A Ph.D student in the Berkeley Energy and Resources program writes:

The third & final day of the climate conference dawned bright & sunny in Copenhagen, and I jammed myself & my poster onto a packed subway car for the trip back to the Bella Center. Trains run every 2-4 minutes in Copenhagen at rush hour; nonetheless, passengers are packed like sardines, especially when 2000 conference attendees try to get on within a few stops!

Before jumping into today's content, I skimmed over two important presentations in last evening's blog and want to take the opportunity to give Bill Nordhaus and Jim Hansen a few sentences more. Nordhaus is a strong proponent of a tax on carbon (although he recommends what many consider a too-low tax), and he took the opportunity of the plenary session to advocate his position. He suggested a hybrid model for the Copenhagen Treaty in which all nations sign onto a climate agreement, with a choice between a cap or a minimum tax, as a way to bring all nations to the table. I've not encountered the idea of a hybrid treaty before, and depending on the tax amount, thought it was an interesting option.

Jim Hansen co-led the session on non-CO2 emissions. He too supports a carbon tax, with the revenues being returned to the public as a dividend, and considers cap & trade a proven failure. He emphasized the urgency of phasing out coal-generated electricity by 2030. He also would like to see action on methane, tropospheric ozone, and black carbon – and emphasized that these must not be lumped in with CO2 because then mitigation of the non-CO2 pollutants is only used as an excuse for not mitigating CO2 to the necessary extent. He reemphasized his recent comments that a 450 ppm CO2 scenario is within the dangerous range and that the planet must return to 350ppm CO2. (we're currently at 385ppm) He also reminded the audience that our goal is to restore the planet's energy balance; net inflow is currently estimated at 0.5 to 0.75 W/m2.

Today's agenda was a plenary session, followed by poster session, then lunch, a final parallel session, and the closing plenary session. The plenary speakers this morning were Prof. Diana Liverman (Oxford), Prof. John Schellnhuber (Potsdam Institute), and Lord Prof. Nicholas Stern (London School of Economics). Schellnhuber and Stern delivered particularly thought-provoking talks. Liverman spoke on the social response to climate policy.

Schellnhuber started by asking the audience how many played Russian Roulette, and when no one raised their hand, reminded us that we are playing Russian

Roulette even under the most ambitious proposed policies: p=5/6 of holding to 2 degrees C warming if global GHG emissions are reduced by 80% by 2050, with negative emissions after 2070. He then presented a number of thought experiments re. land use in a climate-strained world. He asked where the ideal place to grow crops would be based on fertility and precipitation patterns, and discovered that much of that land lies in the eastern half of the US and Europe. He then threw out the idea that these ideal crop-growing areas should be treated as a Global Agricultural Commons. Schellnhuber concluded with some comments on surviving in a +5C world. He noted that the planet's carrying capacity in that scenario would be < 1 billion people, that there would be areas of anoxia in the oceans, and that positive feedbacks between tipping elements would come into play.

Stern followed with a discussion of low carbon growth. He spoke critically of Bill Nordhaus and others who have built economic models with inappropriately underestimated damage functions (e.g., a 50% loss in GDP with a 19C warming!), but also criticized scientists for not speaking more about 4,5,6,7C scenarios, and why it's so important that we avoid those scenarios. He described scientists as being too conservative in always discussing 2 and 3C scenarios, and not adequately communicating the true damage function of higher temperatures to either economists or policymakers. He admitted that the damages are underestimated in the 2007 Stern Review as well. He described himself as more optimistic about the likelihood of humanity solving the problem now than two years ago, largely due to the rapid pace of discussion in India and China and the attention of the Obama administration. Finally, he noted that the economic crisis provides an opportunity to put the unemployed to work building infrastructure and retrofitting buildings, and that labor is cheaper now than in better economic times.

After my poster session and lunch, the day was clearly winding down and I visited two parallel sessions on adaptation – of agricultural production and of urban areas. None of the talks I attended were stand-outs, but it was interesting to be reminded of the extent of adaptation – e.g., the transport sector is concerned about material damage from heat & erosion, increased need for cooling of vehicles and buildings, more delays due to extreme weather events, and possible changes in consumer preferences for transportation modes and destinations.

I wrapped up my poster, retrieved my coat, and headed back to the plenary hall for the day's final session, a panel discussion between the Danish Prime Minister Anders Fogh Rasmussen and four previous plenary speakers (Stefan Rahmstorf, Will Steffen, Nicholas Stern, and Dan Kammen). Conference Chair Katherine Richardson

summarized the six conference messages to policymakers as: 1) climate observations in the past two years have been at the worst case end of the IPCC scenarios for most climate elements, 2) social disruption is to be expected, even below 2C, 3) aggressive mitigation is needed, 4) climate change has inequitable impacts, hitting the poor the hardest, 5) there is no excuse for inaction, and 6) meeting the challenge requires effective governance, public support, and reduced influence of vested interests.

The highlight of the panel was a fairly intense exchange between the Prime Minister and Stefan Rahmstorf. Rahmstorf stated, “You must realize, even 2C is not safe; I consider it an upper limit. Politicians discuss 2C as an ambition, and if things go reasonably we may end up at 3C – this is [not ok].” Prime Minister Rasmussen was clearly disturbed by this, and asked for clarity. “Are you saying that 2C is not enough? Because it’s been a very long hard negotiation in the EU to agree on this. Are you saying that I can’t trust the IPCC?” Rahmstorf replied that nowhere does the IPCC state that 2C should be a goal, and there is a 50/50 chance of very undesirable outcomes at 2C, but that it’s a fine place to start. Prime Minister Rasmussen then asked a follow-up question, “So are you telling me that 50% global reduction below 1990 by 2050 is too low?” Rahmstorf replied that “50% by 2050 gives you only a 50/50 chance of keeping within 2C. I would be more ambitious.” Steffen followed up with a comment that science & policy will evolve and that “adaptive management” is needed. Kammen re-iterated Rahmstorf and said that the stronger 80% global reduction goal is really needed to bring the risk of exceeding 2C down to 15-35%. Prime Minister Rasmussen then closed the session, including in his remarks that his goal for the Copenhagen agreement is a 50% global reduction by 2050, then after the audience nervously laughed, commented that he noted they will take into account that the scientists consider that a bare minimum.

The conference ended with a performance by a band from Greenland. Many were ready to leave and a constant stream of researchers poured out of the plenary hall. We were greeted by a gentle snow falling on the wind turbine outside, a reminder that the weather really does exist after spending the day in a windowless building. Back to campus to continue studying the climate…

All of the plenary talks and many of the parallel sessions can be accessed at: http://climatecongress.ku.dk/.