



Open Community Approach to Climate Awareness

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Stepping outside of the community of scientists



- Enormous knowledge of climate change exists outside of the community of scientists.
- Evolved communities that address problems of environmental stress, that will be amplified, not caused, by climate change.
- Scientific community's desire to "push" climate information to other communities was, perhaps, uninformed.
- Amazing potential to accelerate addressing climate change problems if the existing knowledge base was more readily accessible.

Energy-Economy-Climate Change



- Because of the global reach of Energy, Economy, and Climate Change, solutions need to be woven into the fabric of our behavior.
- Solutions need to be able to evolve from the near-term to the long-term.
- Solutions need to address both local and global attributes of the problem.
- Solutions are impacted by wealth.
- There is no one solution; we need a portfolio of solution paths.

Enabling the climate knowledge-base



- A huge climate knowledge-base (software, data, expertise) already exists, much of it freely available.
- Expertise: people from a knowledge culture not always motivated by monetary reward: witness *Wikipedia*.
- Scarcities in climate “market”: ability to access the data, evaluating them using software, applying both to solve climate-specific problems. Scarcity determines *products*.

Propose open source / open innovation community



- Potential OpenClimate.org products:
 - Providing a portal for the applications community
 - Providing expertise to address climate-specific problems
 - Long term: configurable high-resolution climate model
- OpenClimate.org objectives:
 - Empowering the greater community through information flow
 - Accelerate problem solving with quicker buy-in from stakeholders
 - Alleviate fragmentation, and break down the stovepipes of discipline-focused communities

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Open Community Approaches to Complex Problem Solving



- Open source is a production model that enables communities of people with common interests to work together productively with minimal centralized control. Fundamental elements are:
 - “source” (goods, ideas, code) that is accessible to everyone
 - openness
 - collaboration and community
 - recognition for contributions
 - transparency
 - democratization of the tools necessary to contribute

Open “source” communities



- Value knowledge and synthesis of knowledge
 - Free access to knowledge is beneficial to individuals in the community.
- Proven effective for organizing complex systems and developing elements of solution paths
- Are governed; they are not anarchy
- Are owned by the community

[Return to talk](#)

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Project Scenario: Irrigation of Desert



- A corporation proposes use solar energy to desalinate ocean water to provide irrigation to arid lands
- Worries that large-scale landscape changes will alter albedo and change the balance of water in the region
- Wonders whether regional climate and perhaps weather pattern will be changed
- Needs to know liability risk, or detriment of the company's ability to participate in the carbon market
- The corporation would like to configure a validated climate model, run numerical simulations, evaluate simulations, and analyze the results to assess risk and value of the project
- An answer for potential investors needed in six months

Project Scenario: Planning for Heat Waves



- Excess heat causes more human fatalities than other environmental extremes. *Example: Summer 2003*
- Threats to agriculture (e.g. extended drought)
- How does global warming increase risk of heat waves?
- Answer requires climate predictions, information about cityscapes, and information on vulnerable populations
- The spatial scale of the information is small, not global scale
- Needed: Informed guidance about climate change
- Needed: validated climate predictions, standardized algorithms generating small-scale information from them, and interfaces to mapping and analysis routines

Project Scenario: Water Resources for Energy Generation



- Much of the impact of climate change will be on water resources
- Floods and droughts are both expected to increase
- Energy production is already the largest user of water resources in the USA. Some alternatives to fossil fuels demand even more water than existing energy sources
- Climate change will impact the established distributions of precipitation [[Milly et al., 2008](#)].
- We are currently planning energy future, infrastructure investments with decadal lifetime
- Needed: Informed guidance about climate change
- Needed: validated climate predictions, standardized algorithms generating small-scale information from them, and interfaces to mapping and analysis routines

End of Presentation



- See Climate in a Box as part of this open innovation solution space
- openclimateGIS (Geographical Information Systems) another project
- Questions or comments

Some open source references



- Raymond: [The Cathedral and the Bazaar](#)
- Demil: [Neither Market nor Hierarchy nor Network ...](#)
- Shah: [Motivation, Governance and the Viability ...](#)
- Sturmer: [Open Source Community Building](#)
- von Krogh: [Community, Joining and the Specialization ...](#)

Climate Predictions Offer Opportunity



- This is serious. Global warming and changes of distribution of water will disrupt societies and ecosystems; it will, for the most part, increase the impact that “weather” has on society.
- We have credible predictions of the future; we have actionable information. This is unprecedented opportunity – opportunity to prepare for the future.
 - [Essay on Opportunity and Climate Predictions](#)

Where are we?



- We arrive at a situation where there are four over arching communities:
 - Science, Business, Government, NGOs
- For the most part the elements of the community behave rationally within their community.
- When the communities interact, they can appear irrational to each other.
- With the consideration of the attributes of time, space, and wealth, rationality can often be defined and lead to solution paths.

How to Jump-start an Open Community?



- Define a common set of *values* to allow *stakeholders* to decide whether to “buy in”
- Define a form of *governance* to allow federated development of community
- Grow with a project-driven approach, modest at first, then more ambitious
- Establish a “brand”, known for afore-mentioned values

OpenClimate.org: Values



- Commitment to openness
- Transparency: participants need reasonable expectation that joining will be to their benefit
- Inclusivity: invite participation of all interested communities
- Commitments to quality: e.g. for modeling
 - accuracy
 - validation
 - efficiency
- Honest broker of solution alternatives