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WWF for a living planet

WWF-UK's response to HM Treasury's consultation on the barriers to the commercial deployment of Carbon Capture and Storage (May 2006)

Introduction

The global picture

WWF regards climate change as one of the most serious threats facing the planet and human development, and one which demands urgent global action. To prevent average global temperatures from increasing by more than 2°C above pre-industrial levels – a threshold above which the risk of severe and irreversible tipping points in the climate becomes increasingly likely – the world's emissions of greenhouse gases will need to peak and start to fall within the next 10-15 years.

WWF believes that the key to an effective climate change mitigation programme is the reduction in CO_2 emissions by a rapid shift away from the use of fossil fuels. Breaking the addiction to fossil fuels would also help to enhance energy security and reduce other serious environmental impacts arising from fossil fuel extraction and burning. Hence, WWF is convinced that increasing renewable energies and energy consumption, and reducing tropical deforestation, are the key ways to combat climate change.

However, we recognise that delivering a steep reduction in global CO_2 emissions is a major challenge to the world. This suggests that we may need to accept a role for other carbon abatement technologies, such as carbon capture and storage (CCS), in the short to medium term. However, WWF-UK is concerned about the dangers of seeing CCS as a solution to climate change rather than as a potential short-medium term "bridging technology", which could be employed under certain conditions in order to gain time in the switch to a genuinely carbon free energy supply system. CCS involves a range of environmental risks and uncertainties that are currently poorly understood, and require further research and discussion.

WWF does **not** support the direct storage of CO_2 in the open ocean, open aquifers, lakes or on the sea floor. However, WWF believes that CCS schemes involving geological storage of CO_2 in certain rock formations, such as oil and gas fields and/or saline aquifers under the sea could be acceptable, subject to ongoing research into the safety and security of the storage and full assessment of the environmental impacts of each project. Any CCS project/s must not interfere with or have significant negative direct or indirect impacts on biodiversity. As a result, detailed SEAs and EIAs must be required before a project is permitted to go ahead.

WWF is calling for more research into pilot geological storage CCS schemes, particularly in association with new coal plant build overseas, as we recognise the potential importance of this technology in addressing the rapid growth in emissions from emerging coal-dependent economies such as China and India.

The UK context

WWF is convinced that the Energy White Paper's (2003) focus on energy efficiency and renewables was the right approach to addressing climate change. The DTI's energy review (2006) should be used as an opportunity to reassert the vision set out in the Energy White Paper, and to ensure that it is implemented vigorously.

This conclusion is reinforced by a new report by Ilex to WWF (April 2006) which models emissions and fuel mix from the UK power sector to 2025. Under Ilex's business as usual scenario, the sector's CO_2 emissions will fall by just 18% between 1990 and 2025 – but reductions of 55% are readily achievable by full implementation and modest extension of the White Paper's policies and goals.

Ilex also found that under business as usual, gas will contribute 56% of generation in 2020 and 62% in 2025. (This BAU scenario differs from the DTI's, in that it includes the impact of the EU ETS and also assumes higher and more realistic gas prices.) In Ilex's two low emission scenarios, gas accounts for 65% of the power market in 2025 – but compared to business as usual the absolute level of gas use is 11-16% lower. Thus absolute levels of gas use for power generation should be managed by giving strong priority to reducing electricity demand and promoting ongoing development of renewables beyond 2020.

Relatively high levels of gas use by 2025 are not surprising, given that this period coincides with the closure of almost all nuclear and coal capacity. Beyond 2025, gas use could be expected to decline through policies to reduce electricity demand, further development in renewables and technological innovation, potentially including **carbon capture and storage (CCS)**.

WWF regards CCS as a potentially viable option to further reduce reliance on gas for power generation while ensuring ongoing reductions in CO_2 emissions. It appears possible that CCS could be brought forward on a considerably faster timescale than nuclear, as confirmed by the growing number of proposed projects both the UK and elsewhere in Europe, provided rapid progress is made to resolve a range of legal, technical and financial issues. CCS could be used with either coal or gas, but is particularly attractive with coal as this allows greater diversity in the fuel mix.

WWF therefore seeks assurance from industry and government that the CO_2 will and must be stored safely and permanently in locations that do not allow any leakage rate or 'gassing out' that would be higher than those from conventional natural gas fields; that would mean a permanence time of longer than 100,000 years. This permanence must also be assessed and confirmed through independent scientific review.

Subject to the caveats above and below, WWF is cautiously supportive of demonstration projects in the UK with industry funding and independent monitoring, in order to help confirm whether or not CCS technology is environmentally, technologically and economically acceptable.

CCS should be seen as part of a hierarchy of options – and should not be used to lessen the focus or government funding on renewable energy and energy efficiency. WWF also believes there is a serious need for further research into the whole life-cycle CO_2 benefits of CCS schemes and especially those associated with Enhanced Oil Recovery (EOR), as the oil and gas industry still haven't provided nor confirmed figures yet, despite requests.

There may be a role for CCS in reducing the UK's CO_2 emissions, particularly in light of recent scientific evidence showing that reductions of greater than 60% by 2050 may be necessary. However, if CCS emerges as a viable option the Government should regard it as means to take on more ambitious reduction targets rather than as a tool to deliver existing targets.

There is considerable potential for CCS to make a significant contribution to emission reductions in Europe. The British Geological Survey (BGS) has estimated that the potential geological storage capacity under the North Sea is around 20 billion tonnes of CO_2 in oil and gas fields, with an additional 20-70 billions tonnes capacity in confined aquifers.

However, CCS is currently an immature technology. Its deployment raises several serious issues, which need to be addressed by the Government before any demonstration projects proceed. These include:

- the legal status of CCS, particularly regarding the OSPAR and London conventions on protection of the marine environment, environmental assessments (including whole life-cycle carbon emissions), and systems to issue permits and regulate the activity;
- the liability for long-term storage;
- the feasibility and viability of the new technology; and
- the substantial costs of research, demonstration and deployment.

The emerging status of CCS technologies also means that there is still much uncertainty about their economic feasibility.

One key question is the treatment of CCS under the EU emissions trading scheme and, more widely, the rules for accounting for emissions under the UN Framework Convention on Climate Change. **WWF believes that it is premature to class CCS as carbon-neutral under Phase II of the ETS. Any move to do so under Phase III and beyond should only take place in the context of international carbon accounting rules agreed under the UNFCCC.**

Moreover, WWF believes that CCS projects should not be funded heavily by the UK Government, as this would divert funding and focus away from more sustainable and lower carbon solutions, such as renewable energy and energy efficiency technologies. Hence, as it is large corporations (oil, gas and power majors) who will stand to benefit from the widespread global uptake of new CCS schemes under a future international climate change framework, it is they who should pay for the large majority of the R&D funding and investment, and not the UK tax-payer. Any Government funding should be focused on initial demonstration projects, particularly for more novel and promising techniques such as pre-combustion capture.

In the meantime, the Government should regulate to ensure that no new coal-fired power station is built in the UK without CCS. Other so-called "clean coal" technologies, including gasification and supercritical boiler technology, offer relatively modest improvements in thermal efficiency – but without CCS, CO_2 emissions remain much higher than from gas-fired power stations. All large gas-fired plant commissioned after 2012 should be designed to be capture-ready.

Specific questions from the HM Treasury consultation which comments are invited on:

Please note: WWF has not answered all of the questions in the consultation. We have restricted answers to the areas where we have substantive comments to make.

The Commercial Deployment of CCS in the UK

Q1) What are the barriers to commercial development of CCS?

There are several barriers to the commercial development of CCS in the UK at present and most are related to uncertainties due to CCS being a novel technology, such as;

- lack of clarity on support mechanisms/future carbon price.

- lack of clarity on liability and regulation, including the status of CCS under the OSPAR Convention.

- lack of investment from the industries concerned to date (due to their long-term uncertainty regarding the market) to fund and support the demonstration CCS projects and the independent monitoring and verification of CO_2 storage permanence.

- lack of clarity on costs – as there is a considerable degree of uncertainty about the costs associated with CCS. The costs associated with CCS include the: loss of available capacity at the power plant, which can be in the order of 40% for coal fired plant; capture of CO_2 at source, which differs according to type of plant being fitted and whether the CCS is being fitted during the construction of a new plant or an existing plant is being retrofitted with CCS; transport of the CO_2 to appropriate sites; and storage of CO_2 and permanence and/or leakage.

Potential Carbon Reductions

Q2) What carbon savings could be delivered by CCS, and how do these savings vary between different options for deployment, different fuels, and different kinds of technology at each stage of the CCS process? Can the life-cycle carbon savings be estimated comparably with those of other technologies?

At a global level, the scope for CCS is potentially vast. Last year, the Intergovernmental Panel on Climate Change concluded that CCS could contribute 15-55% of the global mitigation effort to 2100.

However, the questions are difficult to answer in the UK, as they depend on frequently changing variables and assumptions such as future fossil fuel prices and the carbon constraints set in future phases of the EU ETS. WWF believes that the industries must be challenged to produce robust figures on the potential carbon savings in the UK. At present, reliable estimates remain elusive, as the oil, gas and power companies have not provided all of their calculations, especially concerning the whole life-cycle carbon savings when related to Enhanced Oil Recovery (EOR) CCS projects.

Also, new modelling by ILEX Energy Consulting in a report for WWF (April 2006 – report attached to this response)[1] offers illustrative figures confirming that CCS could potentially help to further reduce CO_2 and reduce gas dependency. Under ILEX's low emission PS2 scenario, 4GW of coal-fired CCS capacity could supply some 6% of total electricity demand in 2025 – reducing gas' market share by a

[1] Report by ILEX consultants for WWF-UK 'The Balance of Power'(May 2006) available at: http://www.wwf.org.uk/climatechangecampaign/publications.asp

corresponding amount. Moreover, 4GW of coal-fired CCS capacity could reduce power sector CO_2 emissions by a further 4 million tonnes (2% of 1990 power sector emissions), assuming it displaces gas-fired CCGTs. Thus, it is worth considering the impact such technology could have on CO_2 emissions and fuel diversity if CCS is applied to coal fired plant.

ILEX's illustrative figures assess the impact of replacing CCGT plant with coal-fired plant using CCS. The table below details the assumptions used in this comparison. Coal fired plant without CCS are included to illustrate how plant with CCS is assumed to run with a higher load factor, significantly lower efficiency, and a much lower emission factor.

Assumptions used in the report by ILEX to compare CCGT with coal fired using CCS:

Assumptions	CCGT	Coal without CCS	Coal with CCS
Carbon capture	-	-	96%
Load factor	68%	50%	70%
Emission factor (tCO2/MWh)	0.19	0.30	0.012
Efficiency (HHV)	58%	36%	28%

Source: IPCC and Ilex analysis

Illustration of impacts of replacing 4GW of CCGT capacity with coal fired and CCS:

	CCGT	Coal with CCS	Difference CCGT & CCS
Capacity (GW)	4	4	-
Generation (TWh)	23.8	24.5	0.7
CO2 emissions (mtCO2)	7.8	1.1	-6.8
Fuel use (input value in TWh)	41.1	87.6	46.5

Source: Ilex analysis

In conclusion, WWF regards CCS as a potentially viable option to further reduce reliance on gas for power generation while ensuring ongoing reductions in CO_2 emissions. It appears possible that CCS could be brought forward on a considerably faster timescale than nuclear, as confirmed by the growing number of proposed projects both the UK and elsewhere in Europe, provided rapid progress is made to resolve a range of legal, technical and financial issues. CCS could be used with either coal or gas, but is particularly attractive with coal as this allows greater diversity in the fuel mix.

WWF therefore seeks assurance from industry and government that the CO_2 will be stored safely and permanently in locations that do not allow any leakage rate or 'gassing out' that would be higher than those from conventional natural gas fields; that would mean a permanence time of longer than 100,000 years. This permanence must also be assessed and confirmed through independent scientific review.

Subject to the caveats above and below, WWF is cautiously supportive of demonstration projects in the UK with industry funding and independent monitoring, in order to help confirm whether or not CCS technology is environmentally, technologically and economically acceptable.

Q3) how do the potential carbon savings compare with other options for reducing carbon emissions?

The IPCC Third Assessment Report provides current global figures on technological developments (options) and cost reductions and predicts that in 20 years renewable technologies will overcome cost hurdles and is very likely to be cheaper than coal and gas-fired power stations. Adding CCS to such stations would be more expensive – reinforcing WWF's view that CCS should be seen as only a short-to-medium term bridging technology.

Furthermore, as discussed above in our answer to Q2, new research and modelling by Ilex consultants in a report for WWF offers illustrative figures confirming that CCS could potentially help to further reduce CO_2 and reduce gas dependency.

WWF regards CCS as a potentially viable option to further reduce reliance on gas for power generation while ensuring ongoing reductions in CO_2 emissions. It appears possible that CCS could be brought forward on a considerably faster timescale than nuclear, as confirmed by the growing number of proposed projects both the UK and elsewhere in Europe, provided rapid progress is made to resolve a range of legal, technical and financial issues. CCS could be used with either coal or gas, but is particularly attractive with coal as this allows greater diversity in the fuel mix.

Technology

Q4) what are the different technological options currently available and in development for each stage of the CCS process – and what are the costs of these options?

WWF believes this is better answered by the industries and engineers concerned with and active in CCS development. Also, please refer to the different technological option costs and other related findings as estimated by the IPCC in the Third Assessment Report and the recent IPCC special report on CCS.[2]

Q5) what scope is there for applying these technological options to different forms of power generation (particularly gas and coal) and other large-scale sources of CO_2 emissions, and can they be installed on the basis of both new build and retrofitting?

The scope for applying these technological options to different forms of power generation depends to a large extent on the level of incentives provided, not necessarily fiscal, as a package of measures for low carbon technologies such as renewables and combined heat and power (CHP).

WWF believes that CCS should be seen as part of a hierarchy of options – and should not be used to lessen the focus or government funding on renewable energy and energy efficiency. WWF also believes there is a serious need for further research into the whole life-cycle CO_2 benefits of CCS schemes and especially those associated with Enhanced Oil Recovery (EOR). CCS may be most attractive for coal-fired generation, as this could help to ease concerns over-dependence on imported gas. WWF also believes that CCS is more effective for new stations, thus ensuring relatively high levels of thermal

[2] IPCC special report on CCS at: http://arch.rivm.nl/env/int/ipcc/pages_media/SRCCS-final/IPCCSpecialReportonCarbondioxideCaptureandStorage.htm

efficiency and carbon capture. The UK's existing coal-fired power stations are of low thermal efficiency, and are approaching the end of their 40-year design lives.

Overall, there may be a role for CCS in reducing the UK's CO_2 emissions, particularly in light of recent scientific evidence showing that reductions of greater than 60% by 2050 may be necessary. However, if CCS emerges as a viable option through industry trials, then the UK Government should regard it as means to take on more ambitious reduction targets rather than as a tool to deliver existing targets.

Q6) at what level of market readiness are these various technological options?

As suggested above, questions on market readiness and technological options are probably more appropriately answered by industry and industry analysts. Also, please refer to the different technological option costs and other related findings as estimated by the IPCC in the Third Assessment Report and the recent IPCC special report on CCS.[3]

However, WWF believes that the industry should be encouraged to demonstrate with some urgency whether CCS is a valid carbon abatement option or a potentially dangerous distraction from efforts to reduce fossil fuel use. Subject to the caveats above and below, WWF is cautiously supportive of demonstration projects in the UK with industry funding and independent monitoring, in order to help confirm whether or not CCS technology is environmentally, technologically and economically acceptable, and to speed up the process of climate change mitigation and achieving the necessary emissions reductions.

Regulation, Liability and Public Acceptance

Q10) what scope is there to develop and use CCS within the current regulatory framework?

First and foremost with regards to the regulatory framework, WWF-UK believes that CCS should be treated and seen as part of a hierarchy of options – and should not be used to lessen the focus or government funding on renewable energy and energy efficiency. WWF also believes there is a serious need for further research into the whole life-cycle CO_2 benefits of CCS schemes and especially those associated with Enhanced Oil Recovery (EOR), as the oil and gas industry still haven't provided nor confirmed figures yet, despite requests.

A report by Field and Ecofys consultants[4] which assesses the possible implications of existing international conventions and EU legislation on the implementation of CCS found that of more than 50 treaties studied, none covered CCS adequately.

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[3] IPCC special report on CCS at: http://arch.rivm.nl/env/int/ipcc/pages_media/SRCCS-final/IPCCSpecialReportonCarbondioxideCaptureandStorage.htm

[4] Report by Field and Ecofys consultants at: http://pdf.wri.org/ccs_impact_of_eu_law_on.pdf

Q11) what regulatory framework would need to be put in place to support the development of CCS technology while also ensuring protection of human health and the environment?

WWF does **not** support the direct storage of CO_2 in the open ocean, open aquifers, lakes or on the sea floor.

However, WWF believes that CCS schemes involving geological storage of CO_2 in certain rock formations, such as oil and gas fields and/or saline aquifers under the sea could be acceptable, subject to ongoing research into the safety and security of the storage and full assessment of the environmental impacts of each project. Any CCS project/s must not interfere with or have significant negative direct or indirect impacts on biodiversity. As a result, detailed SEAs and EIAs must be required before a project is permitted to go ahead.

WWF, therefore, seeks assurance from industry and government that the CO_2 will and must be stored safely and permanently in locations that do not allow any leakage rate or 'gassing out' that would be higher than those from conventional natural gas fields; that would mean a permanence time of longer than 100,000 years. This permanence must also be assessed and confirmed through independent scientific review.

The processes of both carbon capture and storage must be subject to robust oversight by a credible, independent regulatory body, backed by a permitting regime similar to the integrated pollution prevention control (IPPC) system. Full transparency and consultation, underpinned by rigorous and frequent site inspections, must be essential parts of this regulatory regime to be put in place to support the development of CCS technology while also ensuring protection of human health and the environment.

Q12) what additional costs and considerations are created by the long-term liability implications attached to CCS, and how can these be best managed?

There are clearly risks and potential liabilities attached to CCS – including environmental and safety impacts of any leakage, and financial risks relating to the treatment of any leakage in a future system to reward carbon storage. These liabilities may need to be covered for many thousands of years. WWF believes it is therefore appropriate for the industry to set up segregated and secure funds to cover any long-term liabilities. Existing CCS schemes and any demonstration projects in the UK should allow more confidence in trying to quantify the potential risks and liabilities.

Q13) what issues arise concerning (short-term) liability for CO_2 at particular points in the CCS process? Are there costs attached to these and what are they?

WWF is concerned that until proven otherwise, leakage of CO_2 may occur and jeopardise compliance if CCS is included in the EU ETS. Therefore, an appropriate method of payback or temporary credits perhaps could be considered for the industry, until industry and government can assure WWF and other stakeholders that the CO_2 can be stored safely and permanently in locations and do not allow any leakage rate or 'gassing out' that would be higher than those from conventional natural gas fields; that would mean a permanence time of longer than 100,000 years. This permanence must also be assessed robustly and confirmed through independent scientific review.

However, CCS is currently an immature technology. Its deployment raises several serious issues, which need to be addressed by the Government before any demonstration projects proceed. These include:

- the legal status of CCS, particularly regarding the OSPAR and London conventions on protection of the marine environment, environmental assessments (including whole life-cycle carbon emissions), and systems to issue permits and regulate the activity;
- the liability for long-term storage;

One key question is the treatment of CCS under the EU emissions trading scheme and, more widely, the rules for accounting for emissions under the UN Framework Convention on Climate Change. **WWF believes that it is premature to class CCS as carbon-neutral under Phase II of the ETS. Any move to do so under Phase III and beyond should only take place in the context of international carbon accounting rules agreed under the UNFCCC.**

Q14) what might be the likely public reaction to concerns about CCS, and how could concerns be addressed?

Public concern surrounding environmental integrity, safety and costs is likely to be eased if the government and industry demonstrate that they are implementing adequate regulatory and liability regimes (including policy and contingency), along with full engagement and consultation with all stakeholders. Furthermore, public concerns and negative reaction towards CCS will be less likely if CCS is demonstrably shown to be part of a much broader package of renewables and energy demand reduction measures which achieve real and substantial carbon emission cuts.

Costs

Q17) how might changes in the relative prices of coal and gas in the framework governing emissions of CO_2 and other pollutants affect the costs and profitability of CCS?

It is clear that the recent shift in fuel prices has greatly favoured the use of coal over gas for power generation. Current carbon prices in the EU ETS are insufficient to tip the balance back in favour of gas – especially following the recent price crash arising from over-generous allocations in phase I of the scheme.

WWF has no detailed comments on the economics of conventional coal and gas generation compared to the use of CCS. The recent substantial increase in gas prices, if sustained, will improve the relative competitiveness of both conventional coal generation and coal with CCS. However, it is obvious that the significant additional costs of CCS mean that the technology will remain uncompetitive in the absence of a significant and robust price for carbon in the medium-term, reinforced by allocation methodologies which reward investment in low-carbon technologies.

Q18) to what extent does EOR reduce costs and increase the commercial viability of CCS?

Greatly one would expect, but need more information and clarity from the industries concerned.

Q21) what are the costs associated with building capture-ready plant and how do they differ from the cost of constructing fully operational CCS facilities? To what extent can any additional costs be mitigated by decisions on design, location etc?

Modelling work by Ilex on behalf of WWF demonstrates that the need for new, large-scale power generating capacity in the UK has been greatly overstated. It shows that the claimed "energy gap" can be greatly reduced, or eliminated, by reducing the rate of growth in electricity demand and delivering on renewable energy targets set out in the 2003 White Paper.

However, WWF is calling on the Government to regulate to require any new coal-fired power station to be fitted with CCS from the outset. A return to coal burn without CCS, even in a relatively efficient modern plant, is unacceptable in light of the urgent need to reduce global CO_2 emissions. WWF also believes that all new large gas-fired stations should be required to be "capture ready" by 2012 at the latest. The evidence suggests that the additional costs of building capture-ready plant are marginal, and would considerably reduce the costs of any subsequent retrofit.

Q22) is the use of CCS currently a profitable option for businesses in the electricity supply sector and other sectors and, if not, what is the shortfall? Under what conditions might it become profitable?

CCS is clearly not a profitable option at present, given the substantial additional capital and operating costs and the lack of any mechanism to recognise the potential emission reduction benefits. WWF understands that developers of CCS projects are currently seeking very substantial financial assistance from the Government. Some level of financial support may be appropriate for a handful of demonstration projects, particularly those involving more novel pre-combustion capture technologies, but the expectation should be that the industry must move rapidly to compete on a level playing field with other large-scale generation technologies.

The key mechanism which could make CCS profitable is the EU ETS. We discuss the issues around the ETS in our response to Question 24 below.

Is there a case for economic incentives for CCS?

Q23) what is the impact of the current policy framework on the development of CCS?

N/A

Q24) are there any particular issues that need to be taken into account with regard to CCS when considering the use of policy mechanisms to reduce CO_2 emissions in the UK economy?

The EU emissions trading scheme should be the key mechanism to recognise the potential emission reduction benefits of CCS. Beyond a very limited number of initial demonstration projects, for which some level of grant support might be appropriate, CCS should compete on a level playing field with other large-scale generation technologies.

WWF sees a clear case for retaining dedicated support for renewable energy technologies because of the wider sustainable development benefits of renewables, and the ongoing potential for steady cost reductions. However, towards the end of the next decade there may be scope to refocus support away from some lower-cost renewables, such as onshore wind, in favour of emerging technologies such as wave and tidal power.

However, several important features of the ETS need to be reinforced if it is to deliver its potential to reduce emissions. Important questions over the incorporation of CCS into the trading scheme also need to be resolved:

1. **Level of the cap:** The effectiveness of the ETS in driving down emissions and incentivising investment in low-carbon technologies is dependent on the price of carbon, which in turn depends on how tight the caps on emissions are across all Member States. The Government must lead by example by setting a tough cap on UK emissions in Phase II of the scheme. WWF is calling for the cap to be set at 60 million tonnes of carbon – a level which should allow the Government to deliver its long-standing target of a 20% cut in emissions between 1990 and 2010.
2. **Long-term certainty:** A widespread concern is that the ETS currently fails to provide sufficient long-term certainty to underpin investment decisions. The European Commission's review of the scheme should consider the scope for extending trading periods to longer than the current five years.

   WWF believes that greater certainty could also flow from a move towards setting annual carbon budgets, initially at UK level but potentially rolling out across the EU. This would give a clear signal to the market of the direction of travel and of governments' intentions in the medium term. The current cross-party consensus on climate change provides a strong opportunity to agree on robust targets going forward.

   WWF also believes that a commitment to move to 100% auctioning in Phase III of the ETS (at least for the power sector) would also provide a strong and clear incentive to develop the low emission technologies.
3. **Accounting for CCS:** One key question is the treatment of CCS under the EU emissions trading scheme and, more widely, the rules for accounting for emissions under the UN Framework Convention on Climate Change. WWF believes that it is premature to class CCS as carbon-neutral under Phase II of the ETS – the issues involved are complex and should not be rushed through. Indeed, the benefits of driving through a rapid decision on this issue are far from clear given that it is unlikely that much, if any, CCS capacity could be up and running by the end of Phase II.

   Any move amend the rules for accounting for CCS for Phase III and beyond should only take place in the context of international carbon accounting rules agreed under the UNFCCC. This forms part of a wider question concerning the role of CCS under the Clean Development Mechanism and accounting for carbon storage in national emission inventories.

   Mechanisms to deal with the potential leakage of CO_2, and address the resulting carbon liabilities, need to be built in from the outset. Ideally, there must be some form of claw-back provision from a segregated fund set up to deal with wider liability questions.
4. **Allocation methodology:** WWF supports a move away from grandfathering to 100% auctioning (at least for the power sector) as the most economically and environmentally efficient option for allocation – and also one which reduces the risk of gaming and political pressure in the allocation process.

   Auctioning would ensure that the full costs of carbon are taken into account in investment decisions – potentially offering robust support to CCS. Benchmarking could also help to recognise the carbon benefits of CCS, provided it is done on a product- and not fuel-specific basis.