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# Managing to the Climate Problem: Science-Policy-Business

## Kyoto, not Kyoto, what else?

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# Class News

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- Some business
  - Nina Mendelson on March 30?
    - That's a Friday
    - Time:



# Class News

- New experimental web site
  - <http://climateknowledge.org/class/aoss605/tiki-index.php>
- Lecture Road Map
  - Previous: Carbon Market
  - Today: Rood, Managing to the Climate Problem: Science-Policy-Business
  - 3/6: Rood, Sulfur Market as Model, Link to Next Set of Lectures
  - 3/8: Lemos, Winners and Losers
  - 3/13 & 3/15: McCormick and O'Neill, Public Health



# Readings

- Basic information on the Kyoto Protocol
  - [Environmental Literacy Council](#)
  - [Kyoto Protocol](#)
- Beyond Kyoto
  - [International Climate Efforts Beyond 2012: Report of the Climate Dialogue at Pocantico](#)



## Ideas and Things

- NEWS: Anyone hear or read any news they want to discuss – or come back to?
  - Australia incandescent bulbs.
  - Portugal wave energy – ocean 1000 homes/megawatt?



# Projects

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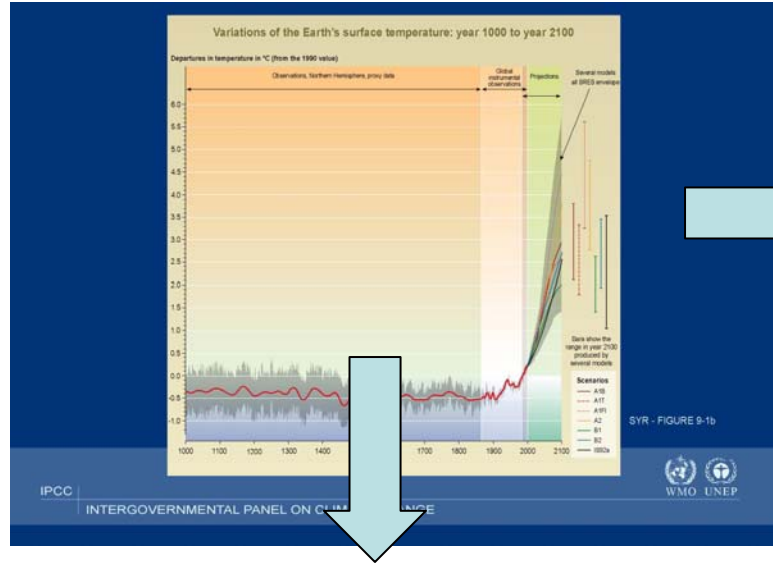


# Outline

- Link from Climate Change to Response
- Mitigation and Adaptation
- Some Basic Management
- Policy in a Management Paradigm
- International and National Policy Attempts
- United Nations Framework Convention on Climate Change
- Kyoto Protocol
- Beyond 2012: Climate Dialogue at Pocantico
- Where do we sit today?



# Predictions motivate action



**Is there some sort of tipping point or abrupt change which will be catastrophic?**

**Is there some range of warming which we can tolerate, adapt to, perhaps be beneficial?**

**Are there feedbacks in the system which will cool the Earth – counter the warming?**

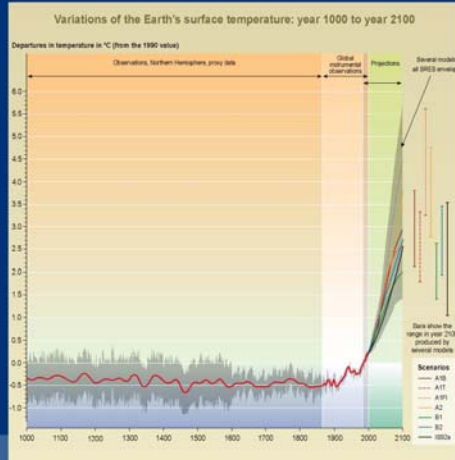
**Should we perhaps just push forward the problem is bigger than we are, it just costs too much, we don't know what we are doing anyway ...**

**How should we respond to the predictions?**





# Predictions motivate action



IPCC  
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



**How should we respond to the predictions?**



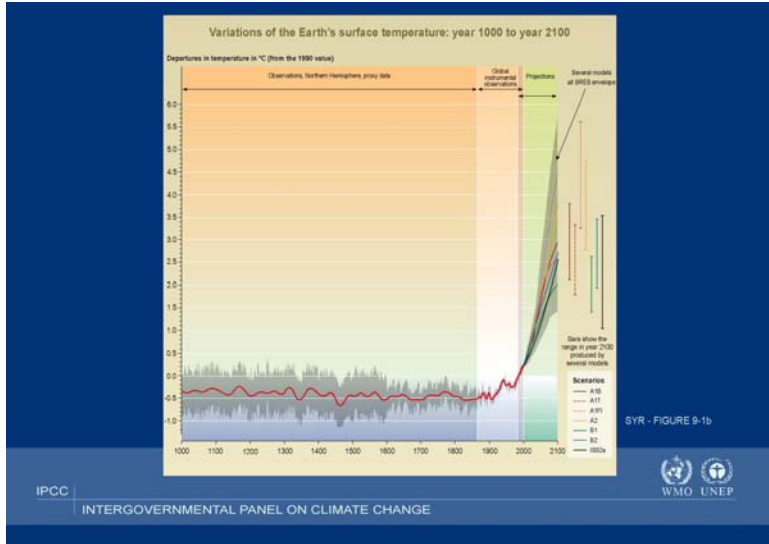
**Must remember that the climate problem is currently entwined with energy sources, energy use.**



**Energy use touches every part of society.  
Societal success.  
Standard of living.**



For example: At the individual level cheap energy might be the choice.



Impact on agriculture

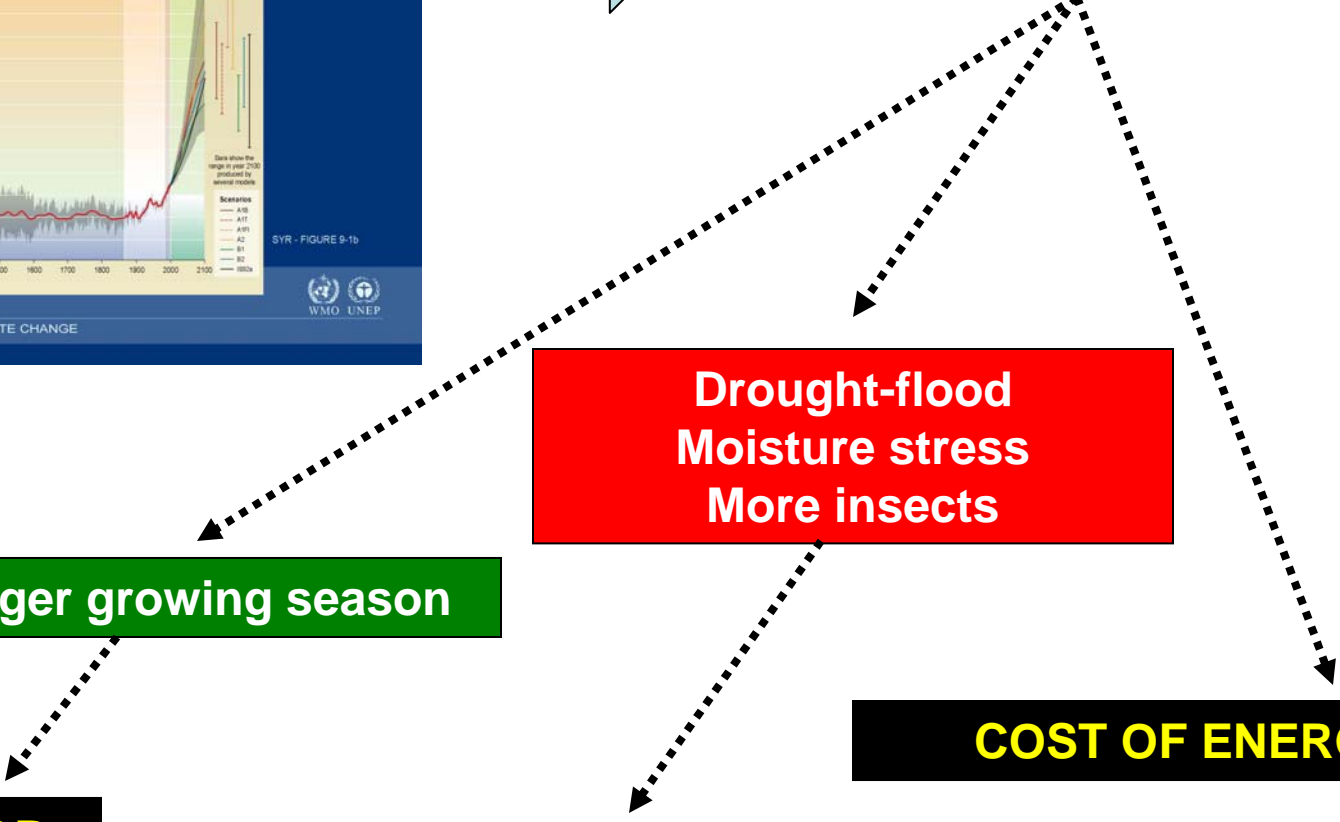
Drought-flood  
Moisture stress  
More insects

Longer growing season

COST OF ENERGY

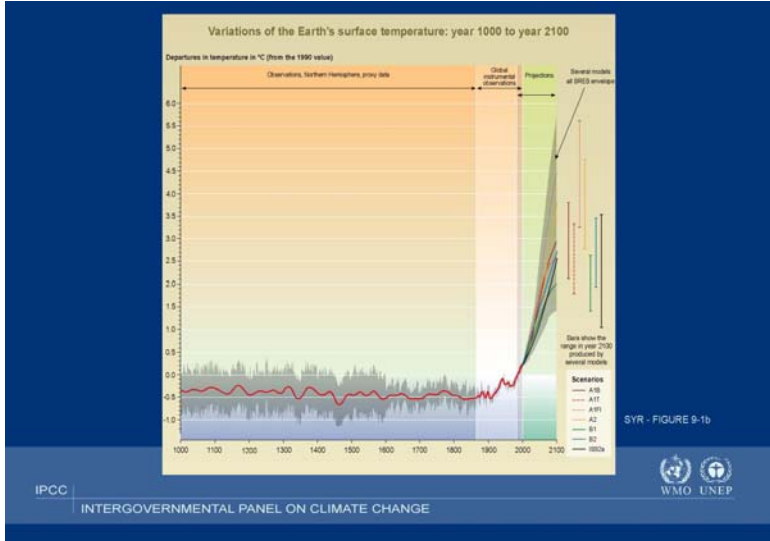
DOUBLE CROP

COST OF WATER / INSECTICIDE





For example: Or whole sector might change its focus because there is money to be made in energy



**Impact on agriculture**

**ENERGY PRODUCTION**

**FOOD PRODUCTION**

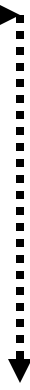
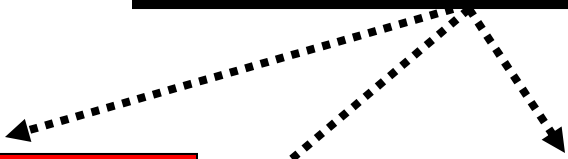
**ENERGY SECURITY**

**FOOD SECURITY**

**NATIONAL SECURITY**

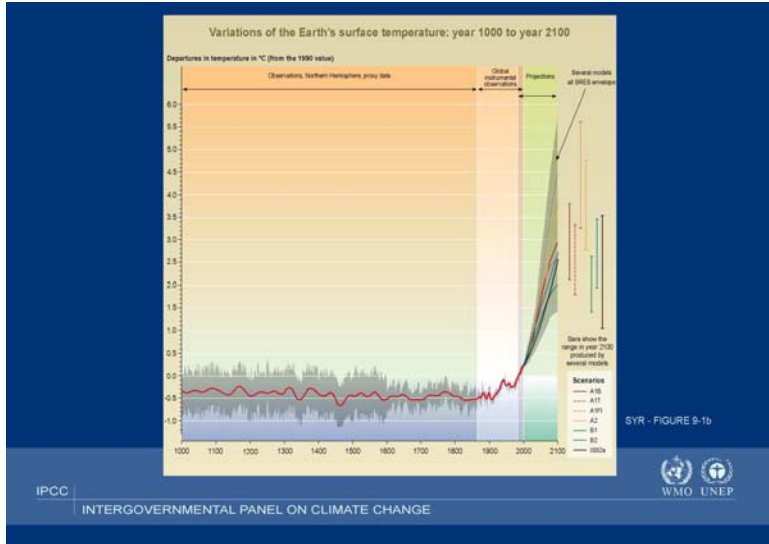
**NATIONAL SECURITY**

**GLOBAL TRADE**





# Predictions motivate action



**How should we respond to the predictions?**



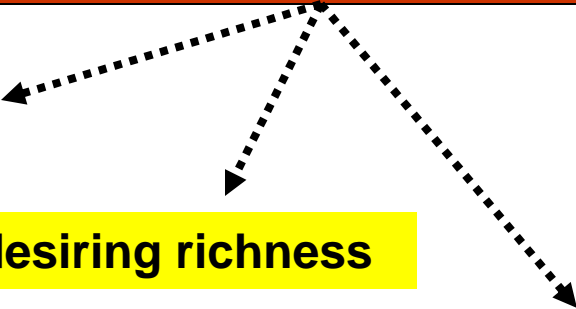
**How we respond depends very much on the current capabilities of the society or nation**

**Rich, technologically advanced**

**Resource rich, desiring richness**

**Ethics // Equality // Liability**

**Poor, low technologically**





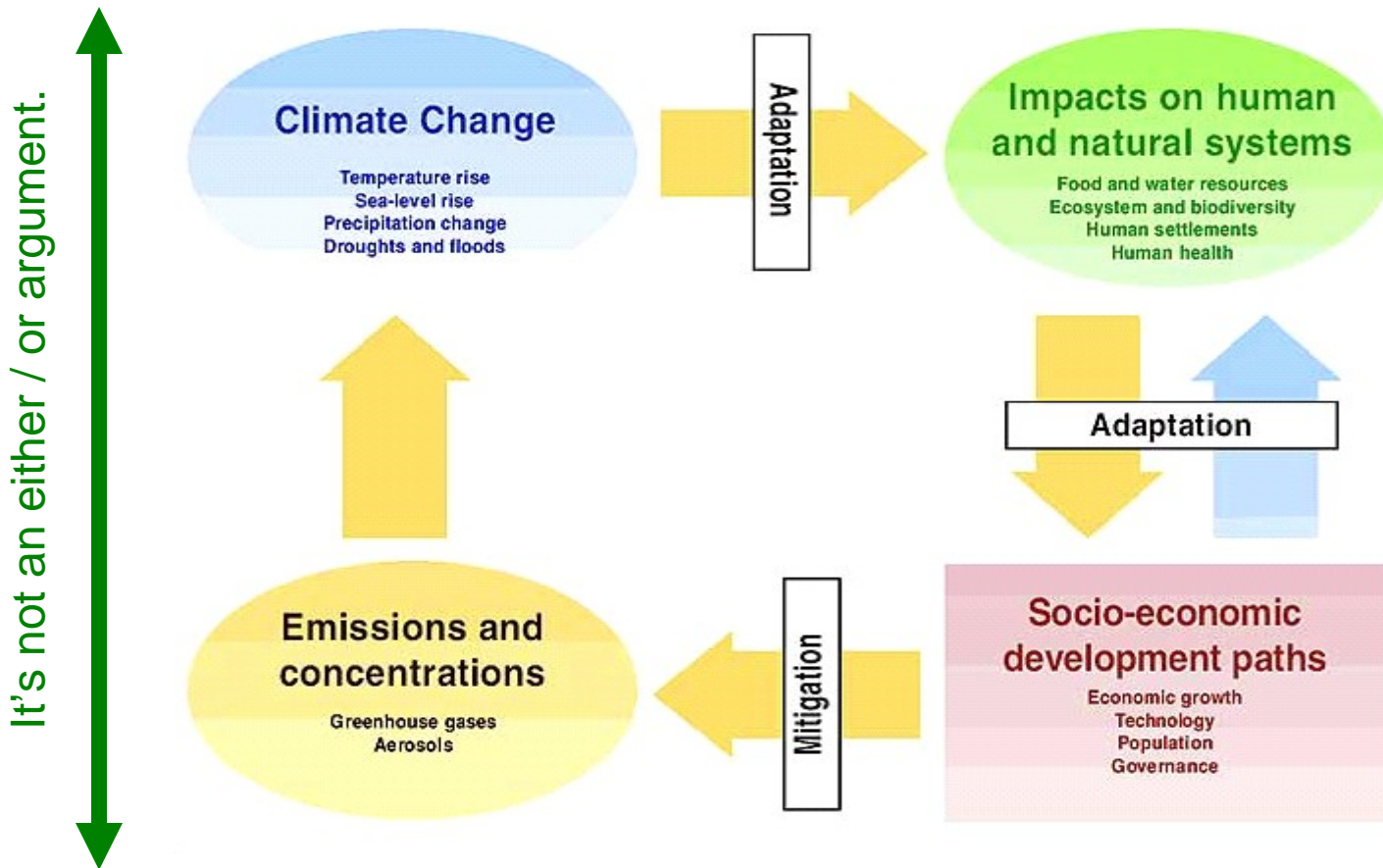
## Some definitions

- **Mitigation:** The notion of limiting or controlling emissions of greenhouse gases so that the total accumulation is limited.
- **Adaptation:** The notion of making changes in the way we do things to adapt to changes in climate.
- **Resilience:** The ability to adapt.
- **Geo-engineering:** The notion that we can manage the balance of total energy of the atmosphere, ocean, ice, and land to yield a stable climate in the presence of changing greenhouse gases.



# Science, Mitigation, Adaptation Framework

Adaptation is responding to changes that might occur from added CO<sub>2</sub>



Mitigation is controlling the amount of CO<sub>2</sub> we put in the atmosphere.



# Thinking about ADAPTATION

- Adaptation: What people might do to reduce harm of climate change, or make themselves best able to take advantage of climate change.
  - Autonomous that people do by themselves
  - Can be encouraged by public policy
    - Command and control tell you to do it
    - Incentives
    - Subsidies
  - Can be anticipatory or reactive
- Adaptation is local; it is self help.
- Adaptation has short time constants - at least compared to mitigation → Hence people see the need to pay for it.
- Some amount of autonomous-reactive adaptation will take place.
  - [Moving villages in Alaska](#)



# Thinking about MITIGATION

- Mitigation: Things we do to reduce greenhouse gases
  - Reduce emissions
  - Increase sinks
- Mitigation is for the global good
- Mitigation has slow time constants
- Mitigation is anticipatory policy
- This is the “second” environmental problem we have faced with a global flavor.
  - Ozone is the first one. Is this a good model?





# About Ozone

- Ozone was predicted to decrease incrementally because, primarily, of catalytic destruction by chlorine released from destruction of chloroflourocarbons.
  - Many of the same types of arguments for and against regulation.
  - Montreal protocol was developed
- The world mobilized to save ozone in the mid-1980s
  - Ozone hole (abrupt surprise!)
  - Smoking gun cause and effect linking chlorine to ozone destruction
  - Public health
  - Profitable alternatives to chloroflourcarbons
    - Business benefit
- Are all of these ingredients needed?



## About the Global Good

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- from the world of business ...
  - [Corporate Strategies for Climate Change](#)  
Andrew Hoffman, Pew, 2006
- Global good without benefit to the bottom line profit is a poor motivator.
  - Coupled with benefit to the bottom line great motivator



# About the Global Good

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- from the world of faith ...
  - [Faith Community](#)
- Global good from a perspective that might be independent of the bottom line profit



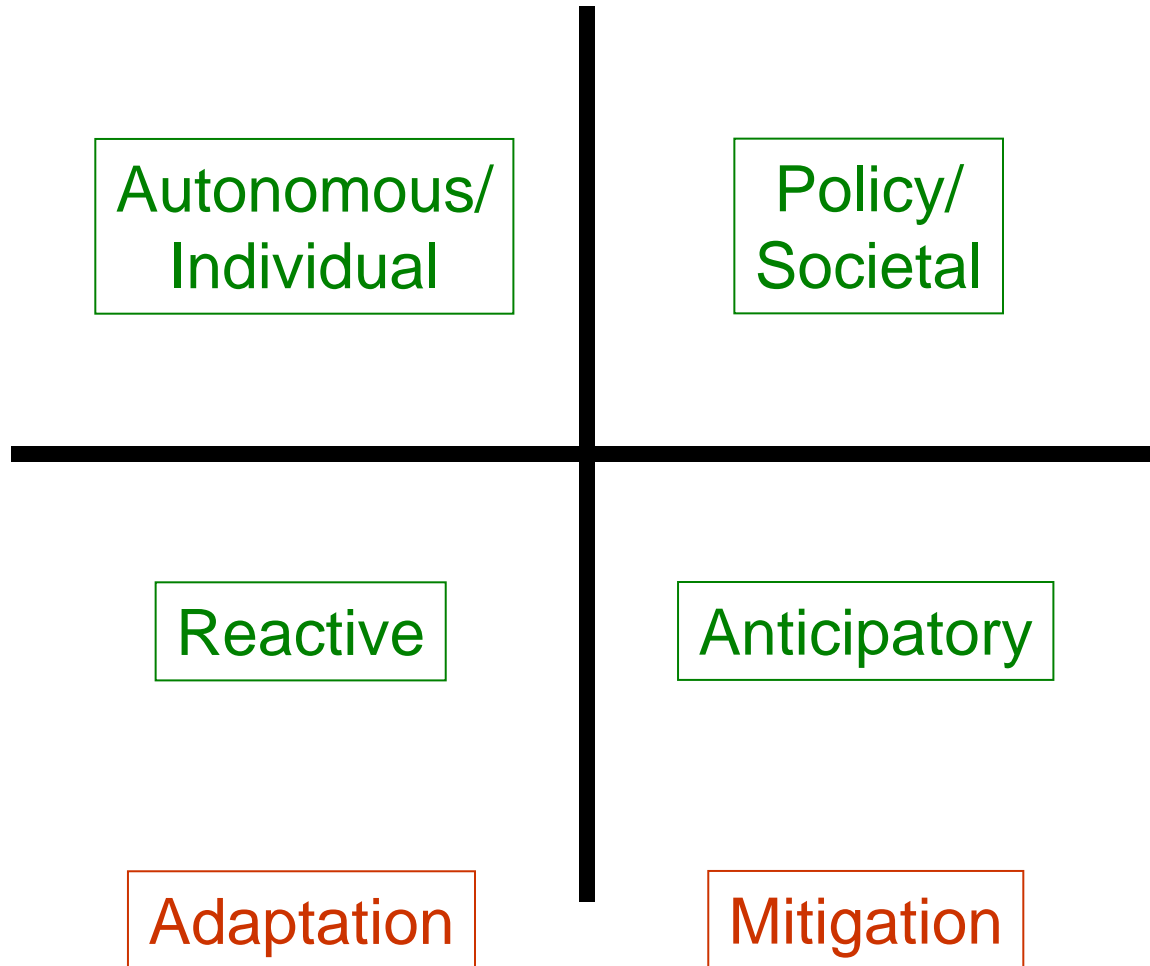
# Some Mitigation-Adaptation considerations

- Those who are rich and technologically advanced generally favor adaptation; they feel they can handle it
  - Plus, technology will continue to make fossil fuel cheap, but with great(er) release of CO<sub>2</sub>
- Those who are poor and less technologically advanced generally advocate mitigation and sharing of adaptation technology
- Emission scenarios don't matter for the next 50 years.
- There are a lot of arguments, based on economics, that lead towards adaptation
  - Mitigation always looks expensive, perhaps economically risky, on the time scale of 50 years.
    - Adaptation looks easier because we will know more
    - This will remain true as long as the consequences seem incremental and modest
      - The Innovators Dilemma, evolution vs revolution?



# Responses to the Climate Change Problem

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# Some Basic Management Tenets

WHERE  
WE ARE  
NOW

WHERE  
WE ARE  
GOING

WE WILL GET DESIRED RESULT AS A  
BENEFIT OF WHERE WE ARE GOING.

THIS APPROACH INCREASES RISK OF  
NOT GETTING THE DESIRED RESULT,  
BECAUSE THE "COST" OF DESIRED  
RESULT IS NEVER INTEGRATED INTO  
THE PROCESS

DESIRED  
RESULT



# TRYING TO BE CLEAR

WHERE  
WE ARE  
NOW

ENERGY  
SECURITY

WE WILL GET REDUCED CARBON FROM QUEST  
FOR ENERGY SECURITY – ENERGY POLICY.

CARBON REDUCTION DOES NOT  
AUTOMATICALLY FOLLOW FROM SOLVING  
THE ENERGY PROBLEM. CARBON  
REDUCTION ALSO NEEDS TO BE A  
REQUIREMENT → NEED CARBON POLICY

CARBON  
REDUCTION



# Basic Management

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- If there is a goal which you must meet, then you need to manage towards that goal.
  - If the goal is critical to success,
  - If the goal must be met on some schedule,
  - then this raises the level of management that is needed.



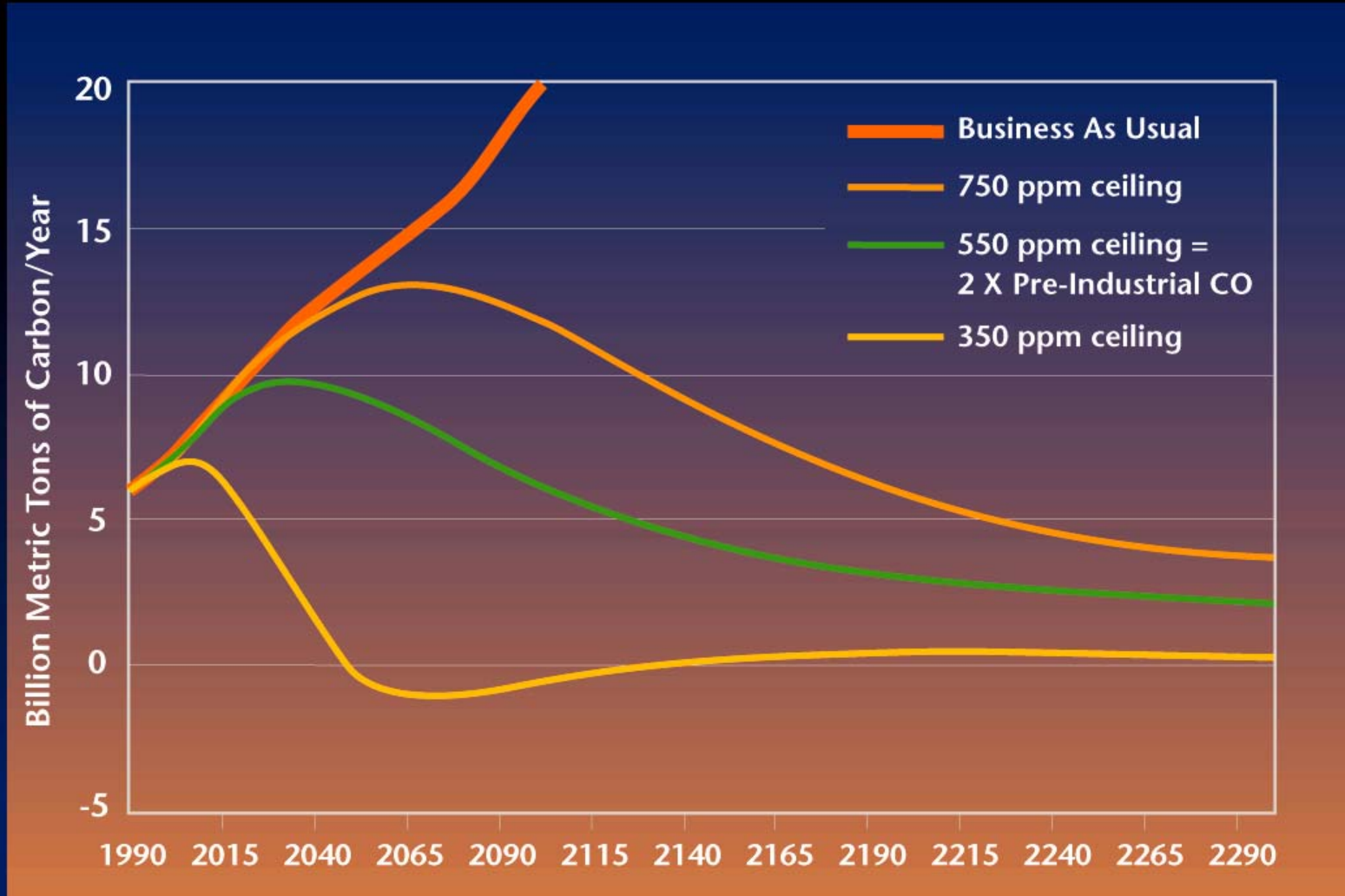


# NEED CARBON POLICY

- We need a carbon policy which is integrated with energy policy.
  - Some alternative energy sources don't do a whole much for reducing carbon dioxide in atmosphere.
  - Coal is viewed as our easy energy security
    - Without sequestration (carbon removal), coal makes the problem worse.
- Concern: Quest for energy security-national security, demand for cheap energy will reduce priority we give to reduction of carbon dioxide in the atmosphere.

# Basic constraint on carbon policy

## Atmospheric Stabilization Emissions Paths





# Basic constraint on carbon policy

## Stabilizing concentrations Means Action Now ...

<b>Ceiling (ppmv)</b>	<b>350</b>	<b>450</b>	<b>550</b>	<b>650</b>	<b>750</b>
Start Date	Too late	2007	2013	2018	2023
Max Emission	6.0	8.0	9.7	11.4	12.5
Max Year	2005	2011	2033	2049	2062

1950 – 1.8 tons // 1990 – 5.8 tons // 2000 – 6.5 tons



TO BE CONTINUED

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