Open Source Tools for Energy and Climate Policy

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http://shoibalc.github.com/Recem/
## Two Paradigms: The Cathedral and the Bazaar*

<table>
<thead>
<tr>
<th>The Cathedral</th>
<th>The Bazaar</th>
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<tbody>
<tr>
<td>- Small number of modelers and institutions, mostly in developed countries.</td>
<td>- Large number of modelers: both developers and users.</td>
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<td>- Closed and opaque models.</td>
<td>- Open models with full access to data and software code</td>
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<tr>
<td>- Limited by the use of expensive and commercial software.</td>
<td>- Use open source software: mostly free and easily available. Makes learning easy!</td>
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<tr>
<td>- No reproducibility or independent verification.</td>
<td>- Easy reproducibility and verification.</td>
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<td>- Policy recommendations are not transparent if the models aren't.</td>
<td>- Transparent policy development pipeline – at least, in principle.</td>
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<td>- What about NGOs and developing countries?</td>
<td>- Capacity building in developing countries and NGOs.</td>
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*Borrowed and adapted [in the open source spirit] from 'The Cathedral and the Bazaar', Eric S. Raymond
[http://www.catb.org/~esr/writings/cathedral-bazaar/]
Change we would like to see

Transparency, reproducibility and verifiability are often not part of the process.

No developing world research institutions were involved in the AR5 scenarios.

Input parameters for the MARKAL database

Lisa Evans made this Freedom of Information request to Department of Energy and Climate Change

Department of Energy and Climate Change did not have the information requested.

From: Lisa Evans
11 January 2010

Dear Department of Energy and Climate Change,

I would like to request the input parameters for the MARKet ALlocation (MARKAL) database that is used to model the energy system in the UK. I would like the parameters as they currently exist.

I would like this schema to be in an Excel spreadsheet, in a format similar to the input parameters for MARKAL from 2007 here:

http://www.whatdotheyknow.com/request/input_parameters_for_the_markal
Objectives

- Reduce costs and risks associated with closed commercial software.
- Access to models and a quantitative policymaking paradigm: NGOs and developing countries.
- Capacity building in developing countries.
- Authenticity in research agenda: research driven by local needs.
- Transparency in the policymaking process in a democracy.
- Reproducibility and independent verification of policy studies.
- Building a collaborative and networked community of researchers and policymakers.
Projects with similar or overlapping goals

**CLIMATE SCIENCE**


KNMI Climate Explorer  [http://climexp.knmi.nl](http://climexp.knmi.nl)

**CLIMATE-ECONOMICS-ENERGY MODELING**


**PUBLIC DATA**

Project Design and Development

- Use a development structure that promotes collaborative work
  
  Solution: Use one of the many free code hosting sites – we prefer GitHub
  
  [http://www.github.com](http://www.github.com)

- Use as many open source softwares as you can ['don't re-invent the wheel']
  
  Solution:
  
  - Open source solvers: COIN-OR COmputational INfrastructure for Operations Research [http://www.coin-or.org/](http://www.coin-or.org/)
  - Development in Python [http://www.python.org](http://www.python.org), a very successful open source language which allows the easy use of large number of other software ['batteries included'].
  
- Good documentation, project website, project user's forum – on the TO DO list!
Short Term Goals

- Proof-of-concept versions of well-known and useful models, and example programs and data.
  - DICE ✓
  - MARKAL – bottom up energy model. Develop an India model.
  - Documentation and example programs
- Reaching out to a larger user/developer base?

Tag on to successful energy modeling communities and use public data repositories
  - COMMEND  [http://www.energycommunity.org][large user base]
  - UNdata  [http://data.un.org/]
- Modeling workshops in India  - Late summer or fall 2012.
Long Term Goals
open and speculative, and they should be

- **Capacity building in developing countries**
  Workshops on the web: Open source models, data and modeling platform can lead to faster and cheaper dissemination of knowledge and expertise.

- **Climate-energy-economics models with a developing world perspective.**
  We hope that large user/developer base will also lead to an effective research/policy agenda driven by local needs.

- **Open model comparison exercises:**
  Develop good open source climate-energy-economics models.
  Collaborate with other modeling groups to translate their model/data to an open access framework.

- Work with open data repositories (UN, World Bank) to **integrate models with data.**
Recem: Repository of Energy, Climate, and Economics Models

Recem is a repository of data and models for use in the modeling and policy making community. The software repository is

https://github.com/shobalc/Recem

Motivation

The world faces the triple challenges of environmentally sustainable development, increasing energy demand and climate change. These challenges can only be addressed by technological development, innovative policies, and a restructuring of the economy. The need to explore and analyze the impact of policies and alternative growth paradigms have made energy and climate economics modeling necessary tools for development policies, long-term planning and policy analysis and implementation.

The goal of this project is to rapidly increase access to these modeling tools, especially in developing countries. Most current models are based on expensive commercial software, and are often closed. This hampers capacity building in this domain, especially in developing countries. The lack of access and openness also obstructs the intellectual process of research. Finally, tools that impact policy should be open and transparent in a