectors and representing nearly 40% of all consumption.



Water Utilities is the next largest sector. This industry publishes its annual energy consumption and its predominant use of pumps makes the consumption estimate realistic.

The next sector is “other water” which includes land drainage for environmental puposes and numerous water applications which may be found in other sub-sectors detailed in the report.

Chemicals and Pharmaceuticals are next largest sector .

Further details of subsector applications and pump types may be found in UK Market report commissioned by AEA environmental technologies.

Programme Metrics to be implemented and agreement for methods of data capture to be established.

No of VFDs sold with original equipment or retrofitted by BPMA Members – Number, translated to estimated KW savings – The characteristics of VFDs in responding to variable system requirements means that savings of up to 50% can normally be saved by supplying or retrofitting these drives – 10% of Motor power will be allocated as saving for recording purposes for every VFD retrofitted or sold with new equipment. The energy saved in the use of VFD's has a direct impact of CO2 reduction.

No of Auditors Trained – Number – This programme will deliver 10 trained auditors – On an ongoing basis it is planned that accreditation of auditors will take place through the supply chain to sustain the auditing process. CO2 will be reduced as an output of the actions of auditors in reducing energy consumption in pump systems.

No of Pump Users attending Training Workshops- Number – This will measure the effectiveness of the BPMA Better Pumping Practices Roll out to raise awareness of pump energy savings opportunities.

No of BPMA member Pump Audits carried out - Number – these are the first active stage of revealing energy saving opportunities and therefore measuring the number of audits carried out is an important measure of user take up of the importance of pump energy consumption.

Energy Savings as result of BPMA audits – KW – Post audit review will capture data on energy savings made as a result of audits carried out.

Customer reported independent Pump Efficiency improvements made – The BPMA will seek to gather data on Energy Savings made by by pump users who take action other than through BPMA member audits. To promote the capture of data the BPMA will introduce at its annual awards event an award to the pump user who can demonstrate significant savings in Pumping Systems.

Number of Institutions incorporating BPMA Pump Energy Savings Opportunity training into their CPD programme – Number – Measures Quality and relevance of training material.

WORK PACKAGE BREAKDOWN

	Ref	Output	Action		
			BPMA Staff	Outside Staff	Members
WORK PACKAGE 1 - The Development of Pump and Pump System Standards and Guides					
Standards and guides that will facilitate sustainability of the BPP Programme and disseminate best practice	1.1	Finalise Plan/Admin	2	1	2
	1.2	Pump Tender Standard	2	5	10
	1.3	Pump Purchasing Standard – For Customers and Procurement agencies	2	5	10
	1.4	Pump System Audit Guide – for use by the supply chain	2	10	20
	1.5	Pump Site Test Standard	2	5	10
	1.6	Draft Proposal for System Certification by Sector Process	2	10	5
	1.7	Pump Certification Standard	2	5	10
	1.8	Pump Performance Classification Standard – Labelling	2	10	10
	1.9	Inclusion of Pump Specific Actions in Building Regulations	2	5	10
	1.11	The development of Pump System Certification standards	Publish Document	TBA	TBA
Total			18	56	87

	Ref	Output	Action		
			BPMA Staff	Outside Staff	Members
WORK PACKAGE 2 - The Training and Accreditation of Pump Suppliers					
Train and certify pump suppliers to Select, Install and Audit Pump Systems to minimize their energy consumption	2.1	Finalise Plan/Admin	2	1	
	2.2	Finalise training material and course notes	2	4	4
	2.3	Print/collate training books	1	1	
	2.4	Publicise Event if Workpackage 1 is not implementd	1	2	
	2.5	Train the trainers	4	4	
	2.6	Deliver Module 1 Pump Principles	2	2	10
	2.7	Deliver Module 2 Energy saving opportunities	2	2	10
	2.8	Deliver Module 3 Practical Pump Audit Training –	2	2	10
	2.9	Identify and gain agreement from audit sites	2	2	2
	3	Carry out site audits in key industries	9	18	72
	3.1	Evaluate Audit results identify common actions and publish best practices	10	18	60
	3.2	Set competency criterion - Accredited/verify auditor competence	2	8	10
	Total			48	64

	Ref	Output	Action		
			BPMA Staff	Outside Staff	Members
WORK PACKAGE 3 – Better Pumping Practices Marketing and Promotion					
To bring the BPMA Better Pumping Practices Scheme to the attention of the Professional Institutions, Trade Associations, the Industry Press and key Pump Users. To bring the project outputs together into a final report to be presented to Stakeholders and to	3.1	Finalise Plan/Admin	2	1	6
	3.2	Create Better Pump Practices Brochure	2	4	6
	3.3	Create BPP overview pack and hold launch event	7	3	12
	3.4	Finalise Series of Energy Articles	1	2	12
	3.5	Place articles in key publications	3	3	2
	3.6	Deliver 1 hour presentations to Institutions and Trade associations (Draft complete and circulated for comment)	10	9	10
	3.7	Improve BPMA Energy Website to publicise best practice (website launched - needs updating/improving regularly)	2	6	4
	3.8	Publish BPMA Energy Yearbook	4	8	2
	3.9	Report back to BPMA membership and user participant	1	1	50
	3.11	Formalise training to Institute CPD status	4	4	4
	Total			36	41

	Ref	Output	Action			
			Man Days			
			BPMA Staff	Outside Staff	Members	
WORK PACKAGE 4 Structured Training to Pump Users to create pull on the Supply Chain						
Train a significant number of pump users in techniques to minimize the energy consumption in the pump systems that they operate.	4.1	Finalise Plan/Admin	Publish Document	2	1	
	4.2	Finalise training material (Draft complete and circulated for comment - Notes to be added)	Powerpoint presentations and course notes - Print/collate training books	2	4	4
	4.3	Train the trainers	Deliver training course	4	4	0
	4.4	Publicise Event if Workpackage 1 is not implementd	Promotional campaign	1	2	
	4.5	Hold One Day Energy Savings Opportunities Road-show	Duplication of training Material and Deliver 4 training courses to min 50 attendees at each	8	20	8
			Total	17	31	12

	Ref	Output	Action			
			Man Days			
			BPMA Staff	Outside Staff	Members	
WORK PACKAGE 5 - Tools to assist pump selection and system auditing						
Tools to assist pump selection and system auditing; Software and Diagnostics and Instrumentation	5.1	Finalise Plan/Admin	Publish Document			
	5.2	Development of Pump Auditing Software – EU Version of PSAT		6		10
	5.3	Development of Intelligent Pump Auditing Strap		6		10
			Total	12	0	20

Appendix 1 Organisations to interface with in delivering strategy

Trade associations

Association of Electricity Producers

First Floor
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Pamela Taylor Chief Executive – pa Yvonne Rawley

Chemical Industries Association

Kings Buildings
Smith Square
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Judith Hackett Director General
enquiries@cia.org.uk or telephone: 020 7834 3399

UK Petroleum Industry Association

7th Floor
9 Kingsway
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Chris Hunt – Director General
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Federation of Environmental Trade Associations

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Heating Ventilating and Air Conditioning Manufacturers Association

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Heating Ventilating and Contractors Association

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Suppliers Organisations**Energy Industries Council**

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REMA - Rotating Electrical Machines Association

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BEAMA The British Electrotechnical and Allied Manufacturers Association

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Energy Agencies

The Carbon Trust

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DEFRA

Department for Environment, Food & Rural Affairs
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Defra
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AEA Environmental

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Fax: +44 (0)870 190 6318

Energy Savings Trust

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Other potential contacts

The Association of UK Energy Agencies

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The National Energy Foundation

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