



## Climate Change : Global Warming Basics

### What Will The Climate Be Like in 2100?

**Stanford University climatologist Stephen Schneider discusses what we know and don't know about the future of the Earth's climate.**



**Stephen Schneider, Climatologist, Stanford University**

"How do we know if people are going to take this problem seriously?" (Photo courtesy: Stephen Schneider)

#### **What will the Earth's climate be like at the end of this century?**

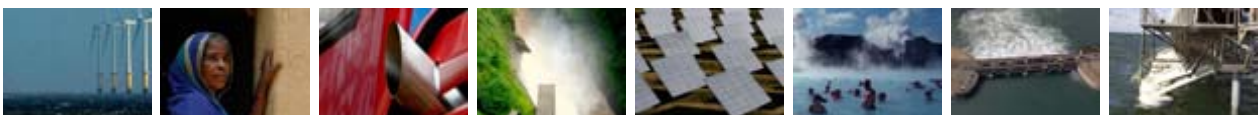
What's the old joke? Prediction is hard, especially about the future. What do you have to do to predict the climate of 2100? Well, you have to know how much CO<sub>2</sub>, methane, nitrous oxide, aerosols - that's dust and smoke - are going to be there, because that changes what we call the forcing - the pressures on the climate system - to be warmer or colder. We know it's going to be warmer. That's virtually certain.

But you don't know what those are going to be on the basis of any history. There's never been a time before when there was six to ten billion people on the Earth, when they're demanding dramatic increases in their standards of living, and when they're using the cheapest available technology - usually coal and oil burning, big cars - to get there. So, before you can forecast how warm it will be in 2100 - and whether it's worth a trillion-dollar investment not to have that outcome - you've got to know a bunch of social factors.

#### **What kinds of social factors?**

How many people are in the world? What standards of living do they have? That's population times GDP per capita - a typical measure of standard of living. Then you have to multiply that by how much energy per unit of GDP. We call that energy intensity. It's critically important. And how do we know if people are going to take this problem seriously?

### Energy Gallery



### **What are the possible climate scenarios for the end of this century?**

Greenhouse gas concentrations double pre-industrial levels and then come down like a steep ski slope because we've invented our way out of the problem with new high technology, and we deploy it starting in 2020. By the end of the century we nearly increased carbon dioxide by, say, 80 percent of pre-industrial levels. That, I'm sorry to say, is a good scenario.

The bad scenario is business as usual. We keep getting richer as fast as we can. We do what we did in the Victorian Industrial Revolution in the rich countries: sweat shops, coal-burning internal combustion engines. Well, what do you think China and India are doing?

### **Which scenario is likely?**

The estimate (for increased temperatures) is between 1.5 and 4.5 degrees Celsius during the next 25 years. Very recently, the IPCC narrowed it to between 2 and 4.5 degrees. They call that "likely." Well, likely means two-thirds to ninety percent. So, that still means there's a 5-7 percent chance it could be "lucky" - below two degrees - or "really unlucky" - above 4.5.

The worst of all worlds is an increase of more than seven degrees. That's an astronomically large number, because an ice age is about six degrees cooler than an interglacial that we're now in. And we're talking about a ten-percent chance it's as large a temperature difference as an ice age to an interglacial cycle, but happening in a century; not in five thousand years.

### **Related Articles**

The UN Global Warming Report 2007  
Facts and Predictions

A Critical Link: Biodiversity and Climate Change

That's an easy prescription for a catastrophic outcome with regard to species extinction, coastal damage, fires, heat waves, droughts, and floods. As Bill Clinton said when I first presented this in the White House in 1997, "all the biblical stuff."

editor: Valdis Wish

publishing date: June 2, 2008

Share this



© Allianz 2007, All Rights Reserved