

Making Regulatory Systems Adaptive to Changing Science and Technology



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Importance of Change

- "It is change, continuing change, inevitable change, that is the dominant factor in society today. No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be...."

- Isaac Asimov

Change: Another View



“Change is inevitable, except from vending machines”

- Woody Allen

Change and Climate Change

- Rapid change in scientific, technological, economic and political factors relevant to controlling climate change is highly likely over next decade:
 - warming projections
 - impact estimates
 - cost projections
 - non-linear effects/abrupt climate change
 - control technologies
 - carbon sequestration
 - geoengineering
 - international developments

Problem 1: Regulatory Regimes Do Not Anticipate Change

- Many regulatory regimes are based on a static rather than dynamic view of world; impervious to likelihood of change
- Example – non-attainment categories in 1990 CAAA
 - Important statutory requirements explicitly based on design values for existing 0.8ppm, 1 hour ozone NAAQS
 - Statute did not anticipate revision to NAAQS

Problem 2: Regulatory Systems Slow to Respond to Change

- Legalistic regulatory regimes typically very slow to adapt to changing science and technology
 - Existing regulatory frameworks
 - e.g., Delaney Clause
 - e.g., Clean Water Act/non-point sources
 - e.g., CAFE program
 - New regulatory needs
 - e.g., nanotechnology
 - e.g., genetic testing
 - e.g., reproductive biology
 - e.g., computer privacy

Current Regulatory Systems Inadequate

“We have moved into... a ...world dominated by rapid improvements in products, processes, and organizations, all moving at rates that exceed the ability of our traditional governing institutions to adapt or shape outcomes. If you think that any existing regulatory framework can keep pace with this rate of change, think again.”

-David Rejeski, The Next Small Thing, The Environmental Forum, March/April 2004, at 45.

Problem is Getting Worse

- As the pace of science and technology accelerates, the legislative and regulatory processes have become slower

Legislation: Gridlock

- Example – Clean Air Act Amendments:

- 1965 } 2 years
- 1967 } 3 years
- 1970 } 7 years
- 1977 } 13 years
- 1990 } 18+ years
- ?

Regulation: Ossification

- Carnegie Commission (1993) – many regulations “frozen in place”
- Average time from proposed to final rule (2003): 322 days
- Almost 20 separate regulatory analyses now required by statute and executive order
- “Concise” statement of reasons in rule preamble has grown from 1-2 Federal Register pages to often 50+ pages plus Response to Comment and other documents

Prof. Richard Lazarus: Lock-in Desirable for Climate Change?

- “For climate change to be successful, ... the basic legal framework and legal mandate must ...be steadfast enough to be maintained over the long term notwithstanding an unrelenting barrage of short term economic interests that will inevitably seek that mandate’s relaxation.”
- “Like Ulysses, we must tie ourselves to the mast.”

Solutions?

1. Incremental regulation
2. Mechanisms that permit (force?) periodic reevaluation/ course correction
3. Novel regulatory schemes that are more flexible and adaptive to better incorporate changing science and technology inputs

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1. Incremental Regulation

- By taking small, initial steps, can quickly begin process of addressing problem, with opportunity to refocus at next iteration



“Baby Steps”

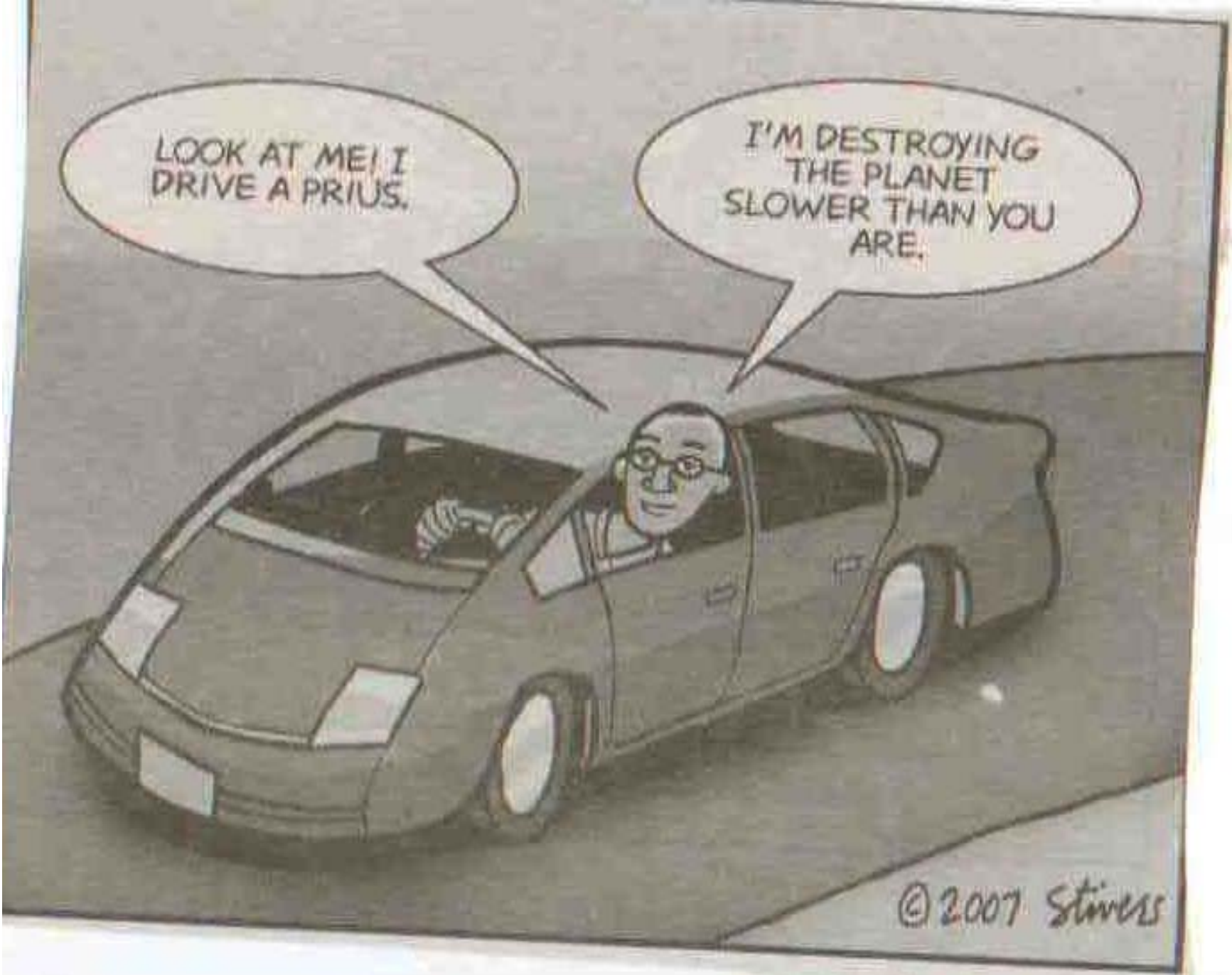
1. Incremental Regulation

- Massachusetts v. EPA, 127 S.Ct. 1438, 1457 (2007):
 - “Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop... They instead whittle away at them over time, refining their preferred approach as circumstances change and as they develop a more-nuanced understanding of how best to proceed.”

Incremental Regulation Problem: Misdirection/Path Dependency

- Incremental steps that only begin to address problem may “lock in” (technologically and politically) regulatory pathways that may not lead to desired end result*
 - e.g., fossil fuel switching
 - e.g., biofuels
 - e.g., hybrid vehicles?
- Solution: Need incremental implementation steps, but not incremental (i.e., piecemeal) objectives

*Cary Coglianese & Jocelyn D'Ambrosio, Policymaking Under Pressure: The Perils of Incremental Responses to Climate Change

A cartoon illustration of a man with glasses driving a grey Prius. The car is shown from a three-quarter front view. Two speech bubbles are positioned above the car. The first speech bubble on the left contains the text 'LOOK AT ME! I DRIVE A PRIUS.' The second speech bubble on the right contains the text 'I'M DESTROYING THE PLANET SLOWER THAN YOU ARE.' The background is a simple grey gradient.

LOOK AT ME! I
DRIVE A PRIUS.

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2. Traditional Review/ Reconsideration Mechanisms

- Sunset provisions
 - e.g., PATRIOT Act
 - e.g., many state statutes
- “Safety valves” or “circuit breakers”
 - e.g., Massachusetts invoked safety valve for insufficient GHG credits under 310 CMR 7.29 CO2 standards for utilities on June 1, 2008
- Annual (or biennial) program reviews

Periodic Review Example: California ZEV Mandate

- California adopted “zero emission vehicle” (ZEV) mandate in 1990:
 - MY 1998: 2 %
 - MY 2001: 5%
 - MY 2003: 10%
- CARB assumed that electric vehicles were only technology available to meet mandate
- Given technological challenges and uncertainties, CARB provided for biennial program review

CARB Biennial Reviews Resulted in Frequent Changes

- 1994 review rejected use of hybrids
- 1996 – CARB rescinded ZEV mandate for MYs 1998-2002
- 1998 – CARB relaxed MY2003 mandate by allowing some partial ZEVS (pZEVs)
- 2000 review – CARB further relaxed MY2003 mandate to allow hybrid credits (AT-PZEVs)
- 2003 – CARB concluded “no viable path” for EVs; allowed manufacturers alternative compliance of fuel cell demo program and hybrids in short term; delayed start date from MY2003 to MY2012
- 2008 – CARB further delayed and weakened ZEV requirements

Biennial Review = Instability?

- CARB Staff (2000): Biennial review of ZEV mandate “has interfered with the orderly growth of the ZEV mandate, because of the uncertainty it introduces into planning and implementation activities on the part of manufacturers, government agencies, and other parties.”
- Flip-flops:
 - CARB rejected hybrids in 1994, embraced them in 2003
 - CARB initially emphasized EVS in 1990, concluded “no viable path” for EVs in 2003; today EVS are once again popular
- National Academy of Sciences (2006): ZEV mandate appears to have “failed”

Lessons from ZEV Periodic Review

- Difficult to predict technology development beyond a couple years
- Although the ZEV review process created some uncertainty and instability, the outcome and credibility of the program would likely have been even more damaging without the periodic review
- Firm compliance dates created artificial deadlines and pressures that distorted policy-making
 - Periodic program reviews are particularly susceptible to these distortions
 - Question: How to “incentivize” industry without firm compliance dates?

Solutions?

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3. More Flexible/Adaptable Regulatory Systems

?

○ “The Pacing Project”

- New 3 –year program at ASU funded by the Lincoln Center for Applied Ethics (June 2008-May 2010)
- Goal: Identify new regulatory models that are more likely to keep pace with rapidly developing science and technology

Conclusion: Need for Regulatory System That Adjusts More Quickly

