

WEDNESDAY PLENARY:

SCIENCE BASED POLICY FOR ADDRESSING ENERGY AND ENVIRONMENTAL PROBLEMS.

Robert F. Sawyer, University of California at Berkeley, USA

Comment by Guillermo Rein, The University of Edinburgh, UK

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What can the Combustion Institute do to promote the feedback between science and society? Is the Combustion Institute doing enough given the great importance of these combustion problems? I look forward more inspiring talks like this one fostering the debate within the combustion community on strategic topics of wide interest and not only on fundamental science.

Reply by Robert Sawyer

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The debate over the Combustion Institute's role, whether to focus solely on high quality science or to venture into advocacy, has been ongoing for decades. Past decisions to avoid advocacy deserve review. The participation of the new generation of combustion scientists in this debate is essential.

Comment by Wolfram Jahn, The University of Edinburgh, UK

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The relevance of this topic in the Symposium is obvious and I look forward to hear more talks on this issue in the future. Considering that global population has been experiencing an exponential growth for the last century or so, and considering that the average wealth of that population is also growing (which means that more and more people will require energy), do you think it is really possible from a combustion technology point of view to reduce CO₂ emissions sufficiently (converting as efficiently as physically possible) so that the anthropogenic effect on the global climate can be controlled in the long term?

Reply by Robert Sawyer

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Improving efficiency is an essential, cost-effective first step. This will not be enough. We need to seek zero CO₂ emissions technologies, to reduce energy demand, and to modify life-style choices.

Comment by John Mertens, Trinity College, USA

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I agree with Professor Sawyer's point that we need to try to educate policy makers about these issues. I would like to suggest that all of us familiarize ourselves with the Stern Review on the Economics of Climate Change, commissioned by the government of Great

Britain (and his recent adjustments to his report). To best influence policy makers, I think it's important to put things in terms of economic costs. Stern performed a risk/probability economic analysis of the costs of global warming, and the costs of taking drastic action to level off CO₂ level in the 500+ ppm regime. As the speaker stated, most policy makers really can't understand the science, but if you put things into dollars and cents, they may listen. I think we should also understand what a tremendous effort it will take just to level-off CO₂ levels at 550 ppm or less. It's a daunting task, and requires immediate and massive efforts. A minor point: the speaker seemed to imply that ocean levels will rise due to the melting of ice. This is a contributor, however I believe a large majority of the predicted rise of ocean levels is due to the fractional increase of the volume of the water in the oceans from the increase in temperature (thermal expansion coefficient).

Reply by Robert Sawyer

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Yes, the Stern report should be recommended reading for the combustion community. The strong message is that we can deal with the climate change problem with a modest effect on global economic growth. Yes, recent sea level rise, measured in centimeters, has been the result of thermal expansion from ocean warming. Of greater concern is the possibility of sea level rise, measured in meters, which would result from Greenland and Antarctic glacial melting.

Comment by Takashi Tsuruda, National Research Institute of Fire and Disaster, Japan

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The carbon dioxide concentration observed in Hawaii shows seasonal and long-period changes. The observed upper and lower peaks should be parallel to each other provided that the seasonal change is constant. In the concentration figure, the observed upper and lower peaks show lower increase rates in 1970's and early 1990's when the global economy experienced depression. Considering the proposed reduction of carbon emission and the real experience during the global depression, which level of living standard is technologically allowed?

Reply by Robert Sawyer

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Living standard, more importantly, quality of life need not be tied to CO₂ emissions. Technology and life-style choices provide opportunities to reduce emissions without sacrificing improving the global human situation.