

How are YOU going to cut global warming from power production?

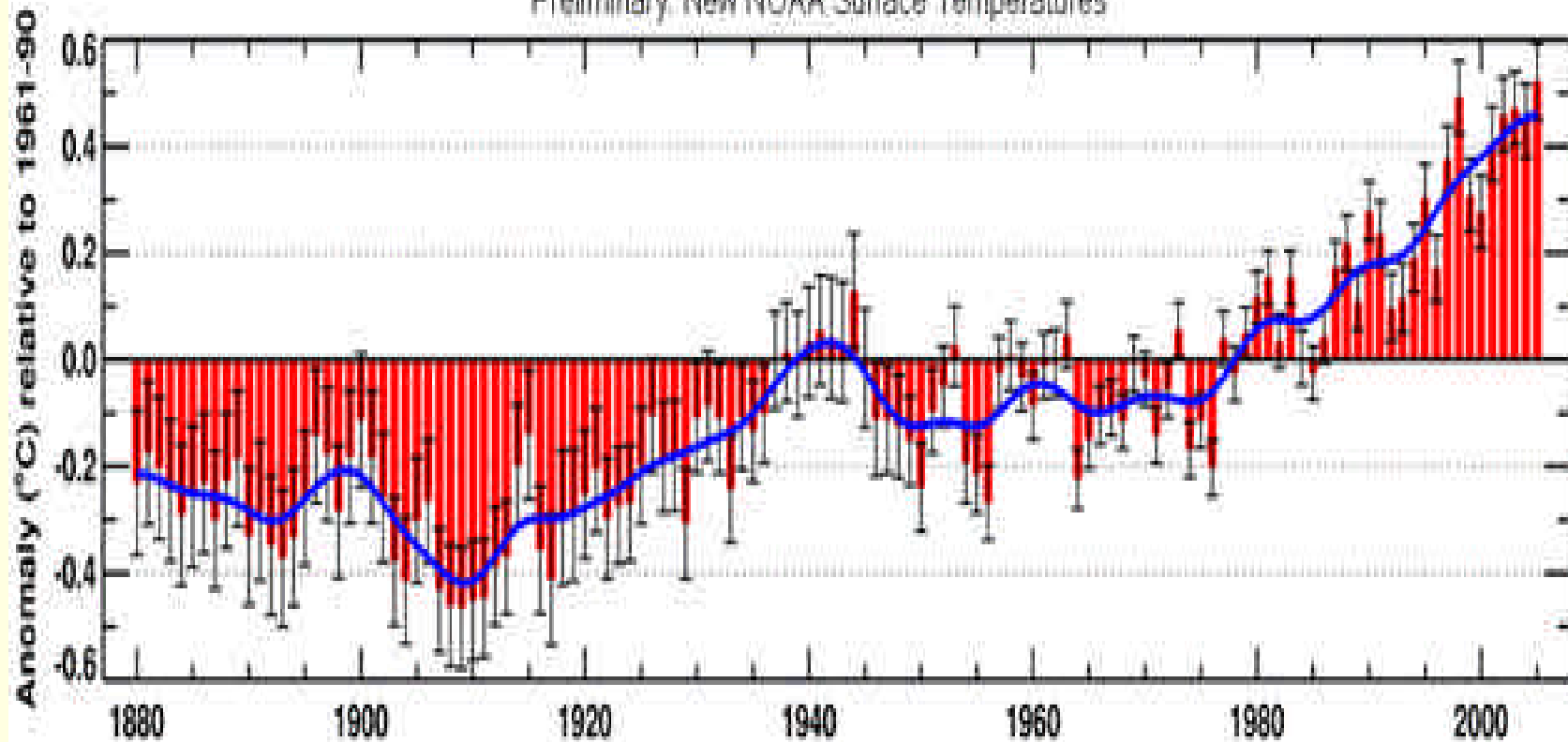
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April 7, 2006

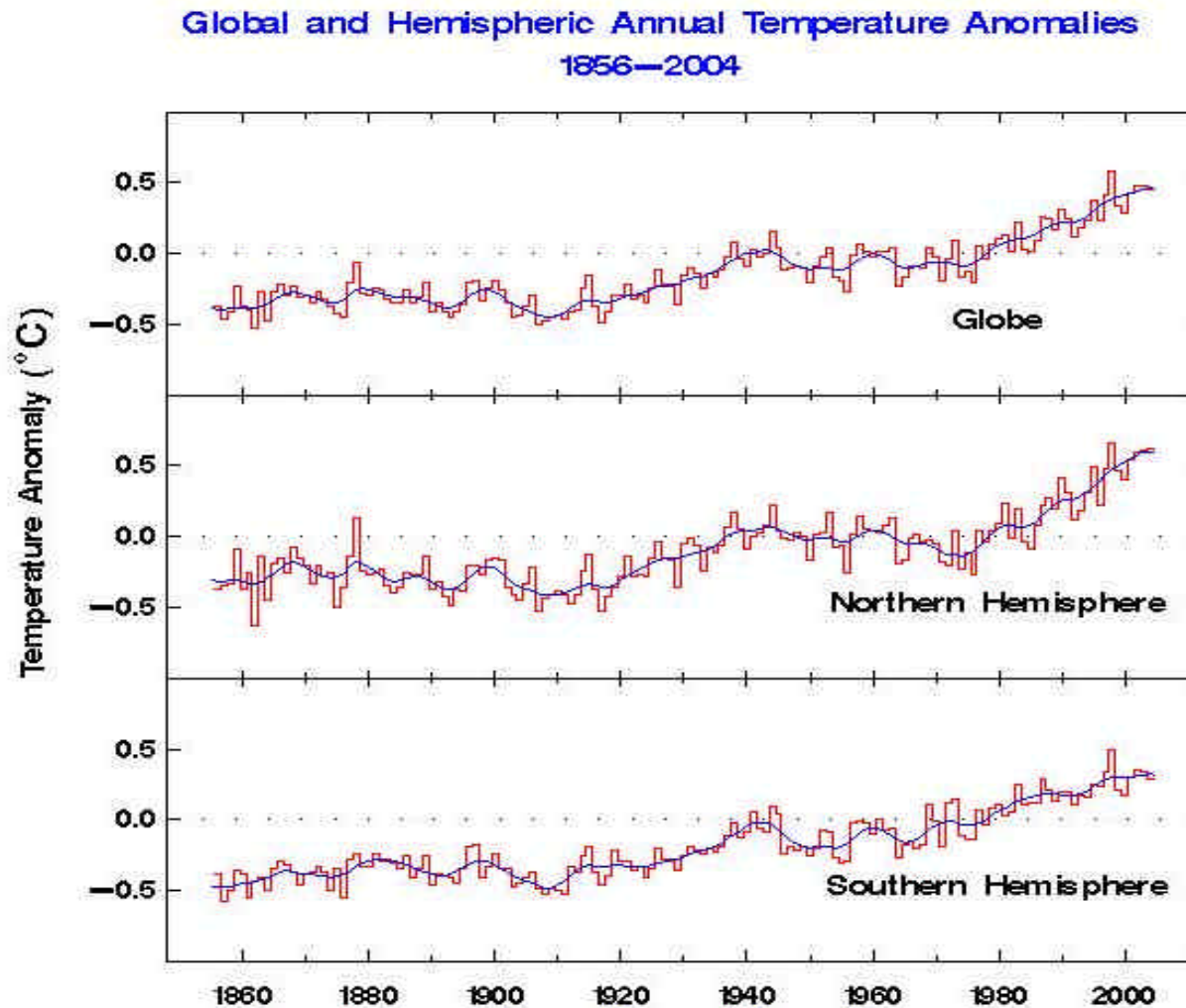
The world seems to be heating up

Global Mean Temperature over Land & Ocean

Preliminary. New NOAA Surface Temperatures



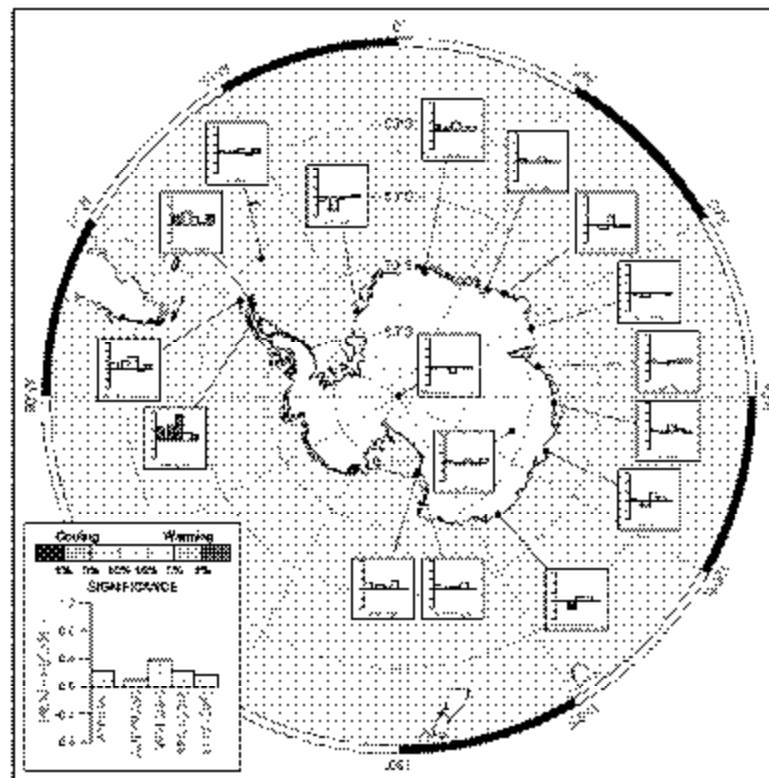
It's true both North and South...



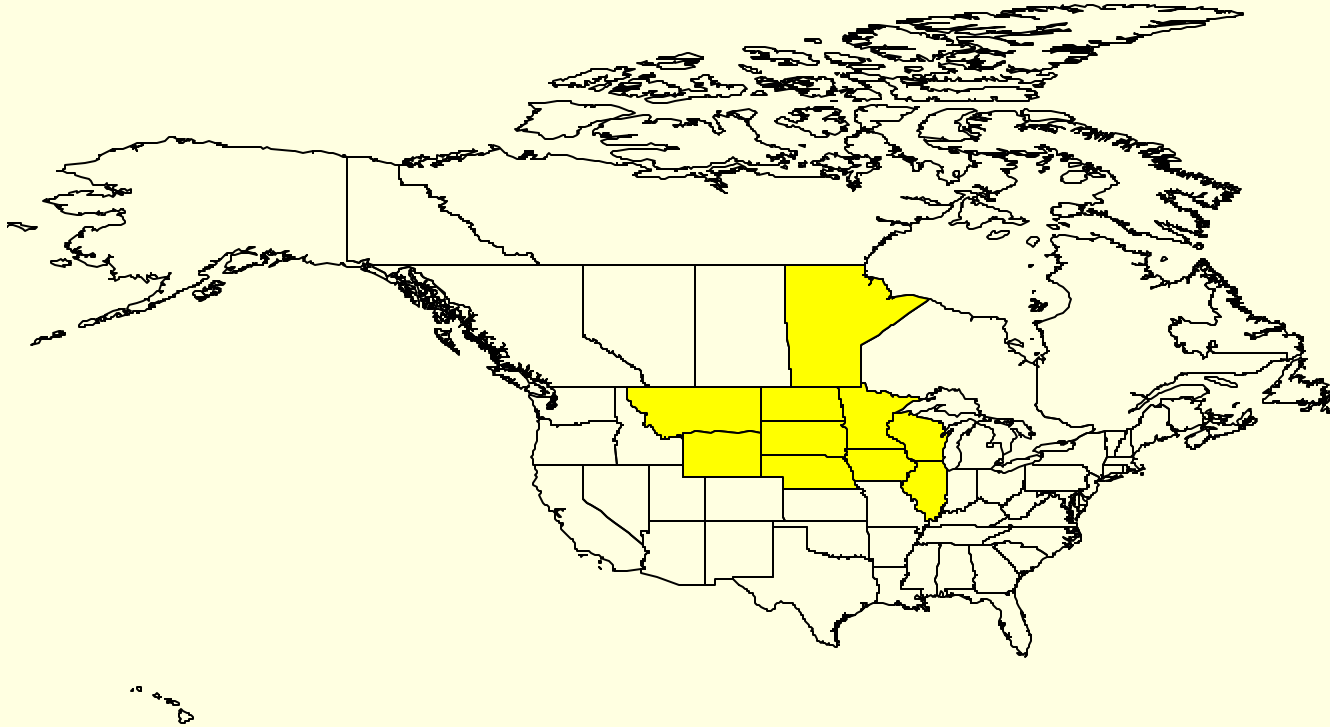
Source: P. D. Jones, T. J. Osborn, and K. R. Briffa
University of East Anglia, Norwich, UK
D. E. Parker, Met. Office, Bracknell, Berkshire, UK

...and even in Antarctica

Antarctic near-surface temperature trends 1951-2004
(Minimum of 30 years' data required for inclusion)



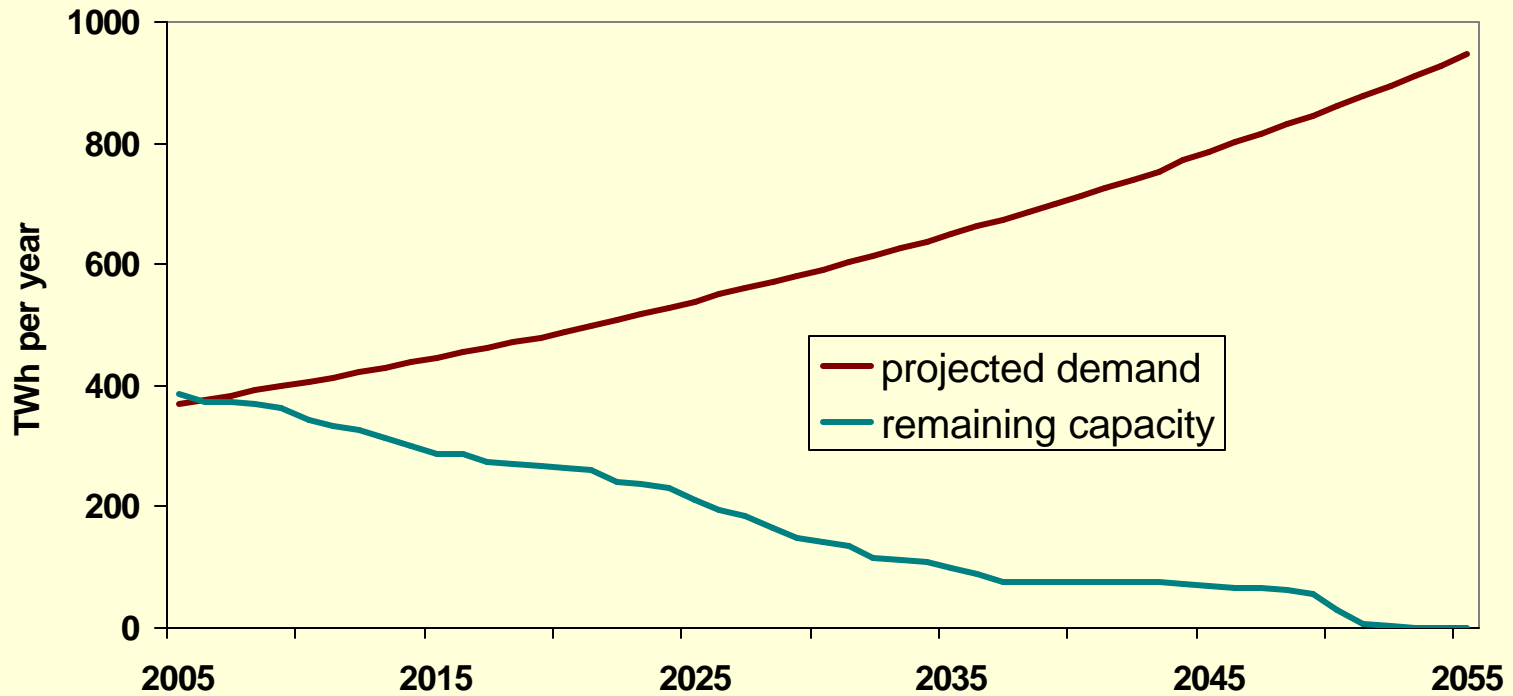
What can the “Upper Midwest” do about it?



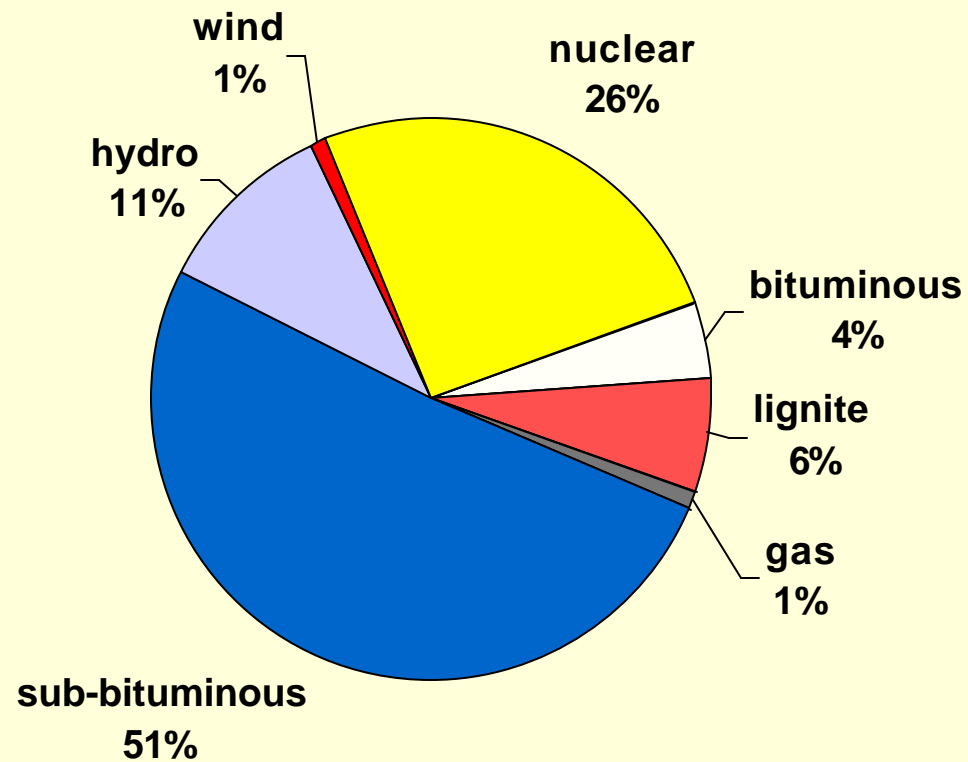
The facts of the matter

- We use a lot of power to run our lives
- We send out a lot of CO₂ and other greenhouse gasses
- We spend a lot of money doing all this

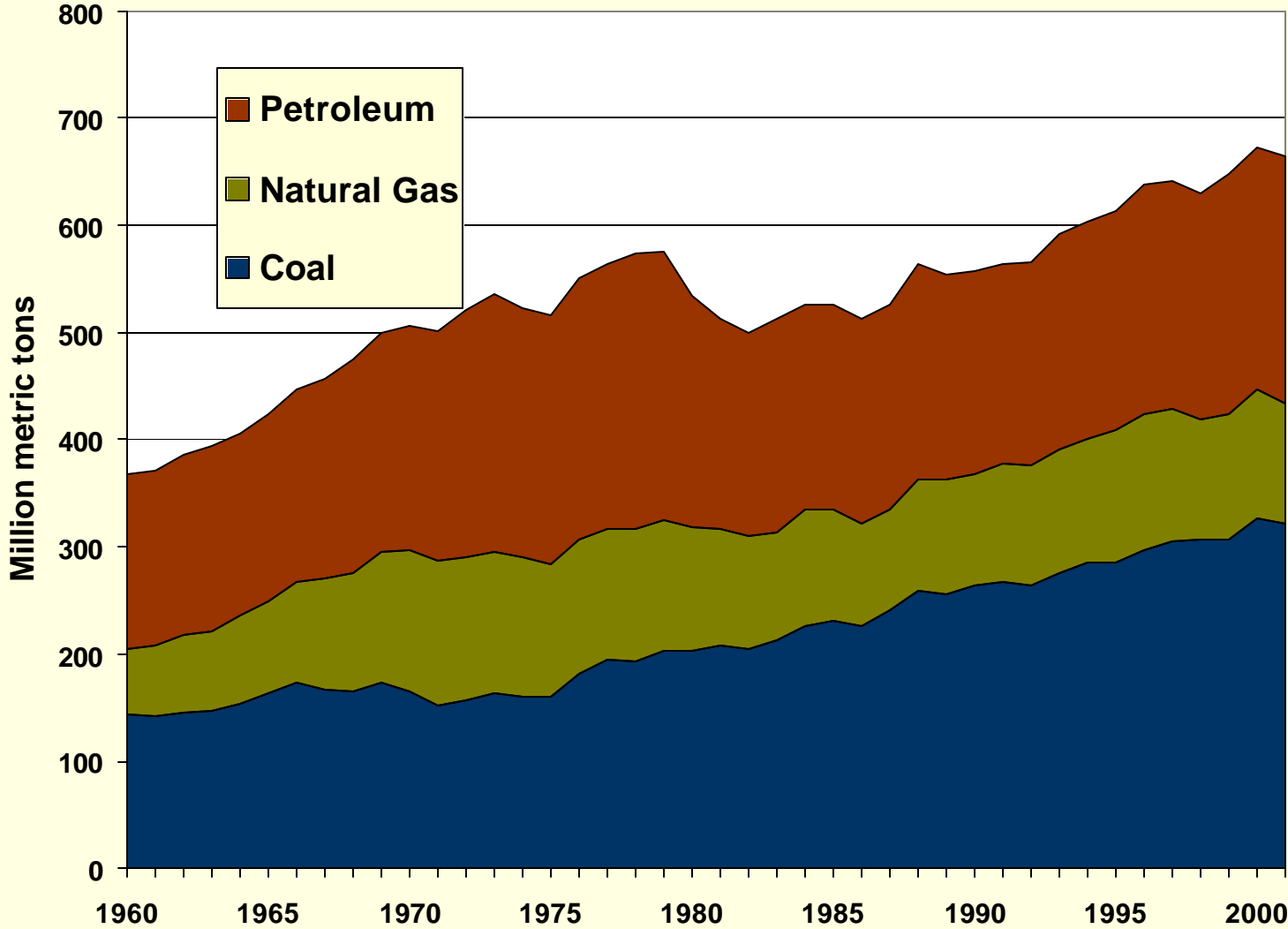
Growing demand and ever-older plants



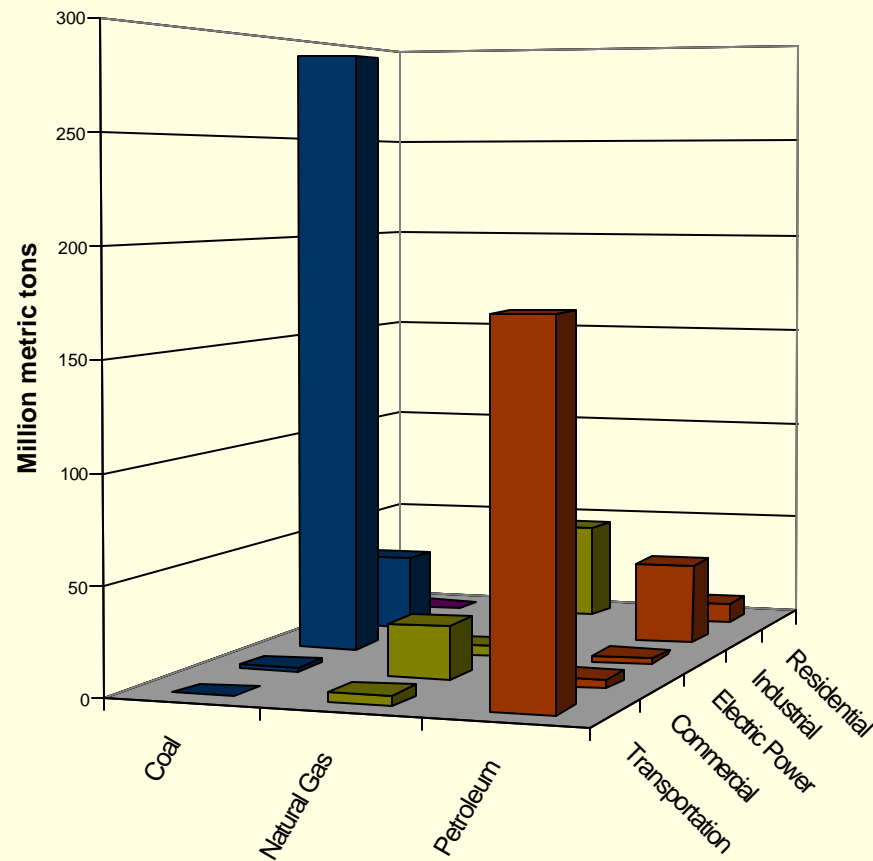
Most of our power comes from coal



CO2 emissions keep going up



A big chunk of the CO2 comes from power production



Forecasts are always wrong

Figure 5. Electricity generation by fuel, 1970-2025 (billion kilowatthours)

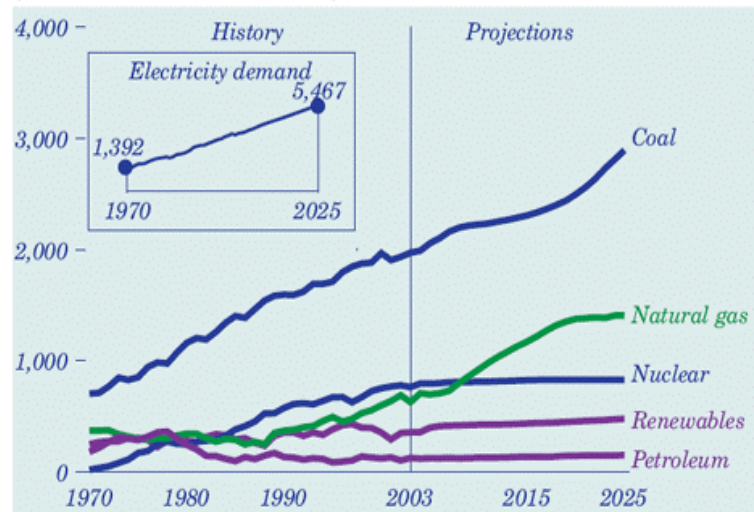
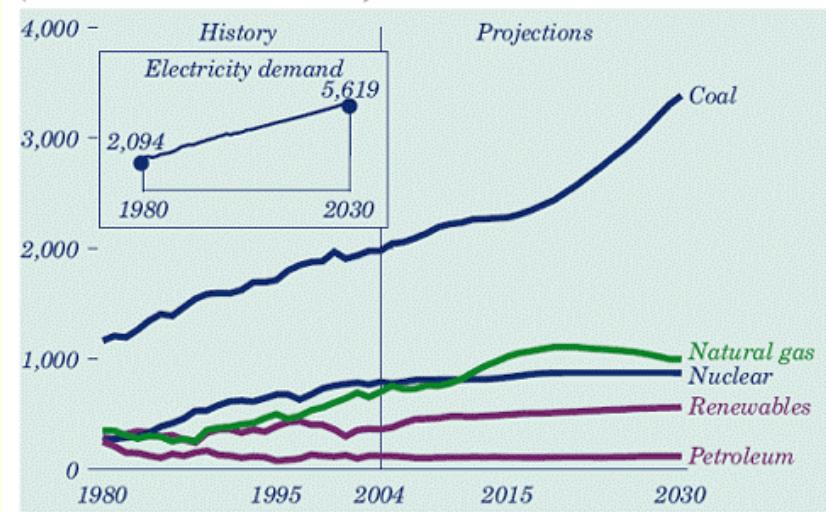
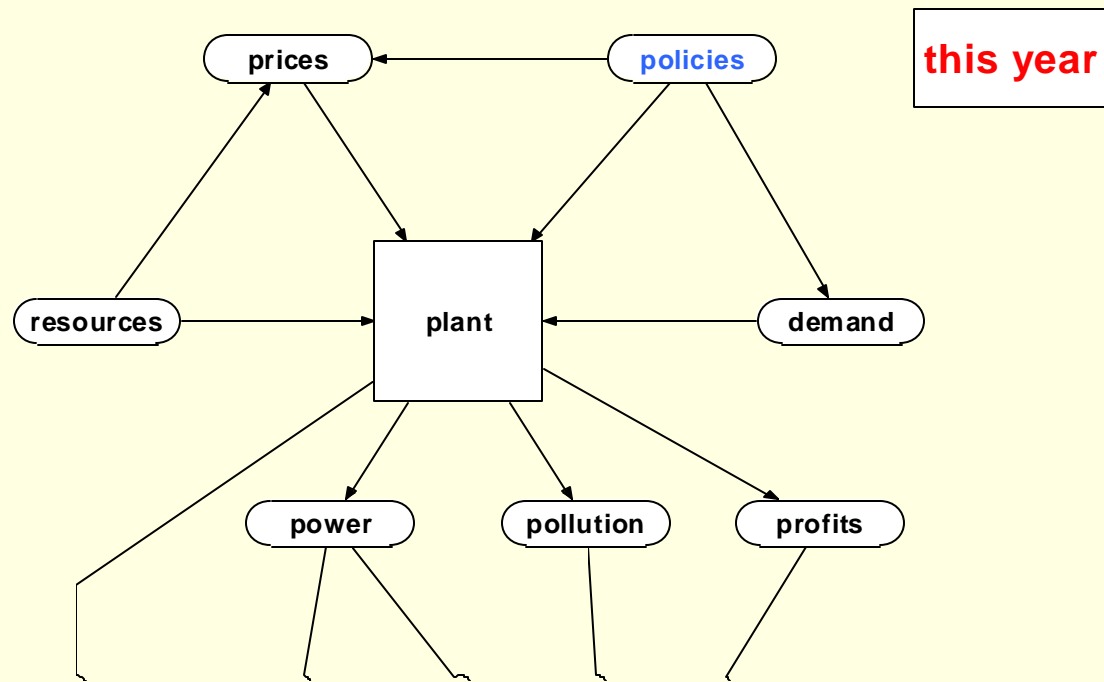


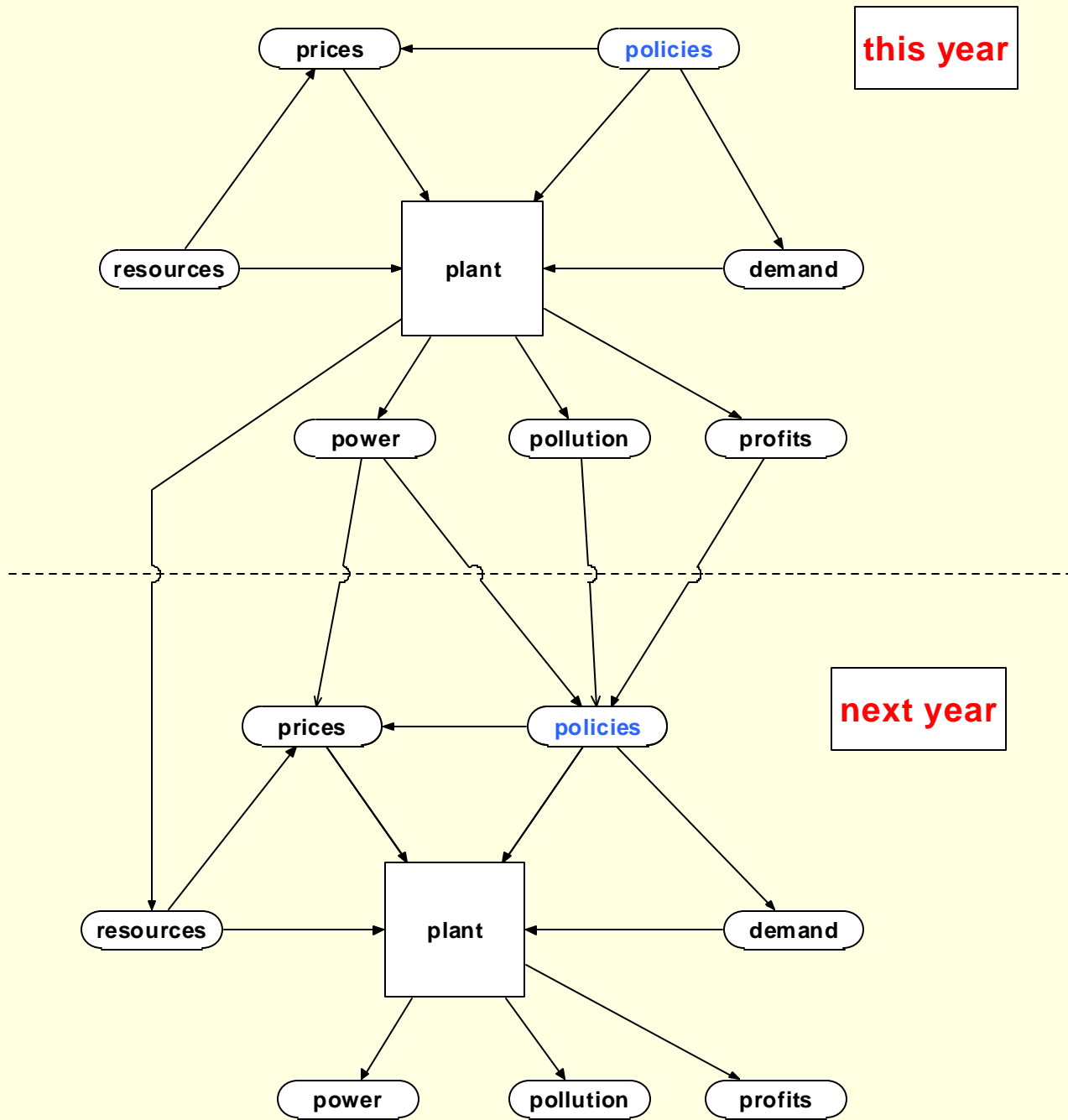
Figure 5. Electricity generation by fuel, 1980-2030 (billion kilowatthours)



Let the people do the forecasting: a model

- *Power demand* is satisfied by lowest-cost *producers*—within legal and financial constraints
- *Government* tries to reduce CO₂ by influencing location and technology of power production
- *This year's* decisions are shaped by *last year's* decisions





What if we don't do anything?

For today, let us agree...

- Light: GOOD
- CO₂: BAD
- Spending money: BAD

The simple task

- Reduce CO₂ by 80% by 2055
- Do this while still meeting all power demand
- Do this without raising prices too much

Greenhouse gas reduction strategies

- *Ban* high-CO2 technologies
- *Require* low-CO2 technologies
- *Subsidize* new low-CO2 technologies
- *Tax* CO2 emissions
- Reduce demand

What is your favored policy?

- What do you prescribe?
- Why do you think your scheme will work?
- Who will be paying for it?
- What if you're wrong?

How do your prescriptions perform?

Can we do it? Can we reduce CO2 emissions and still keep the lights on – and not break the bank?

- Yes, it's technically and economically feasible
- But we really need to think seriously about whether coal and nuclear should be in the mix
- Timing is critical

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