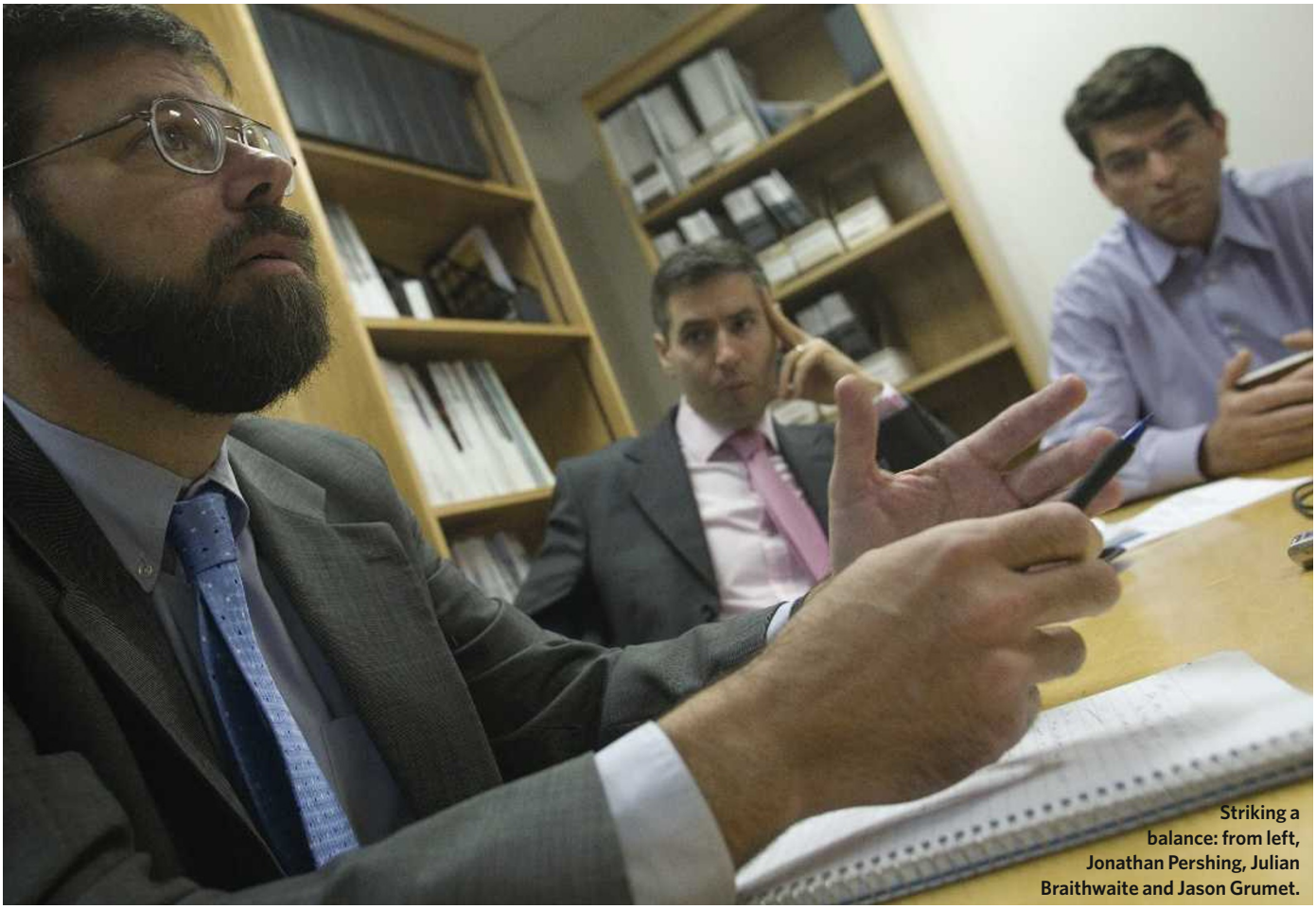


M. TEMCHINE

Striking a balance: from left, Jonathan Pershing, Julian Braithwaite and Jason Grumet.

THE FIRST CUT

For the first time, the US Congress has begun crafting comprehensive legislation to tackle global warming. *Nature* brought together five experts with various backgrounds to discuss the current political climate as the United States moves towards mandatory emissions caps.

Two leading climate bills are currently before the Senate. One, by senators John Warner (Republican, Virginia) and Joseph Lieberman (Independent, Connecticut), would see a 63% reduction in emissions by 2050. The other, by Jeff Bingaman (Democrat, New Mexico) and Arlen Specter (Republican, Pennsylvania), offers softer targets. What are the advantages and disadvantages of the two?

Jason Grumet: The fundamental architecture of the bills is extremely similar. I think that's what gives me some real optimism — that we can now see legislation because we have two serious, detailed, bipartisan proposals that have a great deal in common. There are some important differences, but I think it's worth noting that those differences are not philosophical or ideological. They are different approaches to trying to achieve similar ends.

Jim Rogers: It is important to try to minimize any disproportionate or adverse impact on any certain region of the country because of historic decisions that were made about the type of fuel they use to generate electricity. So that debate will be ongoing. It's a question of fairness, so there isn't a formula that necessarily works for everybody. And at the end of the day, it's going to create a certain amount of pain — like all difficult compromises — for everybody, because there is no perfect solution.

What are the chances we can get this done this autumn or in this Congress?

Grumet: It is unlikely that we will see legislation signed by the president this year. However, I think there is a real possibility that we can see legislation garner 60 votes in the Senate if there is a political will to do so. And once that happens, that legislation becomes the centre of gravity for what will ultimately pass the Congress. There is a tactical question that I think our commission [the National Commission on Energy Policy] has some disagreement with other advocates about, and that is whether in fact the legislation could be so much stronger environmentally in 2009 or 2010 that the best thing to do ecologically would be to actually not try to pass legislation in this Congress. Our commission fundamentally believes the opposite, that the most ecologically responsible thing to do is to get an economy-wide mandatory programme adopted in the United States. Our view is that we should get on with it.

Rogers: Every major piece of environmental legislation that has ever been adopted in this country has been overwhelmingly adopted bipartisanly, and it's never been a close vote. It's been huge votes. This goes all the way back to the Clean Air Act in 1970. So what I hope I will see in the future is this strong consensus growing out of both houses [of Congress].

Jonathan Pershing: It does seem to me that another piece that Jim didn't mention, but I think is quite critical, is the level of popular

Who's who

Julian Braithwaite works on climate issues as counsellor for global issues at the British Embassy in Washington DC.

Jason Grumet is executive director of the National Commission on Energy Policy, a non-partisan group whose work served as a platform for Senator Bingaman's legislation.

Michael MacCracken is the chief scientist for the Climate Institute in Washington DC.

Jonathan Pershing heads the climate, energy and pollution programme for the World Resources Institute in Washington DC.

Jim Rogers is the chairman and chief executive of one of the nation's largest electric utilities, Duke Energy in Charlotte, North Carolina.

support. My own sense is that if I look back over the past three to five years, I've seen an increase in the willingness to pay [for action on global warming]. That brings us back to the question of what kind of technology costs there are, what kind of options we have and what kind of price we might need to pay to get to those options.

Grumet: The Bingaman–Specter bill has incentives that, based on permanent prices, would cost somewhere between $35 and $50 per tonne of carbon in the very first year of the programme for carbon capture and sequestration. Because any carbon price generates a significant amount of revenue, one of the key aspects of this legislation when it ultimately passes is going to be those technology incentives.

Rogers: I see this really through the eyes of our customers and what the cost impacts will be. It is fundamental in my judgement, and we can and should and will build a bridge to a low-carbon world. To build that bridge, we are going to have to build it on technology. [Developing that technology might take] 10–15 years for carbon capture, 10 years for renewables and storage, and 10 years for the nuclear option, at a minimum. We almost have to have a timeframe of how long it is going to take to get the technology that allows the bridge to be built.

Pershing: If we are looking at a process in which we wait for 10 to 15 years before we have any significant movement on a technology, particularly in the case of capture and storage, we've lost a substantial part of the battle. How do we get it so it's not a 10–15 year pathway, but a 5–8 year pathway? What would it take in the way of capital investment? What would it take in the way of incentives? What would it take in the way of subsidies? What would it take in the way of regulation to move it both in the United States and internationally?

The European Union has said that it would set a basic target of limiting the effects of climate change to 2 °C.

Julian Braithwaite: It is the best available target at the moment based on the science. I think we then see that that links back to something you can measure, which is about 450 to 550 parts [of carbon dioxide] per million in the atmosphere, which then allows you to start setting things that you can actually target, such as your caps on emissions.

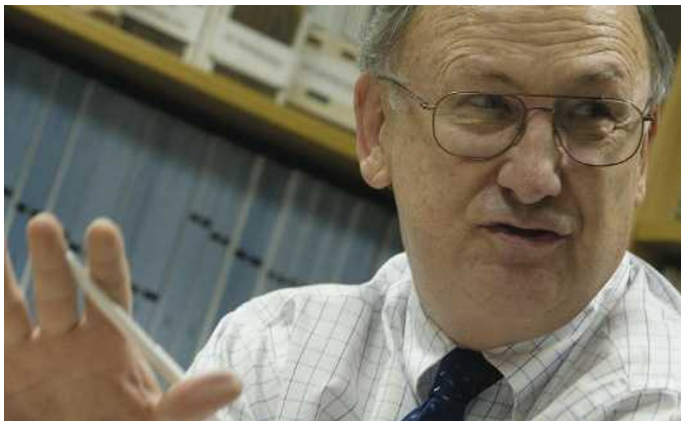
Michael MacCracken: It's important, I think, to understand that when Julian says 2 °C, it's 2 °C above pre-industrial levels — not 2 °C above present. And so, as we're almost halfway there and committed to go another quarter of the way, we're very close [to that warming limit] and we need to act very soon. On the CO_2 alone, the effect on the ocean is starting to appear with ocean acidification, and a lot of the oceanographers are getting very worried about what's going to happen to marine life.

Grumet: I believe there is actually one scientist among all of our elected members of Congress, so this question of how science engages with policy is obviously a very important one. I would start with the unfortunate reflection that I think there is a profound disconnect between ecological imperative and near-term political possibility. And the problem that that creates, as the science becomes ever more clear and the impact ever more chilling, is that the debate has shifted among those who are opposed to action from the question of science to now questioning the solution.

How do we engage the developing world?

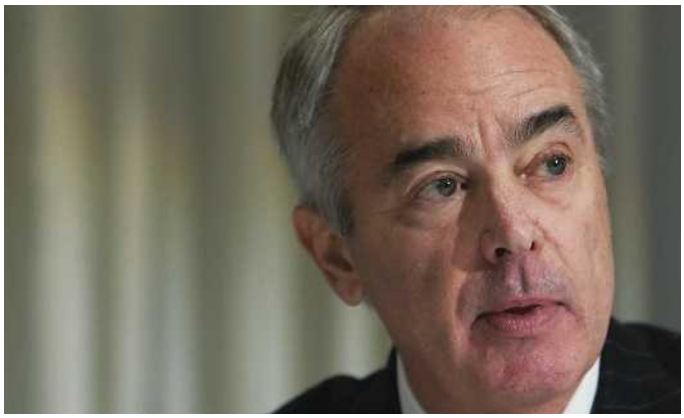
Pershing: If you would like to have developing countries engaged, you can't merely tell them 'we're going to make you do it'. You've got to demonstrate that you're going to do it yourself. If we can demonstrate technology potentials, if we can demonstrate the commercial viability of programmes, if we can demonstrate the profitability of these solutions, all of which I think are inherently realistic and plausible, then we can transfer that information.

Braithwaite: There are two visions of how we go forward being presented to the large emerging economies in the developing world. One is a voluntary system, in effect based on international peer review. The other is one where you continue to develop the global carbon markets, you continue to develop principles of the Kyoto Protocol where you have mandatory



M. TEMCHINE

"Scientists need to speak out very clearly on the exact details of what the policies are." — Michael MacCracken



M. NGAN/AFP/GETTY IMAGES

"The US needs to take advantage of the learning curve that Europe has experienced." — Jim Rogers

caps on emissions — you have common but differentiated commitments, which does offer the prospect in the longer term that at some point China and India will have caps on their emissions.

Grumet: There is also, I think, a very real question about whether CDM offsets [from the Kyoto Protocol's Clean Development Mechanism, in which developed countries fund projects in the developing world to compensate for their own emissions] will have the environmental integrity that we ultimately need. I think they have a role to play, but I think it has to be a role that is predicated upon a few years of learning.

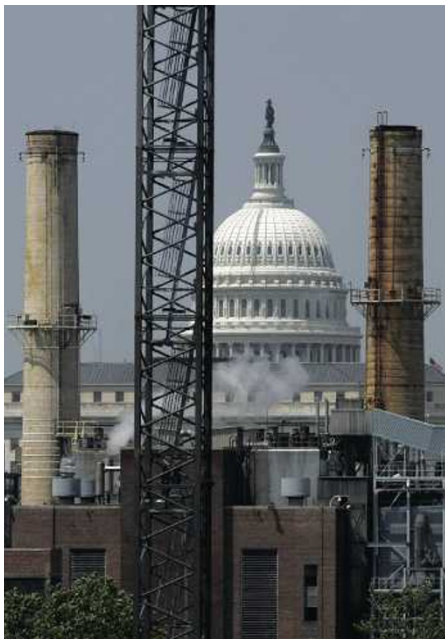
Braithwaite: The European emission-trading scheme and what we've been doing through the CDM is probably the largest real-world example of all of these policies and actions. I think it's fair to say that Europe has been a sort of global laboratory for these policies. And clearly, there are some things that we've learned and we can improve. But I think the point is that in Europe we still think that these systems can provide the developed world with some system for offsets in the developing world to bring these nations in, to give them a stake in this global carbon market.

"Outrage among scientists is kind of modest annoyance among the rest of us." — Jason Grumet

Rogers: The European community has done us a real favour by experimenting and expanding and deploying cap-and-trade, as well as the CDM. And as I have studied some of the issues that they have addressed, these are issues that are not insurmountable. We need to take advantage of the learning curve that Europe has experienced and allow that to give us the courage to build on what it has done going forward.

We tend to talk about costs, but you're a businessman. There are also opportunities for profit out there.

Rogers: I see this — mainly because our company is so dependent on coal — from a cost standpoint, because 70% of the electricity our consumers use is predicated on coal. But that's on the one hand. On the other hand, I see a great profit opportunity here for technology development. If we can get the business model right for the utility industry, and if we can start pouring billions of dollars into energy efficiency and developing those technologies, I think that offers the greatest hope in the short term as we wait for the development of carbon capture and storage, of battery technology and of other technologies.

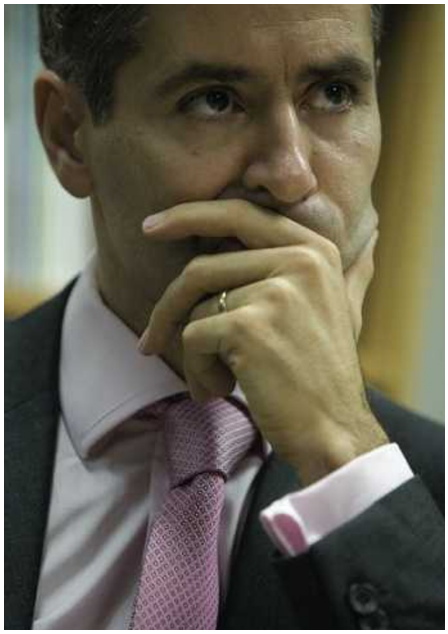


S. WALSH/AP

Power struggle: legislation to curb US emissions will need to strike a political compromise.

Should scientists act as advocates on this issue?

MacCracken: If you want to avoid dangerous or catastrophic kinds of consequences such as the loss of Greenland, you've to get on a path where emissions from developed countries are going down by around 80% by 2050. You have to do that. And we'll have to get developing countries to go along as they can, and go down further after that. So I think scientists need to speak out very clearly on the exact details of what the policies are.



M. TEMCHINE

Julian Braithwaite: in an ideal world, scientists shouldn't have to be advocates.

Pershing: I think that the scientific community has been under-represented in the dialogue and has taken a pass when it should have taken a step forward. It has basically proposed that others know better as to what should be done, and that's not evident. If we take the past 20 years where there has been complete and total inaction, the scientific community in the first IPCC [Intergovernmental Panel on Climate Change] assessment report laid out explicitly the nature of the problem and made proposals as to what ought to be done. Twenty years later, very little has happened. So I suggest the scientific community needs to be much more aggressive.

Braithwaite: I think in an ideal world, they shouldn't have to be advocates; their voice should be heard anyway. When their voice isn't being heard, then that's a different situation. I'm not going to comment on the United States, but in the United Kingdom, I think if we tried to put together public policy without basing it on the best available science, we'd get ourselves into trouble very quickly.

Grumet: The one other point that I will make is that, in our system, there is such a profound notion of there being two sides to every issue. I think where the scientific community finally rose up with some outrage — and outrage among scientists is kind of modest annoyance among the rest of us — was when the real scientific community was fully convinced of the basics of the ecological reality, but there were one or two folks out there pushing a different [sceptical] side. Yet the situation would be consistently set up as one scientist thinks this and the other scientist thinks something different. And finally I think about a year ago the scientific communities kind of got fed up with that.

That sounds like it was a problem with the media.

Grumet: Well, of course it's a problem with the media, but sitting here in the National Press Club, I would not be so bold as to suggest that.

Pershing: It's also a problem with the scientific community, which has been reluctant to ever come out on any side of any issue. That's not the standard scientific process. There's always room for doubt and uncertainty. But in this particular instance, my sense is the scientific community has done itself a disservice. ■

***Nature* reporter Jeff Tollefson moderated this discussion in Washington DC. For a full transcript, visit http://www.nature.com/news/specials/climatepolitics/index.html.**

See also Editorial, page 319.