Are Forecasts of Dangerous Global Warming Scientific?
Preparing for "People vs. Alarmist Regulation"

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A video of this talk and a copy of the slides are available at Heartland after this conference

Support for this talk

Links are provided to the evidence

* refers to recent publications

** forthcoming publications

No time for questions during the talk.

Objective of this talk: Preparing for the "People vs. Climate Change" Case(s)

1. Alarm is over dangerous warming *in the future*, so we are looking at a forecasting problem.
2. To summarize the scientific evidence on forecasting climate and alarmist movements so that it is available to scientists, citizens, regulators, and the courts.
3. To raise the alternative, "People vs Alarmist Regulation" and provide information to decide whether it is worth spending half a day of your time to assist in this effort.

In conclusion: Are long-term forecasts of dangerous global warming scientific?

No, because:

1. the only 2 papers with scientific forecasts found no long-term trends
2. IPCC methods violate 81% of the 89 relevant scientific principles
3. IPCC long-term forecasts errors for 90-100 years ahead were 12 times larger than the no-trend forecasts.
4. tests on three other data sets, one going back to 112 AD, found similarly poor accuracy.
5. the “long-term global cooling” hypothesis was twice as accurate as the dangerous global warming hypothesis.

Also “no” because the warming alarm

6. ignores all 20 of the *relevant* Golden Rule of Forecasting guidelines; the AGS scientific forecasts violated only one.
7. violates Occam’s razor
8. fails to comply with any of the 8 criteria for scientific research
9. fails to provide scientific forecasts of harm to people
10. fails to provide scientific forecasts that “solutions” will work
11. fails to meet any of the 10 necessary conditions for successful regulation.
12. is similar to 23 earlier environmental alarms supported by the government: all lacked scientific forecasts and all were wrong.

IPCC method for “forecasting” global mean temperatures violates evidence-based forecasting principles

The scenarios method violates 81% of the 89 relevant scientific principles for forecasting global mean temperatures. (Armstrong & Green 2007)

By using the “Forecasting Audit” software, you can rate the IPCC forecasting chapter (Randall D.A., et al. 2007).

Warming alarmists do *not* forecast with the aim of accuracy, they create "scenarios for persuasion"

1. Scenarios are *stories* about "what happened in the future"
2. The stories are biased in order to gain action (Gregory & Duran, 2001). For example, scary outcomes lead people *to ignore probabilities*. (Sunstein & Zeckhauser 2011).
3. The stories are based on assumptions of experts who believe that dangerous global warming will happen.
4. Implications of their assumptions are represented by selected computer outputs.
5. Expert judgments about what will happen in *complex, uncertain situations* are no more accurate than forecasts from people with little expertise:
    a. Seer-sucker Theory
    b. Tetlock's 20-year experiment

What does scientific forecasting conclude about global temperatures over the 21st century?

1. Only two papers *claim* to provide scientific forecasts of long-term global mean temperatures. Green, Armstrong & Soon 2009 & Green & Armstrong 2014

2. They concluded that there is not sufficient evidence to forecast a long-term trend, whether up or down.

3. There have been no replications or extensions to refute the findings.

Predictive validity testing requires…

1. Use of all data in all relevant data sets.
2. Testing of reasonable alternative hypotheses.
3. Full disclosure.
4. *Ex ante* forecasts (i.e., testing on data *not* used for estimating models).
5. Successive updating to make full use of out-of-sample data (we used 1 year to 100 years ahead).
6. Effect size estimates.
7. Avoiding statistical significance tests (they not valid).

* Accuracy of long-term IPCC vs. no-change (persistence) forecasts of Hadley data

Relative accuracy of the no change model grows rapidly as the forecast horizon increases. **At 90-100 years, the IPCC errors were over 12 times larger than the**

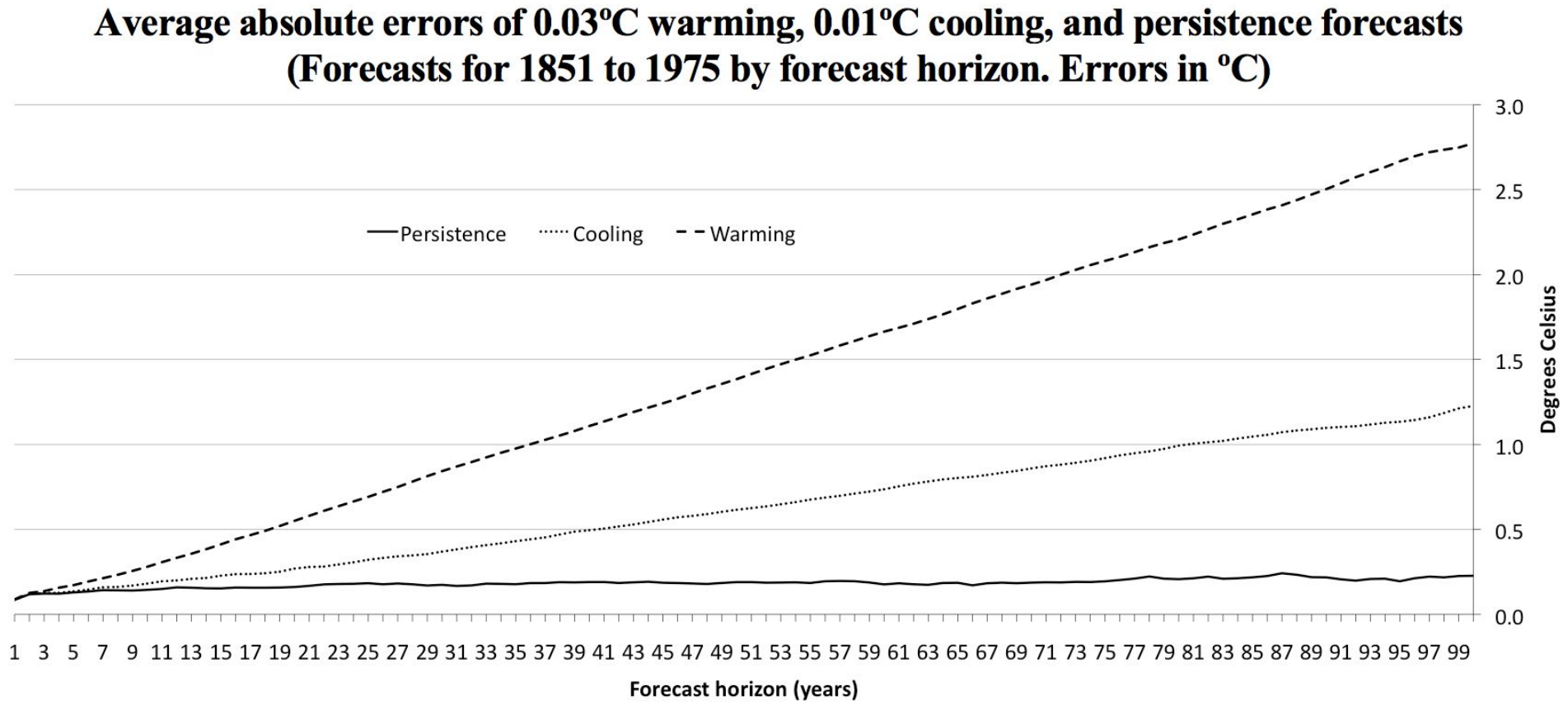


Chart from [Forecasting Global Climate Change (2014)]
Warming and cooling rates are per annum figures.

Validation over different time-periods & data sources

Relative accuracy of forecasts from alternative climate change hypotheses Warming, and Cooling, versus Persistence

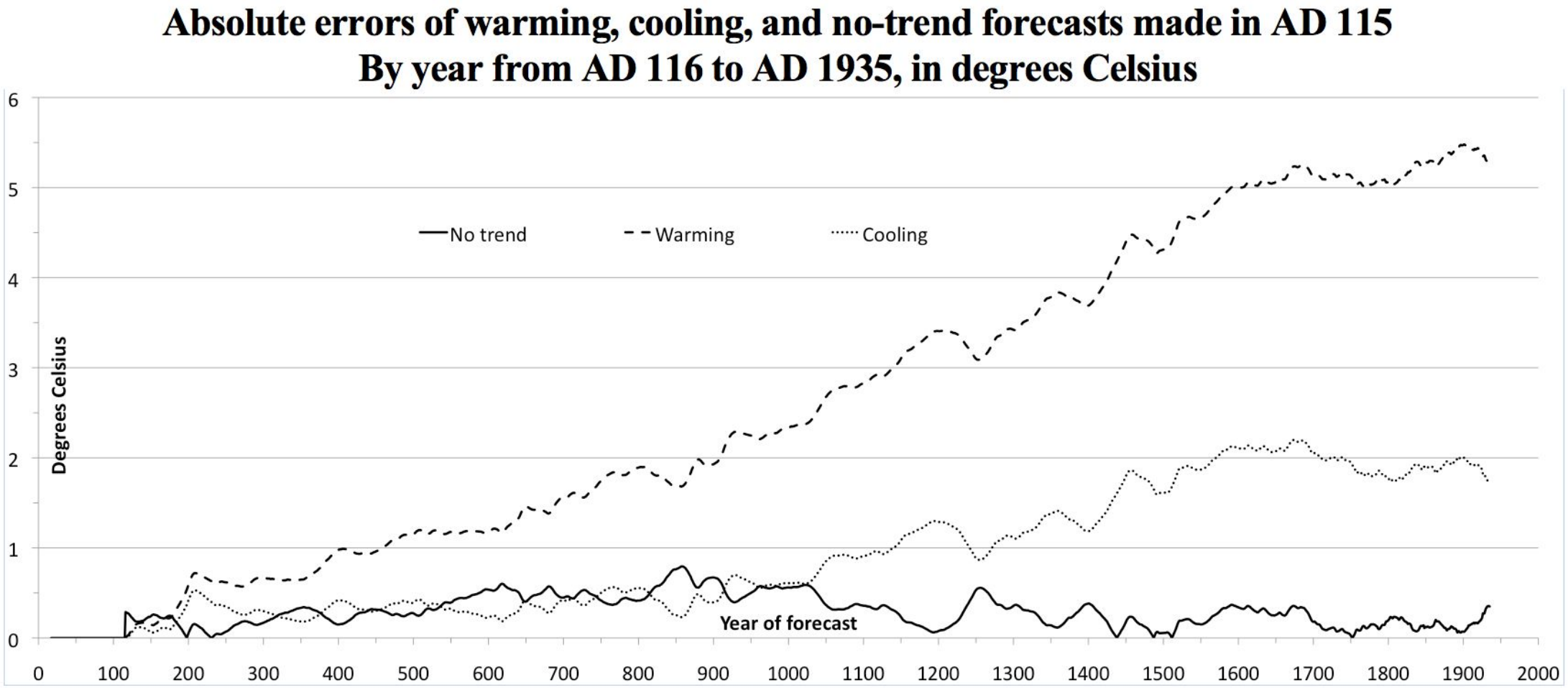
Data series (Test period)	**Forecast horizons** (years)	**Forecasts** (number)	**Hypothesis** (Rate, °C p.a.)	**Relative Absolute Error** (v. Persistence = 1)
UAH 2008–2014	1 – 6 ⅓	76*	**Warming** (0.03)	**1.27**
			Cooling (0.01)	1.05
HadCRUT3 1851–1975	1 – 10	1,205**	**Warming** (0.03)	**1.45**
			Cooling (0.01)	1.10
	11 – 100	6,345**	**Warming** (0.03)	**8.14**
			Cooling (0.01)	3.62
Loehle 116–1935	1 – 1,820	1,820	**Warming** (0.003)	**9.01**
			Cooling (0.001)	3.16

* Monthly forecasts.
**Successive updating used.

From [Forecasting Global Climate Change (2014)]

* Forecast accuracy of IPCC vs. no-trend forecasts

Loehle & McCulloch (2008) land data: Example of forecasts made in AD 115



From Forecasting Global Climate Change (2014)

These tests of *ex ante* forecast accuracy show that:

1. No-trend (persistence) model produced the most accurate forecasts. (The cooling hypothesis was a distant second).
2. Relative advantage of the no-trend model increases as the horizon increases. The global warming forecast error was more than 12 times larger for years 90 to 100 ahead.
3. Long-term forecast errors over human history show that annual global mean temperatures vary within a narrow band without long-term up or down trends. Evidence of high stability.
4. The forecast errors are too small to justify policies. For example the MAE for forecasts 50 years ahead is 0.24ºC.

Structured analogies to forecast outcome of global warming alarm

The “structured analogies” method forecasts by asking experts on the topic to:

(1) list all analogous situations,
(2) rate for similarity to target, then
(3) an analyst averages the experts’ most similar to forecast what will happen

Structured analogies have led to relatively accurate forecasts of outcomes. Green & Armstrong (2011)

26 situations were analogous to global warming (manmade environmental alarms)

a) None were based on scientific forecasts.
b) All were supported by experts
c) The government regulated all but three
d) None of the regulations led to net benefits (substantial harm in 20)
e) None of the claimed environmental threats led to actual substantive harm.

* Do IPCC forecasting methods follow the Golden Rule of Forecasting: “Be conservative by adhering to cumulative knowledge”?

1. The Golden Rule of Forecasting is summarized by a 28-guidelines checklist that can be used by non-experts with no training.
2. The guidelines were tested using findings from 105 published studies
3. On average, violation of a single guideline increased forecast error by more than 40%.

** Golden Rule applied to IPCC scenario

Golden Rule of Forecasting Checklist was used to evaluate IPCC global warming scenario and no-change model forecasts.

Consensus ratings by Armstrong and Green indicated that of the 20 *relevant* Golden Rule Checklist guidelines:

- the IPCC scenarios followed **none**
- the Armstrong, Green, & Soon no-change model followed **95%**

You can rate the models yourself.

** Do the Global Warming forecasts use Occam's Razor?

- Occam's razor, "simpler is better", traced back to Aristotle, has survived centuries.

- We developed a checklist for non-experts to rate simplicity.

* * Simplicity checklist used to test Occam's Razor

Score the following on a 0-to-10 scale

After reading the report on the forecasting process, I am confident that I could explain… . . .to the decision maker:

1. the forecasting methods
2. how prior knowledge about the situation is represented in the forecasting models
3. the nature of the relationships among the model elements
4. how the models, forecasts, and decisions are related to each other

** Evidence on simplicity in forecasting

Green & Armstrong found 32 papers covering diverse forecasting problems that included 97 comparisons of the accuracy of forecasts from simple and complex methods:

a) None of the papers found that complexity helped accuracy
b) Complexity increased forecast error by 27% on average across the papers

The checklist has been designed for use by non-experts, or experts.

Source: Green & Armstrong (2015)

** Seduced by complexity

1. analysts can use complex methods to provide forecasts to support decision-makers' preconceptions
2. clients are impressed by complexity.

"There is, perhaps, no beguilement more insidious and dangerous than an elaborate and elegant mathematical process built upon unfortified premises." (T. C. Chamberlin 1899)

Simple Forecasting Checklist ratings:

** IPCC projections vs. no-change forecasts

Our Ratings of Compliance with Occam's Razor (% of perfect score)

IPCC	No Change
19%	96%

Ratings can be done by novices (and experts) in forecasting.

The ratings take less than an hour.

You can rate the IPCC method yourself.

Global warming alarm needs support of a “three-legged stool”

Global warming polices must provide *scientific* forecasts of:

1. warming trend in global temperatures over 21st Century and longer
2. warming that will be dangerous for mankind
3. net benefits from regulation as implemented and observed

If any leg is missing, there is *no* basis for public policy or regulation.

There are no scientific forecasts to support any of the three legs.

Conclusion: The assumption of dangerous manmade global warming does not have a scientific leg to stand on.

Assessing a global warming alarm policy decision: Endangered polar bears?

We audited 2 papers commissioned for the : “USGS Science Strategy to Support US Fish and Wildlife Service Polar Bear Listing Decision” that were concerned with forecasting the polar bear population.

We concluded that one paper violated or ignored 85% of the relevant forecasting principles and the other, 90%. (Armstrong, Green and Soon 2008)

Our findings, presented at the Boxer Senate Hearings in Jan 30, 2008, were ignored.

We predicted the population would continue to increase for the short term.

An analysis of the polar bear population shows that it grew since 2008. (Crockford, S.J. 2017 V3).

** Is global warming immune from the Iron Law of regulation? IronLawofRegulation.com?

> "There is no form of market failure, however egregious, which is not eventually made worse by the political interventions intended to fix it." (original source unknown)

We have searched the literature, asked experts, and established the Iron Law website asking for evidence of exceptions.

To date, we have found none.

** Purposes of the IronLawofRegulation.com

The website was established to…

1. Describe the necessary conditions for a successful regulation.
2. Summarize evidence on the effects of regulation.
3. Provide techniques for forecasting the effects of a proposed regulation or deregulation.
4. Provide a checklist for assessing which regulations are most in need of revision or revocation.
5. Report regulations that produce outrageous outcomes.

** How does regulation on global warming do against the ten necessary conditions for a regulation?

Rater	Compliance
Armstrong	0%
Green	10%

** Evaluations of policy should rely *only* on scientific research

The scientific method must replace advocacy for policy decisions.

Guidelines for Science provides operational guidance for the scientific method.

The Criteria for Useful Science Checklist, (Guidelines for Science):

- designed for use by scientists, regulators, and eventually by citizens
- can be completed it in about 30 minutes
- use 2 to 5 raters and find consensus

** Criteria for compliance with science

Eight well-established criteria for judging whether a paper complies with the scientific method (for policy making) based of definitions of science over the ages are:

1. Objective: Tests multiple reasonable hypotheses
2. Useful findings (effect size is important for decision making)
3. Full disclosure of methods, data and other relevant information
4. Comprehensive review of prior knowledge
5. Valid and reliable data
6. Valid and simple methods
7. Experimental evidence provided
8. Conclusions consistent with the evidence

** Example: How do IPCC scenarios (a.k.a. forecasts) score on compliance with science?

- Based on our ratings, the IPCC forecasting methods violated all eight criteria.
- Use the Criteria Checklist and make your own ratings in a matter of minutes.
- Because you are rating only the methodology, you need not read the whole paper.
- The ratings have high inter-rater reliability.

** Do researchers mostly comply with science?

- No.
  - Only a fraction of one percent of papers published in scientific journals follow the scientific method.
- Why?
  - No one asks them to.
- Worse, they are rewarded for unscientific work, including:
  - commissioned research (especially grants from governments)
  - advocacy
  - complex writing
  - using complex, invalid, and irrelevant techniques
  - citations, regardless of whether the work complies with science
  - mass media coverage, regardless of scientific content.

** What should we ask of regulators?

1. Comply with the eight criteria for science
2. Audit regulations for compliance by using independent and anonymous raters.
3. Dismiss regulators who fail to comply with science.
4. Reject and revoke non-compliant regulations.

** Require scientific evidence for *all regulations*

1. Reject regulations that fail to meet the logically necessary conditions for successful regulation.
2. Adopt and retain regulations only if they are supported by research that complies with the scientific method.
3. Reject government funding of and involvement in all *assessments* of regulations in order to avoid conflicts of interest.
4. Public interest research organizations (such as *Reason* and *Heartland*) could evaluate regulations for compliance to science.
5. Public interest law firms such as the Institute for Justice could take cases to block outrageous regulations.
6. Charles Murray's proposed "Madison Fund" could insure those who ignore harmful regulations against penalties and court costs.

** Action steps

Use the Checklists for Scientists & Criteria for Science, and suggest that others use them…

1. researchers who work with you or for you
2. journal editors
3. regulators (plus procedures in the Iron Law)
4. journalists
5. employers of researchers
6. funders of researchers

Ask yourself: “Am I willing to spend ½ day to use the above findings to advance the cause of the “People vs Alarmist Regulation?”