

## Boffin Lays Out How to Think About Warming

At a briefing for congressional staffers and media sponsored by the **Cooler Heads Coalition** earlier this month, **Jesse Ausubel**, a researcher at **The Rockefeller University**, laid out a framework for thinking about global warming issues. Among them: energy use, emissions, and concentrations; climate sensitivity, or how much the climate may warm due to increases in greenhouse gas concentrations; the potential impacts on ecosystems and people; and so on.

Ausubel argued that many of these issues are essentially unknowable. Climate sensitivity, for example, has been estimated at different extremes. The aggregate results from peer-reviewed scientific studies show a normal distribution of climate sensitivities. Some suggest that a doubling of atmospheric carbon dioxide concentration will warm the climate by about 4.5 degrees Celsius. Others show low climate sensitivity, which would lead to a warming of 1.5° C. Still others fall somewhere in the middle. Ausubel noted, "The pile of papers keeps getting larger, but the shape of the pile never changes."

The real debate, according to Ausubel, lies in trends in energy use. This is one variable that is known, and as Ausubel has discovered, the world has experienced a sustained long-running reduction in carbon intensity in its energy use. Wood, still a major source of fuel in less developed countries, has a hydrogen-to-carbon ratio of 1 to 10. Coal's H:C ratio is 1 to 2, oil 2 to 1, and methane or natural gas about 4 to 1.

The world has been steadily decarbonizing for the last 150 years, from wood to coal to oil, and now to methane. Ausubel argues, controversially, that total decarbonization is in our future and that the economy will run on hydrogen, powered by nuclear power, similar to the vision of the **Bush** administration.

One of the major implications of decarbonization is that energy policy may be irrelevant. As Ausubel has noted elsewhere, "Neither **Queen Victoria** nor **Abraham Lincoln** decreed a policy of decarbonization. Yet, the system pursued it." Decarbonization and our path to the hydrogen economy will happen regardless of government decrees or federal research money.

Ausubel also takes to task the **U.N. Intergovernmental Panel on Climate Change** for its assumptions on energy use. When Ausubel extrapolated decarbonization trends out to the year 2100 and compared it to the IPCC's 1990 "business-as-usual" (BAU) scenario he found that they bore little resemblance to one another. The IPCC's BAU scenario was a flat line, which assumes technical stagnation or what Ausubel dubs the "**Brezhnev Scenario**." But, properly understood, business-as-usual is a technologically dynamic and progressive scenario that will eliminate CO<sub>2</sub> by 2100. The IPCC's *2001 Third Assessment Report* uses 40 scenarios which show decarbonization and carbonization going in all different directions with no probabilities attached. Failing to provide probabilities is unscientific and reveals the political bias of the results, said Ausubel. [PG]