

Air transport set to scupper London's emissions drive

London Mayor Ken Livingstone is launching an ambitious energy strategy aimed at tackling the capital's disproportionate contributions to global warming, other global environmental impacts and fuel poverty, but curbing air transport emissions will be the biggest challenge.

In his state of the environment report for London, *Green Capital**, Livingstone announced the strategy, alongside four other key environmental strategy documents, and the overall *London Plan*, noting that "these collectively show how we can improve London's environment and at the same time develop sustainable solutions".

He added that he will be "setting ambitious targets to improve our environmental performance over the next ten years, particularly in waste management, air quality and our use of renewable energy".

The report, which will be repeated in 2007, also addressed increasing concerns over vulnerability to flooding in London from climate change (p.12).

But unless carbon dioxide emissions from London's burgeoning air transport sector are curbed, which seems increasingly unlikely in the absence of aviation tax

measures, any reduction programme is likely to fall hostage to growth of new airport capacity in the South East.

Hostage to fortune

Aviation fuel consumption now accounts for over 26% of London's total energy use, almost twice that of 1985 (15%), and is responsible for most of its recent growth in energy consumption according to data from the **Greater London Authority** (2002). The inexorable growth in air transport has, with the exception of the period after September 11, led to a 120% increase in consumption of aviation fuel since the mid-1980s alone. Aviation emissions are customarily ignored in emissions reductions targets, but the London figures underline the futility of any regional reductions programme excluding them.

Green Capital reveals that total energy consumption in

Continued on page 2 ▶

Meacher pushed, Wilson goes in ministerial coup

Michael Meacher, environment minister for six years in the New Labour Government, has finally been removed after several earlier false alarms when it was strongly predicted he would be sacked.

He is one of Labour's longest serving MPs - having first been elected in 1970 - and was also Labour's most experienced minister, having served in various roles throughout the Wilson and Callaghan administrations in the 1970s.

Meacher was never comfortable with government policy on nuclear reprocessing and GMOs, both of which were included in his brief, particularly their regulation. His publicly expressed scepticism over the suggested benefits of GMOs - particularly

with the Prime Minister's often expressed public advocacy of widespread exploitation of GM technology- was probably what did for his ministerial position in the end.

The zenith of his career was during Labour's opposition years in the 1980s and early 1990s, when he sat in the shadow cabinet for fourteen years and was tipped as a future leader.

Meacher told *Radio 5 Live's Simon Mayo* show on Monday that the achievement he was most proud of in his six years in charge of environment policy was to steer the Kyoto climate change protocol to completion in the face of outright opposition by the US Administration - then under **President Clinton** and his environment-friendly vice

Continued on page 2 ▶

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In this Issue

- 2-4 **UK policy**
Dramatic growth in aviation fuel use
Meacher sacked, Stephen Timms replaces Brian Wilson
Sky's the limit for greenhouse gases
- 4-7 **Europe & international**
Draft constitution row
Shock report boosts renewables
G8 global warming Action Plan
Emissions crisis in rich countries
- 7 **International/legal**
Washington in dock over climate change
- 8 **Science**
Climate warms to land use changes
Runaway greenhouse effect
California drying
- 9-10 **Energy efficiency & renewables**
Dramatic office emissions threat
OFGEM sustainability guidance
Brussels CHP move
- 11 **Technology**
Eco-cement faces hardened resistance
- 12-14 **Business | adaption**
London's flood defences
'unsustainable'
Managing climate risks
SW climate change developments
- 15 **Diary, Editorial**
- 16 **Comment, Notes and Quotes**

PARLIAMENT

Towards a non-carbon future - the Government responds

The Government has published its response to the Science and Technology Committee's Fourth Report (CCM1, p.12), *Towards a Non-Carbon Fuel Economy: Research and Development* (HC 55 (HC 745)). It agrees with the committee view on the crucial role of research and development in low carbon technologies, but rejects the charge that it has underspent on research in the sustainable energy sector. It says an additional £28m spending through the cross-Council 'Towards a Sustainable Energy Economy' (TSEC) programme "should more than double Research Council investment in sustainable energy research by 2005-06".

The Government agrees "there is a need to improve the strategic direction, cohesion and co-ordination of the UK's energy policy making and the delivery of its energy research, development and demonstration programmes". However, it believes "the best way of securing this is through the new Sustainable Energy Policy Network and an Energy Research Network as set out in the White Paper", rather than through a new organisation.

It adds that: "the proposed renewable energy authority risks diverting effort into the creation of structures and possibly new silos separate from the main stream of energy policy rather than into the delivery of programmes and commitments".

It adds that in March alone, more consents were granted for wind power than were built in the whole of the 1990s.

Other key issues in the report will be examined further in *CCM4. Science and Technology - Sixth Special Report*, June 9, 2003 Full report at: www.publications.parliament.uk/pa/cm200203/cmselect/cmstech/745/74502.htm

UK on target for Kyoto commitments

Outgoing environment minister Michael Meacher told Gregory Barker, Conservative MP for Bexhill & Battle announced that "Provisional data for carbon dioxide emissions are now available for 2002. This data shows emissions fell by an estimated 8% to 9% between 1990 and 2002," which, he added "demonstrates that the Government is making progress towards the domestic goal to reduce carbon dioxide emissions to 20% below 1990 levels by 2010."

Mr Meacher also said: "Data for emissions of the basket of six greenhouse gases for 2001, submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in April 2003, show that emissions fell by 12.3% between the base year and 2001." He insisted that the latest projections also indicate that we are well on course to meet our Kyoto commitment, saying that this conclusion is supported by two recent, independent assessments.

[source: Hansard, 9 June, column 580W]

Continued from Page 1 ▶

Air transport set to scupper London's emissions drive

London had reached 151,502,253 MWh by 1999-2000, equivalent to 40.3mt CO₂. However, it says a later ecological footprint study, *City Limits*, revealed that CO₂ output by 2000 had risen even further, to 41mt. The study, by Best Foot Forward consultants (2002), also revealed that "less than 1% of London's energy came from renewable sources".

Green Capital says that in the period 1999-2000 domestic CO₂ emissions dominated (46.4%), with 32.64% from London's commercial sector, and 21.2% from transport, based on Greater London Authority data (GLA, 2002).

Overall, emissions have fallen since the 1990 base year, but have remained substantially above the *Kyoto Protocol* target of a 12½% reduction, and have risen slightly recently. Reaching the 20% UK domestic reduction target adopted in the draft energy strategy for London at the recommendation of the London Sustainable Development Commission (LSDC) will therefore pose a challenge in terms of non-aviation energy use, though certainly not an impossible one.

Over a longer period (1965-1999), current non-aviation energy use in London appears to have climbed gradually, with notable reductions during the economic recessions

of the 1970s and 1980s (GLA, 2002). The major change has been the growth of natural gas usage, which accounts for more than half of consumption, but has not in itself dramatically raised consumption.

The main problem is that while overall growth has been steadily upward over most of the period, dramatic growth in the consumption of aviation fuel since the mid-1980s accounted for most of it, pushing overall energy consumption to well over 200TWh by the end of the period.

The report concludes that progress along a sustainable energy, low carbon pathway will need both increased energy efficiency in all applications, and greater renewable energy capacity. It notes that the former "can be assessed by monitoring overall energy consumption and carbon dioxide emissions", and that "improving energy efficiency is the most cost-effective way of reducing carbon dioxide emissions".

**Green Capital: The Mayor's State of the Environment Report for London*

www.london.gov.uk/gla/publications/environment.jsp;

www.london.gov.uk/mayor/sustainable-development/sustainable_development_commission.jsp

Continued from Page 1 ▶

Meacher pushed, Wilson goes in ministerial coup

president, Al Gore - and the American oil industry lobby.

The Oldham West MP has proved remarkably resilient in office, remaining one of the most radical members of the government. He has spoken out several times on the failure of ministers to put the environment at the heart of government, despite Mr Blair's pledge to do so. Meacher was a friend of the green lobby who managed to combine his eco-credentials with a sure-footed ministerial performance.

Disturbed by Downing Street policy advisors, Meacher was the victim of a behind-the-scenes attempts to exclude him from the delegation to last summer's *Earth Summit*. He went after furious lobbying by green groups. His departure will leave a hole in government policy on sustainable development and climate change policy.

The new energy minister replacing Brian

Wilson is Stephen Timms, formerly minister of state for e-commerce and competitiveness at the DTI. He is MP for East Ham. Timms was previously minister of state for schools at the Department for Education and Skills (from June 2001), and financial secretary to the Treasury (from July 1999), where he cut his teeth on energy issues, working on the Climate Change Levy. He also had 12 months before that as a junior social security minister.

In local government he was leader of the London Borough of Newham Council, and in the 1980s he chaired its Economic Development Committee and Planning Committee respectively.

At Westminster he has been a member of the Labour Party departmental committee on the Environment, Transport and the Regions (1997-2001), and has a political interest in urban regeneration.

The sky's the limit for greenhouse gases

With the Government preparing to take major decisions on new airport capacity, CCM investigates the politics of "predict and provide" in the aviation industry.

As recent embarrassments go, the realisation that the Government will never meet its global warming targets as long as aviation remains both uncontrolled and actively encouraged to expand might seem relatively trivial.

But it is beginning to undermine all sorts of policies - most recently London's environmental plan (pp.1-2) - and other sectors are wondering why commercial air travel is so favoured.

Last autumn, the **Royal Commission on Environmental Pollution** pointed out: "if no limiting action is taken, the rapid growth in air transport will proceed in fundamental contradiction to the Government's stated goal of sustainable development."

Then, in May, the **Institute of Public Policy Research** published its report, *The Sky's the Limit*, which pointed out the Government's hopes of a reduction in greenhouse emissions were completely undermined by its proposed airports strategy which foresees an increase in air passengers from 180m in 2000 to no less than 501m by 2030.

Although most criticism of the plan centres on amenity aspects, this is an industry with a dismal record on emissions. Keeping 300t of metal suspended eight miles above the ground for hours on end burns kerosene at an astonishing rate. Flying a single passenger from London to Miami generates roughly as much greenhouse gas as an average British family car emits in a year.

Aviation emissions excluded

Aviation and shipping were, of course, both excluded from the *Kyoto Protocol*, much to those industries' satisfaction. Instead, the problem was remitted to the **International Civil Aviation Organisation** and the **International Maritime Organisation** for action, a guarantee that nothing much would happen for at least a decade.

ICAO did at least commission the **Intergovernmental Panel on Climate Change** to study the science and its *Special Report on Aviation and the Global Atmosphere* was submitted in 1999. This concluded that aircraft contribute about 3.5% to anthropogenic radiative forcing, although

scientific uncertainties prompted it to omit any contribution from aircraft contrails and the cirrus clouds they help form.

They are just one uncertainty; the exact role of NOx is another and, as in so much climate science, the more you know, the more you know you don't know.

"What's happened is that for every question answered, two more emerged," says **Tim Johnson**, director of the **Aviation Environment Federation**. "The range of figures is far wider than the IPCC considered; most people would say their figure is conservative."

Moreover, the growth in air travel is making its contribution worse. It has been running at 4-5%/yr and, while the industry points to the continuing improvement in aircraft fuel efficiency, this only improves things around 1%/y.

On the basis of its *Fifth Environmental Programme*, which came to an end in 2001, the ICAO Assembly requested its Council to study policy options to reduce the impact of emissions and advise the UNFCCC accordingly.

"It called for special emphasis to be placed on the use of technical solutions while continuing consideration of market-based measures," says ICAO.

Its *Sixth Environmental Programme* has therefore been looking at engine certification standards, operational changes to reduce fuel use and, above all, use of market-based measures. It is due to report next year, but no-one is holding their breath. ICAO has all along made clear it prefers market-based solutions to charges imposed on fuel consumption (and the revenue returned in some way to the industry), with taxes on fuel consumption its least favourite.

"But it doesn't feel under any immediate pressure to deliver on trading," points out Johnson.

Fuel taxes prohibited

Indeed the existing *Chicago Convention* specifically prohibits fuel taxes on international flights (although not domestic, which is why American airlines actually pay more fuel tax than most). The *EU Mineral Oils Directive* reflects this, but Europe has indicated a desire for change. It may be that

an ICAO failure to introduce an effective emissions limiting and trading system next year will prompt it to impose fuel taxes on flights within Europe at least via the forthcoming *Energy Products Directive*.

The RCEP recommended a whole raft of possible responses. It pointed out short-haul flights, the worst in terms of emissions per passenger kilometre, could be replaced by rail journeys. But instead, the Government is considering massive airport expansion. The even faster expansion of air freight is another area where it urged action.

Massive expansion

The airports consultation ends at the end of June but decisions are likely to take time. Some of the wilder proposals like new airports at Cliffe and Rugby and three runways at Gatwick may prove publicly unacceptable, but a compromise which still involves huge expansion still looks likely. The AEF ran the **Department for Transport's** assumptions with imposition of fuel tax and VAT factored in; instead of expansion to 501m passengers this suggested 340m by 2030 - an increase of 1.5-2%/yr. This isn't much beyond the improvements technology can offer. But there is still a 1960s "predict and provide" culture at the DfT where road and air travel are concerned, and it is very hard to shift.

"It's almost an impasse at the moment," says Tim Johnson. "The Government is saying climate change is a problem and aviation's role needs to be considered. But the consultation says it is an international industry and the way to pursue reductions is through international fora."

Ironically, of course, there has been a temporary glitch in the growth of air travel, following the terrible events of September 2001. But instead of being an opportunity for step change, it has toppled industry overcapacity into a series of major insolvencies and airlines are saying now is not the time for restrictions.

But with ICAO showing no urgency to send a price signal to the industry, there is little prospect of action this decade. Aviation could end up as the world's most significant source of greenhouse emissions.

Draft constitution is a 'cock-up' for sustainability

Controversy over the current draft of the EU convention on the future of Europe has moved into the environmental arena, with sustainable energy campaigners and environmental lawyers warning it risks undermining previous commitments to sustainability across all European Union programmes.

In particular, the UK **Environmental Law Association** (UKELA) objects to Article 3 of the draft, which commits the European Union to "work for a Europe of sustainable development based on balanced economic growth and social justice". In an open letter to Secretary of State for Wales and EU negotiator **Peter Hain**, it says - this is an inadequate definition of sustainable development because, crucially, it omits reference to 'environment'.

UKELA points out this is inconsistent with that of the *UK Sustainable Development Strategy* and that widely recognised by international agencies.

It also says Article 8 omits key "principles of environmental policy integration and of policy coherence" currently in force through the *Treaty of Amsterdam*.

Association for the Conservation of Energy (ACE) director **Andrew Warren** told CCM he was also deeply concerned at the draft as it stood and its implications for sustainability in energy policy, and was in urgent consultation over the issues it raised. He tended to the view that "this has happened because of a cock-up rather than a conspiracy, and is probably an oversight", but one which would be alarming if the final text were to reflect it.

Eight of Europe's largest environmental groups with 20m members and supporters, notably **Friends of the Earth** (FoE), **Greenpeace**, **Climate Action Network Europe**, and the **European Environmental Bureau** (EEB), are also urgently lobbying for changes. They note that several amendments have already been tabled by French, German and UK government repre-

sentatives, supported by European environment ministers.

Even so, in a joint statement, the *Green 8* pointed out that:

"While giving sustainable development a welcome place in the new Constitution, the **Praesidium** has failed to put the ecological dimension, 'protection and improvement of the quality of the environment' on equal footing with the economic and social components of sustainable development."

They say this "can still be accomplished by a simple shift of wording in new article I-3, thereby avoiding the risk of the ecological dimension being relegated to an afterthought".

The *Green 8* also say they "support the initiative of [Environment] Commissioner **Wallström** to introduce a *Protocol on Sustainable Development*."

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www.ukela.org;

www.eeb.org; www.ukace.org

Sustainable Energy Policy Network

The Government has launched its long-awaited **Sustainable Energy Policy Network** website, promising "a new transparent and accountable way of working" which "is about ensuring the right communications and links are made across and beyond government to deliver the *White Paper*".

The network is to report to a ministerial committee, chaired by Trade and Industry Secretary **Ms Patricia Hewitt** and **Margaret Beckett**, Secretary of State for Environment, Food and Rural Affairs, and will meet for the

first time later this month.

Announcing the launch of the site for **Defra**, **Lord Whitty** said "it will make it possible for people to identify how the *White Paper* is being taken forward and who is responsible for each area of work". He claimed that "the virtual **Sustainable Energy Policy Network** itself will help to ensure that we put sustainable development at the heart of the UK's future energy policy".

The other members of the committee represent 11 departments, including DTI

(outgoing energy minister **Brian Wilson**), **Defra** (Lord Whitty), the **Office of the Deputy Prime Minister**, **Department for Transport**, **Foreign and Commonwealth Office**, **HM Treasury**, **Ministry of Defence**, **Office of Science and Technology**, **Department for International Development**, **Scottish Office**, **Welsh Office**, and **Northern Ireland Office** representation

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www.dti.gov.uk/sepn

Scots online emission register exposes hotspots

The **Scottish Environment Protection Agency** (SEPA) has launched its online version of the *European Pollutant Emission Register* (EPER).

The long-awaited register, which is an obligation under the *Integrated Pollution Prevention and Control Directive, 1996* (IPPC), brings Scotland into line with the USA, Canada, England and some other countries that have long since maintained registers.

Analysis of the as yet incomplete register

for 2002 highlights fossil fuel power stations, oil refineries and landfill sites as the dominant point sources for greenhouse gas emissions, in line with expectations.

The largest CO₂ emission sources in 2002 were **Scottish Power's** Longannet coal-fired power station on the Forth Estuary, one of the largest in Europe, which emitted 11mt CO₂. This was followed by the Peterhead gas turbine run by **South of Scotland Electricity**, which emitted 3.42mt CO₂.

Cockenzie, a coal-fired power station near Edinburgh also run by Scottish Power emitted 2.65mt CO₂.

The **BP** group was also a major contributor to CO₂ emissions in Scotland in 2002, emitting a total of 4.32mt, mostly from its Grangemouth refinery complex.

www.sepa.org.uk/data/eper;

www.scottishpower.co.uk;

www.foe-scotland.org.uk

Shock report boosts renewables case

A report* on the world energy situation by 2030 commissioned by the **European Commission** predicts continued pre-eminence of fossil fuels based on current trends, leading to a doubling of both energy consumption and of CO₂ output relative to 1990 emission levels.

The report's assessment of current trends, issued by the EC's **Directorate General for Research**, makes deeply disturbing reading. It has, however, strengthened the resolve of energy commissioner **Loyola de Palacio** who has warned repeatedly of the need for more rapid progress in energy efficiency and renewables, and, together with **European Environment Agency** emissions data it dominated the last meeting of the **World Energy Council (CCM2)**, pp.1-2; *CCM-e 2/6/03*; this edition, see below).

The report says fossil fuels could supply almost 90% of total world energy by 2030, dominated by oil (34%), coal (28%), and natural gas around a quarter, most of this due to power generation. In the EU, oil would continue to dominate, followed by natural gas, coal and lignite, while renewables would account for under 20%.

Overall, both coal and gas production are expected to double by 2030. Oil consumption rises 65%, forcing up prices, with reserves judged adequate to 2030, but supply problems in prospect thereafter. Sectoral use globally remains constant but varying regionally, with industry accounting for around 35%, transport 25%, and the residential and tertiary sectors for 40%. The projection shows electricity use rising 3% per annum globally.

The report says that "given the continued dominance of fossil fuels, world CO₂ emissions are expected to increase more rapidly than energy consumption (2.1%/year on average)", doubling in 2030 relative to 1990. Emissions in the EU are projected to increase by 18% relative to 1990, and around 50% in the USA.

However, the report also highlights opportunities to avoid this scenario. It says that by attaching a **carbon value** to fossil fuel use, "CO₂ emissions in 2030 are 21% lower than in the Reference at world level and 26% lower in the EU and Accession Countries".

World energy, technology and climate policy outlook 2030 - WETO

http://europa.eu.int/comm/research/energy/weto_final_report.pdf

G8 unveils Action Plan on global warming

The eight economic powers meeting at the Evian economic summit have reaffirmed their commitments to sustainable development and greenhouse gas emission reductions, potentially boosting research, development and implementation of climate change market solutions.

In a detailed G8 Action Plan*, advancing an agenda based on a sustainability *Plan of Implementation* agreed to during the *World Summit on Sustainable Development (WSSD)* last year, the leaders committed to "three areas that present great opportunities for progress". G8 aims to "strengthen international co-operation on global observation" of climate change, permit data-sharing, and "improve the world-wide reporting and archiving of these data and fill observational gaps of coverage in existing systems".

However, of more immediate interest, the G8 also committed to "accelerate the research, development and diffusion of energy technologies", and to "promote energy efficiency of all sources and

encourage the diffusion and uptake of advanced energy efficient technologies, taking pollution reduction into account". Possible measures "include standards, public procurement, economic incentives and instruments, information and labelling".

The communiqué also says G8 aims to "promote rapid innovation and market introduction of clean technologies, in both developed and developing countries", "with appropriate methodologies to involve the private sector".

It commits to "substantially increasing the share of renewable energy sources in global energy use", to "stimulate fundamental research in renewable energies, such as solar photovoltaics, off-shore wind energy, next generation wind turbines, wave/tidal and geothermal, biomass", and to collaborating on research and development.

Significantly, the communiqué commits to "work towards making renewable energy technologies more price competitive".

The statement puts great emphasis on the

collaborative development of fuel cells, reflecting major US as well as EU investment programmes recently announced (CCM), suggesting major market opportunities could finally lift the technology into the take-off stage. It says G8 will:

- work with industry to remove obstacles to making fuel cell vehicles price competitive, striving to achieve this goal within two decades"

- accelerate developing internationally agreed codes and standards in appropriate existing organisations"

- work together to facilitate the use of hydrogen technologies in our and other markets, including through development of infrastructures"

**Science and technology for sustainable development - a G8 Action Plan. 3 June, 2003*

http://www.g8.fr/evian/english/navigation/2003_g8_summit/summit_documents/science_and_technology_for_sustainable_development_-_a_g8_action_plan.htm

Pan-European assessment targets transport and energy

The third pan-European state of the environment report* published by the **European Environment Agency (EEA)** unveiled at the *Environment for Europe Ministerial Conference* in Kiev (May, 21-23) warns that advances in greenhouse gas emissions reductions in eastern Europe were achieved by economic transition, and can

be expected to rise again in the near future.

The report says that the recovery of Eastern European economies is bound to undermine emissions reductions of the 1990s, and that this trend "is already apparent in the transport field".

It says "the increase in demand for road and air transport in western Europe has

resulted in transport issues rising to the top of the environmental / sustainability agenda", with transport now accounting for 30% total energy use in western Europe. Aviation now accounts for 5% passenger share, overtaking rail in the near future.

**Europe's environment: the third assessment, EEA. www.eea.eu.int/*

Emissions crisis looms in rich countries too

The stabilisation in greenhouse gas emissions from the developed world during the 1990s is likely to prove short-lived without far greater efforts in sectors such as transport, according to a report* presented to the **UN Framework Convention on Climate Change** (UNFCCC).

The report, based on projections by governments presented to the UNFCCC's **Subsidiary Body on Implementation**, warns that emissions in the rich countries will rise again by the end of the current decade with combined emissions from Europe, Japan, the US and other highly industrialized countries likely to grow by 17% from 2000 to 2010. UNFCCC says this will happen "despite domestic measures currently in place to limit them", with transport the worst offender.

Even worse news comes from Central and Eastern Europe, where "the so-called transition countries... are starting to increase their emissions again as their economies recover from their early and mid-1990s nadir", says UNFCCC. It points out that this could mean "the developed world as a whole (highly industrialized plus transition countries) will see its emissions increase by 10% from 2000 to 2010".

Developed countries only saw their combined emissions fall by 3% because of a 37% collapse during the economic meltdown in the transition countries during the 1990s, so that the aim of stabilising emissions at 1990 levels by 2000 was met largely by default. Emissions from the highly industrialised economies actually rose by 8%, led by Japan (11%), the US (14%), Australia (18%) and Canada (20%).

The report pointedly confirms that "two thirds of this increase originated in the two Annex II Parties that do not intend to be bound by the commitments of the *Kyoto Protocol*".

Only the **European Union** reported significant reductions of 3.5% over the period, though performance here too was very patchy, varying from a 19% reduction in Germany to a spectacular 35% rise from Spain.

Total CO₂ emissions (82% of GHGs) "decreased by nearly 1 per cent over the period 1990-2000", and over the same period methane emissions decreased by

21% and N₂O emissions decreased by 5%. However, "total emissions of HFCs, PFCs and SF₆ increased by 24%", it says.

Even scenarios with "additional measures" only succeeded in reducing future emissions in some countries, but many of these were based on minimal data, and may have been deliberately conservative to avoid raising further expectations.

The report, unveiled at the *18th Session of the Subsidiary Bodies to UNFCCC* (SB18), held in Bonn June 4-13, is a serious embarrassment to the **European Union**, which has already admitted far more needs to be done to prevent major increases in emissions (CCM2, pp.1-2).

Commenting on the projections, UNFCCC Executive Secretary **Joke Waller-Hunter** said the findings "clearly demonstrate that stronger and more creative policies will be needed for accelerating the spread of climate-friendly technologies and persuading businesses, local governments and citizens to cut their greenhouse gas emissions".

Motoring on

The report says that in 1990-2000 "an overall decline in GHG emissions was observed in all major sectors except transport and the energy industry", which rose by 20% and 10% respectively. It adds that aviation emissions from international bunkers increased by a staggering 48%, (p3) while emissions from shipping remained relatively stable. Climate change policies in the sector ranged from energy efficiency/fuel mix measures to demand side/modal changes.

In the energy sector, "almost all Parties reported new mandatory policies, including taxes on energy and CO₂, negotiated agreements linked to environmental permits, emission trading schemes, energy efficiency standards and portfolio standards, and generation quotas for renewables or CHP". Most had direct incentives for renewables and CHP, and many were shifting to greater natural gas and clean coal technology use.

However, the report finds that "fugitive fuel emissions, from oil and gas production, coal-mining and leakage of natural gas from pipelines, accounted for more than 90% of methane emissions from the energy sector".

Current modernisation in many transitional economies and controversial opencasting of coal were considered control measures, alongside nuclear expansion. Fugitive emissions had decreased more than any other GHG source, by 31% since 1990.

Progress in adaptation

UNFCCC also points to some more hopeful signs in the report. It says "governments are adopting a more comprehensive set of policies and measures than they did several years ago for addressing their emissions", citing emissions trading, carbon taxes and green certificate trading as examples. The report concludes that "integrated climate strategies that are now emerging are the result of a diverse and carefully designed policy mix". It says they focus clearly on climate mitigation, "but also contain elements of adaptation."

Also, while national governments still dominate overall climate response strategies, and most policies and measures are being applied in the energy sector, it says "local and regional governments are becoming more involved". There is a greater emphasis on consulting and collaborating with key stakeholders and civil society, it says.

Adaptation strategies were very varied. The "adaptation activities receiving most support were capacity-building and coastal zone management", while some Parties described projects aimed at "assessments of vulnerability, disaster preparedness, and response and risk management as key components of adaptation policies". Energy efficiency standards in buildings were a priority for many.

Many Parties acknowledged that "sustainable development can be considered as indirectly intended to adapt to the adverse effects of climate change".

While the quality of emissions reporting was widely agreed to have improved, many Parties emphasized the need for better monitoring of policy implementation.

***National Communications from Parties included in Annex I to the Convention: Compilation and Synthesis of Third National Communications.**

Available at: <http://unfccc.int/resource/docs/2003/sbi/07.pdf>.

Washington in dock over climate change as three states sue

Three New England states are making legal history in the USA and internationally with a lawsuit against the Federal **Environmental Protection Agency (EPA)** for failure to address the serious threat of climate change under the *Clean Air Act*.

In the first case of its kind anywhere, the Attorney Generals of the **Commonwealth of Massachusetts, Connecticut and Maine, Tom Reilly, Richard Blumenthal and Steven Rowe** launched the joint action against EPA in Federal district court of Hartford, Connecticut, alleging failure to adhere to the provisions of the *Clean Air Act*.

Speaking on behalf of the three states, Massachusetts Attorney General Tom Reilly said that: "having recognised the dangers that global warming poses to public health, our environment and our economy, the federal government not only has a clear responsibility to address the problem, but a legal obligation as well under the provisions of the *Clean Air Act*".

Maine Attorney General Steven Rowe said: "We believe the plain language of the *Clean Air Act* requires EPA to regulate emissions of carbon dioxide."

The case has obvious geopolitical implications given the refusal of the Bush Administration to ratify the *Kyoto Protocol*, and its implacable opposition to precaution-

ary measures on global warming under the *UN Framework Climate Change Convention*, leaving it increasingly isolated internationally as even the **Russian Federation** edges reluctantly towards acceptance.

The three states demand in their suit that carbon dioxide be reclassified as a "criteria pollutant", joining sulphur dioxide, particulate matter, carbon monoxide and lead. This would force the government to both set and enforce strict standards for permissible atmospheric concentrations of the commonest greenhouse gas.

Weapon of last resort

In Connecticut, Attorney General Richard Blumenthal pointed out that "EPA's inaction on carbon dioxide is intolerable - a dangerous disservice to the nation", adding that "by the Administration's own admission, on the public record, greenhouse gas emissions cause global warming, in turn causing disease, environmental damage, and weather-related disasters such as drought and flooding".

The basis of the current lawsuit is a 1976 **Court of Appeals** decision that compelled EPA to set air quality standards for lead. The decision resulted from an action by the **Natural Resources Defense Council (NRDC)** arguing that EPA had accepted there

were serious risks from lead emissions, but had nevertheless declined to list it as a criteria pollutant and address it as such.

In the current action, under the notice provisions of the *Clean Air Act*, the Attorneys General point out that "the EPA has acknowledged in a legal memorandum and testimony presented to **Congress** in 1998 and 1999 that carbon dioxide is an air pollutant subject to regulation under the *Clean Air Act*".

The action was prepared as a last resort following failure of the Administration to act on a letter sent to **President Bush** on July 17 last year drawing their attention to the *US Climate Action Report 2002* issued last May and urging "a strong national approach" to climate change as the "most pressing environmental challenge of the 21st century". The report confirmed the dangers of global climate change, and projected a 43% increase in CO₂ by 2020.

The unspoken threat of future litigation over climate change impacts is already beginning to be felt within major US and European company boardrooms through shareholder pressure, while criticism over perceived lack of action on the issue has already put the **State Department** on the defensive (*CCM2*, p.8.)

www.ago.state.ma.us/txt/climatechange.htm

Americans want action on climate change

A national survey* by the **University of Oregon's Survey Research Laboratory** has revealed that a large majority of Americans want measures to regulate global warming and that they support the aims of the *Kyoto Protocol*.

The unexpected results of the poll, which are unlikely to be welcomed in the **White House** as **Senate** debates a controversial *National Energy Plan*, revealed that 92% of Americans had heard of global warming, contrary to popular European belief.

Of these, it found that "a strong majority (77%) supports regulation of carbon dioxide as a pollutant and investment in renewable energy (71%)."

Perhaps even more surprisingly, the results also revealed that "a strong majority (88%) supports the *Kyoto Protocol* and wants the United States to reduce emissions regardless of what other countries do

(76%)".

The poll suggests the gulf between European and more sceptical US public opinion over climate change may have been overstated, with opinions closer to those expressed in the latest *Eurobarometer* poll (*CCM1*, p6).

"One of the most surprising findings was the strong, bipartisan support for action", according to principal investigator **Anthony Leiserowitz**. It found "clear majorities of Republicans and Democrats, Conservatives and Liberals that said they support national policies to address global warming".

The University of Oregon says the survey "is especially timely", in that Senators **John McCain** (R-Ariz.), and **Joe Lieberman** (D-Conn.), "are co-sponsoring an amendment to reduce greenhouse gas emissions through government regulation and a market-based

trading system".

However, the poll provides more mixed news on practical measures. It found a slight majority in favour of a tax on "gas guzzlers" (54%). However, it also found that "strong majorities oppose a gasoline tax (78%) or a business energy tax (60%) to reduce emissions". On a market-based emissions trading system, it found that "Americans divide evenly (40%)", with 18% uncertain.

The poll needs to be taken with a degree of caution, given that the sample size was relatively small. The mail survey was funded by the **National Science Foundation**, and conducted between November 2002 and February 2003.

**American Opinions on Global Warming*

The full report and executive summary are available at: <http://osrl.uoregon.edu/projects/globalwarm>

Climate warms to land use changes

Major land use changes over the last 50 years are responsible for up to half of the observed rise in mean surface temperatures across the continental United States, twice as much as previously estimated, according to a study* by meteorologists from the **University of Maryland**.

The study, by two distinguished meteorologists, **Dr Eugenia Kalnay** who pioneered 3-5 day forecasting in the USA, and **Dr Ming Cai**, could have major consequences for projections from current climate models when extended globally later this year. It is also difficult to reconcile with a recent re-analysis of satellite data which confirmed the veracity of global warming projections since the 1970s (CCM2, p.7).

Previous models have attempted to

incorporate the effect of spread of urbanisation in climate models, typically by population counts and lighting seen from space, but these estimates differ considerably, and have ignored spread of industrial agriculture with irrigation. This means that urban-rural temperature differences measured to correct for 'urban heat island' effects have been over-simplistic, and have considerably underestimated impact of land use changes, they say.

To overcome the shortcomings in surface warming estimates, Kalnay and Cai used "the difference between trends in observed surface temperatures in the continental United States and the corresponding trends in a reconstruction of surface temperatures determined from a reanalysis of global

weather over the past 50 years, which is insensitive to surface observations".

From this analysis, Kalnay and Cai infer a land-use bias of 0.27°C per century in recorded global warming, about twice previous estimates.

Both urbanisation and cultivated land reduce maximum daily temperatures and retain warmth better at night than unfarmed countryside, with the result that the difference in surface temperatures between the daytime maximum and nightly minimum is now far less than during the 1950s, the study concludes.

**Kalnay, E. & Cai, M. Impact of urbanization and land use change on climate. Nature, 423, 528 - 531, (2003) www.nature.com*

Feedbacks could spark runaway greenhouse effect

A 'holistic' climate change model developed by a team at the **Hadley Centre for Climate Prediction and Research*** suggests that global warming could accelerate dramatically through positive feedback, as CO₂ released in ocean and rainforest carbon sinks instead become sources.

The team also concludes that reductions in levels of sun-blocking sulphate pollution due to tighter emission controls on fossil fuel power stations are likely to allow increased global warming.

The model predicts that the increase in mean global temperatures could exceed 5.5°C by 2100, which is 1.5°C higher than one commonly accepted forecast.

The latest model upgrades a previous one in 2000 which predicted an alarming acceleration in warming as warmer oceans and rainforests release billions of tonnes of CO₂. It says that even slight drying of the Amazon rainforest would release sufficient quantities of CO₂ to accelerate global warming.

The model's strength lies in its inclusion

of a much wider range of factors than other projections. It takes account of sulphates from volcanic activity, impact of clean air regulations on pollutants, fluctuations in greenhouse gas levels and in sun activity, and uniquely, interactions between oceans and landmasses.

www.met-office.gov.uk/research/hadleycentre/
**Jones et al: Strong carbon cycle feedbacks in a climate model with interactive CO₂ and sulphate aerosols. Geophysical Research Letter, 30, 1479 - 1482, (2003)*

California faces devastating droughts within 50 years

A regional climate model has predicted that California could lose 20% to 30% of its water supplies within the next 50 years as the state's climate warms by an average of almost 3°C, leading to severe disruption to intensive agriculture.

In a state heavily dependent on irrigation, with fast-growing population, industry and power consumption, this raises the possibility of serious conflicts over water.

The model, developed by earth scientist **Dr Lisa Sloan**, of the **Palaeoclimate and Climate Change Research Group** at the **University of California, Santa Cruz**, predicts only slight increases in temperature near the coast of 1°C to 1.7°C, but forecasts dramatic changes, particularly in mountainous regions, where mean June temperatures could increase by 6°C.

These averages mask occasionally more extreme daytime summer temperatures, which could exceed 43°C in Sacramento,

placing huge burdens on electricity supplies through conventional air conditioning demand, unless alternative solutions are developed.

The model, which has successfully forecast current conditions based on known historical data, is unusual in that it has rigorously established quantitative impacts of climate change at a regional level. It is now providing vital information for policymakers and resource managers.

Projections suggest a "slightly warmer, much drier California" in future, with a shrinking snowpack in the Sierra Nevada ranges. Warmer conditions will increasingly favour rain over snow, reducing snowpacks, which act as natural reservoirs, by half. The result will be increased runoff and flooding in winter, but reduced runoff and water shortages at other times, particularly in late summer months in Central Coast regions.

As a result, the **Department of Water Resources** is now updating its *2003 California Water Plan*. There is deep concern for areas such as the highly productive Salinas Valley, where agriculture employs half the population.

The model is also assessing potentially severe ecological impacts due to reduced baseflow in rivers during critical summer months, changes to high altitude forests, increasing wildfires, loss of threatened species, and reduced productivity of coastal waters currently fed by cold ocean upwellings.

The model may have wider implications for US climate policy, because dramatic changes are more likely to be understood at the local level, and because of California's pre-eminent status in the economy and culture of the USA: (see also p7).

<http://review.ucsc.edu/summer.01/CAwar ming.html>

IN BRIEF

Flagship biomass project in jeopardy

A pioneer £30m wood-burning power plant project at Eggborough has gone bankrupt in just eight days, threatening a collapse of confidence in the fledgling biomass energy sector and prompting criticisms of indifference against the Department of Trade and Industry (DTI).

The collapse is a serious blow to DTI plans to generate 50% of renewable energy from biomass energy by 2010, and comes as other DTI-backed pyrolysis projects planned by Border Biofuels and aimed at converting wood and other plant material into more combustible oil also face liquidation.

The Arbre project, which began in 1998, attracted £10m and £3m in grants from the EU and DTI respectively, but has suffered from design problems. It was thought the plant would be re-started under new ownership, if the new owner, DAS GreenEnergy UK could secure a 12p/kwh price deal for its output, four times the traditional fossil fuel power plant price. However, if not the plant may now be exported to India, leaving the 35-member Renewable Energy Growers cooperative of Yorkshire farmers without an outlet for their 12 year commitment to forest residue and willow fuel supplies.

Proponents of biomass energy projects are furious at what they see as a hands-off attitude from DTI, contrasting starkly with support for crisis-torn nuclear generator British Energy last year.

DTI refused to comment specifically on its plans for the Arbre project, pointing out that there were bound to be some casualties in a new technology of this sort. Even so, it said the Government remains committed to biomass, and invited CCM to "watch this space". It is thought the Government may yet wish to negotiate.

Meanwhile, other biomass initiatives, such as the £500,000 Eccleshall Biomass plant running on elephant grass (CCM2, p.10), are likely to be watching the outcome nervously.

DTI: +44 (0)20 7215 5000

£6.7m more for community energy

Defra's Community Energy programme, aimed at energy-saving schemes for homes, hospitals, schools and other public buildings has received a £6.7m boost.

The grants "will help to pay for 11 new projects under the government's £50m Community Energy programme, which helps to cut energy bills and combat greenhouse gases and fuel poverty". In order to ensure all of the fund is allocated, the government has extended the programme to enable bids for a third year, during 2004/5.

Winners including Plymouth City Council and Cloch Housing Association will collectively receive £26m and reduce carbon emissions by almost 13,000tpa.

<http://www.defra.gov.uk/>

Dramatic office emissions threaten low carbon economy

A report* by the Association for the Conservation of Energy (ACE) has concluded that achieving a shift in the conservative attitudes of property managers is the key to vital CO₂ emissions reductions in the commercial property sector.

The report says that inefficiencies in building performance and the greater use of electronic technologies within the commercial sector are endangering greenhouse gas reduction programmes. Energy use has risen by almost 70% since 1973, and shows no sign of abating, driven by increased use of air conditioning and artificial lighting, as well as more demand for energy services associated with the use of information and communication technology (ICT).

The most disappointing aspect is that energy use in the service sector has risen at the same rate as the growth of the sector, so that carbon intensity has not fallen since the late 1980s. This has limited the emissions benefits of a shift from industrial to service activity over the period.

Final energy consumption in commercial services grew by 68.4% from 1973 to 2000, compared to a 9.5% decrease in public sector services energy consumption. This trend is expected to continue upwards, at a rate of 0.7% per annum up to 2010.

The report, based on a scoping exercise and stakeholder consultation in 2002, found that "existing economic instruments could be designed more effectively to promote energy efficiency in offices", with perceived lack of demand and poor return on investment the main barriers. Even so, it also found investment is promoted by the risk of property losing value as climate change impacts become more obvious.

The report says that "much education and

dissemination of information is required, both of the problem and the benefits of solving it, business benefits as well as environmental ones, before the leading companies provide the force for change in attitudes to property valuation".

One way this can happen is through the demonstration effect of leading companies that make most effort to improve energy efficiency and use benchmarking. When they move on, or sublet they raise the standards for the next tenant, the report says. It notes that the public sector has a crucial role, as they are seen as "reliable and responsible tenants who set the minimum acceptable standard". The report concludes that "raising the standard to include energy rating of rental property would send strong signals to the market and provide a new baseline for smaller companies without strong CSR [corporate social responsibility] concerns".

The report identifies property managers as the main agent for change, followed by investors and occupiers. The former "have the key link role between occupier and investor, and influence the market through property evaluation as well as through contract management". On the Climate Change Levy, it says that National Insurance exemptions have benefited the sector, which shows a net gain but is not generally aware of it, while many process industries have lost out.

Enhanced Capital Allowances, mainly focused on manufacturing industry, are available for all types of business, but are not available for energy conservation materials or heating and air conditioning control systems, it says.

ACE: +44 (20) 359 8000

www.ukace.org/research/eceee_offices.pdf

OFGEM sustainability guidance update

Draft revised guidelines to ensure the Gas and Electricity Markets Authority (GEMA) follows sustainable social and environmental policies have reaffirmed greenhouse gas reduction targets, the key role of emissions trading and combined heat and power.

The updated guidance, required under s.10 and s.14 of the *Utilities Act 2000*, aims to bring existing objectives more closely into line with policies outlined in the recent *White Paper*. DTI says they are intended to

"focus the Authority on helping achieve the social and environmental targets and aims set out in the *White Paper*", rather than detailing prescriptive measures.

The key goals include putting the UK on a path to cutting CO₂ emissions "by some 60% by 2050, with real progress by 2020"; maintaining the "reliability of energy supplies"; promoting "competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to

Brussels moves on CHP & renewables

The Council of Ministers agreed May 14 on a "Directive of the European Parliament and of the Council on the promotion of cogeneration based on useful heat demand in the internal energy market", aimed at creating a framework to support and facilitate construction and operation of cogeneration installations (see also *CCM e 3*, 2/6/03).

The Directive sets a target of 18% of electrical generation from CHP by 2010.

However, in an exchange of views on the follow up to the *World Summit on Sustainable Development*, Commission Vice-President Loyola de Palacio, responsible for transport and energy criticised the large gap between targets and reality on development of renewables, and called for Europe to take a more leading role. In 2001, the EU committed to generating 22% of its electricity from renewable sources by 2010, but in practice the renewables share has increased by just 1% since 1995. In response to this deficiency, she encouraged Member States to raise their overall national targets and for EU targets to include the new Member States.

De Palacio also took the opportunity to

announce a forthcoming communication on renewable energy sources by the Commission on these issues.

The proposed cogeneration directive, now awaiting its second reading by the European Parliament and the Council, aims to encourage cogeneration projects in Member States through systematic identification of opportunities, and development of high efficiency cogeneration. Member States would have an obligation to report on progress.

Key issues agreed on included those of definition, fair competition, access to the grid for CHP generation, Member State support schemes, guarantees of origin for output, and assessments for the future potential for CHP.

Announcing the move, de Palacio said "the agreement on cogeneration is a very important step towards a sustainable energy policy. She added that the new legislation "is an ideal addition to the legislation proposed, since I took office, on renewable energy sources, biofuels and energy efficiency: now we have the tools and it is up to us to make full use of them".

<http://europa.eu.int/>

Continued from Page 9 ►

OFGEM sustainability guidance update

improve our productivity", and ensuring that "every home is adequately and affordably heated".

The draft confirms the *White Paper* commitments to reduce greenhouse gas emissions by 12.5% below 1990 levels by 2008-2010, to reducing CO₂ emissions by 20% below 1990 levels by 2020, and "putting the UK on a path to cut CO₂ emissions by some 60% by about 2050, with real progress by 2020".

The guidance also says that "in the longer term carbon trading should be the central plank of our future emissions reduction policies to achieve our carbon targets". It also points out that renewable energy, while "more costly in the short term, is needed now in order to meet our longer term carbon targets", and says it expects industry to respond to the government framework established, "and demonstrate they can achieve our goals at an acceptable cost". DTI reiterates the 10% goal for renewables by 2010, adding that it aspires to double this by 2020.

On CHP, it says the Government remains committed to a target of 10Gwe installed good quality capacity by 2010.

Overall, it says these objectives may depend on a radical transformation of the energy system to a more diverse one in terms of mix of energy technologies, and of supply, control and management of demand. It leaves the detail as to how these changes are achieved to the authority, but expects it to provide the necessary framework to enable businesses and the economy as a whole to meet the overall objectives and targets.

The OFGEM guidance consultation document (*Social and Environmental Guidance to the Gas and Electricity Markets Authority*) can be found at:

www.dti.gov.uk/consultations

Comments are required by 31 August.

DTI: +44 (0)20 7215 5000

**Draft social and environmental guidance to the Gas and Electricity Markets Authority, DTI consultation document, June 2003.*

MARKET ANALYSIS

EU challenges US over energy labelling

European Environment Agency (EEA) head Domingo Jimenez-Beltran has thrown down the gauntlet at the US, challenging it to publish environmental data to allow more transparent comparison with Europe.

He said energy labels on imported products should state whether the country of origin respects the Kyoto Protocol on greenhouse gas emissions control, a thinly-veiled dig at continuing US refusal to ratify the agreement.

The challenge was made as he launched the third and most detailed state of the environment assessment for Europe (p5).

Jimenez-Beltran pointed out that energy prices in the US are half those of Europe, where energy taxes and greenhouse gas reduction measures are in place, so that export of much lower cost US products could be considered tantamount to "dumping".

Jimenez-Beltran also suggested global harmonisation of energy taxes, including on petrol, and a tax on aviation fuel to reduce burgeoning demand.

EEA: +45 3336 7100. www.eea.eu.int/

£2m for solar power

The Department of Trade and Industry (DTI) has announced £2m funding for 21 projects under the £20m Photovoltaic Major Demonstration Programme.

The 21 projects, which are the fourth set of proposals approved since the programme began in 2002, are spread across most UK regions. Individual projects approved received between £35,000 and £180,000. They include a solar powered petrol station and "the largest planned solar power installation in the UK".

DTI: +44 (0)20 7215 5000

Further information at: www.solarpgrants.co.uk or on 0800 298 3978.

Wind farms planning guidance

Local planning authorities will not be required to issue local supplementary planning guidance on wind farm applications in advance of their next plan review cycle, ODPM planning minister Tony McNulty told Bob Blizzard, Labour MP for Waveney. He added that Planning Policy Guidance Note (PPG) 12 "clearly states that Supplementary Planning Guidance should not be used to update plans in this way." He pointed out that a draft revised version of PPG22 on renewable energy is to be published for consultation later this year. The Government expect local planning authorities to update plans on a regular basis to take account of new Government policy, he said, adding that ODPM "expects to update plans once the final version of the new PPG22 has been published. If plans are out of date and not in line with Government policy, then new PPGs will be material considerations to be taken into account in planning decisions."

'Eco-cement' faces hardened resistance

A revolutionary new form of cement which uses less energy in manufacture, can be combined with high proportions of waste fly ash, and sequesters CO₂ instead of generating it is having difficulty in making headway in the intensely conservative building industry.

Eco-cement, invented by **John Harrison** of **TecEco Pty Ltd** in Tasmania, uses a different mix from standard Portland cement, with chalk and clay, but with magnesite rather than calcium as the third ingredient. It can be made in existing cement plants, in low-temperature kilns, absorbs CO₂ on setting and for years afterwards, can be made of up to 90% waste fly-ash, far more than Portland cement, and can be recycled easily into other products based on cement.

Eco-cement itself generates a tenth as much CO₂ as Portland cement, and when organic material such as hemp is added,

blocks of 'eco-concrete' act as carbon sinks, providing a major opportunity for sequestering without the potential risks of geological methods.

If used widely, it could potentially cut CO₂ emissions by at least 5% in Europe and North America, and far more in developing countries. TecEco claims that "100% utilisation would reduce global CO₂ emissions in excess of 20%".

Industry resistance to what must come close to an ideal green building material is all the more surprising, given that it is expected to be cheap, is very durable, strong, and has other superior properties for construction, including greater resistance to salt, and corrosion by chlorine and acids. It needs to be replaced far less frequently.

TecEco says it has other applications, including "controlled low strength materials (CLSMs), grouts and drill hole cements, soil

stabilisation/solidification, stabilising agents in the production of "earth" buildings, mortars, agglomeration of furnace feeds and pellet manufacture, waste and toxic waste immobilisation/fixation, eco-masonry products eg. bricks, blocks, pavers and mortars as well as corrosion proofing Portland cement".

One possible reason for lack of interest is that magnesite is a very widespread mineral, but one which has not previously been mined in large quantities and would involve some adaptation in the supply chain.

The material has already been successfully tested by materials experts at the **University of Aberdeen**, but may yet generate more interest after its current appraisal at the **Building Research Establishment (BRE)** has been completed.

www.tececo.com; www.bre.co.uk

Solar fuel cells bring hydrogen economy home

Early stage research* at the **Georgia Institute of Technology** has revealed that oxides of rare earth elements that "can produce hydrogen from water vapor and methane in continuous "inhale and exhale" cycles" can be encouraged to generate sufficient quantities for small scale applications of fuel cells.

The new method brings closer solar powered, low cost applications of fuel cells in domestic, automotive and other small-scale energy markets that are nevertheless very important in aggregate greenhouse gas emissions. It may also have potential for larger applications.

The research, involving the rare earth elements cerium (Ce), terbium (Tb), and praseodymium (Pr), found that "doping iron atoms into the oxides has lowered the temperatures at which these natural "oxygen pump" materials produce hydrogen, potentially allowing the process to be powered by solar energy".

Traditional reforming processes need metallic catalysts and temperatures in excess of 800°C to convert hydrocarbons such as methane into hydrogen, and are only efficient in industrial-scale production. However, "by operating at lower temperatures, the oxide system being developed at

Georgia Tech could provide a lower-cost alternative that uses less energy and less water to operate", the team notes.

The team, which continues to refine the method, believes that lowering the reaction temperature to 350°C could allow solar energy to supply at least some of the heat needed: "Relying on the use of a renewable energy source could make the process more attractive to home users and remote locations," they point out.

**Advanced Materials* 15 (2003), pp 521-526
Georgia Institute of Technology:
www.gatech.edu/

Engineers compost landfill emission concerns

Cardiff University engineers have developed a rapid municipal waste composting method that produces high quality compost while lowering methane emissions.

The team points out that "increases in municipal waste, the main contributor to landfill, will more than double the landfill gas generated in the next 20 years, a very high portion of which is methane, one of the most aggressive greenhouse gases".

To tackle the growing waste and emissions

crisis, **Dr Keith Williams** and **Dr. Tony Griffiths** of the **School of Engineering**, are conducting large-scale experiments into generating compost from municipal waste by "more actively managing the composting process". They say this can speed up the breakdown of organic material, achieving in eight weeks "a quality of compost that would take a year under traditional methods". Apart from lowered methane emissions and compost, the process reduces landfill and pressures on peat habitats,

the duo points out.

Work is being carried out on a specially constructed site that is constantly monitored, largely sponsored by **Carmarthenshire Environmental Resources Trust (CERT)**. The university is now recognised as a 'Centre of Excellence in Waste Research' by the **Welsh Assembly**.

Cardiff School of Engineering:
+44 (0)29 20874422
www.cf.ac.uk/engin/

London's flood defences will be "unsustainable" beyond 2100

London Mayor **Ken Livingstone** is tackling the problem of current and future flood risks, but with the capital's population set to increase from 7.2m to nearly 8m over the next 15 years, stakes are high with a major incident likely to exceed £30bn even without further global warming.

Green Capital, the state of the environment report for London (see also pp.1-2), has addressed increasing concerns over vulnerability to flooding in London from climate change, and included frequency and severity of flooding as specific indicators of environmental sustainability.

The report, to be reviewed in 2007, says London is at increased flooding risk from raised tides due to "increasing storminess and tidal amplitude, and continued settling of southeastern England".

It notes that London is "a third of a metre lower now, in relation to sea level, than it was in the 1940s", which includes 1.5cm per decade for the lowering of land levels. Climate change will raise sea levels by a further 20cm - 50cm by 2050, and severe storm frequency will increase.

Growing concern over flood risks led the **London Assembly** to commission a review last year by the public/private sector **London Climate Change Partnership** which was explored in the report *London's Warming* (November 2002).

Green Capital points out that "a severe flood in London would cause enormous damage to the economy, and possible huge loss of life in low-lying areas such as the Isle of Dogs and Bermondsey, and potentially in the **London Underground**", and that freshwater and sewerage systems, power,

gas, electricity, telephone and data services would all be disabled.

The report notes that, based on current estimates, "a major flood in London could cost in excess of £30bn in damages". Clearly, increased property values in London and massive investment in the huge estuarine *Thames Gateway* project could raise the stakes much further, and the Thames Barrier, completed in 1982, could not be relied upon to the same extent in future.

Closures increasing

It particular the report warns that "the number of closures of the Barrier against tidal flooding is generally increasing year by year". It points out that "by the end of 2002, the Thames Barrier had been closed 65 times to protect London from tidal flooding, three of which were to assist in reducing flooding from upriver" (see figure). The vast majority of closures to prevent flooding took place

during October to February, it says.

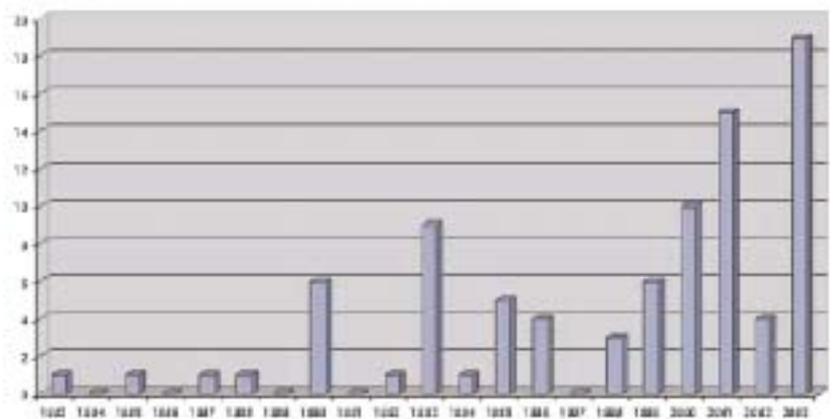
The situation appears to be worsening rapidly. The report cites the first week of January 2003 as the worst so far, when the barriers had to be raised 14 times "to prevent serious flooding" from more than double the usual level of rainfall in the Thames catchment. At the time, river levels "were the highest since 1947. In the event, the 19 closures during January 2003 "gave a higher total in one month than had occurred in any previous year".

The report's assessment of the future is a sobering one. By 2100, "the Thames Barrier would need to be shut approximately 200 times each year to protect London from tidal flooding", rendering its flood defences "unsustainable in their present location".

**Green Capital: The Mayor's State of the Environment Report for London.*

www.london.gov.uk/gla/publications/environment.jsp

Number of Thames Barrier closures per annum



Source Environment Agency (note: 2003 figure is for January only)

CDM board rejects all projects

The ninth meeting of the Executive Board of the *UN Framework Convention on Climate Change Clean Development Mechanism* (CDM) in Bonn has rejected all 14 project proposals and raised the stakes in the controversy over which genuinely advance the cause of reduced greenhouse gas emissions.

Eight proposals were rejected outright by the **Methodologies Panel**, while six were offered the chance of a review at the next

panel meeting subject to several modifications and re-submission by June 26.

The report noted that the panel had "undertaken an enormously challenging task", not least in "carrying out work on the first 14 cases of proposed new baseline and monitoring methodologies with such a high level of professionalism and integrity".

None of the projects proposed were able to convince the panel that they genuinely avoided greenhouse gas emissions, insofar as

such projects, such as hydroelectric capacity, may have been planned anyway where fossil fuels were not a viable economic option. Even so, panellists stressed that these were pioneer projects, and were optimistic for future submissions.

The six offered a review included backers for a Jamaican wind farm, a South African landfill plant, three projects in Brazil, and one in South Korea.

Full report at: <http://unfccc.int/cdm>

Developments in climate change adaptations in the southwest UK

Is your mitigation, my adaptation? Anyone involved in discussing climate change with the public, with the non-specialist, and even with staff holding environmental responsibilities within many organisations, will realise that there is much confusion over the precise definition of adaptation and mitigation. Usually, the discussion ends up taking a mitigation route. And this is not surprising. Mitigation is the 'good' response - the 'green' or 'ethical' response, whilst some perceive adaptation as the means of taking advantage of an unwholesome change.

Additionally, most of the Government's weight has been thrown behind the mitigation drive - the *Energy White Paper* and the DTI's drive being the most recent example.

Yet across the country Defra's increasingly visible **UK Climate Impacts Programme** (UKCIP) has been spearheading the persuasion of regional and stakeholder sectors to take on the responsibility to adapt to the 'inevitable' or in-built climate change that cannot be mitigated.

Scoping studies

As part of its approach UKCIP has been facilitating the production of scoping studies based on regional government areas. Its most recent study, funded principally by the RDA and the **Environment Agency** is the **South West Climate Change Impacts Partnership** (SWCCIP). Its commissioned report, *Warming to the Idea**, has been directed by the **University of Gloucestershire**, (with C-CLIF) and has reinforced the findings of the **Cheltenham Climate Change Forum** (2001). Through the launch of this report, and at the Cheltenham Forum, over 400 delegates have supplied opinions and questionnaire responses that identify key issues for the immediate future. SWCCIP identified that:

- Climate change will impact on everyone in some form or another, whether a business, organisation or as an individual. Everyone therefore has a role to play in responding and adapting appropriately to the impacts of climate change.
- Most individuals are aware of climate change and the influence of global warming, but awareness does not appear to extend to business or other organisations in the region to any great extent.
- Where climate change is recognised in an organisation, emphasis is on mitigation rather than adaptation.

- Local authorities have a key role in adapting to climate change in their roles as service providers, corporate managers and community leaders.

- Climate change can bring opportunities as well as threats.

It is increasingly apparent that for stakeholders, knowledge transfer holds the key, rather than new data acquisition:

- 81% of delegates thought raising awareness of our existing knowledge was the highest priority.

- 19% of delegates thought increasing our knowledge of the impacts of CC was the highest priority. Across all sectors the highest priority recommendations concerned awareness-raising. In responding to this, the steering group for SWCCIP has identified areas of especial regional importance. In this way, SWCCIP hopes to maximise the benefit and coverage of its knowledge transfer policy, and to achieve a real embedding of adaptive climate change responses in the key sectors within the Region.

In the SW the key themes, each with their own stakeholder commissioning panel, are:

- Transport
- Housing and Construction
- The Role of Local Government
- Agriculture and Forestry
- Leisure and Tourism
- Utilities (in the sense of resource utilization)

An ongoing issue, and one that many organisations need to address, is the ownership of the climate change issue. Where are responses most successfully coordinated and implemented? In Local Government, for example, should climate change issues be led by those dealing with sustainability? Or should it be a key feature in every department? And just as management issues need owning, how does an organisation audit the success of its

adaptive and mitigative responses? Other sectors and bodies, including many NGOs and businesses may have a central policy on climate change, but how is this policy brought to life - and done so systematically?

In many cases, it is evident that climate change issues, where they are dealt with at all, are managed as a result of an individual's personal interest rather than under a strategic framework. Until these ownership issues are appreciated and dealt with, many organisations may find that they suffer as a result of inaction, or fail to maximise their competitive advantage. The regional and stakeholder approach, guided by the likes of UKCIP and SWCCIP appear to present a very real opportunity to assist organisations in addressing these issues.

- **Dr John Hunt** is Senior Lecturer at the **Geography & Environmental Management Research Unit, University of Gloucestershire**. (He is also a member of the **Cheltenham Climate Change Forum** planning team.)

**Warming to the Idea - the technical report; summary leaflets and associated www links such as UKCIP can be found at: (<http://www.oursouthwest.com/climate/index.htm>)*

The University of Gloucestershire offers a Postgraduate Certificate in Climate Change Management. It develops a balanced appreciation of climate change patterns of the past and present, the challenges of climate prediction and the options for mitigation of and adaption to such predicted changes. The course is suitable for people who have a good Honours Degree in a relevant subject area. Contact pms@glos.ac.uk or <http://www.glos.ac.uk/uogabout/content.asp>

Building for sustainability

Speaking at a **Construction Industry Research and Information Association** conference on *Climate change and the housing industry* in London on June 4, outgoing environment minister **Michael Meacher** criticised both the construction industry and households for being "extraordinarily extravagant with their energy use at the present time".

He pointed out that even an energy-efficient detached home in the UK consumed 20% more energy than equivalent housing in Denmark.

Meacher pointed out that no construction would now be permitted on floodplains unless there were "extremely good reasons to justify it".

Also at the conference, **Housing Corporation** SW Regional Technical Officer **David Wheeler** pointed out that domestic housing accounted for some 30% of CO₂ emissions, but stressed it was now possible to build sustainable homes that are "so well insulated and energy efficient that no separate space heating is required".

He also pointed to developments that are more or less carbon-neutral, "of which the **Peabody Trust BedZed** development in Surrey is probably the best known example".

The Housing Corporation is now concentrating its resources on fewer, energy efficient, affordable homes in sustainably built communities, in line with government priorities for the next 10-15 years.

Several speakers at the conference pointed out that the best way of building sustainable housing was to use mass-produced components which could be easily quality controlled. However, modern housing methods face continued resistance from conservative attitudes towards radical designs from both tenants and the construction industry.

Senior scientist **Dr Richenda Connell** of the **UK Climate Impacts Programme** told delegates that extensive data of use to long term planning in the construction industry is now available, though little use has as yet been made of it.

www.ciria.org.uk; www.ukcip.org.uk;
www.defra.gov.uk

EDITORIAL

Keeping up the heat

May was a confusing month for anyone following the swings and arrows of climate science and modelling, and perhaps perplexing for those in policy-making.

An impressive study by **University of Maryland** researchers published in *Nature* (see p.8) revealed possible serious flaws in climate models on the grounds that they have not taken into account the warming impact of industrial agriculture as opposed to gaseous emissions.

This, they say, could mean that projections for warming in the USA due to greenhouse gas emissions are 50% too high. If so, the implications would be serious in such an already heated debate.

But hold on. An updated model by the **Hadley Centre for Climate Prediction and Research** (p.8) appeared in the same month, allowing for a much wider range of factors than ever before, including cooling effects of eruptions. It renewed warnings from its 2000 report that rising temperatures could trigger a positive feedback loop with CO₂ locked up in sinks such as the Amazon rainforest and oceans being released rather than absorbed, accelerating warming dramatically. Even with the uncertainties inherent in any climate model projection, the possibility of catastrophic change at a rate that allows little or no adaptation, let alone prevention or restoration, must give us pause.

If May was a confusing month for climate science predictions, June has been still more so for climate policy in the UK. The loss of environment minister **Michael Meacher**, the UK government's longest standing minister (pp.1-2) in this month's reshuffle is to be much regretted. His knowledge of climate issues has been unmatched by any other senior member of the Government. As was his zeal for negotiation and implementation, revealed in the UK's leading role on the *Kyoto Protocol*. Loss of energy minister **Brian Wilson**, who had been active in pushing through sustainable energy policy in the wake of the *White Paper* adds up to an impression of retrenchment.

Over the next few months it will become clearer whether this double whammy has indeed undermined **New Labour's** commitment to climate change measures.

PKH

DIARY

June

25 June

Meeting Kyoto Targets in the EU - Challenges for the Power Sector
Brussels, Belgium
www.panda.org/

July

13-18 July

Gordon Research Conference (GRC) on "solar radiation and climate"
New London, USA
www.usgcrp.gov

16-18 July

The impact of Global Environmental problems on continental and coastal marine waters
Geneva, Switzerland
www.usgcrp.gov

September

4 September

Third Sustainability Days ... "Connecting environmental research ... with the transition to sustainability"
Norwich, UK
www.tyndall.ac.uk/events

8 September

National Energy Action Conference - "On target for a warmer future"
University of Derby
"Energy, Economic and Global Challenges: Environment in Balance."
mary.unan@nea.org.uk

16 September

Institute for Environment and Health 10th Anniversary Open Seminar
University of Leicester
www.le.ac.uk/ieh/news/news.html

16 September

Climate Change in the UK: Impact on Environment and Health
University of Leicester
www.le.ac.uk/ieh/news/news.html

17 September

Meeting the Climate Change Challenge
Sønderborg, Denmark
pln@mst.dk

29 September - 3 October

The Third World Conference on Climate Change,
Moscow
www.meteo.ru/wccc2003/econc.htm

Carbon Futures

Among the 18 volumes of the **Treasury's Euro** report published on June 9 is to be found a tome entitled *EMU and trade*. At para 7.3 on p.60 it states: "... on the basis of a careful review of the evidence, this study concludes that a reasonable range for the potential increase in UK trade with the *euro* area resulting from UK membership of EMU is between 5% and 50%, without any trade diversion from the non-euro area. .. the upper estimate....seems closer to the more likely outcome." (see www.hm-treasury.gov.uk/media/C4AA1/adsub03_456.pdf).

And although at para.79, p.61 it says "There are substantial uncertainties and risks surrounding these estimates..." an outstanding question remains: has the Treasury done a carbon audit, or an environmental impact assessment of such a massive increase in trade, which would involve significant increases in transport, probably by air and road, thus increase in oil usage?

On oil, a motion was put before Parliament on 12 June highlighting a statement by US Deputy Defense Secretary **Paul Wolfowitz** last month, when he said "Let's look at it simply. The most important difference between North Korea and Iraq is that economically, we just had no choice in Iraq. The country swims on a sea of oil."

And on Iraq, we were fascinated to read the piece in the *Independent* on 9 June headed: 'Tablets that may reveal *El Niño* secrets are feared lost in Iraq;' and reported that the secrets of *El Niño*, one of the most mysterious and destructive weather systems, could be unlocked by hundreds of thousands of ancient clay tablets now feared lost or damaged in the chaos of Iraq. A case of Humankind's carbon past destroyed in the US quest to secure its carbon-based future?

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Notes and Quotes

"It is a landmark vision to make the environment and a 60% reduction in carbon emissions one of the four pillars of energy policy. The challenge is to deliver on that." Former energy minister **Brian Wilson**, in energy issues debate, Westminster Hall, 12 June

"When allied to energy efficiency measures, renewable energy is one of the most effective methods of reducing carbon dioxide emissions." **Defra's** new environment minister **Elliott Morley**, *Hansard*, 11 June, column 871W

"As a Member of Parliament, I, too, want a low-carbon future. I am not quite sure about a zero-carbon future because as a carbon-based life form, I like to have a few emissions. Not all of them contribute too much to the greenhouse environment," **Simon Thomas**, Plaid Cymru MP for Ceredigion in energy issues debate, 12 June

"This Administration's non-policy on greenhouse gas emissions is to do nothing

and study everything. Now is the time for action, not more study. Unless we force Federal action, carbon dioxide will cause more disease, health damage, and weather extremes, including both droughts and flooding."

Connecticut Attorney General **G Richard Blumenthal**, on launching a lawsuit against the **US Environmental Protection Agency** over global warming inaction this month.

"This country is signed up to the [Kyoto] target, but there is a lot of work to do yet on persuading other countries, not least the United States of America, to come on board." **Dr Ian Gibson**, Labour MP for Norwich, North, in energy issues debate, 12 June

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