Kyoto: What about the Risk?

by William Leiss & Stephen Hill

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WILLIAM LEISS IS RESEARCH CHAIR IN RISK COMMUNICATION AND PUBLIC POLICY AT THE HASKAYNE SCHOOL OF BUSINESS AT THE UNIVERSITY OF CALGARY, WHERE STEPHEN HILL IS A POSTDOCTORAL FELLOW

Right about now the exchanges on Kyoto among the federal and provincial governments, as well as between the feds and Canadian business groups, resemble nothing so much as a dialogue of the deaf. Nobody seems to be listening to the other parties in the debate. Worse than that, despite all the rhetoric flying back and forth about how much Kyoto is going to cost us, one very crucial element always turns up missing: climate change risk. That's why we're having this debate in the first place, isn't it? So why is there almost no mention of it?

We think we know what explains the silence on these questions, and it's simple, really. All players in this debate realize that Canadian public opinion is, and always has been, solidly behind Kyoto ratification, because Canadians believe that climate risk exists, needs to be addressed, and that Kyoto is the best way to do this. Some who believe that ordinary citizens couldn't possibly understand this issue claim that public opinion is unreliable because people don't know what supporting Kyoto will cost them. This is curious, since industry and the Government of Alberta have been bombarding them with one-sided information on this point continuously for almost a year. And still they support Kyoto. Such stubbornness is unforgivable, apparently.

When we focus on the risk, and not only what it might cost us to deal with that risk, we find that there appears to be no real debate at all. No knowledgeable commentator on these matters – including the Alberta government and senior industry spokespersons – seems to deny that there is such a thing as climate change risk. Most also seem to be solidly committed to "taking action now" to deal with that risk. But in fact, if we back up a minute and remind ourselves what that risk is, we can see that not all parties are playing fairly here.

In particular, the so-called "made-in-Canada" approach, touted as a credible alternative to Kyoto ratification, simply does not yet deal with the risk of climate change. This is because it does not put absolute limits on emissions of greenhouse gases. Unless we limit such emissions, we are not dealing with climate risk. It's as simple as that.

Alberta's made-in-Canada plan proposes emissions intensity targets –reductions in emissions per unit of GDP – instead of emissions reduction targets. We will be more energy-efficient if these targets are met, which is a good thing, but this will not, by itself, do anything about climate risk. This is because the impact of such reductions can be offset by increases in GDP and population. The Pembina Institute has calculated that if our economy continues to grow as it has over the past ten years, then our absolute emissions will actually grow, even as our emissions intensity targets are reached.[1] In

[1] Bramley, M. 2002. *An assessment of Alberta's Climate Change Action Plan.* Pembina Institute for Appropriate Development. www.pembina.org/pdf/publications/plan_critique020906.pdf. September.

other words, we wouldn't have done anything at all to address climate risk under this plan. This is what all those advertisements don't tell us.

There's a good reason why we insist that climate risk should be addressed squarely, openly, and honestly in any discussion about Kyoto ratification. We can explain this by referring to the accompanying diagrams, prepared by UBC professor Hadi Dowlatabadi.[2] The scale on the left-vertical axis shows global emissions of carbon dioxide, the most important greenhouse gas. The bottom scale is time, starting in the year 1750 (the beginning of the Industrial Revolution) and projected forward to 2300. The right-vertical axis shows the concentration of carbon dioxide in the atmosphere. The graphs show the global carbon dioxide emissions, based on two different scenarios – one stabilizes total emissions at current rates, while the other dramatically decreases total emissions.

These diagrams give us some perspective on the seriousness of climate risk and how much work is likely needed to address it.

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[2] The carbon emissions and concentration scenarios presented here are based on a model developed by Dowlatabadi that uses the neutral biosphere carbon cycle model of Maier-Reimer and Hasselman (1987), together with historic fossil fuel emissions from 1750 to 1997 (Marland, Boden et al.) and land-use emissions from 1850 to 1990 (Houghton and Hackler). The missing historic emissions and the carbon cycle parameters are calibrated using the Siple ice-core CO2 record (Neftel, Friedli et al). Readers may also want to explore the Java Climate Model at the website www.chooseclimate.org to see how emissions and atmospheric concentration are interrelated.

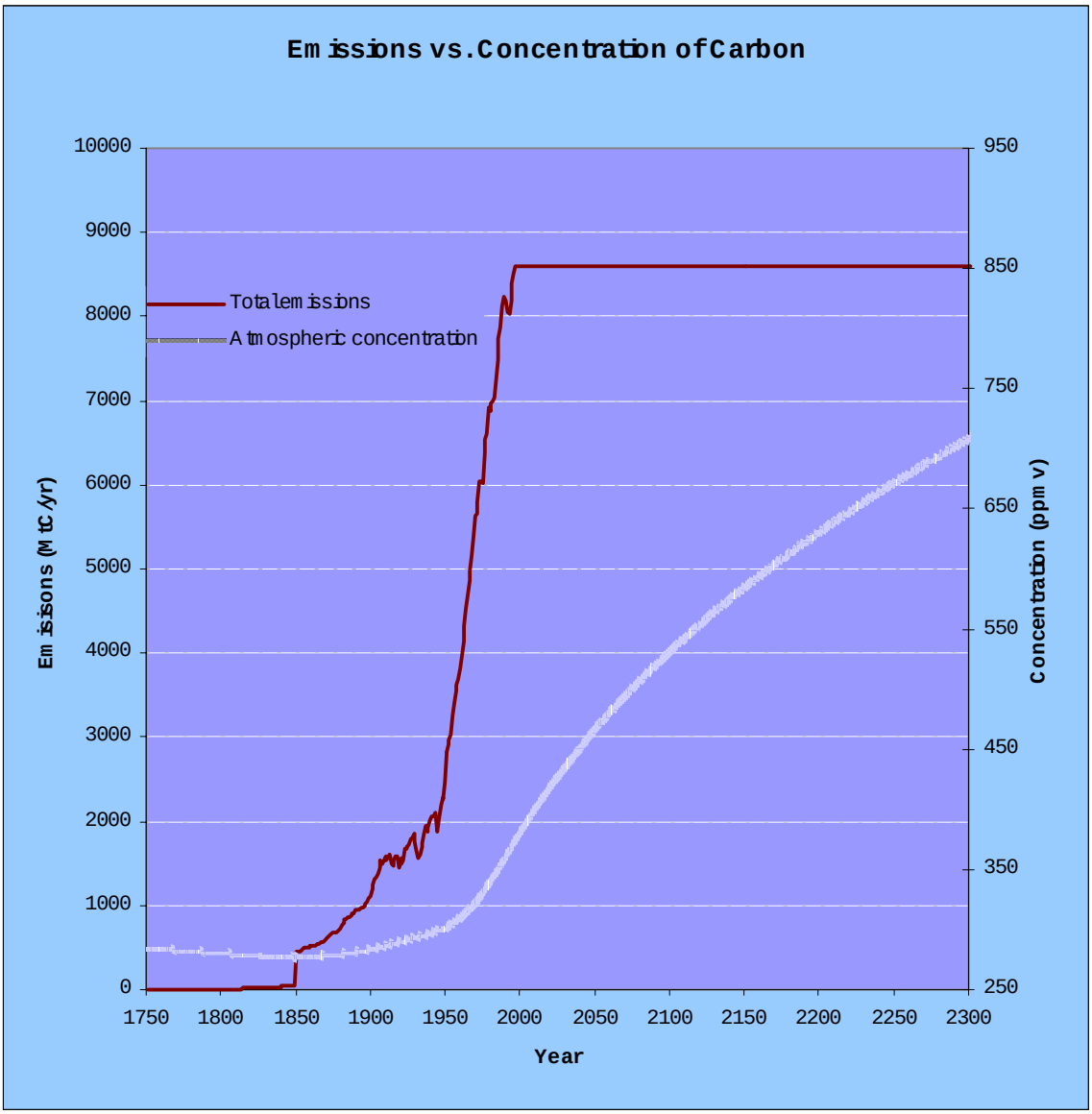

Figure 1. Greenhouse gas concentrations continue to rise and the risk of climate change grows even if we were somehow able to keep our emissions at current levels.

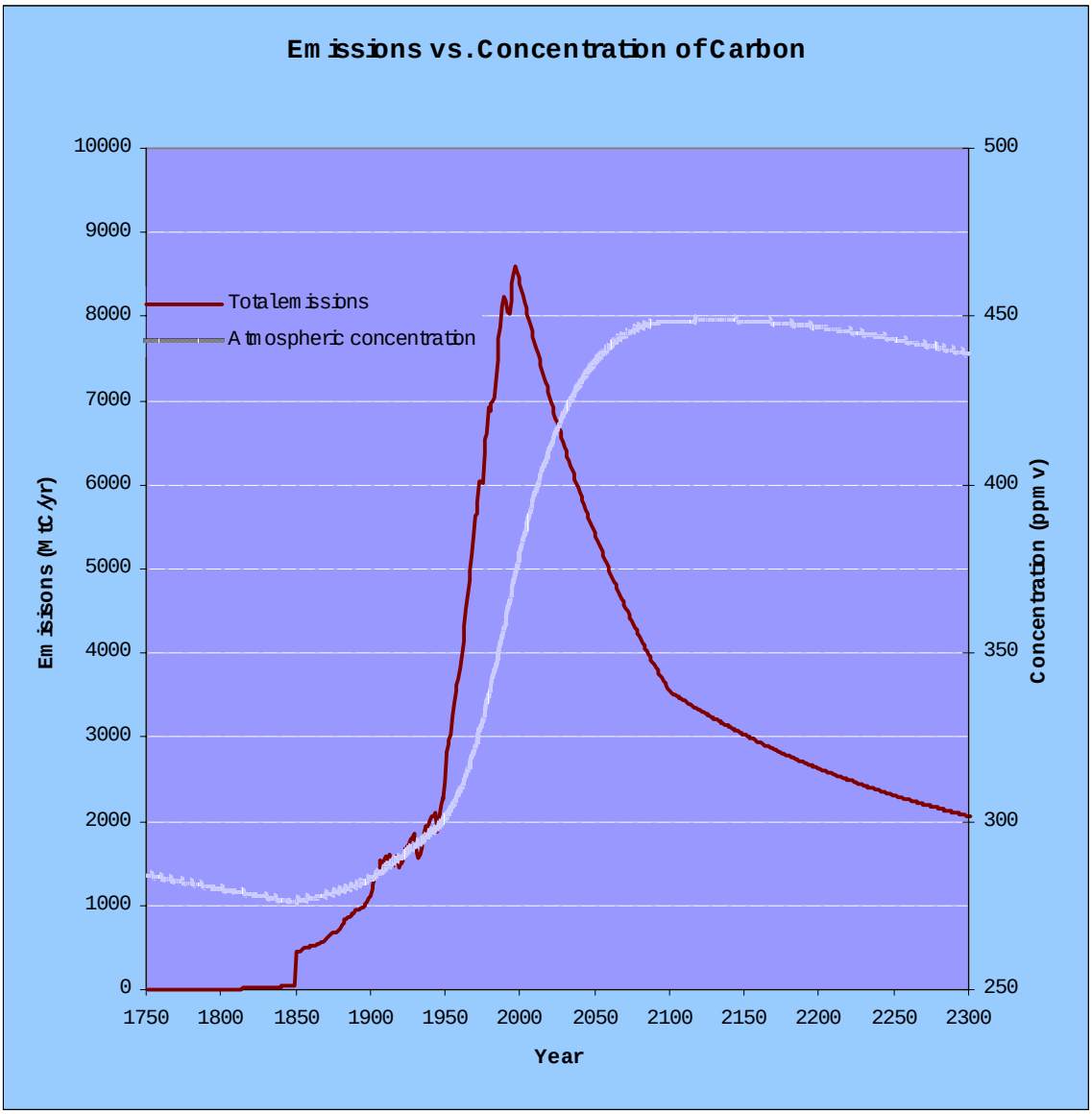

Figure 2. Atmospheric concentrations of carbon dioxide will only stabilize around 450ppm (about double pre-industrial averages) if we take early and dramatic action to reduce our absolute global emissions. Climate models predict we will see significant changes in climate even at these concentrations.

Look at the top of the first figure, where the emissions line suddenly goes flat around the year 2000. This shows what would happen to carbon dioxide concentrations if all nations in the world somehow were able to take action to hold their emissions at current levels. As emissions go flat, atmospheric concentrations continue to rise, for at least the next three centuries. This tells us that current global emissions are well above what is required to stabilize concentrations at whatever level we are willing to risk. The second diagram shows the magnitude of emission reductions we need to see to keep atmospheric concentrations about double pre-industrial levels. While even these levels create climate risk, they are better than the tripling or quadrupling of concentrations that we're on track for now.

The difficulty in addressing this risk is twofold. First, there has been an enormous increase in how many tonnes of carbon dioxide we've emitted over time, and the rate is still accelerating. Second, we also see in these diagrams that there is a great deal of "inertia" in the climate system: It takes a long time to "respond" to changes in key inputs, such as GHGs, and to reach a new type of "equilibrium" where things settle down again once those inputs have reached a new level of stabilization (where the line goes flat). We won't know the ultimate outcome of our current emissions for decades and centuries.

The same kind of thing happens with the depletion of the ozone layer. This was caused by different types of gases we put in the atmosphere, namely chlorofluorocarbons (CFCs), which we used as refrigerants. After countries around the world signed the Montréal Protocol in 1987, most emissions of CFCs were stopped. But the concentrations of CFCs in the upper atmosphere, where they cause damage to ozone,

continue to rise, and will keep on doing so for a long time yet. In effect, the gases we put into the atmosphere become our legacy to our grandchildren and great-grandchildren.

This inertia, or long time-lag, means that the sooner we start making reductions, the sooner we will bring the key indicator (atmospheric concentrations of GHGs) under control. We need to make that line on the graph "go flat" as soon as we can to reduce the risk. Climate change risk is a function of what is called "climate forcing."

According to the accepted theory of climate change, changes in the emissions and then concentrations of GHGs force changes to the global climate system over long time-frames. These changes include temperature, weather patterns (rainfall and drought, storms), sea levels, and possibly some melting of the huge Greenland and Antarctic ice sheets. If the forcing is large, as the rapid increase in greenhouse gas concentrations since industrialization are, then the later changes may be as well.

We have consistently described climate change as a "risk scenario." This means that we must take a chance that our actions this year, in ratifying Kyoto and then developing plans to reduce our emissions, are the right things to do. We know that we will have to make further reductions later. We also know that Kyoto is not the entire solution. We will be going back to the agreement, along with all other nations, to negotiate new arrangements, probably around 2010. When we do, Canada and other countries will be insisting that developing nations such as China and India come to the table and agree to absolute emissions reductions as well. Canadians know that only a formal international agreement is appropriate to deal with a problem that is global in its scope, as climate risk is.

In closing we propose a simple way to break the impasse in the current discussion about Kyoto, which focuses almost exclusively on how much it will cost us to reduce our emissions. The next time you hear someone making a statement, such as, "Ratifying Kyoto will wreck the Canadian economy," ask: "But what about the risk?" And if they say, "Oh, but our plan deals with the risk," ask: "Does your plan have specific targets and time-frames for GHG emissions reductions?" And, if the answer is, "No," then tell them it's time to get serious.

We are wealthy enough to spend money on just about anything, nice houses, cars, travel, entertainment, and whatever. Why can't we also spend the time and effort to reduce our greenhouse gas emissions in line with the first step that Kyoto requires? If Canada, with all its financial and intellectual resources, is unable to curtail our emissions, what can we expect from the rest of the world? Maybe we'd rather pass the risks onto our children and grandchildren. Pity.

Additional References Related to Figures

Houghton, R. A. and J. A. Hackler. "Carbon flux from land cover change." *Trends: A Compendium of Data on Global Change*. Oak Ridge, Tennessee: Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, US Department of Energy, 2000.

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