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Agenda

- § Stern Report on Climate Change
- § 2007 Energy White Paper
- § EU Renewable Energy Directive and developing the UK Renewable Energy Strategy
- § Role of Geothermal in meeting UK energy and carbon targets
- § Call for Evidence on Heat
- § Key new initiatives

Stern Review

30 October 2006: Sir Nicholas Stern, Head of the Government Economic Service and Adviser to the Government on the economics of climate change and development, presents his report to the Prime Minister and the Chancellor of the Exchequer on the Economics of Climate Change

Key messages:

- **Given the costs of impacts, taking urgent action is good economics – spend now (around 1% GDP) to save significantly more later**
- Even with strong action to reduce greenhouse gas emissions **adaptation** must be a crucial part of development strategy
- Policy requires **urgent and international action**, pricing for damages from greenhouse gases, supporting technology development and combating deforestation



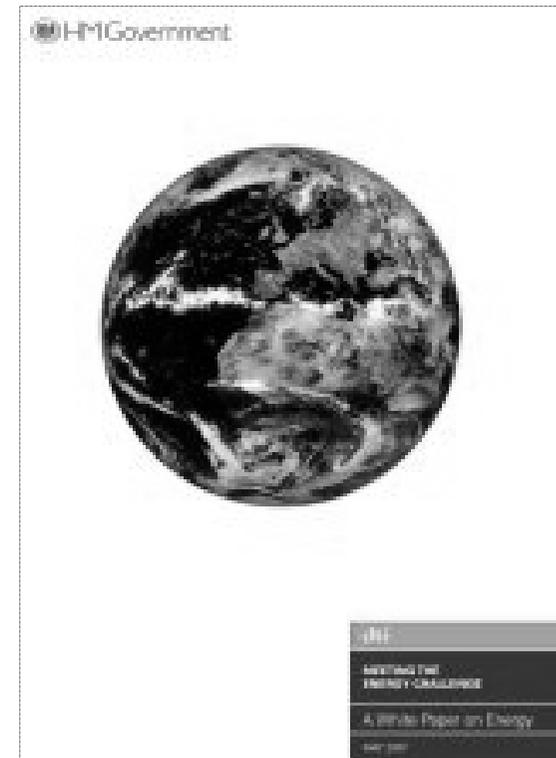
http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

Energy White Paper – ‘Meeting the Energy Challenge’

• **23 May 2007** - Energy White Paper sets out how we will face our two long-term energy challenges to 2050:

- Tackling climate change by putting ourselves on a path to **cutting CO2 emissions by some 60% by about 2050**, with real progress by 2020; and
- Ensuring secure, clean and affordable energy as we become increasingly dependent on imported fuel

• **We commit to: “...conduct further work into the policy options available to reduce the carbon impact of heat and its use in order to determine a strategy for heat.”**



<http://www.berr.gov.uk/energy/whitepaper/page39534.html>

Renewable Energy Strategy (RES)

§ May 2007: UK takes key role in securing agreement among EU Heads of Government to a **binding target of 20% of EU's energy (electricity, heat and transport) to come from renewables by 2020**

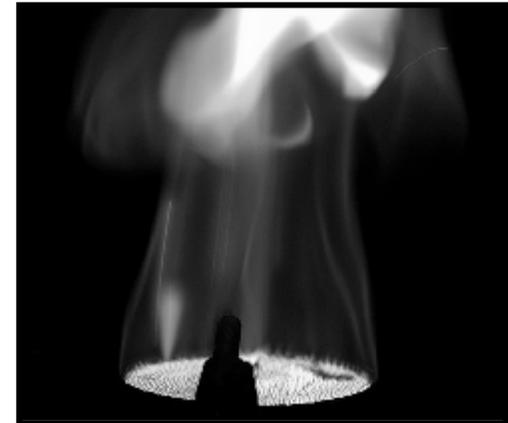
§ November 2007: PM announces plans for a 2008 consultation on how the UK would achieve its renewables target and to publish a **Renewable Energy Strategy in Spring 2009**

§ January 2008: Commission issues its proposals, in the form of a draft Renewable Energy Directive (RED) and proposes the UK takes a **15% renewable energy target** as its contribution

§ This targets covers UK electricity, heat and transport; it is for the UK to decide how to apportion the split between the three (subject to the final agreed EU target on renewable transport fuel.)

<http://www.berr.gov.uk/energy/sources/renewables/strategy/page43356.htm>

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How can Geothermal energy contribute?

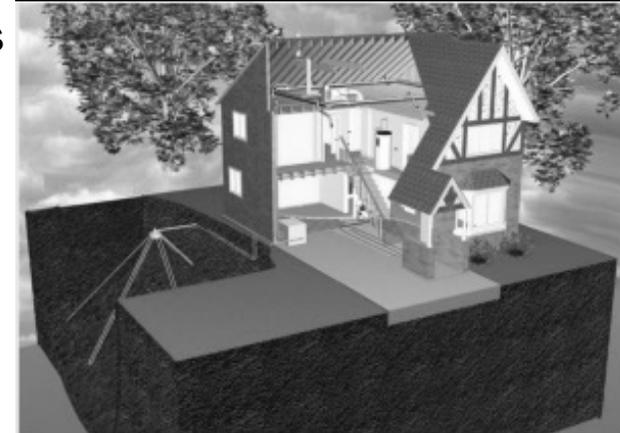
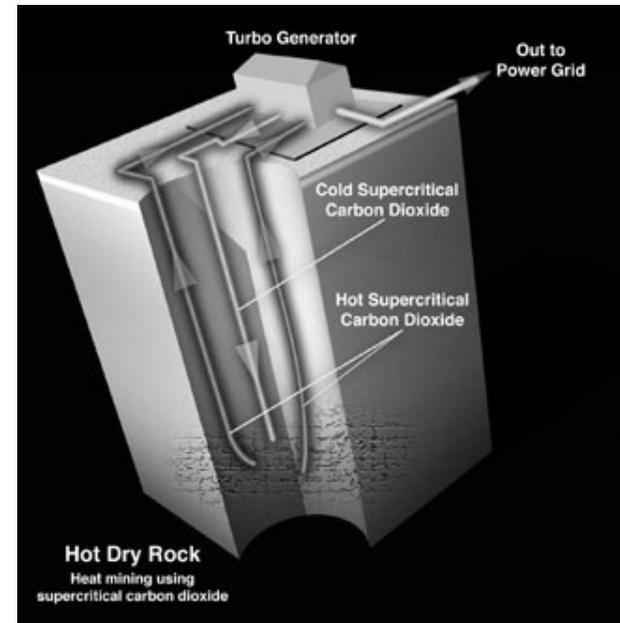
§ At very high temperatures and deep boreholes – **electricity** could be potentially produced

§ Hot Dry Rock geothermal energy research continues in Japan, Europe, Australia and USA

§ 2006 USA (MIT) feasibility study looked at developing 100GW geothermal electrical capacity by 2050

§ At much lower temperatures, geothermal heat can be used for **heating space and water** in domestic and commercial buildings, and for low-temperature processes

§ Ground source heat pumps commercially available from manufacturers including: Dimplex UK, Kensa, NIBE Energy, Ochsner Warmepumpen, Radiant Heating Solutions, Unico Climate Control and, Worcester-Bosch Group



http://geothermal.inel.gov/publications/future_of_geothermal_energy.pdf (MIT report)

Renewables Obligation (electricity) Banding proposals

Band	Technologies	ROCs/ MWh
Established 1	Landfill gas	0.25
Established 2	Sewage gas, co-firing with regular biomass	0.5
Reference	Onshore wind, hydro, co-firing with energy crops, EfW CHP, geopressure	1
Post Demonstration	Offshore wind, dedicated regular biomass	1.5
Emerging	Wave, tidal, ACT (including AD), dedicated regular biomass CHP, dedicated energy crops, solar, geothermal , microgeneration	2

Heat

§ Almost half of all UK's carbon emissions arise from the use of heat - for space and water heating, cooking, industrial process heating, industrial drying and similar purposes

§ Yet, compared to decarbonising UK electricity we are at a much earlier stage

§ Currently around 5% of UK electricity is from renewable resources, and the RO is expected to take this to 15% in 2015

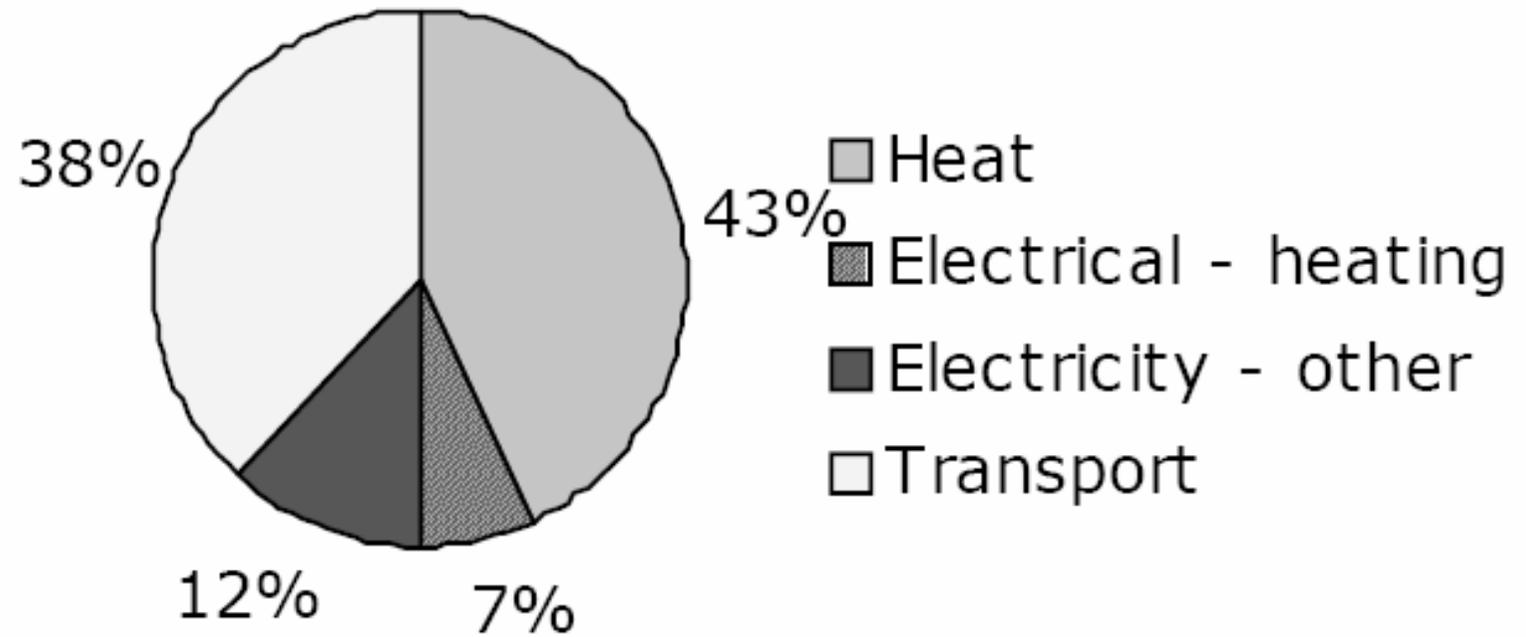
§ But just **0.6% of UK heat supplies is renewable**

§ Unlike electricity, there is no existing national network that can be used for easy distribution of renewable heat

§ Consumers are used to buying fuel (gas, oil or coal) or electricity and converting these into heat in boilers or electric heaters in the home or workplace; change is viewed as painful, time consuming and risky!



UK final energy demand 2005



BERR Energy Trends 2007

2008 Call for Evidence on Heat

§ On 31 January Call for Evidence launched by BERR with Defra and DCLG. Closed at end March

§ This set out Government's understanding of the opportunities and prospects for renewable heat and some of the constraints preventing greater use of renewable heat

§ It sought views on whether we need **new incentives to stimulate the development of renewable heat; what form it might take (heat obligation? fixed tariffs? alternatives?) and which options provide the most cost-effective solutions**

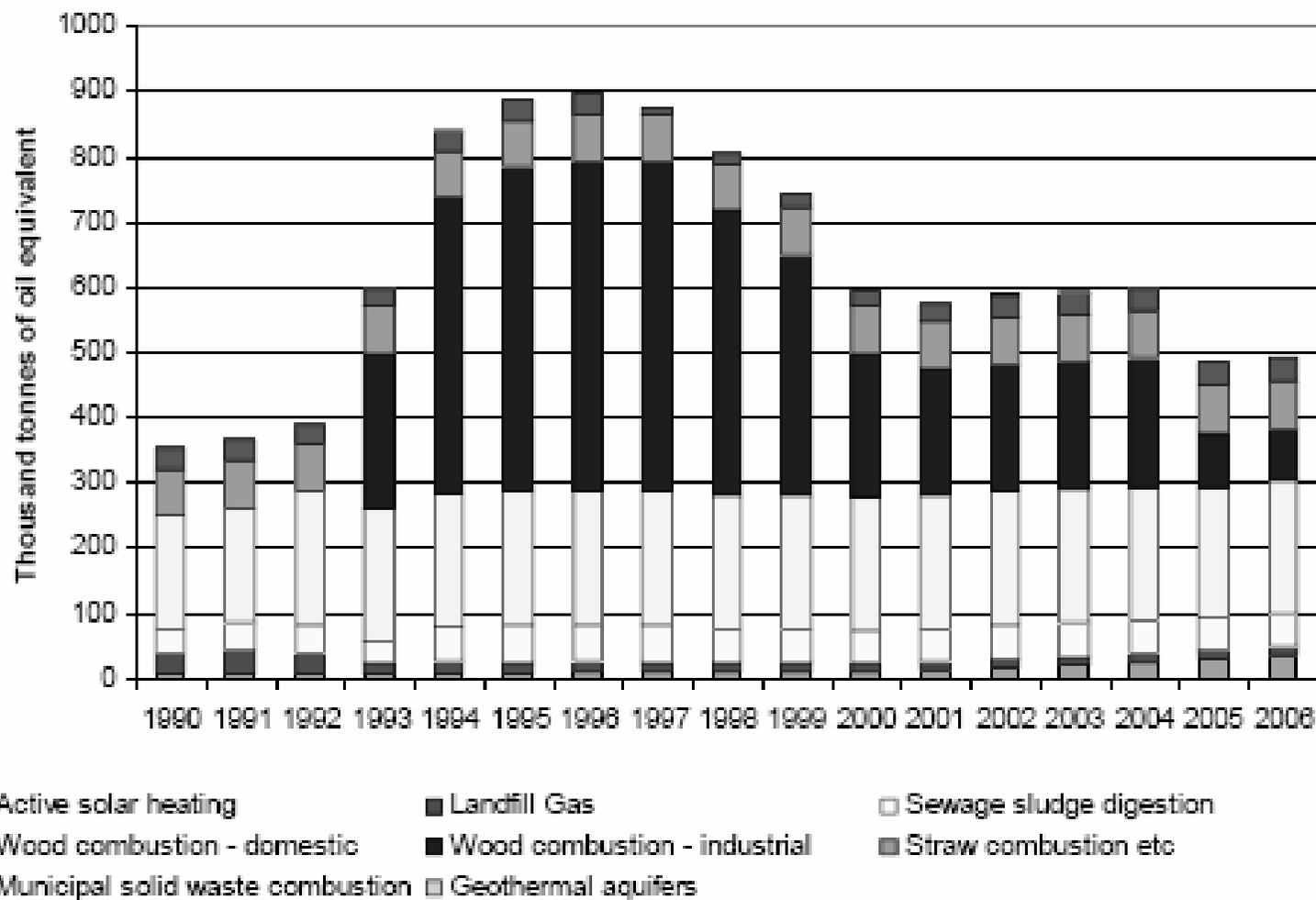
§ And requested technical contributions and evidence on overcoming constraints, what role low-carbon electricity should play in heating and how surplus heat can be captured, transported and used, especially where we have a well established gas network

§ Responses and analysis will feed into the Renewable Energy Strategy and into developing our wider approach on heat

<http://www.berr.gov.uk/files/file43609.pdf>

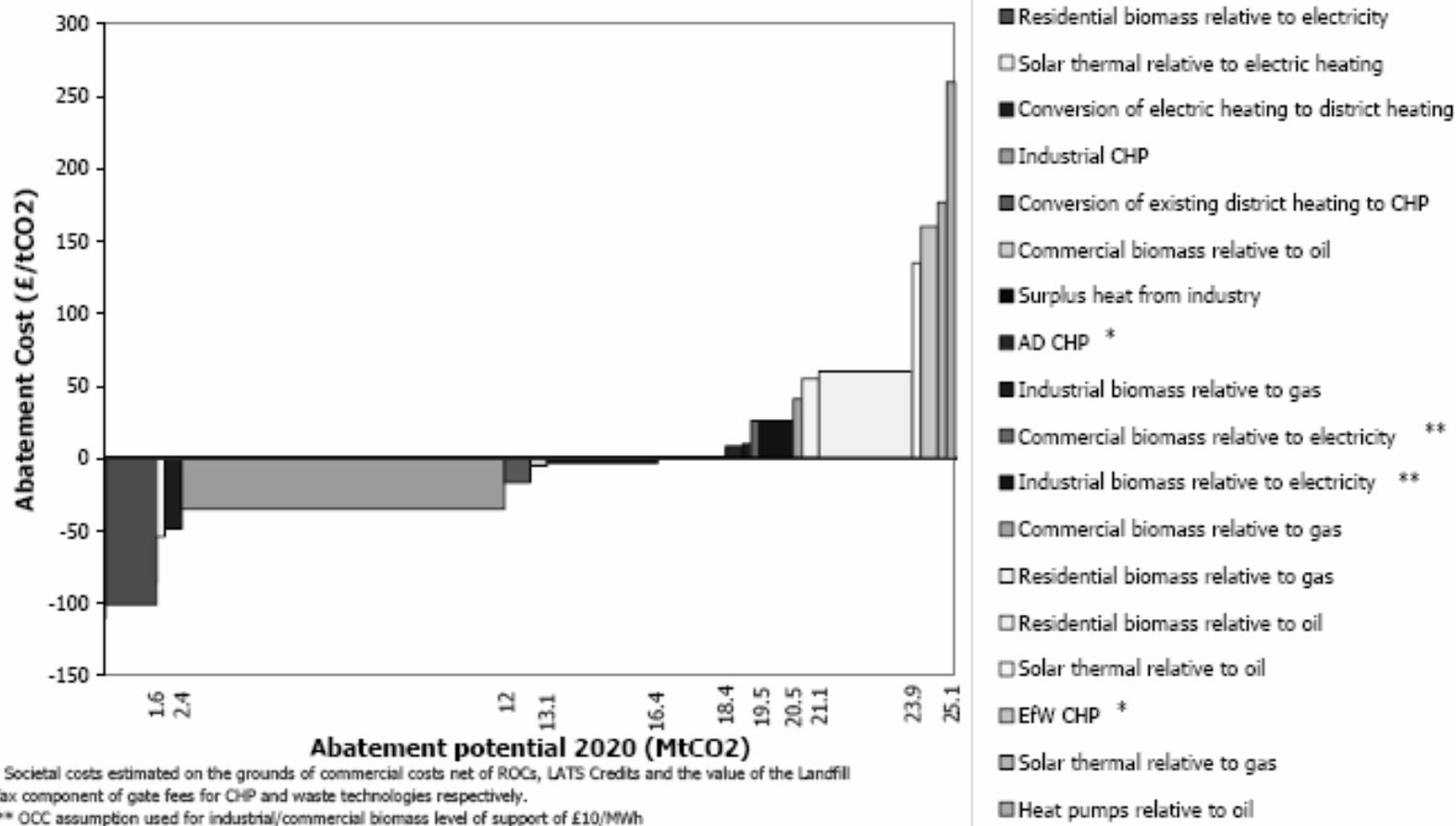


Figure 4.1: Breakdown of renewable heat sources 1990–2006



Source: DUKES: www.berr.gov.uk/energy/statistics/source/renewables/page18513.html

Marginal Abatement Cost curve for Heat



- The MAC curve ranks range of technologies from the **most cost effective to the least**.
- Bars shown below the axis save money or produce net benefits to society, even before the effect on carbon dioxide emissions is taken into account
- Width of the bars represents the total potential amount of carbon emissions savings that could be achieved if all likely opportunities are exploited

Type of Technology	Abatement Cost (£/tCO ₂)	Abatement Potential 2020 (MtCO ₂)	Cumulative Abatement Potential (MtCO ₂)
District heating in city centre schemes	-110.64	0.04	0.04
Residential biomass relative to electricity	-101.00	1.52	1.56
Heat pumps relative to electric heating	-86.00	0.12	1.68
Solar thermal relative to electric heating	-54.00	0.29	1.97
Conversion of electric heating to district heating	-48.62	0.42	2.38
Industrial CHP	-34.99	9.64	12.03
Conversion of electric district heating to CHP	-16.65	0.58	12.60
Commercial biomass relative to oil	-4.90	0.49	13.09
Surplus heat from industry	-3.27	3.30	16.39
District heating in dense residential areas	-1.63	0.08	16.47
Industrial biomass relative to oil	1.10	1.89	18.36
District heating in new build housing	6.82	0.03	18.39
AD CHP	8.45	0.51	18.90
Industrial biomass relative to gas	10.00	0.34	19.24

MAC Curve – continued

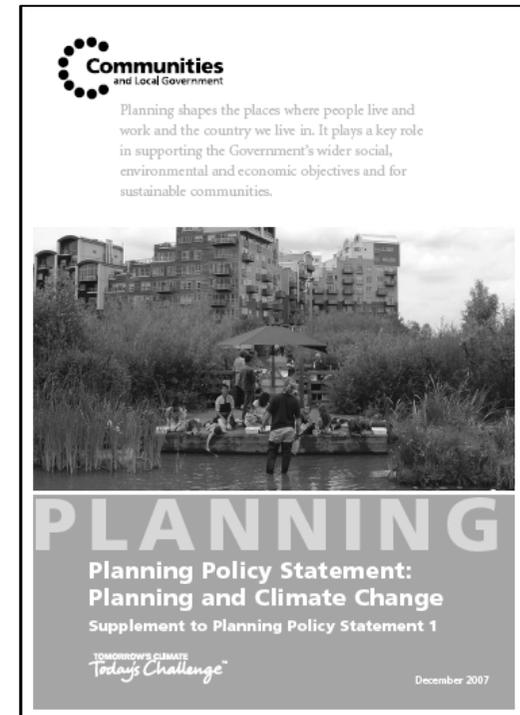
Commercial biomass relative to electricity	26.00	0.27	19.51
Industrial biomass relative to electricity	26.00	1.03	20.54
Commercial biomass relative to gas	41.00	0.08	20.62
Residential biomass relative to gas	55.00	0.50	21.12
Residential biomass relative to oil	60.00	2.78	23.90
Solar thermal relative to oil	135.00	0.22	24.12
EfW CHP	160.00	0.55	24.67
Solar thermal relative to gas	177.00	0.32	24.99
Heat pumps relative to oil	260.00	0.10	25.09

Planning & Climate Change

§ 23 July 2007 - '**Building a Greener Future**' policy **statement** confirmed our intention for all new homes to be zero carbon by 2016 with a tightening of the energy efficiency building regulations - a 25% improvement in energy/ carbon performance in 2010, moving to 44% in 2013 - up to the zero carbon target in 2016.

§ 17 December 2007 - **Supplement to PPS1 – Planning and Sustainable Development**, sets out how planning should help shape places with lower carbon emissions and be resilient to climate change

§ Aims and policies within these statements to be fully reflected by regional planning bodies in Regional Spatial Strategies, by the Mayor in London's Spatial Development Strategy and by planning authorities in their Local Development Documents.



Excerpt from Planning and Sustainable Development PPS1 Supplement

Renewable and low-carbon energy generation

“19. In developing their core strategy and supporting local development documents, planning authorities should provide a framework that promotes and encourages renewable and low carbon energy generation. Policies should be designed to promote and not restrict renewable and low-carbon energy and supporting infrastructure.

20. In particular, planning authorities should:

- not require applicants for energy development to demonstrate either the overall need for renewable energy and its distribution, nor question the energy justification for why a proposal for such development must be sited in a particular location;

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- expect a proportion of the energy supply of new development to be secured from decentralised and renewable or low-carbon energy sources.”

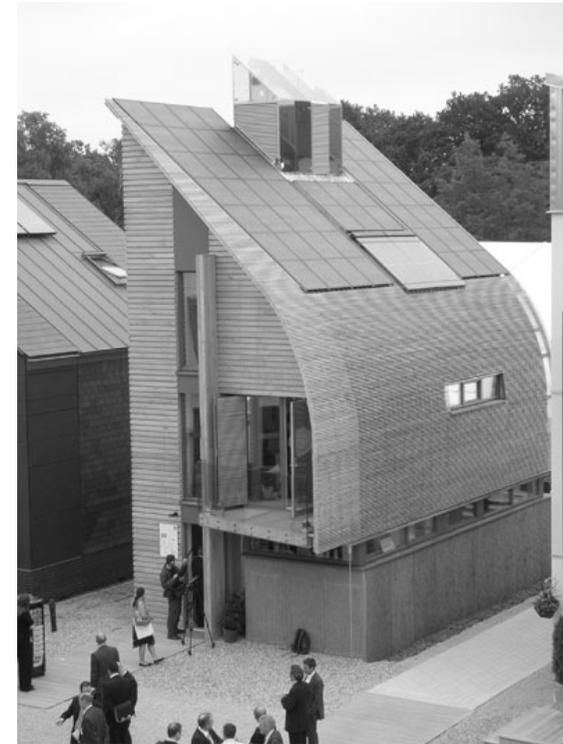
Zero Carbon Buildings and Ecotowns

§ Target for *all new homes to be zero carbon from 2016* and proposed target for **new non-domestic buildings to be zero carbon from 2019**

§ Definition of a zero-carbon home is one where there are **zero net emissions** from all energy used in running the home over one year; includes heating, lighting, hot water and all electrical appliances

§ 3 April 2008 - Government published 15 short listed Eco-town locations in the consultation '***Eco-towns: Living a greener future***'. This seeks the public's views on the vision for eco-towns and the shortlisted locations proposed

§ Ecotowns will be expected to deliver outcomes against seven criteria including **zero carbon and environmental standards** and **design quality**; expected to be up to five eco-towns by 2016 and ten by 2020. Each town is to be 5,000-20,000 homes



Other initiatives supporting GSHPs

§ **Low Carbon Buildings Programme (LCBP)** - Government's £86m grant programme for microgeneration technologies, runs to 2009

§ **The Carbon Emissions Reduction Target (CERT)** – whereby energy suppliers have a target to promote and deliver energy efficiency measures to their customers) started supporting microgeneration in April 2008

§ Microgeneration installations (including ground source heat pumps) became **permitted development** (i.e. removing the need for specific planning consent, providing criteria were met) from on 6 April 2008

§ **Microgeneration Certification Scheme** has recently been launched and will provide UK consumers with independent certification of microgeneration products and services

§ Lack of information is a big barrier. The expanded Energy Saving Trust '**Act on CO2**' / '**Green Homes Service**' will include information and advice about microgeneration for householders.

Help us to shape energy policy

§ Respond to the UK Renewable Energy Strategy consultation due to be launched in June

§ Latest details on its developments – including the consultation document when launched - are available at:

www.berr.gov.uk/energy/sources/renewables/strategy/page43356.html

§ Please feel free to respond to just 1 or 2 questions on the areas you are interested in; evidential data and new ideas are particularly welcome!



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