

Hazy reasoning behind clean air

Science alone can't determine how regulations are written, argues **David Goldston**.

Last month, *The Washington Post* reported that President George W. Bush had personally intervened to weaken new regulations to control smog just as they were about to be announced by the Environmental Protection Agency (EPA). In response, advocates of tighter standards predictably charged that the president had overturned a scientific judgement. Carol Browner, who headed the EPA under President Bill Clinton, put the matter starkly, telling the *Post* that the Clean Air Act creates "a moral and ethical commitment that we're going to let the science tell us what to do".

But does it? This conceit that science alone should and can dictate clean-air standards is propagated by political figures of all stripes and often by scientists themselves. Politicians always want to argue that any regulatory meas-

ure they are supporting by science because it is sound objective fact. That's especially true in an environment, when on your side may be that can reach some ideological persuasion.

In reality, though, involve policy judgement. The clear determinations uncertain. The clear decisions to the "judgment" of the EPA (a pre is advised by, among Contending that that science conflates policy muddying the debate needlessly in the line.

So what's really at smog rules? The rule sets what is known as for allowable cancer ozone, the main concern the law, the second to "protect the public damage to crops, not thing else other than covered by the prime.

The EPA's 24-member weighed in on two critical secondary standards should ozone be measured permissible level of ozone may sound like a technical



PARTY OF ONE

areas turn out to violate the standard because ozone levels can vary significantly within a given day. For example, if being above the allowable

unanimously recommended a specific range of ozone standards, a number within that range can hardly be seen as the only justifiable standard under the law. Indeed, the EPA's own science staff had recommended a slightly different range. Critics are free to attack the number chosen by the president, which will keep some rural counties in compliance with clean-air rules. What they cannot legitimately argue is that the president's selection runs counter to the science. The debate is about what kinds of damage harm the public welfare and what kinds of uncertainty can be tolerated as a basis for decision-making.

The debate over the new ozone standards is just beginning, but the detrimental impact of confusing science with policy can be seen by looking back at what happened in 1997, when the EPA last changed the ozone rules. The fight then was over the primary ozone standard, the one designed to protect public health. The EPA proposed tightening the standard, and Browner (then EPA's chief) repeatedly argued that the decision was dictated by the science.

As a congressional staffer, I fought for the EPA proposal and I still support it. But what the science was that for a given a predictable number of times from aggravated the time, there was little caused chronic health before the policy issue (admissions are accepted) politician was interested. The members isory panel at the time dard to suggest, but was a "policy call", not science in no way told do.

ost in what became a acrimonious debate opponents of the new is accused the other of is was bad for policy fhow to decide on an action never got raised, l. And it was bad for tions of poor science e of political goals can confusion about the

even more clearly than of a policy debate debate. In such instances, yripping off the policy- ing them. ing lecturer at star for the at vil.com.

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[...] EPA's science panel found that "quantitative evidence [...] must ... be characterized as having high uncertainties." **What to do in the face of uncertainty is a policy question, not a scientific question. [...]** The debate is about [...] what kinds of uncertainty can be tolerated as a basis for decision-making.

Industry groups are fighting
government regulation by
fomenting scientific uncertainty

DOUBT

By David Michaels
Photographs by Mindy Jones

Is Their Product

Science American, June 2005, pp. 96



UNCONVENTIONAL ECONOMIC WISDOM

Gambling with the Planet

Joseph E. Stiglitz

<http://www.project-syndicate.org/commentary/stiglitz137/English>
2011-04-06

Experts in both the nuclear and finance industries assured us that new technology had all but eliminated the risk of catastrophe.

Events proved them wrong: not only did the risks exist, but their consequences were so enormous that they easily erased all the supposed benefits of the systems that industry leaders promoted.



Drilling, Disaster, Denial

By PAUL KRUGMAN

Published: May 2, 2010

It took futuristic technology to achieve one of the worst ecological disasters on record.

Without such technology, after all, BP couldn't have drilled the Deepwater Horizon well in the first place.

Nobel Prize in Economics Robert Emerson *Lucas*, Jr.

Presidential Address to the American Economic Association

“Macroeconomic Priorities,” *American Economic Review*, 93(1), 1-14.

“**Macroeconomics** was born as a distinct field in the 1940s, as a part of the intellectual response to the Great Depression. The term then referred to the body of knowledge and expertise that we hoped would prevent the recurrence of that economic disaster. My thesis in this lecture is that macroeconomics in this original sense has succeeded:

Its central problem of depression-prevention has been solved, for all practical purposes, and has in fact been solved for many decades” (Lucas 2003, p.1).

“If it is very easy to **substitute** other factors for natural resources, then there is, in principle, no problem. **The world can, in effect, get along without natural resources**”

The Economics of Resources or the Resources of Economics

Ely Lecture December 1973

Nobel Prize in Economics Robert Solow

DATE: December 12, 1991

FR:

Lawrence H. Summers

'Dirty' Industries: Just between you and me, shouldn't the World Bank be encouraging MORE migration of the dirty industries to the LDCs [Least Developed Countries]? I can think of three reasons:

- 1) The measurements of the costs of health impairing pollution depends on the foregone earnings from increased morbidity and mortality. From this point of view a given amount of health impairing pollution should be done in the country with the lowest cost, which will be the country with the lowest wages. I think the economic logic behind dumping a load of toxic waste in the lowest wage country is impeccable and we should face up to that.
- 2) The costs of pollution are likely to be non-linear as the initial increments of pollution probably have very low cost. I've always thought that under-populated countries in Africa are vastly UNDER-polluted, their air quality is probably vastly inefficiently low compared to Los Angeles or Mexico City. Only the lamentable facts that so much pollution is generated by non-tradable industries (transport, electrical generation) and that the unit transport costs of solid waste are so high prevent world welfare enhancing trade in air pollution and waste.
- 3) The demand for a clean environment for aesthetic and health reasons is likely to have very high income elasticity. The concern over an agent that causes a one in a million change in the odds of prostrate[sic] cancer is obviously going to be much higher in a country where people survive to get prostrate[sic] cancer than in a country where under 5 mortality is 200 per thousand. Also, much of the concern over industrial atmosphere discharge is about visibility impairing particulates. These

Nature News

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477, 139-140 (2011) | doi:10.1038/477139a

Fukushima impact is still hazy

Chaos and bureaucracy hamper assessment of
nuclear crisis.

Obama Sought to Know 'Whose Ass to Kick' on Oil Spill , Tom Diemer Correspondent

Obama said he wasn't interested in analyzing the spill as if in a college seminar. "We talk to these folks [experts] because they potentially have the best answers, **so I know whose ass to kick.**"

<http://www.politicsdaily.com/2010/06/08/obama-sought-to-know-whose-ass-to-kick-on-oil-spill/>

NYT September 1, 2011

A Deep Faith in What's Been Proved by CHRYSTIA FREELAND

You might call it the cognitive divide — the split between an evidence based worldview and one that is rooted in faith or ideology — and it is one of the most important fault lines in the United States today.

President Barack Obama ... chose the Princeton University economist Alan Krueger to lead his Council of Economic Advisers.

Lawrence Summers, the former Treasury secretary and a Harvard economist, described Mr. Krueger, his former student, as a “total empiricist” and a “great data monger following the data where it went.”....

Word crunchers found that the president’s (Obama) 2009 inaugural address was the first one to use the term “**data**” and only the second to mention “**statistics.**”

According to a ... poll released this week, Governor Rick Perry of Texas is the Republican front-runner. He spoke at a Christian religious rally on the eve of entering the primary contest last month and has questioned the science of evolution and climate change.

We are today, as we were in 2008, living through an unprecedented crisis. The economies of the Western world are sick, and the international balance of power is shifting. **To be driven by data is an admirable thing. But when you find yourself in dangerous and uncharted waters, there is no data to guide you**

Weinberg A M. Science and trans-science. *Minerva* 10:209-22, 1972.
[Oak Ridge National Laboratory, TN]

Origins of Science and Trans-Science

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time
becoming involved in the debate over nuclear power—in particular the debate over the hazard of low levels of radiation.

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After the paper was published, Harvey Brooks added another dimension to "trans-science"—the evolution in time of systems governed by large classes of nonlinear equations.

such
suggested that an analysis of such situations was beyond the power of mathematics, and therefore, was trans-scientific.²

The term "trans-science" is used quite widely now. Perhaps most notable was W. Ruckelhaus's admission in 1985 that many of the EPA's regulations hang on the answers to questions that can be asked of science but cannot be answered by science—i.e., are trans-scientific.³

is gradually being recognized in many quarters. For example, W.G. Wagner concludes: "...in order to accommodate trans-science, the judicial framework must change... Trans-scientific obstacles can be circumvented by referring to more predictable notions of qualitative causation and unreasonable conduct—thus the courts may be able to reincorporate the principle of deterrence into the adjudication of toxic torts."

In addition to giving a name to an idea that regulators and toxic torts lawyers had been grappling with, "science and trans-science" has added another dimension to the perennial quest for limits to science. To the limits of science posed by Heisenberg's uncertainty principle, or the second law of

limits of science. *Proceedings of the Symposium on Phenotypic Assessment*, December 7-10, 1986. Brookhaven National Laboratory.

Minerva 10:484-6, 1972.

Technol. 1:19-38, 1985.

4. Wagner W G. Trans-science and torts. *Yale Law J.* 9:428-49, 1986.

RIO DECLARATION ON ENVIRONMENT AND DEVELOPMENT
Rio de Janeiro, 3-14 June 1992

Principle 15

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, **lack of full scientific certainty shall **not be used** as a reason for postponing **cost-effective** measures to prevent environmental degradation.**

MINIMALISM AND EXPERIMENTALISM IN THE ADMINISTRATIVE STATE

Charles F. Sabel and William H. Simon,

http://www.law.yale.edu/documents/pdf/Intellectual_Life/LTW-Sabel.pdf

Experimentalism takes its name from John Dewey's political philosophy, which aims precisely to accommodate the continuous change and variation that we see as the most pervasive challenge of current public problems.

Its **governing norm** in institutional design is reliability – **the capacity for learning and adaptation**.

The central characteristic of these circumstances is “**uncertainty**” in Frank Knight's sense – contingency that cannot be known or calculated actuarially or with formal rigor but can only be estimated impressionistically (Knight 1921). **In the realm of uncertainty, policy aims cannot be extensively defined in advance of implementation; they have to be discovered in the course of problem-solving.**

The reason for this practical influence...is that **public policy is increasingly pre-occupied with problems characterized by Knightian uncertainty.**

René Descartes (1596-1650). Discours de la méthode (1637)

Sixième partie, Extrait

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car elles m'ont fait voir qu'il est possible de parvenir à **des connaissances qui soient fort utiles à la vie**; et qu'au lieu de cette philosophie spéculative qu'on enseigne dans les écoles, on en peut trouver une pratique, par laquelle, connaissant la force et les actions du feu, de l'eau, de l'air, des astres, des cieux, et de tous les autres corps qui nous environnent, aussi distinctement que nous connaissons les divers métiers de nos artisans, **nous les pourrions employer en même façon à tous les usages auxquels ils sont propres, et ainsi nous rendre comme maîtres et possesseurs de la nature...**

Galileo: primary and secondary qualities



... a piece of paper or a feather, when gently rubbed over any part of our body whatsoever, will in itself act everywhere in an identical way; it will, namely,

. But we, should we be touched between the eyes, on the tip of the nose, or under the nostrils, will feel an almost intolerable titillation – while if touched in other places, we will scarcely feel anything at all. Now this titillation is completely ours and not the feather's, so that if the living, sensing body were removed, nothing would remain of the titillation but an empty name. And I believe that many other qualities, such as taste, odour, colour, and so on, often predicated of natural bodies, have a similar and no greater existence than this.

Galileo Galilei (1623): *The Assayer*

The Scientist Qua Scientist Makes Value Judgments

Richard Rudner

**Philosophy of Science, Vol. 20, No. 1 (Jan., 1953),
pp. 1-6**

...clearly the scientist as scientist does make value judgments. For, since no scientific hypothesis is ever completely verified, in accepting a hypothesis the scientist must make the decision that the evidence is sufficiently strong or that the probability is sufficiently high to warrant the acceptance of the hypothesis. Obviously our decision regarding the evidence and respecting how strong is "strong enough", is going to be a function of the importance, in the typically ethical sense, of making a mistake in accepting or rejecting the hypothesis.

Value judgements

Coincidentally, at a workshop last week in Hamburg, Germany, a gathering of climate scientists, policy experts and philosophers of 'post-normal science' articulated a similar perspective. **Science becomes 'post-normal' when facts are uncertain, stakes high, values in dispute and decisions urgent; in such cases, societal needs must be taken into account to avoid costly mistakes.**

More importantly, these studies highlight a significant deficit in current typical appraisals of science and technology outcomes. They should serve as cautionary tales about the danger of scientists' interests, deliberately or otherwise, becoming too dominant in determining outcomes.

Eisenhower's Farewell Address to the Nation January 17, 1961

<http://www.informationclearinghouse.info/article5407.htm>

Today, the solitary inventor, tinkering in his shop, has been overshadowed by task forces of scientists in laboratories and testing fields. In the same fashion, the free university, historically the fountainhead of free ideas and scientific discovery, has experienced a revolution in the conduct of research. Partly because of the huge costs involved, a government contract becomes virtually a substitute for intellectual curiosity. For every old blackboard there are now hundreds of new electronic computers.

The prospect of domination of the nation's scholars by Federal employment, project allocations, and the power of money is ever present – and is gravely to be regarded. **Yet, in holding scientific research and discovery in respect, as we should, we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite.**