

ON SCIENCE, ACTION, AND ACTIVISM

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A. Introduction: Salmon & CO2

I remember the moment I began to think seriously about climate change. It was when Armond Cohen and others from the Clear Air Task Force paid me a visit in Seattle to discuss, privately, the policy implications of then-new research by Jim Hansen, Tami Bond, and others that strongly implicated soot, methane, and tropospheric ozone – not just carbon dioxide – in global warming. That first meeting lasted several hours. By the end, I'd realized what the intervening years have since confirmed: in public policy terms, global warming is the Pacific salmon issue writ large.

That statement won't resonate widely, since few people are yet involved with the policy aspects of climate change and salmon. You have to know that in the years since Pacific salmon were first listed as threatened or endangered under the Endangered Species Act, electric ratepayers in the Pacific Northwest have paid billions of dollars to modify dams, spill water, and improve spawning habitat (although 90% of the salmon-bearing streams and rivers in the Northwest are undammed), yet at the same time recreational and commercial fishermen have gone right on "harvesting" salmon – that is, killing the salmon just when they are finally mature and ready to reproduce for the first and only time in their lives. Restaurants and stores have gone right on selling Pacific salmon, too, often labeling them as "wild," but never, ever labeling them as "Non-Endangered" or "Non-Threatened," because they can't.

Pacific salmon: endangered species in a can. It's a nutty situation, if the objective of our efforts really were to save the fish. The bumper sticker you'd expect to see, and don't, is "Save the Salmon: Don't Eat It." But saving the fish is not, in fact, everyone's

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primary objective. A substantial portion of the activist population wants to use the fish and its plight and the Endangered Species Act as big clubs, battering elected officials and the populace in pursuit of other goals: dam removal, habitat protection, higher electric rates, less rapid economic expansion, reduced population growth, more fish to harvest. For these ends – many laudable in themselves, but otherwise difficult to achieve – the plight of the salmon makes a convenient and effective tool.

Fair enough. But here's what's wrong: if you ask those wielding these clubs to support the further step of helping adult salmon make it past fish nets and fish hooks and a burgeoning population of seals and sea lions so that the fish can get home to spawn, you get little sympathy and no help. Why? Because salmon survival isn't really their main objective. If it were, they'd agree to give the adult, spawning-ready salmon a break.

What's the global warming parallel? Well, obviously, for some people, the fact that global warming is occurring and that carbon dioxide is its single leading human cause provides an excellent club with which to batter elected officials and the populace to take a variety of steps the club-wielders would favor whether or not global warming were occurring, and whether or not carbon dioxide caused it. This in itself is not reprehensible, just as it is not reprehensible for activists to use the salmon to try to save streams and restore rivers. But if people ostensibly concerned with climate change, upon being informed of the global warming impacts of soot, methane, and tropospheric ozone, show little interest in dealing with these pollutants – or, worse, if they attack those who call attention to them – then, as I predicted the day I met Armond, global warming will eventually become, in public policy terms, the Pacific salmon issue writ large. The salmon won't be saved, and the globe will be warmer than it should or need be.

We can do better than that. It starts with defining the objective – and requires us to stay focused on it. In the case of climate change, the objective seems to have been quite well defined initially. But the passage of time, and activism, have blurred the focus.

B. Lessons From 1970

The first Earth Day was April 22, 1970 – Lenin's birthday, as suspicious minds noted. In Senator Magnuson's office, we marked the occasion with a new environmental initiative, introduction of his World Environmental Institute Resolution. The Resolution, which later passed the Senate unanimously, called on the U.S. and U.N. to create a research center devoted specifically to international environmental issues. It was, to our knowledge, the first Congressional action aimed at international environmental problems – which we took to be acid rain, deforestation, ocean pollution, and the like. We were not focused on climate specifically.

The Resolution produced many invitations to Senator Magnuson in 1970. As the staff member assigned the legislation, I took the senator's place at several events. One, the National Environmental Health Association convention in Las Vegas, proved eye-popping for a twenty-two year old (and plunged me into a briefly-publicized debate with the Nixon aide now known as Senator Elizabeth Dole). Yet a more important such

occasion – one at which I merely listened, and didn't speak – was the first international conference of environmental scientists, held later that year at Williams College in Williamstown, Massachusetts.

Several hundred scientists (plus me) assembled in large auditorium. Perhaps some participants in this Workshop were there, and remember how the conference began. A host stepped out on stage. He said, in effect, “This is an historic occasion. Never has such a large group of scientists been assembled from throughout the world to discuss international environmental problems. We have, as a group, great power to shape the future. If we unite in our resolve, there are two matters on which we can have a decisive impact. We can agree never to use the word ‘methodology,’ since there’s already a perfectly good word for that: ‘*method*.’ And we can agree never to use the word ‘particulate,’ since there’s a good word for that, too: ‘*particle*.’ By agreeing on this, we here can stop these two words dead in their tracks. There’s still time! We can make a contribution to science for which generations to come will thank us.”

This was meant as a joke (though there’s truth in jest) – something to melt the ice on that portentous occasion. The joke succeeded: it drew laughs. It would have drawn more, but in 1970 most people had never heard those two neologisms, “methodology” and “particulate.” So some people didn’t get the joke. It was ahead of its time.

I’ve often thought back to that moment, and not just because *methodology* and *particulate* survived and proliferated. The story says something about science, and about objectives. If those few hundred scientists had actually banded together at that early date and resolved to smother *methodology* and *particulate* in their etymological cribs, they probably could have. The world might have benefited (slightly), and perhaps thanked them. But that wasn’t the conference’s objective. In fact, influencing policy wasn’t the objective either. The objective was for scientists to meet, exchange findings and ideas, and agree upon an agenda for further research. I assume the conference was successful.

Imagine, though, that enough research had already been done. Not enough to satisfy every scientist involved, but enough to form a reasonably solid foundation for policymakers to take action of some useful sort. What if the assembled scientists had agreed on an *action* agenda, not just a research agenda? Could they then, by concerted effort, have brought about the policy changes they felt were needed?

The answer, I think, is yes. In fact, the weight of scientific opinion in that 1970s era presumably helped force subsequent action on acid rain and ocean pollution, just as scientific consensus two decades later helped spur action on greenhouse gases. That’s really a very encouraging thought. But it comes with a few caveats:

- The leap from research to advocacy can be daunting for some scientists, isn’t an objective for others, and isn’t always applauded by policymakers – or by funding sources. It’s often easier, and safer, to stick to one’s knitting.

- Mere consensus among scientists, without concerted action, isn't likely to produce policy change. Or it will do so slowly and haphazardly. Both "action" and "concerted" count. A lone scientist can be considered a maverick; a workshop of scientists who want to make a policy difference can do so.
- If scientists don't tell policymakers the policy implications of scientific research, non-scientists will. But the implications non-scientists tout may not be those that scientists see.
- Among advocates, science can become a smokescreen, hiding the advocate's true objectives and – worse – obscuring the most basic principles of logic and common sense. This is hardly news. It was true of Social Darwinism. It's true of the science tossed about in the Pacific salmon debate. And it seems increasingly true on climate matters.

Why "increasingly true on climate matters?" Because, in my view, mainstream environmental advocacy, nicely launched along a CO₂-limiting path, shows signs of reacting slowly, if at all, to what's happening outside the West, what's happening with energy technologies and pollution control, and what's been learned about black carbon, methane, and tropospheric ozone. The climate policy objective, once clear, is becoming confused in public discourse. If it's clarified again, it may still be achievable. That's one area in which those at this Workshop, you who are so influential in atmospheric science and climate policy, can make a huge contribution.

C. **The Objective: Back To The Future?**

A decade and a half ago, in response to efforts by many of you here and others, the climate-focused scientific and policy community seemed to agree on the appropriate objective: avoidance of "dangerous anthropogenic interference" ("DAI") with the climate system. In other words, human activity shouldn't be allowed to affect climate too much or too rapidly, with "too much" defined in terms of impacts on the environment. Although there's debate on what constitutes DAI, avoiding it still seems to be the right objective.²

Scoffers and skeptics pooh-pooh the notion of humans contributing significantly to climate change. They certainly belittle the possibility that human contributions could become dangerous. The environmental movement, and many scientists, have spent years shaking their heads at the scoffers and skeptics – and sometimes railing against them. I would suggest, gently, that we've allowed the scoffers and skeptics to pre-occupy us more than they should, and that we've been too easily drawn into debate with them, impugning their intelligence or their motives or their integrity. By railing against them, we allow ourselves to be positioned as extreme and scary in the news media, with American labor, and with the mainstream public. It's necessary to stand up

² A pet peeve: the jargon and acronyms that festoon the literature of climate and atmospheric science seem ungainly and often unnecessary, at least to this layperson. Jargon and acronyms also tend to limit the readership and "BPI" ("beneficial policy impact") of climate literature.

unequivocally to those who insist the Earth is flat. But we should do so in a fashion that doesn't allow us to be easily dismissed as "there you go again" Luddites or radicals.³

My not very original but emphatic belief is that progress in avoiding DAI will be (and perhaps already has been) slowed less by scoffers and skeptics than by advocates and governments losing sight of the original objective and focusing too narrowly on reducing emissions of just one greenhouse gas (carbon dioxide) produced from one primary source (fossil fuels) in one decreasingly prominent set of nations ("Western" ones). Reducing CO₂ production from fossil fuels in the West should be a means to an end – an important one, but not an end in itself.⁴

An exclusive focus on CO₂, and particularly a pre-occupation with CO₂ produced from Western fossil fuels, strikes me – if I understand correctly the thrust of the scientific research that led to this Workshop and its 2002 predecessor – not only as a potentially great harm to climate policy, but also a self-inflicted one, something those who work on climate issues can cure. If those of you at this Workshop resolve to broaden the focus of climate change activism, you have the power to do it.

It all comes back to maintaining focus on the appropriate objective. Dangerous amounts of human-caused warming are the enemy. Carbon is not the enemy. Fossil fuels are not the enemy. Western nations are not the enemy. Prosperity is not the enemy. Technology is certainly not the enemy – indeed, it's probably our greatest ally. If our objective remains to prevent "dangerous anthropogenic interference with the climate system" – not just to scold wealthy nations for how they live – we need to think much more broadly than just about CO₂ from fossil fuel burning in the West. And, thanks to those of you here, the leaders in this matter, we can.

I don't believe we have to downplay the importance of CO₂ in order to play up the importance of non-CO₂ pollutants for climate and human health. I understand, however, Jim Hansen's caveat that policymakers and activists need, at this point, some cause for optimism, some hope that CO₂ can be tackled successfully. How otherwise can people be energized to tackle non-CO₂ air pollutants immediately, perhaps buying time to tackle CO₂ better and more efficiently in the end?

Still, what Jim and others of you have argued for some time is, in effect, that we can walk and chew gum at the same time. If the objective is stated clearly and kept firmly in mind, an action agenda designed to meet that objective should have plenty of room for tackling CO₂ and non-CO₂ air pollutants alike.

³ The scoffers and skeptics correspond, in the Pacific salmon analogy, to those who deny there's a problem because none of the five Pacific salmon species as a whole is actually endangered (but the problem has to do with individual stocks), or because total returns of Pacific salmon are at record levels (but most of these are hatchery fish, not the native fish whose genetic material is in danger of being lost).

⁴ Focusing exclusively on CO₂ from fossil fuels in the West corresponds, in the Pacific salmon analogy, to focusing exclusively on dams or habitat (while ignoring fishing).

D. Fragments of Advice For An Action Plan

1. Jargon, acronyms, and terminology

Minor issues first: Teachers often tell students that if you can't write something clearly, you haven't thought about it clearly. As a layperson, I recognize that science, like any other complex discipline (or fraternity), develops its own shorthand to make communication among colleagues simpler and swifter. In some scientific fields, there are popularizers who can explain developments to a lay audience (not always to the satisfaction of their scientific colleagues). Stephen Jay Gould was a great example.

Among non-scientists, writers such as James Fallows and David Quammen provide contemporary examples, too. Both make technical and scientific matters readily understood by lay readers. They should be invited to write about the matters on which this Workshop is focused. But unless one of them begins writing about climate soon, it's going to take those who understand the science and its implications to write more clearly for a wider readership, at least if we want your work to have a policy impact. That means less jargon and fewer acronyms, among other stylistic changes. (Even such wizards as Fallows or Quammen might find the current literature of atmospheric science relatively inaccessible, if not impenetrable.)

One specific suggestion for terminology (in keeping with the 1970 plea to avoid *methodology* and *particulate*): I think it would help to begin describing methane, when speaking of it as an atmospheric gas or pollutant, as *fugitive methane*. This conveys that it's escaped and that we'd like to capture it. And it distinguishes this sort of methane, which is wasted, from natural gas that producers work hard to find and extract. It also distinguishes methane as pollutant from methane as fuel, which is not a pollutant in itself but a source of CO₂. For folks from the energy sector, like me, it's initially a bit of a puzzle to see or hear methane listed as a pollutant along with black carbon and tropospheric ozone. The term *fugitive methane* – recalling EPA's policies to deal with *fugitive dust* – helps make clear that this is methane that escapes unburned to the atmosphere (and which would have economic value if we captured it).

Okay, on to bigger things.

2. Two strategies for drawing up an action agenda

I think if the scientists at this Workshop draw up an action agenda, then clearly and concertedly emphasize its importance and draw public and governmental attention to it, you have every reason to expect that you can have a positive impact on climate policy in the real world. You should be confident of that. But what should the action agenda include? Apart from the substance, there's the important matter of form. The substance may or may not drive it.

One strategy for devising an effective action agenda is what Mike Mansfield of Montana, when he was Majority Leader of the U.S. Senate, called “three bigs and fifteen

littles.” What are the three most important things, among eighteen or twenty, the accomplishment of which is feasible? It’s a way of forcing oneself to prioritize, of course: devote your efforts to three big and achievable things, and maintain focus on them, while not forgetting what else you’d like to achieve if circumstances permit. But Mansfield’s three bigs and fifteen littles also reflect a reality about human institutions and the scale of effort required to produce even a single change. (A former sub-Cabinet official told me that in a single term you can either accomplish three major policy changes or fire one employee.) Policy, like politics, is the art of the possible.

Still, there is an alternative. A decade ago, the government-appointed Recovery Team for endangered Snake River salmon provided an example. Led by scientists but including economists and other professionals, the Team came up with a draft report that conspicuously included an action agenda of a hundred individual items. The Recovery Team then told policymakers, in effect, “Each of these items, if accomplished, would aid the recovery of these endangered animals. The more you accomplish, the faster and surer recovery will be. Some measures, of course, are controversial; others are expensive. If you can’t accomplish those, for political or economic reasons, then try to accomplish the rest. The fish will be better off than if you accomplish none.”

The government rejected the Recovery Team’s draft report, and never commissioned another for Pacific salmon (apparently the report didn’t fit the government’s pre-conceived policy views). The same fate, of course, might befall any set of action items that climate scientists at this Workshop recommend. But that fate could as easily befall a climate action agenda prepared on the Mansfield model of three bigs and fifteen littles. So consider whether the Recovery Team’s approach still might suit your needs, given what you’d like to see accomplished.

One related matter. A member of that Recovery Team noted that objectives also dictate the appropriate management structure for achieving them. “If your objective is to put a man on the moon,” he said, “you’ve got to organize a NASA moon shot. But if your objective is to make a quilt, you can get by with a quilting bee.” Conversely, if you organize a quilting bee, all you can hope to produce is a quilt. In thinking about the policy changes you’d recommend, give some thought to whether the task of avoiding dangerous human interference with the climate system is more like putting a man on the moon or like making a quilt. This may help inform the choice between the three bigs/fifteen littles and the “long list” approach to an action agenda. (I used to think dealing with global warming was more like putting a man on the moon than making a quilt. Now I’m not sure.)

3. The role of the road map – or declaration

The late Professor Richard E. Neustadt always expressed perplexity that his greatest legacy seemed to be the observation that “Presidential power is the power to persuade.” Heck, he used to complain, all political power is the power to persuade.

Scientists can have a great deal of persuasive power. Their power is greatest when they speak in a firm voice, with a specific message, and offer a clear roadmap. Einstein's letter to President Roosevelt, explaining that an atomic weapon was feasible and that Germany might build one, was enough to launch the Manhattan Project. Einstein was sufficiently eminent not to need other signatures on his letter, but colleagues whose names Roosevelt would not have recognized helped draft it. (Outside the realm of science, consider the impact of General Marshall in offering a roadmap for the Marshall Plan, or of George Kennan in offering a roadmap for "containment" of Soviet Russia.)

We all know that global warming has produced in media and legislative circles what's now an incomprehensible babble of voices, most of them shrill and many of them contradictory. Scientists and policy insiders can listen selectively, but most of us can't. This is where a roadmap – or declaration – issued by a substantial and influential segment of the atmospheric science community would make very good sense and could have extraordinary persuasive power.

There are more important things you can say than "let's avoid the use of *methodology* and *particulate*." For example, here's a non-scientist's first, rough cut of a possible outline for a climate scientists' declaration:

1. Climate change is occurring. This is a fact.
2. Human activity contributes to climate change. This, too, is a fact. *How much* and *with what consequences* are still subject to debate.
3. The objective of climate policy should be to avoid dangerous human interference with the climate system. Such interference is measured in terms of adverse impacts on human health, well-being, and the environment.
4. The most familiar way in which humans interfere with the climate system is by producing "greenhouse gases" that trap solar energy in Earth's atmosphere. For climate purposes, the most important greenhouse gas is carbon dioxide.
5. However, greenhouse gases are not the only way in which humans contribute to climate change, and carbon dioxide is not the only greenhouse gas. The global climate impact of air pollutants other than carbon dioxide may well exceed that of carbon dioxide. Moreover, unlike carbon dioxide, these air pollutants are harmful to human health.
6. As scientists, we believe that reducing both carbon dioxide emissions and climate-warming air pollutants (including but not limited to other greenhouse gases) should make it possible to avoid dangerous human interference with the climate system. This is enormously good news: excessive global warming is not inevitable, and preventing it is not beyond human capabilities.

7. An important additional point, independent of climate considerations, is that reducing climate-warming air pollutants will also provide major benefits to human health and longevity.

8. Attached to this Joint Statement is an action agenda – a climate policy roadmap for governments, funding sources, and other policymakers. This is, to our knowledge, the first climate policy roadmap that includes targeted measures to reduce non-carbon dioxide air pollutants as well as carbon dioxide. Although there still exist some uncertainties (which further research may reduce), we believe existing science is sufficient to predict confidently that this roadmap, if followed, should allow society to avoid dangerous human interference with the climate system (and will improve human health).

9. The opposite is also true: we believe that if this climate policy roadmap is not followed, then, based on the scientific information and reasonable projections currently available, it may become impossible to avoid dangerous human interference with the climate system. This means it may become impossible to avoid the serious adverse impacts to human health and the environment that dangerous interference may produce.

This is merely suggestive, but I hope it makes its point. Honed and polished, widely endorsed and properly publicized, such a declaration could do a lot to focus the policy debate on whatever climate policy roadmap – the action agenda – you decide to attach.

4. A suggestion about a “hook”

As several of you know, I’m an advocate for saving the Arctic, and for using the plight of the Arctic to help focus policy attention on air pollutants other than just carbon dioxide – specifically on soot (black carbon). My scientific knowledge of the situation is, of course, very limited; all I know is what I’ve read in the research papers of Jim Hansen and others. But to my lay reader’s mind, it seems incredibly important politically that soot, lofted to the Arctic from abroad, adds a direct localized thawing effect to the disproportionate high-latitude impact of greenhouse gases. It’s a “double Whammy” in the north, and it makes a powerful tale.

What’s happening to the Arctic is immediate, visible, and real. It’s very troubling to a great many people of different political persuasions – including Alaskans, who on average are more conservative than other Americans. And it apparently can’t be explained by greenhouse gases alone. This provides a perfect opportunity – and, to my mind, almost a moral obligation – to demonstrate vividly to policymakers (and environmental activists) that carbon dioxide alone is not the only problem. Using the Arctic as an illustration can help draw essential support to an entire action agenda.⁵

⁵ Jim Hansen suggests that (and, with others, is apparently now studying whether) the seemingly impending loss of the Arctic sea ice and the creation of more open water around Greenland may, by warming the wind, accelerate the rate of ice cap melting and movement in Greenland, too. This scenario provides the climate equivalent of what we in the electric power sector call a “cascading generating failure.”

5. Useful advice from another former Congressional aide

After leaving the Senate staff, I moved home to Seattle and didn't often return to Capitol Hill to lobby for clients. But when I did, a young legislative assistant once taught me a valuable lesson. "Whenever someone comes to see me," he said, "I always ask three questions: What precisely do you want us to do? Who will oppose it? What will the arguments of the opponents be?"

If you think about it, these are excellent questions for any policymaker to ask of any supplicant (or advocate). They cut right to the heart of the matter. And, in answering them, you are compelled to be very honest. If you omit to mention an opponent you know about, that opponent will crop up later and your credibility will be damaged. And if you omit to mention an argument you know the opposition will make, not only will your credibility be damaged but you will have lost the opportunity to counter that argument by responding to it in advance.

If and when you put together an action agenda, it's worthwhile to ask yourselves the same three questions about each specific item on that agenda: What precisely are we asking be done? Who will oppose it? What will their arguments be? The three questions are great aids to your own thinking. (I always go through this exercise with clients now.) They help prepare you to say the right things, and to get things done.

6. "Overwhelming force" – and industry as allies

The most important maxim for those who would influence public policy might be drawn from *The Art of War*: "First determine the necessary points of engagement, then arrive there with overwhelming force." This is certainly true of the legislative process. And, I believe, it is true of policymaking generally.

Assuming you do put together an action agenda, now or in the future, it is more than useful – it is vital – to determine for each agenda item, "What are the necessary points of engagement for this one?" And "How can we arrive there with overwhelming force?"

The necessary points of engagement may be in Congress, at the White House, before an agency, in the courts, or at the U.N. They may be at a scientific conference, in the board room of a multinational corporation, before an editorial board, or in Delhi or Beijing. One way of thinking about which points of engagement should be considered necessary is to ask, "Where do we need to win, and who do we have to have on board, in order to achieve this?" Wherever these necessary points of engagement are, it's worthwhile to sit down and actually list them on a sheet of paper. (I do this with clients, too.) Then you can figure out how to assemble overwhelming force at each – and how to avoid wasting time and resources on points of engagement that don't matter because they aren't necessary ones.

I've noted above that scientific consensus, properly presented, can be an enormous force – perhaps overwhelming, all by itself, at particular points of engagement. Environmental allies (even religious groups) can also lend great force in many circumstances. But consider, too, the potentially powerful forces of commerce, and whether they can be enlisted as allies in a particular case. If they can, it's usually a lot less difficult to win.

In climate and other environmental policy circles, all industry tends to get lumped together and assigned the “bad guy” role. This often means industry is immediately dismissed as a potential ally. But the world of industry is as complex as it is pervasive, and the Muse of Commerce has a lot of imagination. For every company that's heavily invested in today's technology, there's another that can't wait for a chance to promote tomorrow's. Competition and the need to elbow one's way into the financial sunlight produce a lot of companies eager to take advantage of every niche that policy changes create. Some companies possess “disruptive” technologies – better mousetraps. But in real life, the world won't necessarily beat a path to their doors. Sometimes it takes a policy assist: a new regulation, a new tax law, support from the World Bank or the International Monetary Fund or a utilities commission or a “green” venture capitalist.

There are lots of contemporary examples, but of greatest immediacy for climate purposes may be the examples resulting from gasification of coal. The potential amount of forthcoming capital investment in worldwide coal gasification is staggering. The substantiality and heft of the primary contenders are awesome. Huge international corporations are becoming heavily invested in this technology – and, nipping at their heels, various inventors and entrepreneurs are trying hard to commercialize a whole new generation of additional gasification technologies.

Scientists and environmental activists can claim a good deal of credit for helping create the conditions in which coal gasification is beginning to thrive. But if you want the pace of investment in coal gasification to pick up – and I suspect that item will turn up on the action agenda, should you produce one – it's important to consider how much additional force (perhaps enough to produce the requisite overwhelming amount) these industrial titans and their would-be successors could add as allies at particular necessary points of engagement, such as with regulators, governments, and funding sources.⁶

A shorter way of saying this: technology may be our greatest asset in avoiding dangerous human interference with the climate system. And technologists may make extremely useful allies. It's worth the effort to find out – and find common ground, if possible.

⁶ On March 29, National Public Radio broadcast a special report on coal gasification. David Hawkins of the Natural Resources Defense Council, a participant in this Workshop, got some air time and said supportive things. But the two individuals whose voices (and enthusiasm) dominated the report were top executives from General Electric and American Electric Power (“AEP”), the largest coal-using U.S. electric utility (and erstwhile critic of the Kyoto Protocol). Strange bedfellows? Not on this issue.

E. Conclusion

The collective influence of those at this Workshop, your ability to help bring about real-world actions that actually help, is great – perhaps much greater than you realize. You can help others of us stay focused on the objective: avoiding dangerous human interference with the climate system. I’ve contributed the cautionary example of the endangered but relentlessly hooked and netted Pacific salmon, each of which dies a virgin, to warn what goes wrong when the appropriate policy objective becomes obscured. You know, from your own research and experience, how easily something similar could happen to climate policy if the original objective (avoiding dangerous interference with the climate system) gets lost and reduction in CO2 emissions from Western fossil fuel sources gets substituted in its place. This still strikes me as a real risk: the Pacific salmon problem writ large.

If you choose to adopt a climate action agenda, one that gives appropriate weight for the first time to non-CO2 warming agents such as soot, fugitive methane, and tropospheric ozone, you can get policymakers and others – including industry, foreign governments, NGOs, and the news media – to pay attention and take helpful action. I’ve offered a very few suggestions I hope will assist you. They aren’t much; they may provide a start.

My most important hope, however, is simply that you will undertake the effort, and do so collectively, with the confidence you should feel. If you do, you’ll have a lot greater real-world impact than your predecessors who assembled in Williamstown in 1970.

It’s a privilege to share this occasion with you, to hear what you’ve learned, to watch you begin.

Thank you.

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