

Modeling and Assessment for Policy: Synthesis and wrap-up

ESD.864

Noelle Selin

May 16, 2013



Massachusetts Institute of Technology
Engineering Systems Division

Revisiting Course Objectives

- By May, you should be able to:
 - Understand and apply tools and techniques used for technically-focused policy analysis
 - Identify best practices and limitations in using quantitative models for policy
 - Evaluate the effectiveness of scientific and technical advice in policy-making processes
 - Describe and analyze strategies to manage scientific and technical advice processes
 - Communicate technical results to policy audiences
- Active learning approach
(learn-by-doing)

Tools and Techniques: Recap

Tools and Techniques	Course content
Verification and validation	PS 1, class # 3 (V&V), model credibility exercise, Cases: NASA, economics
Assessment design and evaluation	PS 2, class #4 (C,S,L), Goentzel lecture, Solomon lecture, LRTAP/RAINS, EN-ROADS, cancer case
Benefit-cost analysis	Class #17 (benefit-cost), Sunderland lecture, Zoepf lecture, Case: clean air
Systems modeling	PS 3, class #12 (box models), EN-ROADS exercise, LCA, Cases: oil spill, cancer,
Integrating interests and politics	class #14-16 (risk), class #21 (public participation), Cases: cancer, oil spill

Class cases

- ❑ NASA model standards
- ❑ Economic modeling
- ❑ Sports statistics
- ❑ Cancer screening
- ❑ Oil Spill
- ❑ Clean Air

Plus, non-class cases on climate and IPCC, RAINS model, transportation modeling, modeling at EPA, humanitarian logistics, EN-ROADS model, fisheries, etc.

Real-world example (1)

- Presentation to state regulators on results of co-benefits study for climate policy to state air pollution policy community
- Question from Vermont: how do we convince policy-makers in the current political climate?

Real-world example (2)

- ❑ A handful of senior US academics are planning a workshop to form specific policy recommendations to UN on black carbon emissions controls.
- ❑ Gov't technical analyst perspective: at best, waste of time, at worst, counterproductive
- ❑ How can he help make their efforts more effective?

Overview of “lessons learned”

- What can we do as informed producers of technically-based policy analysis to:
 - Conduct better analyses
 - Make our analyses more useful
 - Make an impact on the world...!
- As a decision-maker, if you need to make a decision that needs technical input, how do you get it?

Cross-cutting issues

- ❑ Management of uncertainty
- ❑ Decision consequences
- ❑ Stakeholder values/views
- ❑ Transparency (or lack thereof)
- ❑ Limits to modeling/assessment
- ❑ Communication

How can we do technically-focused policy analysis better?

- Technical elements
- Social/societal elements
- Socio-technical interactions

Responses from the class....

emphasis added and some responses condensed

Technical elements (from class submissions)

- "...models and policies are never static, which is why they serve an important role in society. They are always **dynamically evolving to accommodate changes or new observations and reconfigured** with varying stakeholder preferences, thereby avoiding the dreaded situation of 'a dead hand in policy'..." [Marcus]
- "**Drawing the boundary** for your model is crucial and broadening the boundary too much could be beneficial or lead to worse outcomes." [examples: RAINS, economics] [Neha]
- Everyone recognises the imperfection of models and so a healthy level of skepticism is probably a good idea. To influence policy, a model must overcome this skepticism. For subject area experts, **proper documentation of assumptions and uncertainties** may be enough to achieve this, but for the public that probably won't be adequate. [Ekene]
- identifying **key scientific information from reliable sources** is the key to speed up the process. Without sufficient knowledge in related scientific and/or engineering fields, this cannot be done easily. [Ohchan]

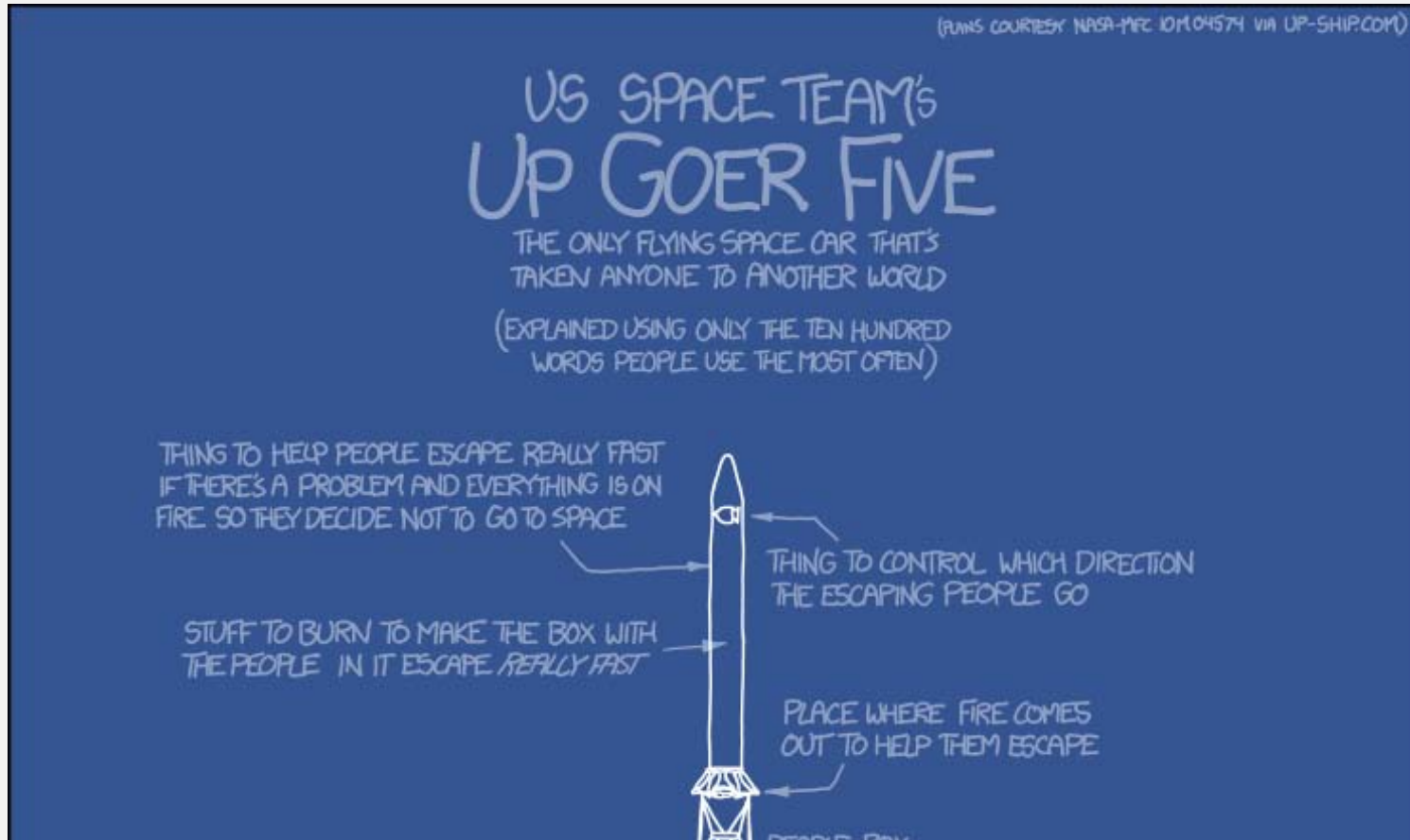
Social/societal elements (from class submissions)

- A lesson that came to my mind while looking at all the different cases was that ***the difficulty of reaching a final decision varies depending on the number and nature of decision makers***. There are cases where you have a multitude of decision makers (e.g., climate change, endosulfan); for these, reaching a solution is harder, especially if the DMs have competing objectives due to personal preferences/benefits (see LCA class exercise). On the other end of the spectrum, there are cases where there is just one decision maker and, in theory, reaching a final decision is simpler. However, we have seen how even this decision can be complex, due to the different factors the single decision maker (i.e., the front office) had to take into account. [Nico]
- it's difficult, if not impossible, to get a **consensus** and there is also no right consensus. [Tanya]
- you have to understand your stakeholders and their interests in order to make any progress; **making that progress is absolutely contingent upon being able to communicate your position**, and to make sure each stakeholder understands what you want them to understand [Julia]

Socio-technical elements (from class submissions)

- The degree of influence **uncertainties** have on the final decision is highly dependent on how much time the policy maker can afford to **delay** before making the decision. [examples: NASA, clean air] [Daniela]
- **the degree of separation between the analysts/modelers and the decision-makers.** The degree of separation between these two groups has a high chance of affecting the governance structure, the type of people included in the assessment team, the type of technical assessment done, and the weight of the technical study in the decision. [Franco]
- There were problems either when people trusted [models] too much, or not enough. [Erin]
- Scientific information is used in a decision based on whether the **structure of the technical team providing information matches the decision-making structure.** [Jareth]

Now for the fun stuff....



Courtesy of [xkcd](#). CC-BY-NC.

Thanks for a great class!

- Subject evaluations:
 - <http://web.mit.edu/subjectevaluation>
 - We'll wrap up early so you can start them
- Follow-up thoughts, conversations, etc. are welcome and encouraged!

MIT OpenCourseWare
<http://ocw.mit.edu>

ESD.864 / 12.844J Modeling and Assessment for Policy
Spring 2013

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.