How To Tell the President the Facts

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Outline

Two parts:

I. Presentation to the president

II. Analysis of the presentation

Aim

Examine air pollution from ships in US harbors and on the seas

Recommend actions

What do we know?

- Air pollution kills
- More deaths this year from air pollution than AIDs
- Air pollution down in the US
- Marine sources will exceed land sources in the next ten years
- Shipping produces one sixth of sulfur dioxide in world

International context

Shipping not covered by Kyoto protocols

International Maritime Association agreement in 1997 ineffective

National context

Populations particularly affected: near harbors

Example: Latino population surrounding the Los Angeles harbor system

Affected by diesel truck and ships

How Did We Get Here?

Effective control of land-based sources

Little control over marine sources

Available Options

Do not address problem

Costs:

1. Environmental
2. Human
3. Political

Available Options

Address problem

Costs:

1. Regulatory
2. Political

Recommendation

Address problem

Target: Reduce pollution from ships to levels below on-land sources

Actions

Low sulfur fuels

Mooring incentives

International action

II--Analysis of Presentation

1. Deep background
2. Mandated science
3. Risk assessment
4. Standard setting
5. Conclusion

1. Deep Background-1

SO_2 Emissions (European Union)

Year	Land	Shipping
1990	16.4*	2.0
2000	5.8	2.6
2010	3.9	2.8-3.3

* million tons

2. Deep Background-2

SO_2 Content of fuels

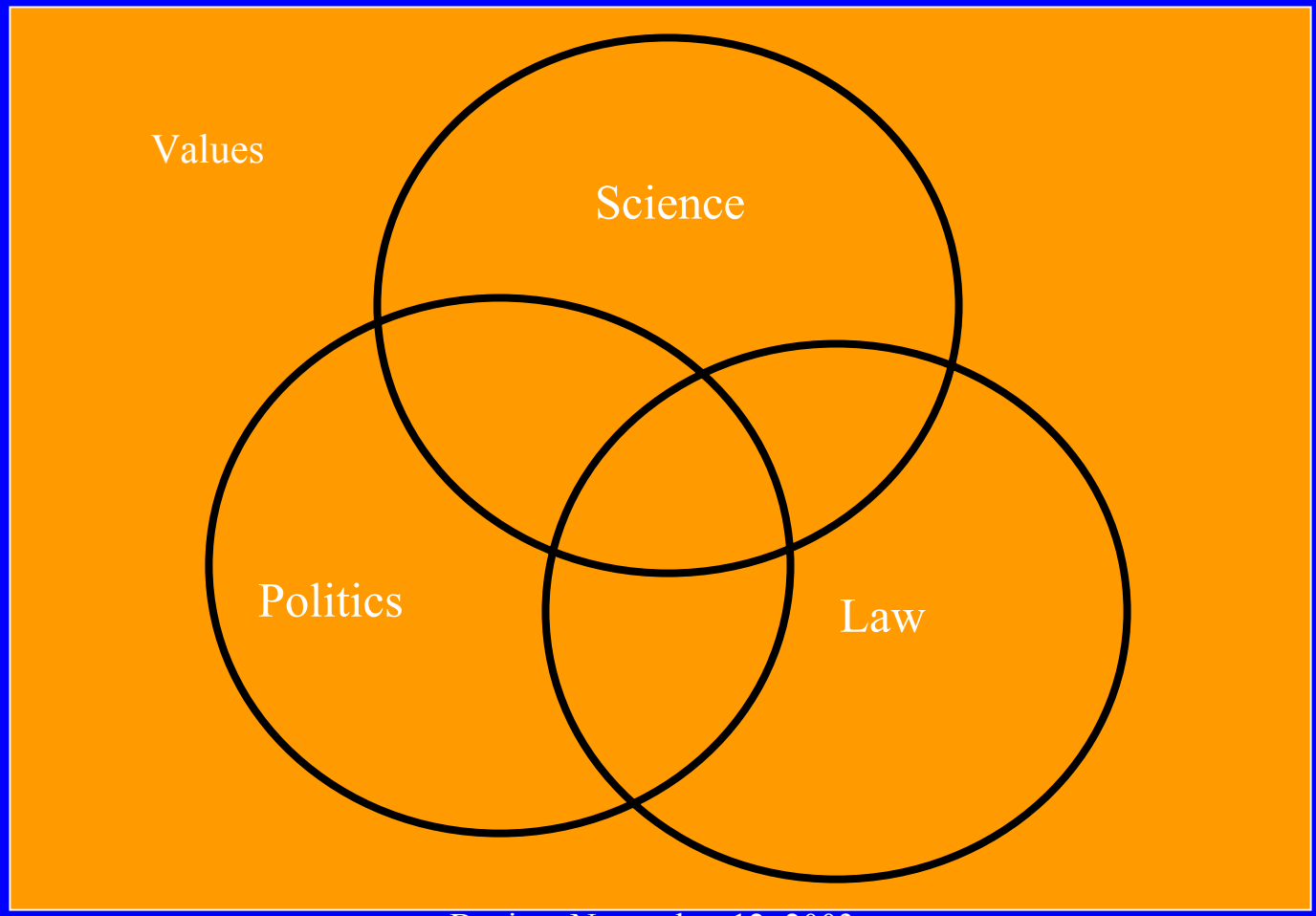
Fuel	SO_2
Bunker fuel	3%
Gas oils	1%
EU 2008 objective	0.1%

1. Deep Background*-3

SO_2 Emission per ton-kilometer	$SO_2 x 10^4$
Trucks (2000 standard)	93
Large vessels (>8000dwt)	2600
Medium (2000-8000dwt)	3600
Small (<2000dwt)	5100

*Acid News, **2,** May 2003.

2. Mandated Science-1



2. Mandated Science-2

Mandated science* as the intersection of:

1. Science: Effect of air pollution
2. Politics: Latino population
3. Law: Regulatory responsibility
4. Values: Social justice; international competitiveness; re-election;…; all of these

* Term introduced by L. Salter (1988)

2. Mandated Science-3

Characteristics of mandated science:

1. National support for research (NSF, NIH,…)
2. National compact: science is good, valid, altruistic; ultimate arbiter,…
3. Sole support for many scientists
4. Relatively unique to the US--compare with current situation in Russia

3. Risk Assessment Paradigm-1

A. RISK EVALUATION

1. Hazard identification
2. Dose response assessment
3. Exposure assessment
4. Risk characterization

B. RISK MANAGEMENT

3. Risk Assessment Paradigm-2

RISK EVALUATION

1. Hazard identification often haphazard
2. Dose response often based on animal studies; problems of extrapolation of animal to human
3. Exposure assessment difficult, expensive, time consuming. Nexus of cause-effect issues.
4. Risk characterization integrative, beginning to be steered more and more by value

3. Risk Assessment Paradigm-3

RISK MANAGEMENT

1. Scientists often leave the mandated science arena here.
2. Gets “dirty” that is, values become more prominent
3. Argument is that science defines options (or non-options) and that it’s the policy folks who need to implement.
4. Examples of risk management:
   - International Whaling Commission
   - Kyoto “accords”
   - ….
   - ….

4. "Logic of Science"-1

Root, D.H. (2003). Bacon, Boole, the EPA, and scientific standards. *Risk Analysis,* **23:** 663-668.

1. One of the first students of Ron Pyke!
2. Asserts that there are "three logical forms for establishing a proposition."

4. “Logic of Science”-2

Root’s argument

A. Logic of the syllogism

B. Logic of the physical sciences
(repeatable events; a priori hypotheses)

C. Logic of the courtroom
(non-repeatable events; ex post facto hypotheses)

AND: Logic of the courtroom less reliable than the logic of the physical sciences.

4. “Logic of Science”-3

Root’s example:

1. EPA report on passive smoking
2. Increased chance of lung cancer in non-smoking female resident of the US
3. Report based on a retrospective meta-analysis

4. “Logic of Science”-4

Root’s conclusions:

1. Logic of the physical sciences replaced by the logic of the courtroom
2. For example (acc to Root) susceptible populations chosen after the fact.
3. Therefore probability calculations are suspect

5. Conclusions

1. Communication always involves two or more parties--often with unequal science backgrounds
2. Mandated science requires understanding and communication by scientists; forces wider context
3. Risk analysis gets messy at the management level
4. Root's paper illustrates the necessity of understanding broad patterns of inference.
5. Science does not operate in value-free environment

References

Root, D.H. (2003). Bacon, Boole, the EPA, and scientific standards. *Risk Analysis*, **23:** (663-668).

Salter, L.(1988). *Mandated Science: Science and Scientists in the Making of Standards.* Kluwer Academic Publishers, Dordrecht, Boston and London.