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LETTER

On the extraordinary value of "committing to commit"—an opportunity *not* to be missed

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On July 25, 1997, the US Senate passed what has become known as the "Byrd–Hagel Resolution" (Senate Resolution 98 of the 105th Congress; Byrd–Hagel Resolution 1997). Named after its two primary sponsors—Democratic Senator Robert Byrd from West Virginia and Republican Senator Chuck Hagel from Nebraska—its original language was dropped in the Senate hopper on June 12th. The language emerged without amendment (but with a preamble added) from the Foreign Relations Committee on July 21st; and the measure passed with 64 co-sponsors by a vote of 95–0 on July 25th. Clearly, there was unusually swift action on a resolution with unambiguous support across the entire Senate. It said, in part, that (emphasis *in italics* by the author; the entire resolution, a complete list of co-sponsors and some analysis can be found at http://www.nationalcenter.org/KyotoSenate.html):

It is the sense of the Senate that—

1. the USA should not be a signatory to any protocol to, or other agreement regarding, the United Nations Framework Convention on Climate Change of 1992, at negotiations in Kyoto in December 1997, or thereafter, which would
   (a) mandate new commitments to limit or reduce greenhouse gas emissions for the Annex I Parties, *unless the protocol or other agreement also mandates new specific scheduled commitments to limit or reduce greenhouse gas emissions for Developing Country Parties within the same compliance period*, or
   (b) would result *in serious harm to the economy of the USA*; and
2. any such protocol or other agreement which would require the advice and consent of the Senate to ratification should be accompanied by a detailed explanation of any legislation or regulatory actions that may be required to implement the protocol or other agreement and should also be accompanied by

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an analysis of the detailed financial costs and other impacts on the economy of the United States which would be incurred by the implementation of the protocol or other agreement.

We are now on the eve of the Copenhagen meeting of the Conference of the Parties of the Framework Convention from which the parameters of the next international commitment period for greenhouse gas emissions reductions will hopefully emerge (responding to Article 2 commitments to stabilize "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" UNFCCC 1994). Those same negotiations will also work to design programs that promote adaptation among the world's most vulnerable (responding to Article 4 commitments to help "developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects"). As we anticipate progress in these negotiations, though, it is important to recognize that Byrd–Hagel still applies to negotiators for the USA and could directly inhibit their ability to engage fully.

Two papers published in this inaugural issue of *Climatic Change Letters* do just that, but they respond by offering strong evidence that strict adherence to the letter of the Resolution by the USA could be quite expensive. They show that extracting "commitments to commit" to future emissions reductions from large non-Annex I countries could dramatically reduce the cost of achieving a given concentration limit—as long as such a commitment to commit were credible, but *even if the commitment would not come into force during the "same compliance period" mentioned in the Resolution.*

One paper, authored by Richels, Blanford and Rutherford, employs a long-standing and very well respected integrated assessment model (MERGE) to explore the value of BRIC (Brazil, Russia, India and China) and other non-OECD countries' committing now to participate later (specifically in 2030) in a global emissions reduction program designed to limit concentrations to 550 ppm CO_2 equivalents. This is not an extraordinarily restrictive concentration target, of course; the median estimate of the associated increase in equilibrium global mean temperature (above pre-industrial levels) is slightly less than 3°C (surrounded in Figure SMP.11 in IPCC 2007 by 10th and 90th percentile estimates of around 2°C to nearly 4°C). Richels et al. (2009) nonetheless show significant cost savings in all regions, including the OECD countries, in comparison with a baseline scenario in which BRIC and other non-OECD countries wait to commit until 2030, and then begin to act immediately. Using a discount rate that begins at 5% and falls to 4% by midcentury, the distribution reported here sees OECD, BRIC, and rest of world costs of achieving a 550 ppm equivalent concentration limit falling by 51%, 31% and 44%, respectively (for a global reduction of 41%).

The key to understanding why such reductions might be plausible lies in recognizing that anticipating participation from BRIC countries provides enormous financial incentive for investment in the development and deployment of alternative energy sources well before 2030 threshold. This anticipation thereby produces a smoother transition to a world where most if not all countries are committed to a 550 ppm limit and thereby reduces the cost of adjusting to a more ubiquitous participation in the specified global mitigation program.

The second paper, authored by Bosetti, Carraro, and Tavoni, employs a different integrated assessment model (WITCH). Their model is an energy-based macroeconomic model whose climate module accounts for carbon externalities and whose energy module accommodates technological development and dispersion explicitly. Bosetti et al. (2009) explores the value of China's committing now to participate in 2030 in a global emissions reduction program that is also designed to limit concentrations to 550 ppm CO_2 equivalent; in their world, other BRIC countries come on line in 2030 and the rest of the world participates in 2050. Their results also show significant cost savings in all regions, including OECD countries (48%), BRIC countries (22%) and the rest of the world (22%), in comparison to a baseline scenario in which China joins the other BRIC countries in 2030 without anticipation. The world average is 38% for this experiment—a number that is only slightly lower than the estimate offered by Richels et al. (2009) even though the discount rate is fixed at 5%. Again, the key is that anticipation of participation by China (alone this time) informs investment well before 2030 and reduces the cost of the adjustment. Since the model has a more explicit and detailed energy module, these results are perhaps even more reassuring because they identify some of the particular energy technologies that might be widely adopted over the next 20 years if China were to commit now—increased investment in nuclear power and electricity generation with carbon sequestration along with decarbonizing the transport sector are highlighted. Regardless of the precise details, it is important to note that the trajectories described are well within the realm of possibility given current Chinese programs and available investment funding.

Neither of these results is at all surprising on a theoretical level. We have known for a very long time that economies large and small perform much better if they can expect changes in environments—especially big changes in their environments. On an empirical level, though, the size of the cost savings and their distribution across the world reported in both papers is quite surprising. The numbers are model-specific, to be sure, but they are so large in percentage terms that they argue strongly against strictly enforcing the letter of the Byrd–Hagel Resolution. Allowing a "commitment to commit" in the next compliance period by China (and/or the other BRIC countries) to count as satisfying the timing structure italicized in condition (1a) above would certainly facilitate progress in Copenhagen. Perhaps more importantly for prospects of Senate ratification of any agreement that might emerge from Copenhagen, accepting such a commitment would ameliorate concern about italicized condition (1b) by dramatically reducing the economic cost to the USA of complying now.

The credibility of any country's agreeing to a future action could be questioned, of course, but not for long in this case. China's "commitment to commit" to emissions reductions in 2030 targeted at a concentration limit of 550 ppm would, for example, align their economic incentives with those of the USA over the intervening 20 years. To see why, it is sufficient to recognize that such commitments would, for example, increase the frequency of symbiotic investments across two (or more) countries in alternative energy and conservation technologies—joint programs of the sort recently negotiated between China and USA and announced in Washington late in the summer of 2009. The resulting interdependencies can be expected to spawn both common sources of economic opportunity and common sources of economic

vulnerability. Economic vitality across the two countries should, in other words, increasingly grow or shrink together.

The two papers referenced here from this issue both have titles that end with question marks. Let me try to answer their questions. Bosetti et al. (2009) wonder if China's "commitment to commit" could break the negotiation roadblock in the ramp-up to the Copenhagen Conference of the Parties. Maybe so, but only if the US Senate sees its value and widens its operational interpretation of the Byrd–Hagel Resolution. Richels et al. (2009) wonder if accepting, if not encouraging such commitments might be a second-best solution for a second-best world that deviates from the economic optimum every day. For sure this is the case, and maybe even to the extent of reducing the economic cost of achieving any concentration target nearly half.

Taken together, two papers published in this inaugural issue of *Climatic Change Letters* suggest, to me at least, that Richels, Bosetti, and colleagues have uncovered an opportunity of extraordinary value—one that is, quite simply, too good to pass up.

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