Science for Decisions

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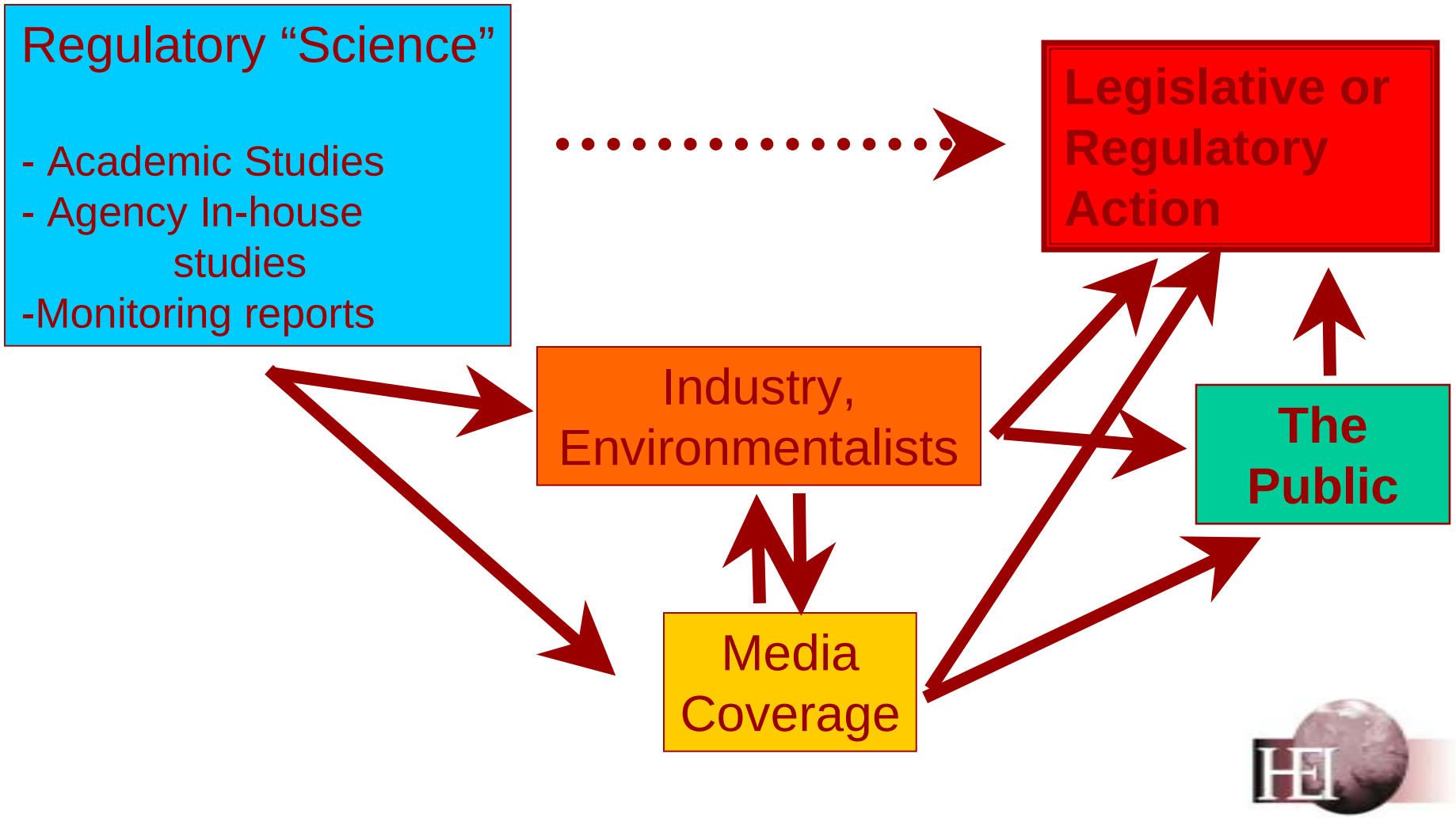
Science for Decisions

- The Context – How science informs policy
- At the Edge: two very different worlds
- A few suggestions for the science community

The Context:
How "Science" Becomes Rules



At the Edge:
The Two Very Different Worlds of Science and Policy

- ***Scientists*** **seek long-term, robust "findings" (always with caveats)**
  - ***Policy Makers*** **want "answers." NOW.**
- ***Scientists*****: value objectivity, facts**
  - ***Policy Makers*****: see facts as advocacy tools**
- ***Scientists*****: prefer "basic" science**
  - ***Policy Makers*****: need "applied" science**
- ***Science*****: at its best in controlled laboratory conditions**
  - ***Policy makers*****: want "real-world" effects on humans and ecosystems**
- ***Scientists*****: want science at the center of decisions**
  - ***Policy makers*****: science one among technical, political, economic factors**

Two Worlds in Action:
The 1997 PM NAAQS Debate

- The Science:
  - Growing number of epidemiology studies associate health with PM levels
  - Little toxicological evidence of mechanism
- The Proposal from EPA:
  - New, more stringent NAAQS for $PM_{2.5}$
- The Debate:
  - Some science: No data for $PM_{2.5}$, No mechanism,
  - Hot issue: “Hidden” data (Harvard Six Cities Study)
- The Hearings: Science and Policy collide

Two Different Worlds

- Substantial Differences in approach and needs
- Further complicated by other interpreters
  - Stakeholders, media
- What can the science community do?
  - A few suggestions

Suggestion:
Strategic Science

- Good science requires a long lead time
- The key policy questions will be shaped by many:
  - Legislators, regulators, environmentalists, industry
- Science needs to better understand what is coming up in the policy world
  - Input from all key parties
- Science started strategically now
  - with a target 5-10 years in the future

Strategic Science Planning

- NRC Committee on PM Research Needs
  - Created in wake of 1997 debate
  - Developed 14-year “portfolio” of priority research
  - EPA now implementing multi-year research plans
- HEI Strategic Plan
  - Every five years
  - Extensive consultation with decision makers, stakeholders
  - Targeted at major upcoming decisions at 5- and 10- year time frames

Example: HEI Strategic Plan

Table 3. Implementing the Strategic Plan

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Major Upcoming Regulatory Events	• US PM NAAQS Criteria Document • Tier 2 Standards • EU Heavy-Duty Diesel Standards	• Mobile-Source Air Toxics Rules • EU Clean Air for Europe • US decisions on diesel fuel	• US PM NAAQS review	• EU PM Limit Values review	• US and EU Heavy-Duty Diesel Rules take effect	Looking Ahead • State plans for PM • 2007 Rules for Heavy-Duty Diesel • EU/US Auto/Fuel Standards
HEI Strategic Plan 2000–2005						
Air Pollution Mixture						
• PM and Gases	Implement, maintain and expand worldwide inventory of PM studies → → → → →					
	Complete key PM and epidemiologic studies	Extend NMMAPS and Reanalysis Projects	Conduct NMMAPS collaboration with European APHEA project			
	Complete current studies of comparative toxicity of PM components and CAP → →	Targeted and systematic studies of comparative toxicity of the PM mixture and of key components to inform implementation of PM standards → → →				
• Air Toxics	Complete current personal and controlled human exposure studies	Long Term Epidemiology Planning Workshop →	Initiate, with appropriate partners, epidemiologic studies of effects of long-term exposure to PM and other pollutants (requires additional funding) → → →			
	Mobile-sources workshop					
	Complete current benzene, butadiene, and aldehydes studies	Extend benzene, butadiene and aldehydes studies studies				
	Air toxics research needs workshop	Initiate air toxics mixtures research (POM [PAHs] and others) → → →				
• Diesel Exhaust	Complete current diesel → Select best research feasibility studies directions	Initiate studies of acute noncancer effects				
		Launch, if feasible and with funding partners, new epidemiologic study of long-term effects of diesel exposure (requires additional funding)				
Effects of Regulation (Accountability)	Science and stakeholder workshops on methods to measure accountability	Conduct research to develop measurement techniques				
					Conduct research to measure health effects changes from reduced air pollution	
Emerging Technologies	Establish HEI Special Committee on Emerging Technologies to assess and screen technologies developed in response to PM, climate change, other drivers → → →					
	Review Literature on Imminent Technology (eg, cerium)		Review Literature on Imminent Technology (eg, diesel controls)			
			Initiate targeted research assessing consequences of most likely fuels and technologies → → →			

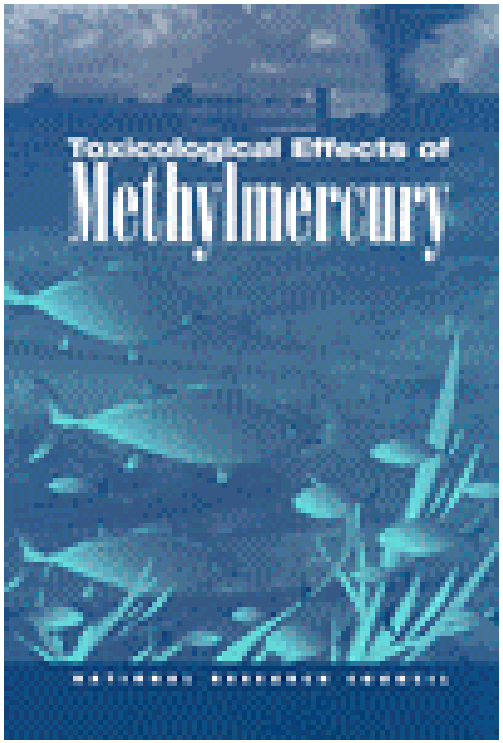
Suggestion:
Science to Maximize Credibility

- Individual Scientists Produce Individual Results
  - Some scientists attempt to advocate based on them
  - Stakeholders, Media overemphasize individual studies
- ***Result***:
  - The public, and decision makers, left to choose among conflicting scientific views;

Suggestion:
Science to Maximize Credibility

- An ***Alternative***:
  - Panels of scientists drawing from entire literature
  - Intensive, independent peer review
- Examples:
  - Intergovernmental Panel on Climate Change (IPCC)
  - NRC and HEI reports

Scientific "consensus" builds credibility



Suggestion:
Improved Translation, Communication

- Science and Policy speak different languages
- Science translated for policy makers by many:
  - Agency staff, legislative aides
  - Stakeholders, media
- There are some good translators out there
  - But adversarial nature of process lends itself to distortion, “cherry-picking” the results
- Science Communication will never be perfect
  - But scientists could do a better job

Thoughts for better communication by scientists

- Recognize that communication **STARTS** (rather than ends) with the publication of the report
  - Be prepared to engage in briefings, hearings, etc. to help get the "story" right
- Learn to write plain English abstracts and summaries
  - Don't let advocates, media, write them for you
  - Don't hide behind jargon (e.g. "heart attacks" vs. MI)
- Make clear what we *know*…
    - and what we *don't know*

Summary:
Improving the way science informs policy

- Science has a real and important role to play in improving policy
- But it is - and will never be - easy
  - Policy making is a complex and contentious world quite different from the world of science
- Scientists can improve their chances of informing decisions:
  - ***Thinking Ahead*: strategic science planning**
  - ***Working Together*: building scientific consensus**
  - ***Speaking Plainly*: communicating better**

Thank You

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