What Can Geoengineering Do for Us?
Public participation and the new media landscape

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Abstract

There is public concern that SRM would preclude a deeper restructuring of our energy system, thus preventing an opportunity for social change. However, I propose that geoengineering could actually carry an opportunity to create some of the societal reorganizations needed. To understand this opportunity, it is necessary to reappraise what "the media" are in 2010. The media do not simply transmit knowledge: they are an environment that we live in. Also, communication has a ritual function, in which a culture shares stories about itself. Hence, the current challenge is not about spreading information about climate change or geoengineering— the challenge is about presenting the concepts in a way that is consonant with people's cosmologies, and about spreading a narrative that would help people make sense of the situation.

This paper has two related aims. Firstly, it lays out the initial theoretical considerations for a new communication approach to ethical SRM, suggesting a discursive strategy which could help create a reality in which deeper infrastructural changes are politically possible. Secondly, it explores how the Oxford principle of public participation in geoengineering decision-making could go beyond a power-point sentiment, and posits some ways in which new media and institutional structures could contribute towards this end.

I. Could SRM offer opportunities for wider societal change?

What can climate change do for us? — Mike Hulme

It is commonly understood that solar radiation management would be deployed alongside mitigation efforts; most scientists take pains to emphasize this point. However, the geoengineering discourse features a wide constellation of actors, some of whom believe that geoengineering is a way to avoid "changing the way 7 to 8 billion people live" (Schelling, 2009).

Change is exactly what many of the people on the planet need: precluding this change would be a devastating blow to them. What has made global warming so difficult to deal with politically is an inability to confront the two processes at the heart of the matter: fossil fuel combustion and development. The changing temperature, which we focus so much upon, is simply the end result of the interplay of these processes. SRM aims to adjust this end result— and if SRM is pursued in the way some economists construct it, we may be flirting with the danger of missing our opportunity to truly reform the global energy regime and and confront development challenges. This is what I call the "social opportunity cost" of SRM. In delaying these societal reorganizations, people suffer: hence, there is no ethical SRM without untangling the messy politics of fossil fuels and development.

Of course, maintaining this line of thought is basically to close down "realistic" discussion: if we were currently capable of addressing fossil fuel use and development, we would have already struck a deal to mitigate emissions. Nevertheless, let us continue thinking about geoengineering in the context of a wider sociohistorical perspective and see where it can take us.

Even through SRM is fraught with social opportunity costs, perhaps we could take advantage of this relatively early moment in appraising the technology to consider whether climate engineering carries inside it an *opportunity* to create some of the very societal reorganizations needed. How could SRM serve as an opportunity for social change?

The short answer is: as a flashpoint issue that demands an honest reappraisal of how we think about the relationship of humans to extra-human nature, and as an issue that demands a radically different form of public decision-making if we want to somehow reconcile it with our ideas of democracy. It could be an opportunity for experimentation with global democratic structures, and an opportunity for embracing what Beck calls a "cosmopolitan common sense" (2010), which would improve global society in other ways. An underlying premise of this paper is that the new media environment we live in offers the possibilities for relatively rapid transformation of common sense; that narratives and discourses can propagate rapidly through this new media environment. SRM, if carried out in a best-case scenario with carefully designed participation structures, may provoke an *infrastructural* opportunity to move towards global democracy and participation, innovating models which could be used for other decisions; more importantly, it could open a *narrative* opportunity that would put other socioecological changes into the realm of the possible. I am not suggesting that the idea of SRM, thrown into a new media ecology, would do these things— rather that it could bring an opportunity for engineering the discursive climate in ways that would have a positive impact upon other important societal issues.

Obviously, taking advantage of these opportunities would not be easy. Geoengineering is a point where cosmologies collide: people who envision the world (and the place of humans within it) in one way and people who see the world in another way have emotionally charged conflicts about how to interpret the meaning of geoengineering. The twenty-first century world is full of topics on which worldviews collide— civil rights, abortion, religious freedom, the list is long— but most of these topics don't require action which would impact all life on the planet, and most of these topics can be deliberated for centuries without the pressing urgency of climate change. SRM, on the other hand, has a more immediate volatility. So, even though it might be easier avoid the mire of culture and politics, convening conferences around the more manicured ideas of "governance", culture is

unavoidable. Thus, it is better to appraise the moment and use it wisely, as an opportunity to move towards a more just and equal energy system.

This is in some respects a complex essay: it touches on most of the heavy words, like "culture", "nature", democracy, and modernity. There is no easy path through this terrain. But we need to understand how these relate to geoengineering if we want to research, deploy, govern, or resist SRM. I would like to say straight off that this is not a paper about consulting stakeholders (we have some of those already), and the types of recommendations this paper gives to policy-makers may read as unconventional or idealistic. This paper is a thought-experiment, which started when I asked myself: how could SRM actually be a good thing? At this stage, the aim is not to offer up a set of answers on the question of public participation, but to make sure we are being guided by the right questions as we begin to collaboratively work through options. This is a paper about myths and stories as much as it is about media; and as I sit here in Baku, contemplating the cultural, economic, and symbolic significance of the image of the benzene molecule which appears on the Azeri fifty-manat note, I have to ask you, the reader, for both trust and patience. We will dip into what may be unfamiliar territory, because this paper trespasses across many fields (communication studies, geography, political science, sociology, and history, to name just a few)— yet an understanding of geoengineering in the public minds is incomplete without venturing through these disciplines.

The two interrelated aims of this paper are 1) to explore how the Oxford principle of public participation in geoengineering decision-making could go beyond a power-point sentiment, and posit some ways in which new media and institutional structures could contribute towards this end, and 2) to offer a new communication approach to ethical SRM. So, first we will consider the *form* in which deliberations can take place, and then we will consider the *content* of how we could talk about SRM in ways that open up conversations. A prelude to this is understanding some aspects of how media works in the twenty-first century.

seven premises about media:

1) Media is an environment. The media sphere is where humans increasingly interact, especially in the developed world. As Deuze observes, "life gets enacted in and through media" (2007: 42). Throughout this paper, I employ Silverstone's notion of the *mediapolis*: "the mediated space of appearance in which the world appears," where we are constructed as human (or not), and where public and political life emerges (2007: 31).

2) This environment is interactive, but that doesn't make it equally authored. Digital media is no true "public sphere", à la Habermas; "the world is shareable but not necessarily shared" (Silverstone, 2007: 27). It is often intimated that we are stepping into a brave new interactive world: rhizomatic, democratic. Yet while digital code is a beautiful technology that allows us to manipulate, write, and rewrite the media, the mediapolis is still built by the hands of large corporations: those who own the literal infrastructure of backbone cables and data farms, those who create the code of the programs we use, those who host and organize the content, and those who produce much of the content. The power to interact is molded by many hands before it gets handed down to the consumer/ creator/ end-user.

3) There is no "public"— only publics. Ask a circulation manager or audience development department at any publication or website who "the public" is, and they will probably have very specific ideas about just who the public who reads *their* publication is. Audiences are formed and sold as commodities to advertisers. This, combined with the trend towards "narrowcasting" and personalized search options, means that fragmented communities of special-interest users create media realities that are not necessarily interacting. (When was the last time you watched Fox News? Do you talk to people who do?) This can limit a true public debate, perhaps even a public reality (see Hajer, 2009; Sunstein, 2007; and Papacharissi, 2002). While the collective term "the public" is used occasionally throughout this paper, it is more as a *goal* than an actually-existing entity.

4) Both media texts and audience have an active part in making meaning. The "empty vessel" perspective is as passé in media studies as it is in education—few believe that humans are blank slates to be injected with media—but neither are the readers/watchers/participants completely free to construct their own interpretations; the author is not dead.

Social scientists studying climate change communication have faced difficulties trying to employ the "information deficit model," which presumes that "the public are 'empty vessels' waiting to be filled with useful information on which they will then rationally act" (Ockwell et al, 2009: 321). Geoengineering will likely suffer from the same communication difficulties as climate change in general, until we radically alter the model of thinking about the challenge.

5) Communication serves a ritual function. The transmission view of communication has to do with the Euroamerican legacy of colonization, geographical expansion, and conquering distance—communication once equaled sending a telegram. The ritual view of communication, however, views communication as being grounded in ideas of sharing, participation, and communion (Carey, 1992). Hence, using media isn't just about transmitting information: it consists of us telling stories about ourselves. This plays out in interesting ways in the geoengineering discussion.

6) Media doesn't just relate events, it also performs them. Media represents the world, but also enacts social relations and identities (Fairclough, 1995: 15). This is explored by Beck, who writes that "the news media do not only function in terms of a global focusing of events; rather, the news media adopt a more performative stand, actively enacting certain issues as 'global risks'" (2010: 261). This is especially relevant with geoengineering, which is often staged as the insurance policy for climate risks.

7) Language can create conceptual changes. There are certain opportunities that living in a mediapolis affords us for rapid societal change. A new concept, given life by a word, can spread quickly: "geoengineering", while not a freshly minted word, has almost done this. Imagine talking about "geoengineering" without the signifier "geoengineering": for one, vastly different approaches like biochar and aerosols in the stratosphere would probably not be lumped together in the same news article, and so "geoengineering" would not have the dread-inspiring gravitas that it does.

New terminology and new metaphors don't just reflect changing realities; they create shifts in the narrative, open the way for shifting realities, make change possible. Language doesn't simply innovate to accommodate the new ways of seeing the world—it plays an active role in creating new views. There is not enough space to fully elaborate this point here, but it is fundamental to understanding what is going on with public perceptions of geoengineering.

II. Public Participation

One of the five principles that academics from Oxford, University College London, and Cardiff came up with is "public participation in geoengineering decision-making." A first basic question, then: Is public participation even possible? Any attempt to involve the public now runs into the problem of also having to inform and perhaps form the public, so let us hope that familiarity with the idea of geoengineering will increase in the future. And while I want to shy away from this model that there are people "out there" who much be "reached" to grab their permission, there are material, infrastructural challenges to involving large portions of this earth— I mean this quite literally in terms of bad road conditions and low bandwidth. (And, of course, consultation is not the same thing as active participation in the process; democracy is more than going to the ballot box.[2]) Moreover, from a standpoint of general realism, it could flatly be impossible to make decisions on global environmental risks democratically. As Altvater writes, "The congruence of decision, concern, and control has gone. It is impossible to decide on the effects of the radioactive fallout from Chernobyl or the construction and use of the atomic bomb democratically in 'democracy's place'" (1999: 290).

Right now, the institutional structures for including true public participation in global political decisions are underdeveloped. But let us suppose, for the sake of exploration, that we *could* adequately face these challenges and create mechanisms for public participation in the future. In this section, we will discuss discursive representation as a possible avenue, and explore the ways in which new media could engage with these structures.

However, if we assume public participation is possible, we could ask a second basic question: Is public participation desirable? From my point of view, as someone brought up in a democratic system, this question has an instinctive affirmative answer. Yet I remember traveling in Bhutan, shortly after King Wangchuck had introduced elections for the first time, and talking to citizens who were dismayed about the introduction of democracy and the conflicts that come with it. Some were genuinely upset about all the new politicians arguing, and thought that things had worked more peacefully when the king took care of governing. Clearly, the analogies between a remote, Buddhist mountain kingdom and the entire planet are limited; I bring this up simply to make the point that democracy can be a slow, messy process that everyone might not agree on. If climate change is truly a matter of pressing urgency, then it is possible that by opening up geoengineering decisions to a wide public, states could be failing in their responsibility to protect citizens from climate change. Or, as James Lovelock recently claimed, "it may be necessary to put democracy on hold for awhile" (qtd. by Dryzek and Stevenson, 2010: 3). I don't happen to agree with that argument, but you can see how a simple premise like "public participation in decision-making is good" is actually quite complex— what if technocratic leadership is really in the interest of people?

But let us work on the premises that public participation is both possible and desireable. In a classic piece about decision-making and environmental risks, Fiorino identifies three arguments

2   It would be sad if the global north faced the same mistakes we often make in delivering aid when we try and "consult" people: i.e., coming in to a place, delivering some materials without understanding the social context, in which they would be used and then leaving. I won't elaborate this point here, but it is not impossible to imagine some kind of well-intentioned participation exercise that greets people who are on the periphery and leaves people them still on the periphery when it is over. (Can real participation even be designed?)

against technocratic orientation. There is a substantive argument, which says that lay judgments about risk are as sound or more sound than those of experts— that nonexperts can identify issues, problems, and solutions that experts miss (1990: 227). A normative argument simply states that a technocratic orientation is undemocratic, and "accepts, as an ethical presupposition, that citizens are the best judge of their own interests." And an instrumental argument is that effective lay participation in risk decisions makes them more legitimate and leads to better results (1990: 228). Relating these three arguments to geoengineering, the normative argument for public participation probably has the most traction, and makes a good starting place.

At the outset of our discussion, I would like to note the clear danger that public participation can be posited as bottom-up engagement when it is really top-down legitimation: as Bronson has warned, there is a "very high risk of co-optation" (2010). Stirling writes about the risk of instrumentality— that a public inquiry becomes an instrument for gaining public trust— and has an important observation: "Where the focus lies on a trusting participant (e.g., the public), rather than a trustworthy object (i.e., the specific technology or institution in question), then the instrumentalities become clear" (2008: 270). That is, "preoccupations with public trust can thus be a useful indicator of otherwise tacit instrumental perspectives" (ibid.). If we proceed with public participation, as I hope we will, we have to be very conscious and reflexive about it, looking out for these signs of instrumentality and moving to change them.

Citizens, audiences, publics? Thinking critically about the "general public"

Most people have never heard of geoengineering: Anthony Leiserowitz, director of the Yale climate change project added a question about geoengineering to his latest climate change poll, and found that 74% of respondents had never heard of geoengineering—and only 3% of the respondents had a correct idea about what it actually is (2010a). So, we should not imagine that there is a "public" out there that is hostile to geoengineering: the case is rather that there are two small minorities that are hostile to geoengineering, and a large public that is unaware.

The two smaller publics I speak of are the people concerned with chemtrails, and the environmental activists, who are in a few ways similar and in many important ways very different. They are similar in that they are skeptical of those in power, but the activists have credibility. In my view, there is also a large segment of people out there who have heard of geoengineering— people who read *Wired* or *Science*, tech-savvy and environment-interested people— who are vaguely skeptical of geoengineering, but skeptical for reasons of science, not ideology: i.e., they understand how complex the climate system is and generally think it is a bad idea to mess with it. These people are likely not going to go out and protest geoengineering, though they may follow the issue, and I would call them the "silent majority," or what Maarten Hajer might call "citizens-on-standby", with the observation that "a passive audience is only passive until it switches on" (2009: 180). When surveyed in an opinion poll about geoengineering, they might come up with similar answers to the other publics, but their worldview / interpretive storyline is much closer to that of climate scientists than to people who believe in chemtrails. Thus, I think it is vitally important not to conflate the different publics, as interacting with them will require different approaches. (That may sound a bit strategic, but we are using communication strategies every day: I will speak to an elderly man in

Beijing in a different manner than a teenager in Houston or a scientist in Boulder. My argument throughout this paper is that we must use our full human range of adaptive communication skills when engaging with different publics; if you use one voice for an imagined monolithic public, you marginalize all the other publics.)

What is the relationship of scientists, policy-makers, and climate change communicators to these publics? I want to use the recently-released NERC report (*Experiment Earth? Report on a Public Dialogue on Geoengineering*, August 2010) as a point of departure for examining this. The first sentence of the executive summary begins, "'Experiment Earth?' was a public dialogue conducted for the Natural Environment Research Council (NERC) on geoengineering," which itself begs some questions— what will be the content of a public dialogue be "conducted" *for* an agency? The stated aim was to identify and understand public views on geoengineering research and deployment. However, to identify and understand public views, they had to in some sense create the views, because the public did not have much understanding of the subject to begin with (2010: 1). They informed the public through discussion groups with scientists (which may well have given them a different understanding of geoengineering than if they had simply encountered the topic in the media, and perhaps a better one). The exercises and presentations had stated objectives, like "Introduce idea of needing to trade-off relative pros and cons of different technologies", or "Get participants thinking about different questions relevant around governance, winners and losers, compensation, commercialisation" (2010: 72-73).

The difficulty of trying to "identify and understand public views on geoengineering", and at the same time trying to introduce specific ways of thinking about the issues, is obvious. Trying to tell people they need to trade-off pros and cons, and assess prospects for winners and losers, is encouraging a certain (rational, economic) way of thinking. If you gathered a group of people and "got them thinking" about different kinds of questions, you might well produce a different set of public views on geoengineering. When describing the "information given to participants", the report states that "Whether humans have caused this problem or not was outside the scope of the dialogue" (17). Suppose, instead, that you gave participants information about how carbon concentrations in parts per million have been rising since the heavy burning of fossil fuels in the 1800s and that they are pushing 400ppm, and you show them a graph of this, and inform them and that the link between burning fossil fuels and rising temperatures is probable. Suppose that you asked them what they thought were the causes of global warming were, and situated geoengineering in the context of the actual problem that geoengineering hopes to address. Or suppose that you gathered people together with not just scientists, but philosophers and psychologists, and asked them how they *felt* about geoengineering and nature-society relations. Suppose they created artistic or written visions of the future, and discussed spiritual views on the climate situation. The possibilities of how to "engage" with this issue are manifold: the point is that if you are giving people information, and encouraging ways to engage with the issue, it is difficult to then measure their "views." In Stirling's piece on the social appraisal of technology, he asks, "What is the purpose of structured exercises in participation? Are they about informing, or actually forming, the commitments themselves?" (2008: 267). How do we balance education with engagement and gauging perceptions? These questions are quite salient here.

The positioning of scientists, policy-makers, and the "public" is quite complex. The discussion events described in the NERC report were accompanied by open access events, in which people

filled out 'Have your say' cards asking 'What should scientists studying climate research be doing to save the environment?' (2010: 13). This is a question asked by professionals about professionals. It intimates whose responsibility it is to be "saving" the environment— and also provokes matters of agency. The general tone of the report is that the people should be consulted, but that they do not have the responsibility or power to do much themselves. It is far from the substantive argument for participation that Fiorino suggests— we do not ask what expertise the public can add; there is no intimation that nonexperts can identify problems or solutions that experts miss, or that their participation makes the end result of things better in any way. The people are consulted, but not as collaborators.

One final point about the NERC report and how it imagines the public— there are dialogues between people described as "General Public" and "Scientist." I want to really challenge this idea of the "general public." The report made an attempt to include people with different views, genders, and ages (income level would have also been interesting). But that still does not mean that these individuals assembled make a "general public." In part, this may be a function of the postmodern media landscape: Poster argues that "the citizen, the intellectual, the democratic subject of the nation-state— these characters who fill the landscape of modernity were inconceivable without print" (2001: 13). But in the electronic technocultural landscape, the subject/object relation changes, so people don't have stable, centered identities, but fragmented and multiple identities (2001: 14). In postmodernity, nobody can be general. With the erosion of public space, and the erosion of the citizen, both "general" and "public" become unreliable terms. They are also nationally-based conceptualizations, and might have to be adjusted to consider global issues (what does a global general public look like?)

Despite this postmodern angle, I do believe that the various publics can be combined in a cosmopolitan vision. Moreover, the NERC report, despite my critiques of it, seems to be an honest start at public dialogue. Let us turn to how we could create better mechanisms for public participation. What would the criteria for a good mechanism be? What forms will it take? Can discourse which emerges in public space be transmitted into empowered spaces?[3] How does it intersect with new media?

Recommendations for ways to include public participation

I will first mention six broad points of consideration, and then briefly discuss some specific mechanisms.

1. Design for many publics. One ground to begin building on is the conceptualization of publics who have various expertises and prior life knowledge, and by going beyond "consultation" to involvement or engagement.

2. Design reflexive mechanisms. A one-off inquiry or event would be insufficient; the process must build on itself. Furthermore, the mechanism itself should be subject to public design, not just left in the hands of professional dialogue designers. That is, it should be meta-deliberative, as described by Dryzek and Stevenson: "Meta-deliberation is the reflexive capacity of those in the

3   See Dryzek and Stevenson, 2010, for more on public and empowered spaces, and discursive representation.

deliberative system to contemplate the way that system is itself organized, and if necessary change its structure" (2010: 9). A good question by Fiorino to keep in mind is, "Does a process allow citizens to define issues, question technical experts, dispute evidence, and shape the agenda?" (1990: 230).

3. Innovate mechanisms that put different stories in conversation. Instead of having dialogues which are shaped by already-existing frames, make sure the forums directly allow for people to talk out the worldviews that are shaping their understanding of what geoengineering is. Stewart Brand actually talks about this— he mentions debates where different actors would ask, "Tell me what you're concerned about," and then they would have to summarize the opponent's position (2009: 231). There is a wealth of interpersonal communication literature that could be relevant in designing mechanisms for discussion and participation— and I encourage including it, because being exposed to different cosmologies is part of democracy. A dialogue between people who all believe that the best way to approach a problem is a cost/benefit analysis will be a limited dialogue.

4. Work with NGOs, but recognize their limitations. The NERC report states that "Before the dialogue began, a steering group of scientists, science communicators, and representatives from government, business and the third sector was appointed" (2010: 14). Does the "third sector" really stand in for civil society? Is the discursive representation by NGOs accurate? We can turn to a recent paper by Scheer and Höppner, who evaluated the public consultation to the UK Climate Change Act 2008. In the process of consulting the public in developing climate change legislation, 152 participants were selected to represent a range of demographics for a citizen's summit (2010: 167). Most of the people did not hear about the summit or the engagement initiative in the press, but through NGOs (Scheer and Höppner, 2010)— in this case, NGOs function as the media. Scheer and Höppner observe that "while NGOs and citizens are usually treated as a monolithic 'public', they are driven by different rationales and play different roles in consultations. NGOs can be seen simultaneously as initiators, campaigners, participants, representatives of the public, and mediators of citizen's responses" (2010: 271). They explain that "NGOs were clearly very important in stimulating the participation of large numbers of people. However, it should be cautioned that such input may take even more attention away from 'unique' responses, as the consultation can become increasingly prone to becoming a numbers game" (274). In this case, many of the people responding to the consultation read briefings by large NGOs like Friends of the Earth, and submitted the generic answers generated by that NGO, rather than responding with their unique thoughts. NGOs serve the public, but also have their own instrumental rationales, and their concerted movements can overwhelm the responses of individuals.

5. Engage with the global south, but also with people the peripheries of developed countries. The NERC report is laced with intentions to include the developing world, which is excellent. We in the "developed" world should recognize that there are people at the margins of our own societies, and work there as well.

6. Transcend disciplines and scales. A successful mechanism for engagement might break out of the language and professionalization of political science to include a cultural component. Imagine educators, artists, and librarians conspiring to create an engagement program, not just research councils and professional survey designers— if the funding existed, perhaps special book exhibits and art installations could help to create a snowball effect of interest. Furthermore, a

mechanism could overlap across a variety of scales, from communities to the globe. Engagement could be done through a variety of networks.

Many specific mechanisms for engagement, consultation, and participation on issues of technologies or environment risk have been developed over time. Some involve direct democracy, like the referendum; others involve varying degrees and methods of representation. It is beyond this paper to attempt a comprehensive survey, so I will focus primarily on a few of the strategies which I think may be adaptable for the topic of SRM.

The introduction to this section mentioned the challenges of participation: lack of information, lack of infrastructure, and lack of will to participate among them. I believe that the lack of information problem requires a separate educational effort. The lack of will to participate could be addressed by a combination of compelling media performances and by a generating a new narrative about climate change and modernity (explored in the second half of this paper). The question of infrastructure for participation is what I will address in what follows. Because of the limitations of connecting with everyone on the earth— even in this cyber-era— I think it is worth exploring the idea of discursive representation.

Dryzek and Niemeyer haver argued for this, asserting that "democracy can entail the representation fo discourses as well as persons or groups", and state that "discursive representation is one way to redeem the promise of deliberative democracy when the deliberative participation of all affected by a collective decision is infeasible" (2008: 481). They make clear the point that representing a discourse can be distinct from representing specific persons: i.e., when Bono says he represents Africa, he is representing the *discourse about* Africa, not specific Africans (ibid.). This can be preferable to mere group representation: there is no certainity that I as a woman represent the interests of women, for example. The idea that Dryzek and Niemeyer suggest is a Chamber of Discourses, which would be similar to a public assembly, except that all discourses are represented. There are different options for how to go about actually constituting this: first there is the task of identifying all relevant discourses, then selecting representatives. Random selection is one method; the difficulty is that you need a large sample size to represent all discourses, but a large group of people will not be able to deliberate easily together (2008: 486). Dryzek and Niemeyer propose forming minipublics (15-20 persons) who can deliberate together: this could make an intriguing reality TV series, especially if it moved back and forth from the deliberation hall to the field. Then, there is the question of making decisions: consensus, or voting? I would advocate strongly for constituting a chamber of discourses (though calling it something a bit less academic-sounding) which works on the basis of voting and acts as an advisory body to policymakers, with a formal mechanism for transmitting its deliberations into the spaces of power.

This chamber of discourses would be best combined with other methods of increasing participation. As a point of departure for mentioning some of these, I will again refer to Fiorino's paper about citizen participation and environmental risk, as it offers a good discussion of several mechanisms: initiatives, public surveys, negotiated rule making, public hearings, and citizen's review panels. Initiatives (ballot initiatives, as commonly used in California or Switzerland) would be a poor choice for geoengineering, as they simply take a snapshot of public opinion and adopt it as the basis for policy (1990: 232). They are not necessarily far-thinking, and they force a decision from among dichotomous choices, which would be too simplistic for a topic like geoengineering. Public

surveys have the advantage that they can incorporate views of publics that may not be interested in participating in a more intensive process, and they will probably be a useful consultation mechanism in conjunction with other strategies insofar as they are not used as proxies for deeper engagement. Negotiated rule making, which has been employed by agencies like the EPA, "does not offer the direct participation of amateurs in risk decisions" (1990: 234), yet it could be adapted to at least offer discursive representation. Public hearings will likely be a component of any public engagement endeavor, and a citizen's review panel could also be a good way to generate engagement. Both of these would have some media appeal, especially the citizen's review panel, if the jury format was telegenic. It would have to be really sophisticated to be more than a spectacle, but if well-done, it could generate enthusiasm for discussion.

In Fiorino's conclusion, he emphasizes that

> Negotiated rule making relies explicitly on a pluralist model of interest group representation. In the other four, the quality of this direct participation varies. In a hearing, it is participation as a commenter, and in a survey, as a respondent. The initiative and review panel achieve something close to participation as a citizen; participation is not primarily reactive, and there is some recognition that individuals are capable of judging what is in their own interests (1990: 236).

I would like to draw attention to a key phrase here: *participation is not primarily reactive*. The best mechanism for participation will not simply allow citizens to choose between geoengineering strategies like they are in a supermarket, selecting the goods that suit the situation best. Democracy is not about choosing, it is about speaking (see Fishkin, 2009). Rather, a good mechanism will encourage citizens to create their own visions of the kind of world and climate they want to live in. This is so far from where we are now that it sounds almost absurd; yet it is a worthwhile goal. Right now, people might not desire to (or have the time to) participate in climate decisions. A classic problem with representative democracy is that most people "free ride" on those who are willing and able to invest time in being citizens of a republic (Levinson, 2010: 65). What would a situation where people want to participate in envisioning the future climate look like?[4]

Intersections of new media: potentialities and pitfalls

Suppose that in ten years, geoengineering is a topic of public discussion. How could we make the leap from public discussion of geoengineering to public participation in geoengineering decision-making? Deliberation is at the heart of democracy, and is a prerequisite to the mechanisms

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4   Interestingly, in a paper on the promise and perils of electronic engagement, Rowe and Gammack suggest that "trust is not only a (potential) desired outcome of involvement, but also a potential factor influencing willingness to be involved in the first place. Hibbing and Thiess-Morse (2001) surveyed US citizens' willingness to participate in political processes and found that there was more incentive to participate when the government was *not* trusted (the repair theory), than when it was (the reward theory). One implication of this is that the public prefers not to participate, but rather to accept the decisions of an expert polity they can trust (a sort of management-oriented mentality)." (2004: 40).

mentioned above, so we will now examine the ways in which new media can support deliberation and discussion (and the ways in which it might hinder them).

At the moment, most media stories about geoengineering are triggered by other media events: the publication of an article in some journal, the release of a book, etc.: stories triggered by events taking place in physical space, like conferences or experiments, make up a smaller portion of stories (Buck, forthcoming). At some point, this will probably change, but right now geoengineering is a topic produced in (and to some degree, by) the sphere of the media. My premise is that the mediapolis is where public discussion of geoengineering will take place, and that non-digital citizen inquiries or forums will support this discussion, but perhaps not drive it.

Let me be clear that my approach to geoengineering and new media is not instrumental. Communication technologies are far more than tools. As Poster writes, "The Internet is more like a social space than a thing, so that its effects are more like those of Germany than those of hammers. As long as we look at is a hammer, we will fail to discern the way it is like Germany" (2001: 176). That is, we should approach new media to see how it intersects with geoengineering discussions— how new mediascapes shape the discussions, the political situation, and even the concept of geoengineering itself— but not think of new media is as a tool for conducting public dialogue.

New mediascapes seemingly hold a lot of promise to act as spaces where deliberative decision-making can happen. "The myths of cyberspace point to an intense longing for a promised community, a public democracy, or what Carey refers to in the American context as John Dewey's 'conjoint life of the polity,'" writes Mosco (2005: 15). According to Mosco, the myths of the digital age held that we would experience an epochal transformation, and "transcend time (the end of history), space (the end of geography), and power (the end of politics)" (2005: 3). Proclamations like this abounded in communication studies circa 2002, and though the tone has mellowed, the potential for increased democracy still exists. It exists simply because we have the infrastructure to talk to each other, even if we don't use it in deliberative-democratic ways. This infrastructure could take us in the direction of global democracy, and perhaps lead closer to Dryzek's vision of severing the close connection between democracy and the state: "democracy need no longer be confined to the processes of the state" (2002: 277). The mediapolis also offers new forms of collaborative intelligence-gathering, like Wikipedia, and the possibly to share information openly. This connection potential doesn't simply network us— it could allow for us to grow morally. It is through media that we see the Other; thus, as Silverstone writes, the media are an "increasingly significant site for the construction of a moral order" (2007: 7). If that other is increasingly like us— and if we can interact with that other— the story of the great modern divide between "us" and "them" starts to weaken a bit. But, as suggested in the introduction, these capacities are not always used, due to existing structures within the mediascape.

This brings us to the obstructions of new media in fostering public discussion. Firstly, to put it frankly, a capitalist media system does not exist for the purpose of serving the public good. There is some weight to the argument that have moved from a culture-debating public sphere to a culture consuming-one, as Wilhelm states (2000: 145), and many critics have lamented this. With regards to geoengineering, this can play out in issues of shallow, sensationalist coverage, and (more significantly) lack of coverage. For example, in the public consultation to the UK Climate Change

Act 2008, most people did not hear about the consultation in the press— it faced low coverage, and none of Scheer and Höppner's interviewees heard about it in the media (2010: 267).

Another obvious disadvantage of relying on new media for public discussion is the "digital divide", where access to information technology is unavailable for many. Somewhat less obvious is the phenomenon of narrowcasting, where people seek out information that they are interested in and that suits their worldviews (or where people are offered content that suits their previous interests, as happens in personalized Google searches). Sunstein is concerned that the internet is "producing a decrease in unanticipated, unchosen interactions with others" (2001: 23). Hence, "a decline in common experiences and a system of individualized filtering might compromise the ideal of deliberative democracy" (2001: 26). Sunstein also points to social science research about group polarization: that groups of like-minded people who discuss an issue end up thinking what they thought before, but in more extreme formulations (2001: 65). New media allows us to congregate in niche communities where we are exposed to issues that are of concern to us— but we might not hear about issues that we don't already care about.

Still another potential concern with new media is the diffusion of responsibility problem. As Silverstone observes, the screen "grants sensation without demanding responsibility" (2007: 119); we can learn about situations without having to be responsible for them. A seminal report from a conference put on by Yale on Americans and climate change includes a section on "Dialogue as an Antidote to Diffusion": "Put simply, it becomes harder to tell yourself that someone else will lead on climate change if you're in a room with them and they're looking back at you saying the same thing about you" (Abbasi, 2006: 71). The report's solution is that "innovative dialogues can help counter the 'diffusion of responsibility' phenomenon", and they recommend "a more open-ended type of activity in the form of organic, unscripted, and authentic dialogues between people who don't normally connect" (ibid.). It is arguable that face-to-face discussion on geoengineering is preferable to mediated discussion, as it may demand a deeper connection and commitment.

Of course, there are elements of how new media works which can't easily be placed into neat categories of positives or negatives. One is performance: as Hajer writes, in a mediatized age, "we are now looking towards a politics that starts with the fact that publics are now active judges of performances" (2009: 181). There are specific knowledges of how to perform (and, I might add, how to include narrative, or at least drama) that can be valuable, even if the actors in the situation never wanted to become actors in the dramaturgical sense.

A second element of how new media works is speed, and the inclusion of fringe elements into the wider discourse. Stories move rapidly through the mediapolis; it is difficult to understand exactly how this operates. We recently saw a preacher with a following of 50 spark an international crisis because of this (the man in Florida who began with some YouTube videos about burning the Koran this September 11, whose story moved from the blogosphere into the mass media via the *Guardian*, until Obama himself had to intervene). It is not difficult to imagine a similar sequence of events with the topic of geoengineering, where the voices of fringe elements become represented in the wider world as if they were less-than-fringe elements. (However, when these stories go viral in this manner, the system seems to clear the virus equally as quick.)

Thirdly, lack of face-to-face interaction is an interesting variable— Rowe and Gammack ask how the reduction of social cues impacts electronic engagement mechanisms and exercises (2004: 46). They suggest that electronic engagement brings status equalisation: that lay members of the public would be more willing to engage frankly with people who have higher status, like experts and policy-makers (ibid.). They also point out that computer-mediated groups more frequently exhibit uninhibited behavior (Rowe and Gammack, 2004: 49, after Siegel et al, 1986). This could help or hinder geoengineering discussions.

A final musing on this intersection of new media, discussion, and decision-making: I wonder if computer-mediated communication is an appropriate way to deal with technologically mediating our climate. Will interacting through programmable media make us more comfortable with the idea of programming our climate; is there some analogy or resonance there? Furthermore, as climate impacts bodies— it is an intimately physical matter— should we be talking about it in body-to-body communication, in the physical realm?

It is my hope that these concerns, ideas, and questions can contribute to a wide, rich dialogue on how to go about encouraging the public deliberation and participation that would be an integral part of an ethical approach to SRM. In the next section of this paper, we will attempt to open the dialogue further by considering how best to communicate with these varied publics.

graphic of words which appeared in the headlines
of major world newspaper articles, 1990-2010

III. A narrative approach to communicating about geoengineering

"Have you stepped on a secular religion?"
— Jon Stewart, interviewing economist Steven Levitt about geoengineering

Levitt: "I think that the idea that we don't have to pay the price for polluting
is a really, really hard one for people to take."

Understanding stories: a narrative communication approach

What does the Nobel laureate Paul Crutzen, who proposed stratospheric aerosol injection in a groundbreaking article, have in common with the anti-geoengineering activists from the "Hands Off Mother Earth" (HOME) campaign?

Both have been motivated to act by a sense of despair about climate change. As Crutzen described in Heidelberg during a summer school about geoengineering in 2010, he put together his facts about what was happening with global warming, saw that mitigation measures were slow to take shape, and figured that geoengineering may be the only way avert biospheric disaster. The HOME activists felt despair at the ecological crises produced by industrial societies, perceived geoengineering experiments as a further threat, and became motivated to stop them.

There is actually shared emotional ground between scientists, activists, and other actors, but there is a divergence of storylines. People can assess the same set of facts, but because they have a different understanding of the plot and characters, they will come up with entirely different courses of action to take. Harvey's comments on environmental justice are salient here: "different designations as to who is the villain of the piece give rise to radically different explanations of both what is wrong, who is responsible, and what to do about it" (1999: 111). This is why it is vitally important to understand the narratives people are using to interpret scientific fact. It might seem counterintutitive to talk about stories with such a "scientific" topic, because *story* has the connotations of *tale* or even *falsehood*— but narratives are how humans make sense of the world.[5] When we make a statement like "We will, whether we like it or not, be faced with the decision of whether or not to do this over the next few decades, especially if the climate problem is worse than we think,"[6] there is a narrative implied there. There is movement through time, a plot which develops, a moment of climax— and people understand this. Likewise, the statement "I look at emissions reductions as trying to keep your house from catching on fire and these geoengineering schemes as a kind of insurance policy,"[7] also suggests a storyline with which we can comprehend what geoengineering would mean.

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5   As argued well by psychologist Jerome Bruner (1991).
6   David Keith, quoted by journalist Vivian Song in *The Toronto Sun* (2008).
7   Ken Caldeira, quoted by Mahoney in *The Globe and Mail* (2009).

What I am recommending here is a narrative approach to communicating about geoengineering. Basically, this means being fully aware of the story scientists, policy-makers, and writers are telling. Narratives help people make sense of the scientific facts that describe the situation; as climate change communicators have found, facts without narrative are unlikely to engage people. The report from Yale climate scientists explains the problem:

> Rarely is there an anecdotal lead in a climate change story to drive the narrative and promote a sense of personal relevance, whether a likely victim of potential climate change impacts, an entrepreneur with a solution or a scientist- hero. Instead of human interest pegs, climate change stories tend to contain complex and abstract scientific information and follow a numbing structure: some event occurs (e.g., collapse of an ice shelf), the basic climate change science is spelled out, alternative explanations are offered, and the IPCC or some other authoritative source is cited, implying that more research is needed. These stories are sufficiently similar that the reader has little sense that the science has advanced (Abbasi, 2006: 122).

Can the narrative surrounding geoengineering be changed? I will suggest here that it can be, given how few people even know about geoengineering, and that the discourse is dominated by a scant handful of scientists.

The first step to shifting the discourse is simply to understand the existing narratives. In a quantitative content analysis of print and online media sources, I found that most stories were framed catastrophically (telling some story about climate disaster), but also often managerially (telling a story about the need to manage the planet through technology) (Buck, forthcoming). As I have discussed this elsewhere, I will not go into detail here, but the catastrophism is interesting. It echoes in some sense *the* major narrative, the mother of narratives: something is born, it grows old, it dies. Somehow, climate seems to be joined with this story to become the factor which hastens the end; and as in every good tragedy, there is something unwitting and poignant that ironically caused the end.

This story existed before climate, however. Rousseau wrote that "everything degenerates in the hands of men"; Nietzsche worried about the coming barbarism; the Frankfurt school lamented the fallen nature of modern man; even Al Gore wrote about our "strange Cartesian spell" and its effect on the world. The story here is familiar: there was a beautiful natural world, humans spoiled it; or, there was a beautiful culture / civilization, but now it is degenerate. The story is familiar because it has appeared in the Bible, in Fascism, in Romantic poetry, in postmodern critique. Perhaps the anguish that people feel about geoengineering is in some sense not specifically about geoengineering; rather, it could be about the final climax of this deeper story. Geoengineering is linked to a sense of loss— the lost nature, the lost connection to nature— and so it can be a profoundly emotional issue.

A way forward

The current narratives about geoengineering— that it is a reluctant choice we may have to make after failing to mitigate emissions; that it is an insurance policy we should invest in— are unlikely to galvanize public interest in any direction, because they are stories of failure, and of

insurance. Furthermore, they do nothing to address justice issues, or the fundamental drivers of the climate change problem. What would make for a better narrative with which to understand geoengineering and its implications?

At the outset of this discussion, I should address the common postmodern complaint: that there is no universal narrative by which anything (or everything) can be understood— and that such a narrative, if it did exist, would be Eurocentric. This is a fair and important concern. However, I believe that it is an interesting exercise to sketch out a basic narrative shape that could have room for many storylines within it— especially since the Anthropocene indicates that we are a "civilizational community of fate," as Beck puts it (2010). We are, after all, members of the same species, and are there some traits, emotions, and behaviors which are broadly shared: humor, love, smiling, tool-making, expression.

Any successful narrative would necessarily be driven by basic elements which most humans are already concerned with, such as freedom or success. Here, it is worth mentioning Harvey's "gut response" to the question "Is a universal environmental ethic possible or desirable?", to which he said, "Of course it is impossible — of course it is desirable" (1999: 109). It may not be possible to create any kind of narrative by which a wide variety of publics can understand climate change, but it may be worth it to try. I believe that at the root of our various (interlinked) crises— the financial crisis, the ecological crisis, the crisis of climate politics (if you consider Copenhagen have been in crisis)— is a crisis of narrative. We lack a compelling storyline to draw together philosophies or ethics that could move us in some direction. Hence, the risk of not investigating this area is greater than the risk of sounding completely idealistic or hubristic. In the spirit of open experimentation, I venture to propose four themes of such a narrative.

1. Possibility, potential, and belief in human beings

Malthusian nightmares haunt the climate change discourse: images of conflict over water scarcity, hordes of environmental refugees, etc. Climate change is the story of our inability to create a healthy, just, and balanced world; geoengineering is constructed as the grim resolution to this story, and set against a geopolitical backdrop, where we imagine struggles over control of the Earth's thermostat.

To counter this imagined war of all against all— or the perspective of "strategic realism," as Gwynne Dyer, author of *Climate Wars,* puts it— climate change communicators could pull out the good traits in humans and focus attention upon them, like altruism and innovation. What if humans could cooperate on a new way of living upon the earth, with geoengineering as one component of this?

A post-Copenhagen common sense says that people are unwilling / unable to shift their societies away from fossil fuels. Strategic realism, or the grim geopolitization of climate, has become almost an unquestioned myth— and as Gramsci observes, common sense creates the folklore of the future (qtd. in Mosco, 2005: 29). If myth is "congealed common sense," as Mosco puts it, we have worked ourselves into some following a kind of myth where change is impossible: a dangerous place to be, both politically and spiritually. What myths are not being lived, or told? A question from

Nordhaus and Shellenberger worth considering: "How might history have turned out differently had we imagined the solution to global warming as *unleashing* rather than *restricting* human activity?" (2007: 127).

2. Art, ecological restoration, and the positive connotations of design

Think *technology*: what do you see? Machinery, power lines, circuit boards, beeping and blinking things? Perhaps it is time to perform an archeology on this word, and reclaim some of its earlier meaning. *Technology* comes from the word *techne,* meaning "art," art as in artifice, but also creation; the application of human imagination and skill to the world. Fundamentally, this has nothing to do with blinking devices, and everything to do with creativity and "tinkering." Much of the media coverage of geoengineering has disparaged "tinkering" with the world's climate, and while this is understandable, it also evidences a pessimism about a trait that may be embedded in human nature. Rather than disparage an urge to manipulate, could we rather seek to develop and refine it into a responsible art? This seems to be the thrust of Brand's *Whole Earth Discipline*, where he writes that "we're left with intention, with conscious design, with engineering. We finesse climate, or climate finesses us" (2009: 19). The names for this process are manifold (and often awkward)— Brand mentions managing the commons, tending the wild, mega-gardening, and intentional Gaia— but the concept, I believe, is rooted in art and design.

Perhaps there could be an ethical form of geoengineering, if it was part of a larger artistic vision. It is an important exercise to articulate what our best-case vision for geoengineering is. If we've accepted the premise that it is inevitable, then I posit that the optimal geoengineering situation is smaller-scale, locally managed carbon dioxide removal projects— regional and community carbon management— done in conjunction with decentralized, regional food systems and permaculture, organized so that individual gardeners and farmers could take part, and executed with a culturally-variable sense of beauty. SRM could be done to allow us time to actualize that vision, but it would only be ethical if done on the road to a more just and beautiful world. What is your best-case vision for geoengineering (besides hoping that it is not necessary)?

3. Connection with nature

Let us return to this question of why "environmentalists" are against geoengineering. Anti-geoengineering sentiment, in many cases, comes from a story of being disconnected from nature, and a sense of pain at this lost connection. Geoengineering is seen as one more manipulation, one final injury inflicted upon a breaking and beaten planet. While this story, and this nature/culture divide, is still in place, geoengineering will have a difficult time capturing widespread public support and legitimacy in Euroamerican societies. A new narrative would necessarily have to address this divide, which has persisted at least since the Enlightenment, and tell a story of being connected to nature in a different way. It could posit geoengineering as part of a connection, rather than a disconnect. This is not implausible: geoengineers do listen to Mother Earth, intensely, and much of their research is developing ways to listen better; it is an intimate kind of connection, though not framed as such. Geoengineering would be a deep attachment. More difficult than working with this sense of connection is dissolving the old binary, where human activity and culture is on one side and Nature

/ Environment is on the other. So you have "environmentalists" opposing human transformation, faithful to the binary.

"Environment started as a relation, a sense of connection, then turned into a thing," observes Proctor, who identifies a "double disconnect: first, moving from environment as surroundings to environment as a thing, and second, splitting environment into nature and culture sets of things along the way" (2009: 297-8). So the first task in healing this split, which has paralyzed environmental politics, is to un-thingify the environment. Or to, put it slightly more gracefully, to reconceptualize nature-society relations, and recognize that we are part of the environment, acting reflexively within it. "We are a species on Earth like any other, endowed, like any other, with specific capacities and powers that are put to use to modify environments in ways that are conducive to our own sustenance and reproduction," is how Harvey formulates it (1999: 122). This formulation is basic, unsexy, and I think it has a great measure of truth: human labor and human action are actually natural, and if they belong on the "nature" side of the divide, then the divide ceases to have meaning.

4. Honestly recognizing the ways in which the world is flawed

Geoengineering is not an environmental issue. Like climate change, it is fundamentally a development issue. "Climate politics is precisely not about climate but about transforming the basic concepts and institutions of first, industrial, nation-state modernity," writes Beck (2010: 256). If we want to honestly and ethically deal with geoengineering— and deal with geoengineering in a way that will have any legitimacy— then we have to tread upon this ground, with the starting point being that the world right now is unequal and this needs to be changed. A good narrative to help us make sense of geoengineering might deal with reconceptualizing modernity— or modernizing modernity, as Beck puts it, going beyond "ecological modernization" to challenge its very premises. And this is deeply connected with the nature/society divide we've just been discussing.

Latour's insight in *We Have Never Been Modern* was that "we", the moderns, divide Nature and Society, while "they", the non-moderns (or pre-moderns) do not (1993: 99). They are supposedly at one with nature; then the Great Divide happens, and Nature and Society (or Culture) become increasingly purified essences, realms drifting apart. But if we get rid of this idea that we are somehow modern, then we open up space to reconceptualize these categories. And *this* opens up new political possibilities. As Latour writes,

> If we have never been modern... the torturous relations that we have maintained with the other nature-cultures would also be transformed. Relativism, domination, imperialism, false consciousness, syncretism— all the problems that anthropologists summarize under the base expression of 'Great Divide'—would be explained differently (1993: 11-12).

What is modern? Cleanliness, order and light.[8] And these things are possible without fossil fuels. Rather, fossil fuels represent pollution, messy extraction, inequality, corrupt regimes, etc. The new modernity is not auto-driven, oil-driven, or coal-fueled: it retains cleanliness, order, light, and health, plus whatever qualities you are inspired to add to it. It can be Islamic, Christian, Hindu; it finds joy in the other, it is cosmopolitan, and not defined by speed or accumulation, but flow. And,

8   Following Alain de Botton.

as Beck writes, "an alternative modernity will have to include a new vision of prosperity which will not be the economic growth held by those worshipping at the altar of the market. It will define wealth not in gross economic terms but as overall 'well-being' (2010: 262). The point where we actually make it past measuring wealth in terms of GDP may seem rather distant, but we have to aim for it (and this is the essence of this paper: that it is vital to have a destination imaginary; that having a just and beautiful destination imaginary is the only thing that can give any kind of ethical support or legitimacy to a geoengineering project).

The political implications of not dissolving these categories— Nature and Society, Modernity and Environment— are grim. Beck explains that

> If you see an opposition between modernity and nature, then you see the planet too fragile to support the hopes and dreams for a better world. And then you will have to envision and enforce a kind of international caste system in which the poor of the developing world are consigned to (energy) poverty in perpetuity. The politics of limits will be 'anti' – anti- immigration, anti-globalization, anti-modern, anti-cosmopolitan and anti- growth. It will combine Malthusian environmentalism with Hobbesian conservatism (2010: 263).

How do we get out of the politics of limits? The story comes first: otherwise we are stuck. Or, to quote Mosco, myths are pre-political: they can open the door "to a deepening of political understanding" (2005: 16). The story must enable the policies, because policies are trapped within the existing narratives about modernity and development.

What is the role of scientists in telling a new story? The Yale report on climate change recommends that the facts of climate change "must be actively communicated with the right words, in the right dosages, packaged with narrative storytelling that is based rigorously on reality, personalized with human faces, made vivid through visual imagery – and delivered by the right messengers" (Abbasi, 2006: 11). Are scientists the right messengers? While studies suggest celebrities like Oprah and Angelina Jolie to "spread the word" on climate change (Nielsen 2007), scientists have credibility when it comes to the facts. Obviously, scientists do not simply generate "facts" which the machinery of the press works to frame. Rather, the facts begin inside a frame, and are expressed through the frame in which they are generated: that is why a new narrative must start with scientists.

In the case of geoengineering, a small group of scientists has a large share of voice on the topic: in a recent study of geoengineering print newsmedia from 1990 - 2010, I found that 70% of assertions on the topic of geoengineering were made by scientists (of varying types), and nine scientists were responsible for 36% of the assertions (David Keith and Ken Caldeira together made up 15% of the statements) (Buck, forthcoming). This is a pretty interesting situation, where a small group of people has power to really frame a topic, at least in the mass media or traditional press. This is where many of the stories in the blogosphere are sourced from (Buck, forthcoming); the blogosphere is less wild that one might think. It is my hope that the scientists involved in geoengineering will choose to actively frame their work with creativity and compassion.

It is difficult to conclude a paper whose purpose is to open and explore more than to put forth a classic argument or study an existing phenomenon. Nevertheless, I can reiterate that the only way to approach SRM ethically is to put in a genuine and clear effort to address what this climate dilemma is really about (fossil fuels, development, and misguided conceptualizations of modernity, among other elements)— and to use geoengineering as part of a wider vision for a better world. If geoengineers communicate this vision, and elucidate what the world they hope to geoengineer fully looks like, it could be part of a movement towards positive socioecological change.

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