The Purpose and Structure of the Feasta Climate and Energy Group.

I'd like the Climate Group to develop a new view of its purpose at its meeting in Scotland. I'd also like us to think about adopting a new structure to enable us to carry that purpose out.

Until a year ago, the group's focus was on developing Cap and Share. We did this mainly by e-mailing our ideas and drafts of explanatory leaflets round to each other for improvement and comment. This work was largely completed in 2008 with the publication of "Cap and Share – a fair way to cut greenhouse emissions" in May, the reports on the effect that C&S was likely to have in India and South Africa, and at the end of the year, the report from the Irish national sustainability council, Comhar, on how C&S compared with other emissions-reduction tools, such as a carbon tax, which governments might adopt at a national level.

Early in 2008, however, we came to realise that although C&S was potentially an effective way of limiting fossil fuel emissions, it would be very dangerous to use it by itself as it would lead to a greatly-increased demand for biofuels and that this would be disastrous unless the carbon stocks held in the world's forests and soils were protected. We adopted what we called a "twin-track" approach and began to investigate how that protection might be provided and whether we could devise a good way to reward landowners who increased the carbon content of their soil and/or the biomass growing on it.

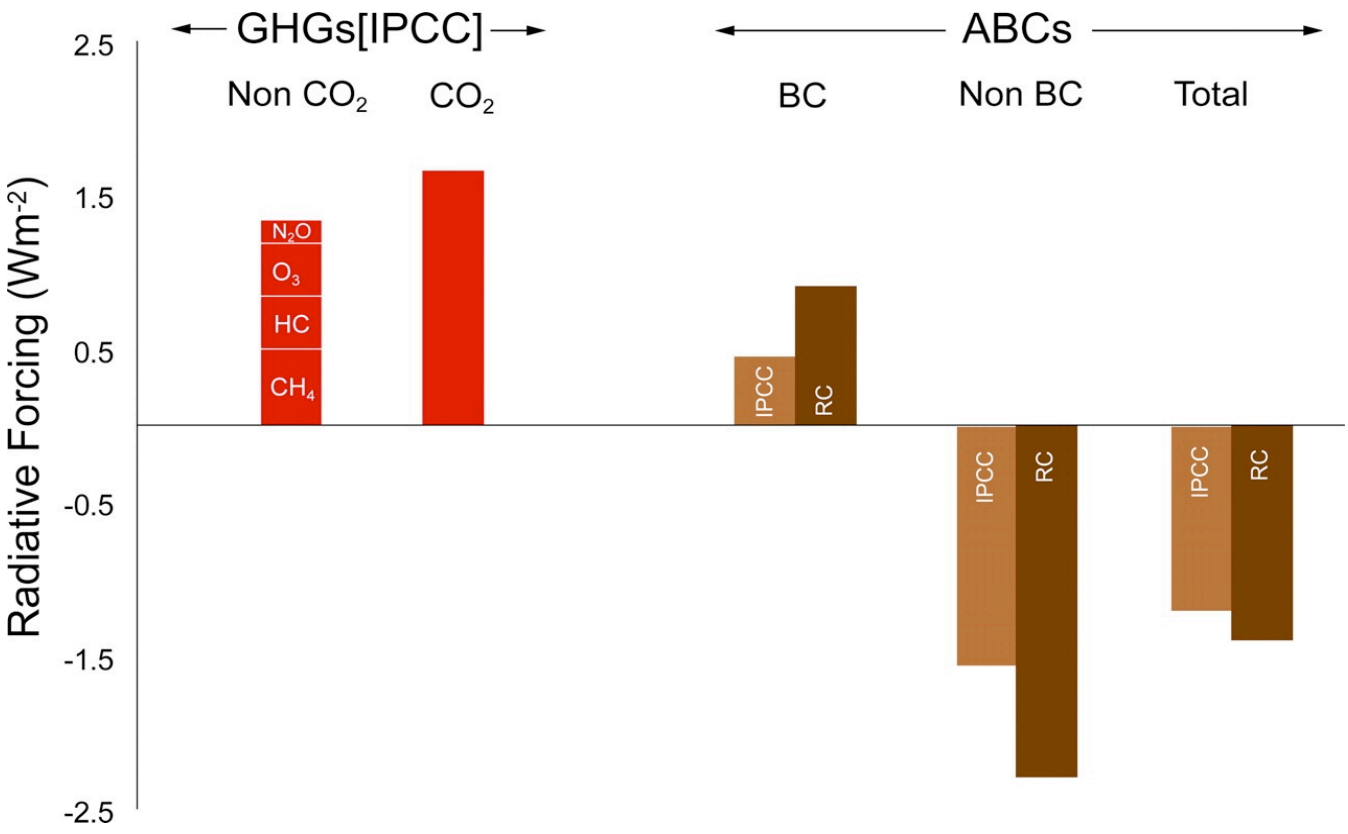
Our interest in this area led to a contract from the (Irish) Department of the Environment to provide policy advice on reducing Irish land-based emissions – mainly those from agricultural activities - and on how natural sinks for ghgs could be improved. The funding allowed the method of working to change and, instead of getting input from members of the group, specialists were approached for it. The draft report was posted on the project website at the end of November. See http://carboncyclesandsinks.org/wp-content/uploads/2009/11/Reducing-Greenhouse-Emissions-A4_Draft%201.pdf

A lot of interesting conclusions - which we will discuss in detail in Scotland - came from the work . In particular, it became clear that the UN habit of expressing the effects of greenhouse gases like methane and nitrous oxide in terms of their "Global warming potential" expressed in terms of CO2 was very crude. The report suggests that it would be much better to have specific reduction programmes for each gas, or possibly even for each gas from a specific source. It says, for example, that methane from farting cattle – enteric methane – should not be lumped in with methane from other sources because it was very much more difficult to reduce without reducing herd numbers and cattle had a potential role to play in increasing soil carbon. Having several reduction programmes rather than one should give greater flexibility in negotiations. Everything would not have to be settled at one big meeting.

In other words, rather than a twin-track approach, I've come to the conclusion that we need to take a multi-track one, gathering the latest research findings on each gas or aerosol that affects the global climate and developing a policy position on it. If you look at the graph I've sent as an attachment which is from the 2008 article "On avoiding dangerous anthropogenic interference with the climate system: Formidable challenges ahead" by Ramanathan and Feng you will see that almost as much warming is caused by nitrous oxide, ozone, and halocarbons together as is due to carbon dioxide.

The graph also shows that airborne particles of black carbon, produced by the incomplete combustion of fuel, whether it be from diesel engines, charcoal cooking stoves or bushfires, causes at least half as much warming as CO2. Why is there no programme to reduce these emissions which, since the carbon particles only stay in the atmosphere a few weeks, would bring rapid results? The carbon particles damage the climate in two ways – when they settle on snow, they

absorb solar rays which the snow would otherwise have reflected and cause it to melt faster. When floating in the air, they warm that too. They also damage human health. There's a good article about



black carbon at http://www.yaleclimatemediaforum.org/2009/07/black-carbon-and-global-warming/ and another at http://blog.psaonline.org/2009/09/17/hazy-reasoning-on-black-carbon/

The graph shows something else too. ABC stands for "atmospheric brown clouds". Some of the anthropogenic particles in these clouds are light coloured and reflect the incoming solar radiation. They therefore have a cooling effect. If humans hadn't caused this pollution, ("global dimming") the world would have warmed by quite a lot more. Policies are therefore needed to maintain this pollution or replace the protection it gives in another way.

The fact that there are vast areas of ignorance in climate science means that it is hard to develop sound policies, particularly as they would be working in a complex system. For example, it's not yet clear whether clouds have a warming or cooling effect. Last July, *Science* published research findings (see http://www.sciencemag.org/cgi/content/summary/325/5939/376 and http://www.rsmas.miami.edu/pressreleases/20090723-clouds.html) which show that low-level stratiform clouds which currently shield the Earth from the sun's radiation, may dissipate as the sea warms, thus allowing it to warm more. This would cause more cloud dissipation and create a vicious circle by allowing further warming unless wind speeds increased (something that warming might cause) and offset the effect by generating more cloud. Since estimates of cloudiness are crucial components of the models used to predict what the effects of the release of greenhouse gases

might be, the *Science* article demonstrates just how unreliable those predictions are.

This is confirmed by another *Science* article which appeared this week and was picked up by lots of newspapers. Here's the *USA Today* account.

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Study: Water vapor may help 'flatten global warming trend'

By Doyle Rice, USA TODAY

http://www.usatoday.com/weather/climate/globalwarming/2010-01-29-watervapor29_ST_N.htm

Why the Earth's surface temperature hasn't warmed as expected over the past decade continues to be a puzzle for scientists. One study out earlier this month theorized that the Earth's climate may be less sensitive to greenhouse gases than currently assumed.

Another surprising factor could be the amount of water vapor way up in the stratosphere, according to a new study out Thursday in the journal *Science*.

Water vapor, a potent, natural greenhouse gas that absorbs sunlight and re-emits heat, is "a wild card" of global warming, says the paper's lead author, senior scientist Susan Solomon of the National Oceanic and Atmospheric Administration in Boulder, Colo. Solomon was also a co-chair of one of the groups within the Intergovernmental Panel on Climate Change that put out the definitive forecast of global warming in 2007.

In the *Science* paper, Solomon and her colleagues found that a drop in the concentration of water vapor in the stratosphere "very likely made substantial contributions to the flattening of the global warming trend since about 2000."

While climate warming is continuing - the decade of 2000 to 2009 was the hottest on record worldwide - the increase in temperatures was not as rapid as in the 1990s.

The stratosphere is the layer of the atmosphere just above the troposphere, which is the layer of air here at the planet's surface. (The troposphere goes from the surface up to about 8 miles, and the stratosphere is from about 8 to 30 miles above the surface.)

The decline in water vapor in the stratosphere slowed the rate of surface warming by about 25%, compared to that which would have occurred due to carbon dioxide and other greenhouse gases, notes the study. Specifically, the planet should have warmed 0.25 degree F during the 2000s, but because of the influence of the water vapor, it rose just 0.18 degree F.

"We call this the 10/10/10 paper," says Solomon. "10 miles above your head, there is 10% less water vapor than there was 10 years ago."

Why did the water vapor decrease? "We really don't know," says Solomon, "We don't have enough information yet."

The findings are "surprising," says Bill Randel, an atmospheric chemist at the National Center for

Atmospheric Research, who was not part of the study. He said it was surprising how big an effect such a very little change in stratospheric water vapor has had on the surface climate.

These fluctuations in water vapor could be part of a feedback loop. Although it's known that water vapor in the troposphere increases as the climate warms - and is a major climate feedback that is well simulated in global climate models - in sharp contrast, models do a poor job of simulating water vapor in the stratosphere, according to the paper.

But Solomon points out this isn't an indication that predictions on global warming are overstated: "This doesn't mean there isn't global warming," notes Solomon. "There's no significant debate that it is warmer now than it was 100 years ago, due to anthropogenic (man-made) greenhouse gases."

And how will this water vapor affect future global warming? "We really don't know the answer to this," says Solomon. "If the water changes are due to the specific way the sea-surface temperature pattern looks right now, then it may well *not* be linked to the overall warming. It could just be a source of variability from one decade to another as the ocean pattern slowly changes. Or it could be linked to the overall warming of the tropics, in which case it could continue to 'put the brakes on.' Only time will tell, and more data."

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The group has moved beyond devising a fair way to share out the benefits of using a limited amount of fossil fuels. If it is thinking about policies to deal with a number of emissions - aerosols including black carbon, methane, nitrous oxide and halocarbons – in addition to CO2, we need a different structure. This is particularly the case as we intend to explore the potential and possible policies for developing sinks as well. No one person can cover everything so it seems to me that individual members are going to have to specialise and bring what they have found, and the policies they recommend, back to the group later in the year. If we decide to go for this option, the group will need a structure which can handle it.

Richard Douthwaite.