Notes from call between GiveWell and Jane C.S. Long, 06/01/12

Alexander Berger (Research Analyst) represented GiveWell.

Dr. Long is Associate Director at Large for Lawrence Livermore National Laboratory, working on energy and climate. She co-chaired the Bipartisan Policy Center's recent report on geoengineering and works for the University of California at Berkeley and the Environmental Defense Fund.

The following transcript is edited for flow and content based on notes taken during the call by GiveWell. Questions by GiveWell are in **bold**; answers by Dr. Long are in normal text.

GW: My impression is that a lot of the research on solar radiation management (SRM) right now consists of computational modeling and things like studying records from volcanic eruptions. Are there other major threads of research that are currently ongoing?

JL: Well, there's a lot of research in governance, which is where most of my work is focused. I'm not a climate scientist, so I don't work on the technologies themselves.

The research on geoengineering is in an interesting place right now. No government wants to say "we have a program of research in geoengineering." So the science being done is mostly bottom-up, as proposed by researchers. Researchers propose one-off projects, and sometimes get a little bit of government funding, but the governments are able to say they don't have a program in geoengineering research.

By working on governance issues right now, we can lay the groundwork so that when the governments come around to funding in a more focused way, there will be some norms for them to adopt to govern the research.

At some point we need to start testing the processes that will determine whether SRM would work, probably in the atmosphere. You can go out and measure things that would tell us whether the aerosols we inject are destroying the ozone. You could measure other quantities that would tell you a lot about whether your numerical models are giving reliable results.

Public engagement becomes key once you begin to do outdoor research in the atmosphere, and we have no preparation for how to handle that. In the UK, a project was funded to test deployment technology and they sent the principal investigator (PI) out to do public engagement, something he had not been trained for and it was very difficult for him. We're not prepared to interface with the public yet.

Philanthropists can use this time before the government is ready to provide governance to help scientists themselves review examples and case studies and develop basic ideas for how to move forward with governance.

GW: A lot of the philanthropic funding for geoengineering research seems to have gone towards these governance initiatives. Do you think there's been much progress so far?

JL: At a high level, yes, I think there's been progress, but a lot of the details and applications still

need to be figured out. If you write a proposal for a geoengineering experiment, for instance, what should you have to include?

I also think it's important to start the international discussion, something that the Solar Radiation Management Governance Initiative (SRMGI) has worked on. For example, it is highly likely that China and India would be involved in any eventual deployment of SRM. Work on governance can help support relationships with those countries that might be built up over time.

GW: I get the impression that there are very few PIs working on geoengineering research right now. Do you know why are there so few people working on this?

JL: The main reason is that there's no organized research program yet. There may be more people working on geoengineering research than you think, though, since some people are calling the research they're doing climate research, even though it has implications for geoengineering.

Another problem is that geoengineering is genuinely controversial amongst scientists.

I agree that we need to get more people involved. The small number of people mean that their ideas are the only ones going forward right now, and I think that pretty much everything on the table now will eventually be proven to be a bad idea, so the amount of thinking that needs to be done is huge. But right now there's no money in the area, so there's nothing for people to go after.

GW: If someone with money wants there to be much better information about the prospects of climate engineering, what do you think the highest-value activity to fund would be? Would it be something on the policy or governance side, like "fund another Asilomar conference" or something more in the realm of "build more computational models" or more like "try to build the right kind of nozzle for spraying seawater to increase cloud albedo?"

JL: I think governance should still be a high priority for donors. They should support efforts for scientists to develop norms of behavior and research. Doing so is less controversial than other forms of geoengineering research, and perhaps more helpful. I think that a lot of scientists are afraid of doing things right now, so they're not doing anything. Articulating geoengineering research norms within the scientific community would help allay their fears, and enable more people to get involved in the research.

I've become completely convinced that scientists need to work to develop governance mechanisms and norms. The government is in a difficult position. One person I spoke to within the federal government told me that they face a catch-22: if they start working on governance for geoengineering research, they make the research look scary, so governance work is self-defeating in starting a program.

It seems the only way to go from ad hoc science—which is, in the end, inadequate—to programmatic science is to get the science community to come up with at least part of the governance ideas.

I think the history of recombinant DNA (which plays a role in cloning and the like) is a good example. Scientists came together to develop their own norms about what research was and wasn't

acceptable. Then when it finally came time for the government to pick up the ball, they largely adopted the norms from the scientific community. These kinds of norms can help you prepare for when the government turns around and is ready to be programmatic about this.

GW: What actual governance project would you fund? Who would you write a check to?

JL: I work part time for the Environmental Defense Fund (EDF). I think those kind of organizations are in some ways a good place to go. Universities are another place, maybe their "science and society" researchers. The Bipartisan Policy Center is another example.

EDF, Harvard, Berkeley, ASU, Oxford and Stanford have these loose affiliations and virtual projects going on around governance. This has been catalyzed by the failure of the SPICE project's outdoor research components. The SPICE PI is a member of the team. Oxford is trying to propagate a research registry, and some other groups are trying to develop models for transparency. They're happening ad hoc right now, but they need to grow and expand; more money could help with that.

SRMGI tried to do this in some way, by trying to begin a conversation with a broad array of stakeholders. They tried to be more inclusive with who they brought to the table, including scientists from the developing world.

GW: You were quoted in the New Yorker a couple weeks back saying it would be "game over" if methane feedback started occurring. Can you tell me what you mean by that? Would it not be possible to start geoengineering at that point?

JL: I said it, but didn't love that quote. I don't think it's definitely "game over." I do think that the impact of methane feedback could be very large and really difficult to adapt to, and that a lot of people might die. I think that's within the realm of the possible. There's no way to quantify those outcomes, though. What we know is that as emissions continue, we're always increasing the risk.

There's nowhere near enough basic monitoring of what's going on with the methane right now. We're losing satellites that monitor the climate, and we have vast amounts of the Arctic that we aren't monitoring. We understand what's happening under the ice because some scientists strap instruments onto seals that then go down under the ice and transmit signals to researchers, but we should be way more focused. You could get a very strong case that that's a high priority. So right now, if methane feedback was happening, we might not even know.

GW: If you were giving $10 million for work on climate, how would you decide how to allocate it?

JL: I think there are three top priorities:

- mitigation, especially ensuring that technologies that could radically reduce emissions are being transitioned to scale;
- monitoring, so we know what climate impacts are occurring; and
- geoengineering research, in case we don't mitigate soon enough.

I think it's really hard to decide how to allocate funds between these three priorities because they are all critical, but of these geoengineering should be the least expensive for now, perhaps $10-20 million/year, whereas much more money should be poured into mitigation and monitoring.