

# Energy and Technology for the 21<sup>st</sup> Century

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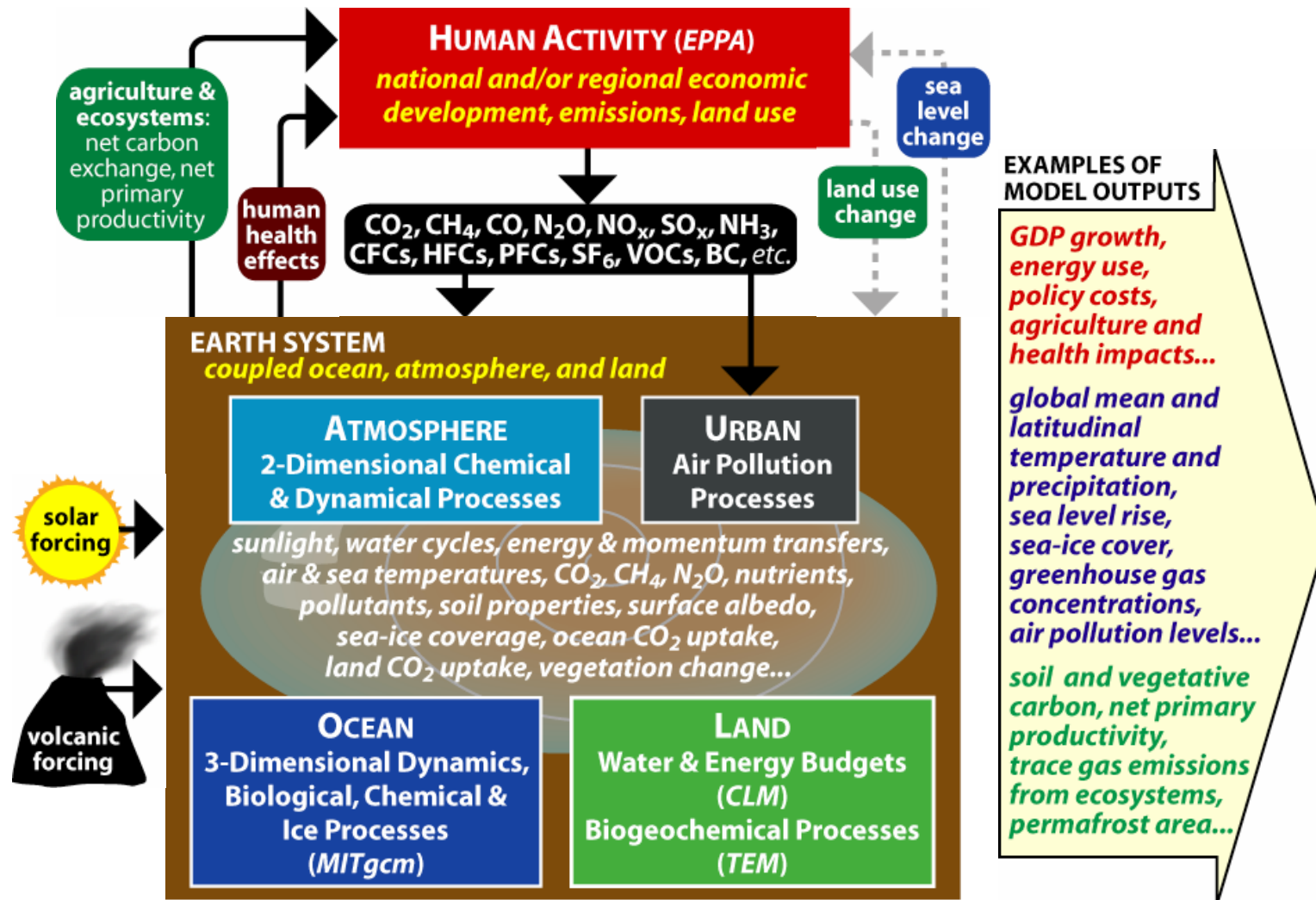
Annual Partners Conference  
MIT Center for Real Estate  
14 February 2006



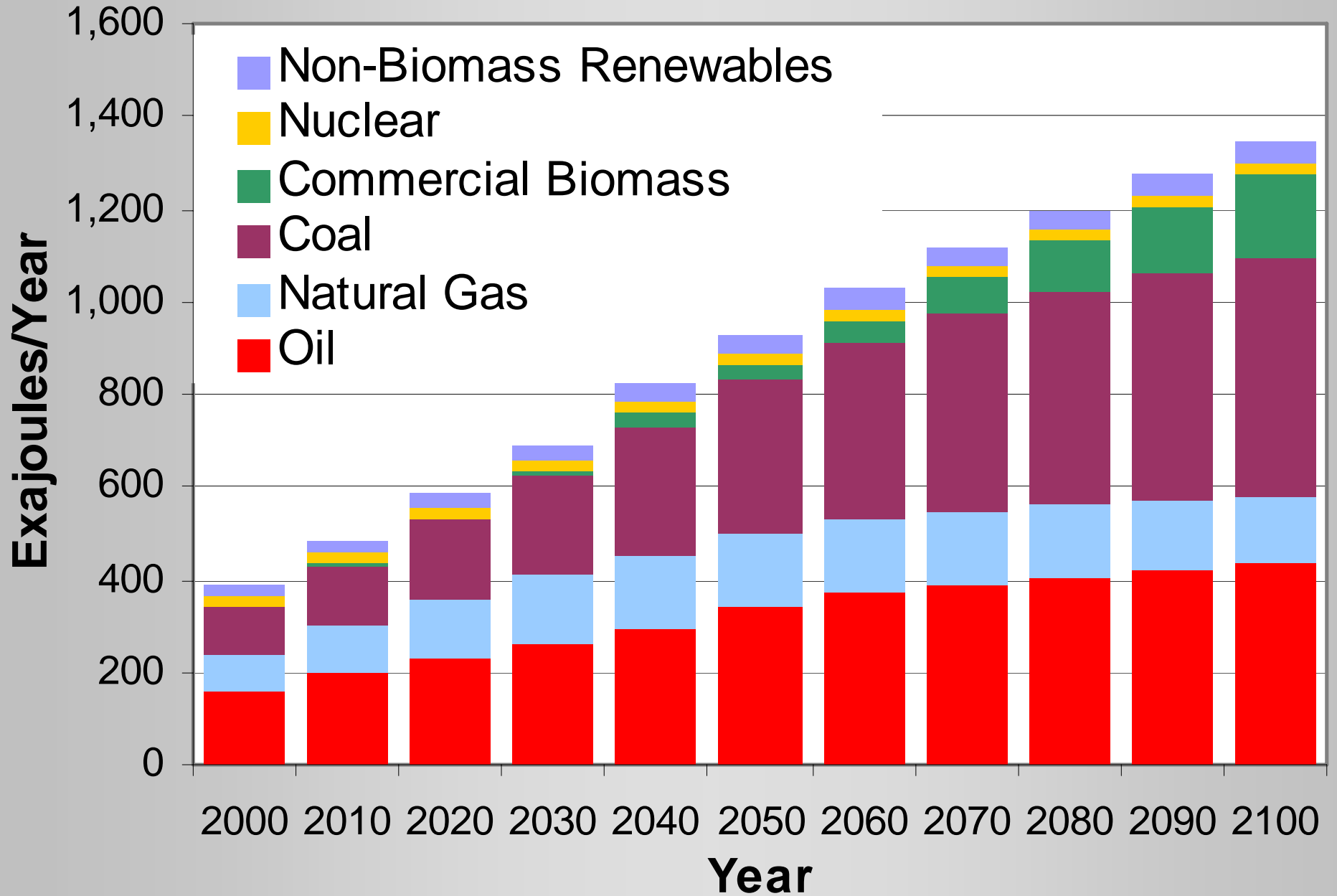
# To Set the Stage: Thinking About the Long-Term

- Population: 6  $\Rightarrow$   $\Rightarrow$  9 to 10 billion by 2100
- Per-capita economic growth
- What energy sources? The great divide!
  - If no threat of climate change
  - With greenhouse gas reduction
- Will we run out of fossil energy?
- What technologies will be used?
- And on what “real estate” will all these developments take place?

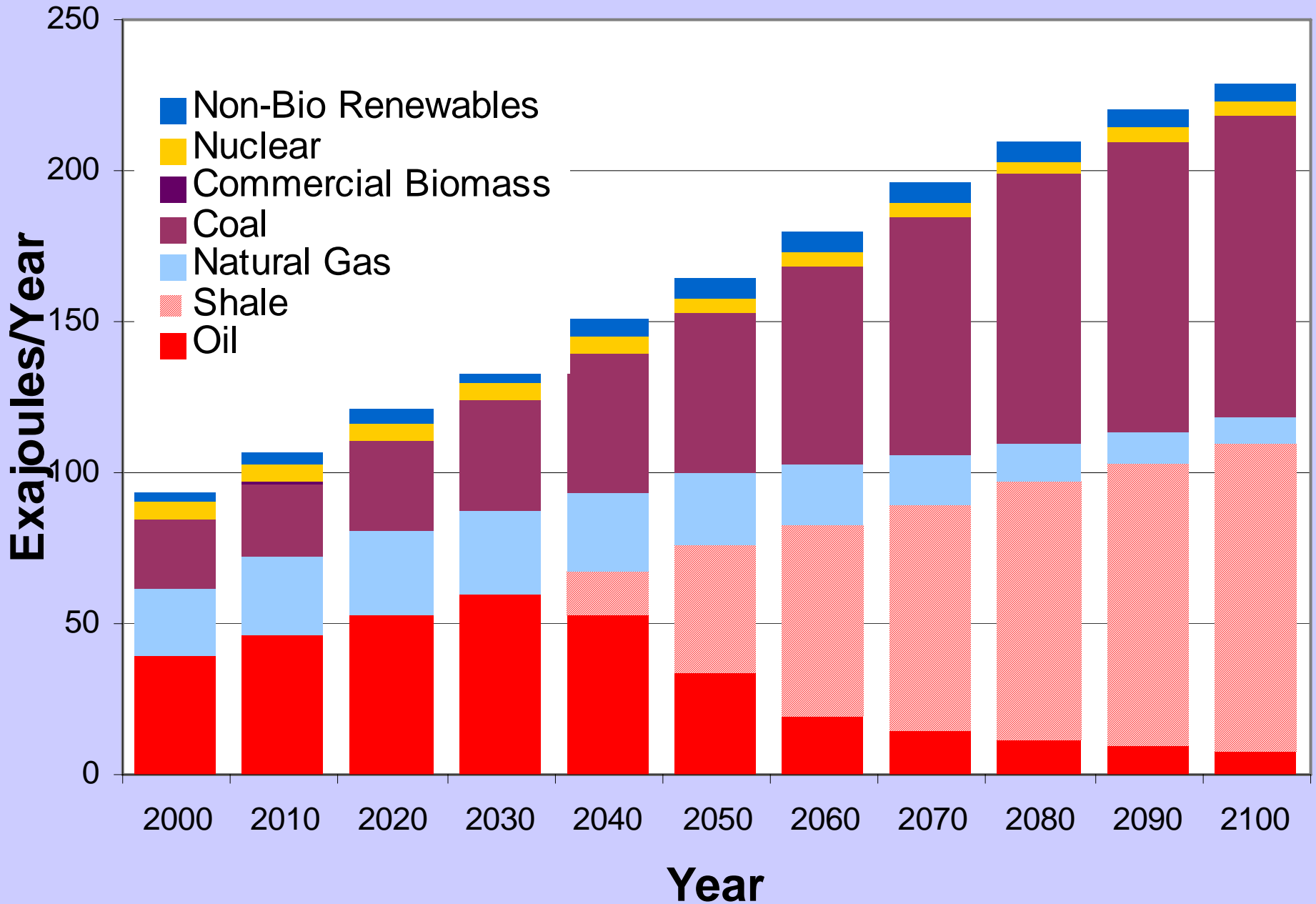
# MIT Integrated Global System Model (IGSM) Version 2



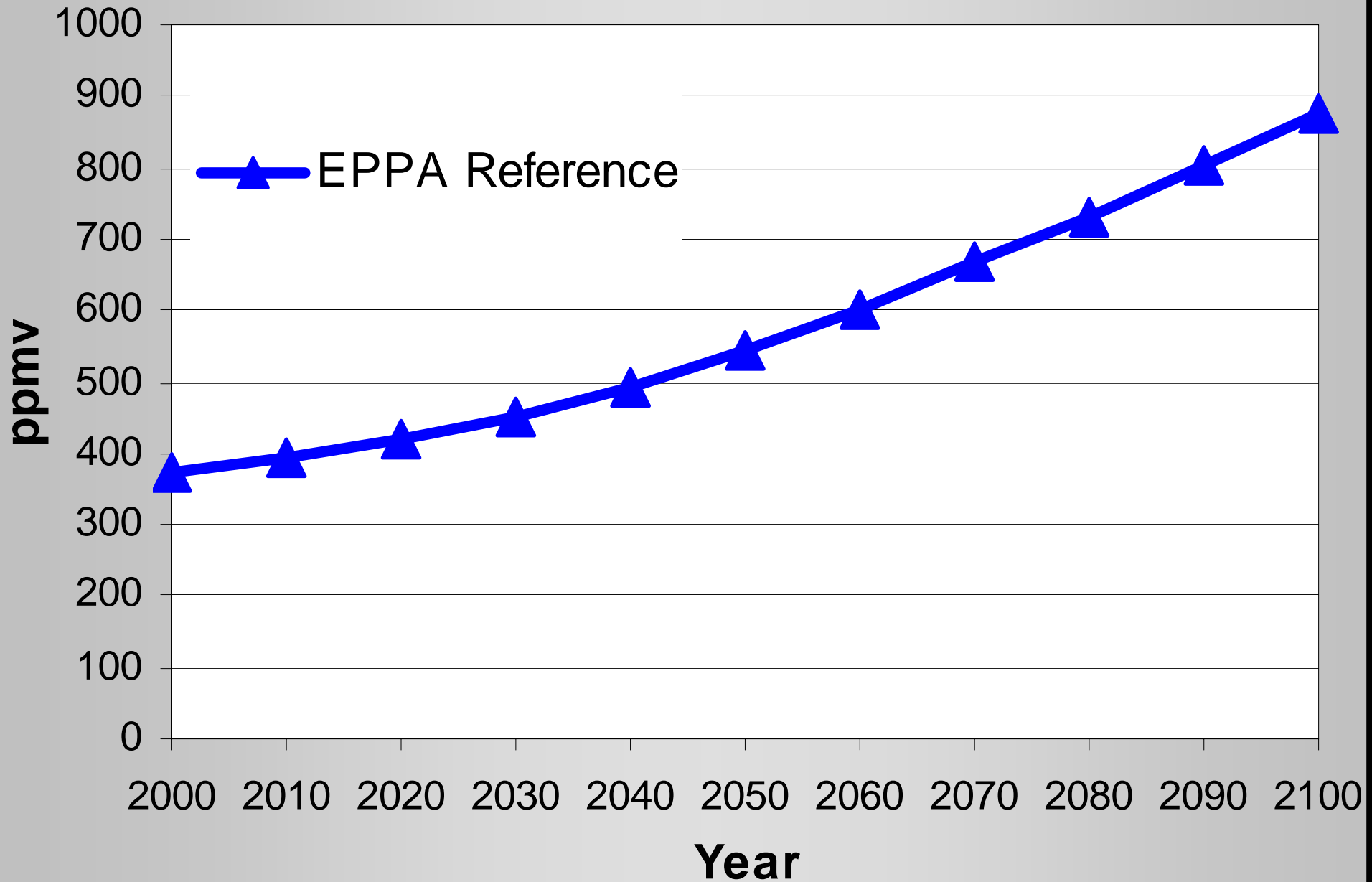
# Global Primary Energy: Reference



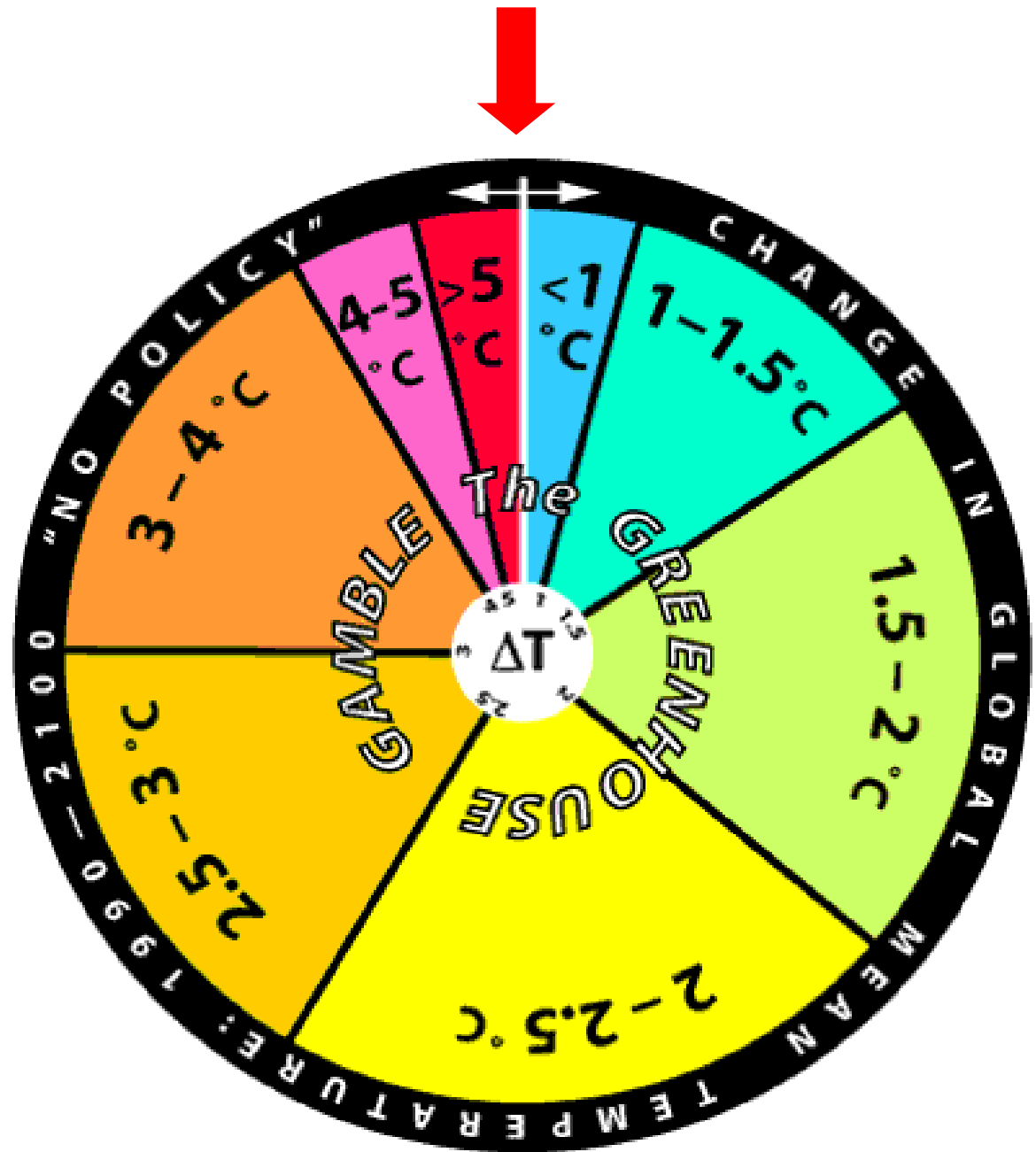
# U.S. Primary Energy: Reference



# CO2 Concentrations

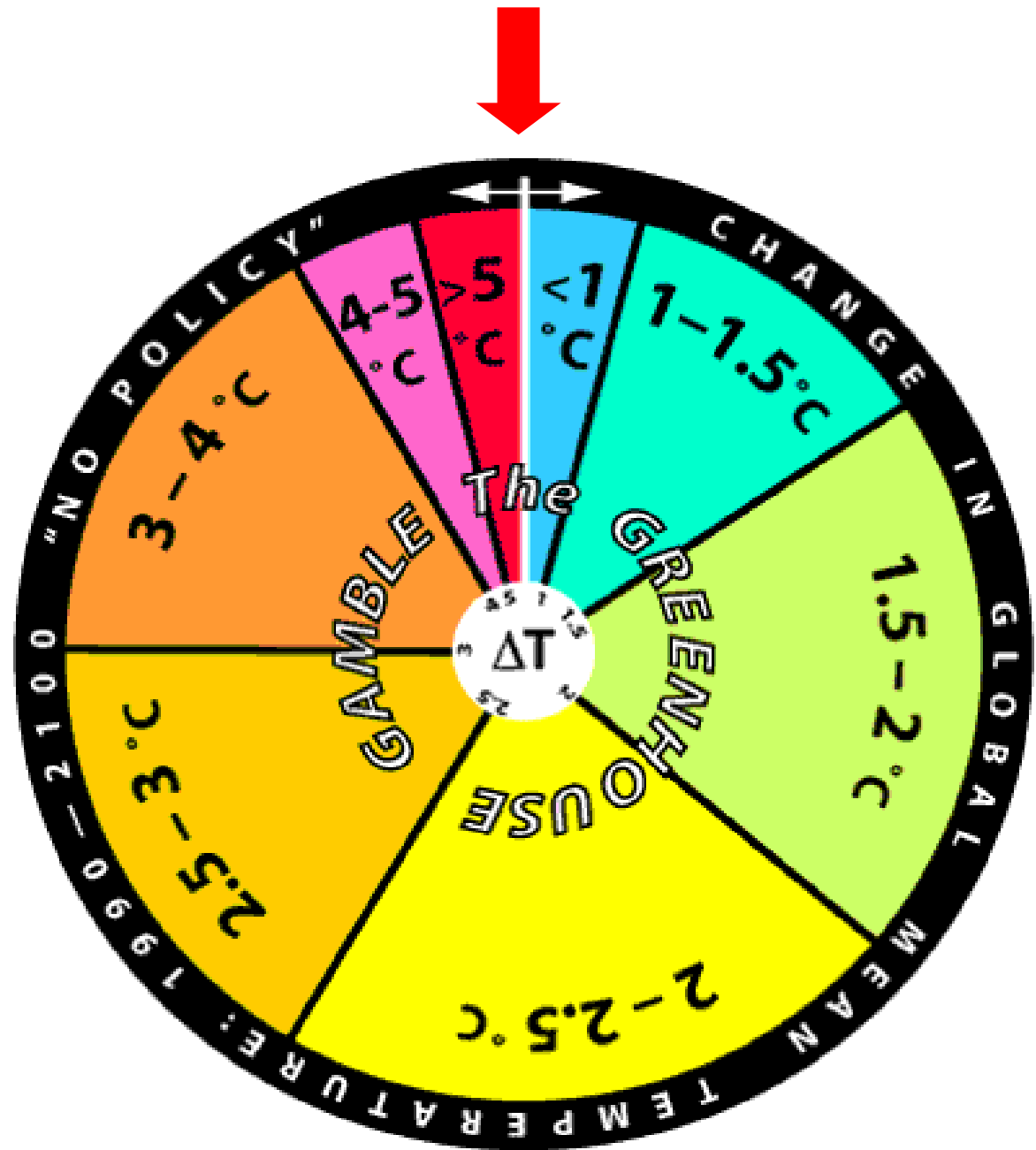


What is the level of risk?



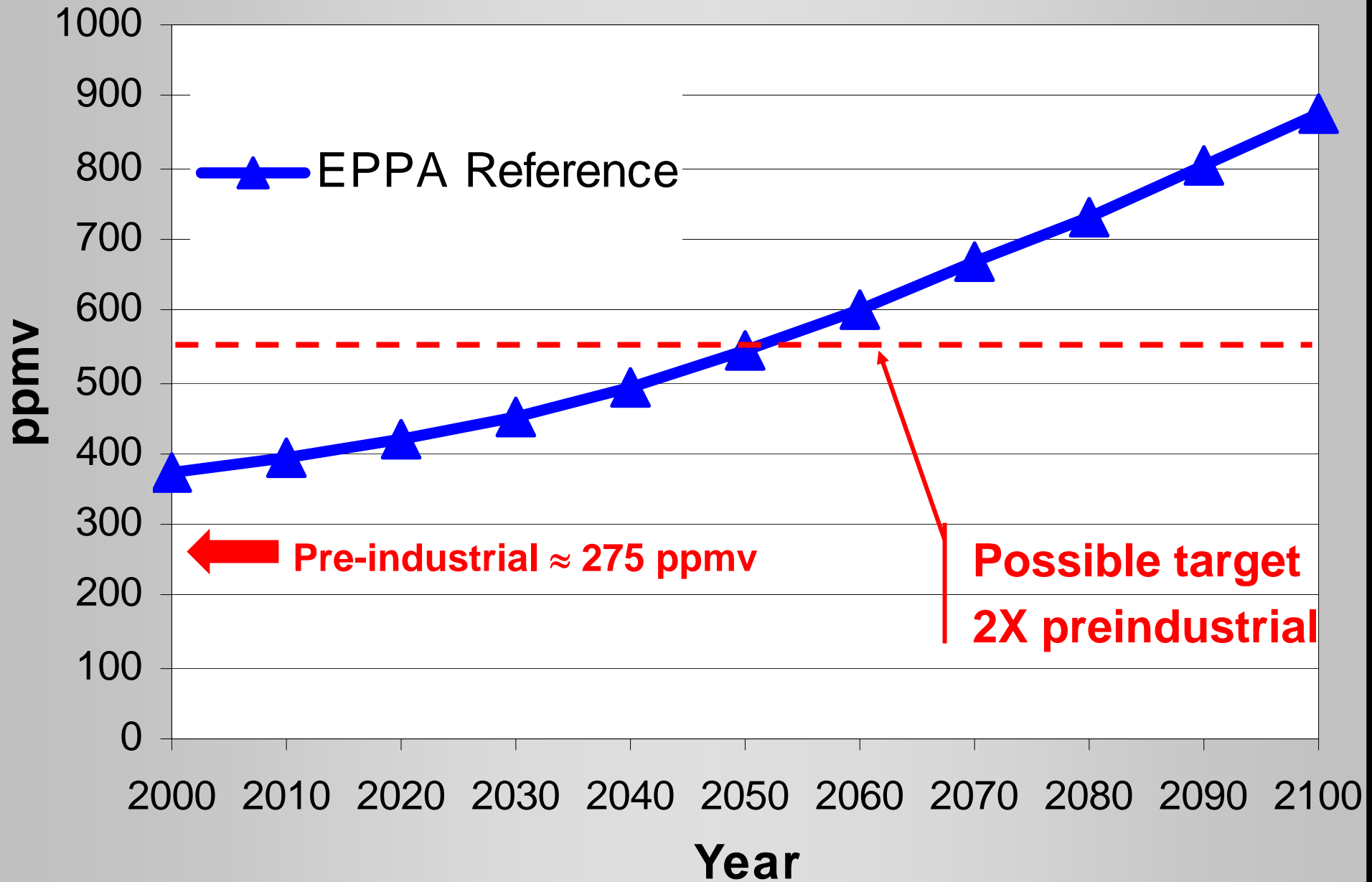
Thought experiment:  
 $\Delta T$  to 2100,  
no policy

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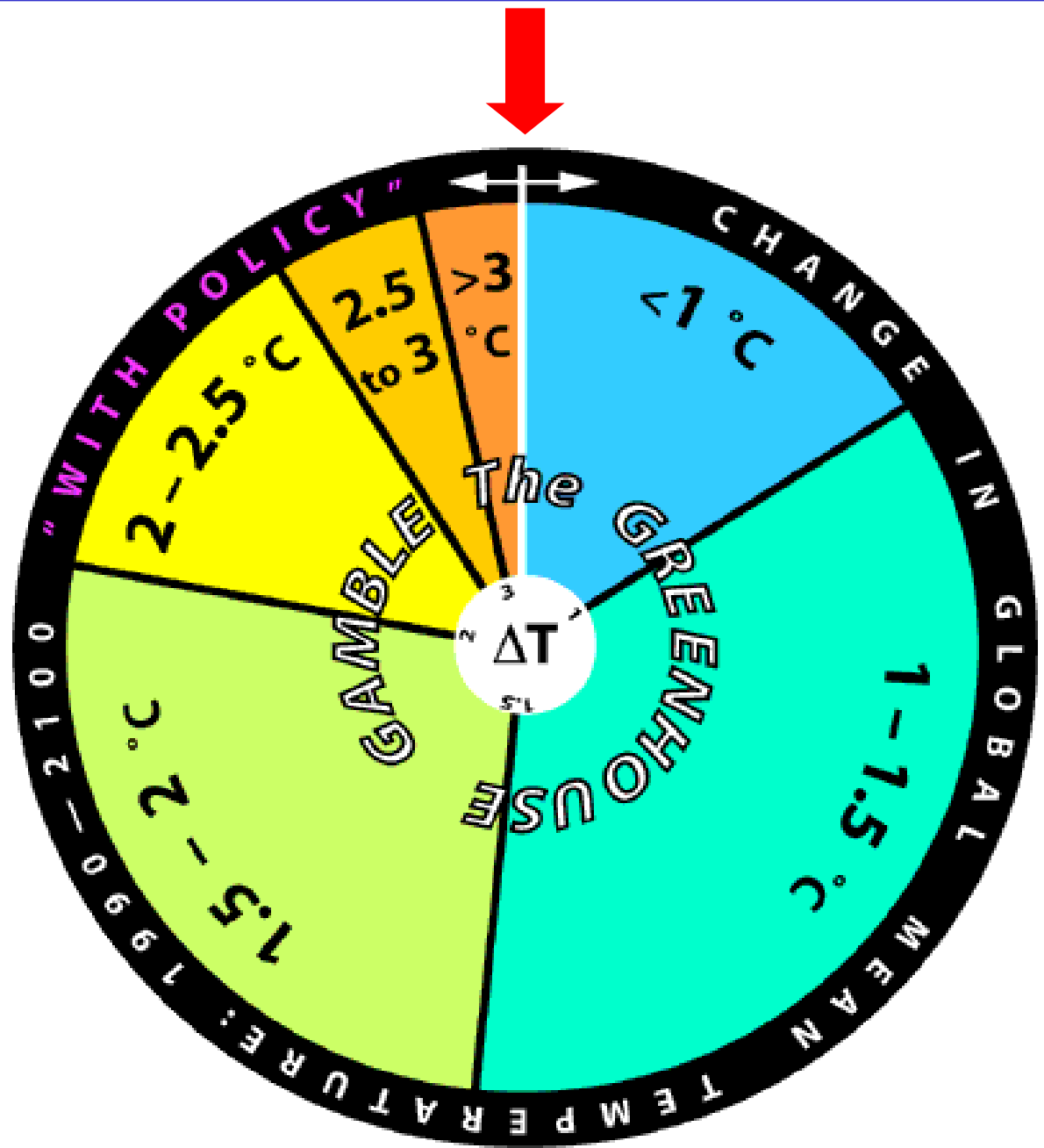
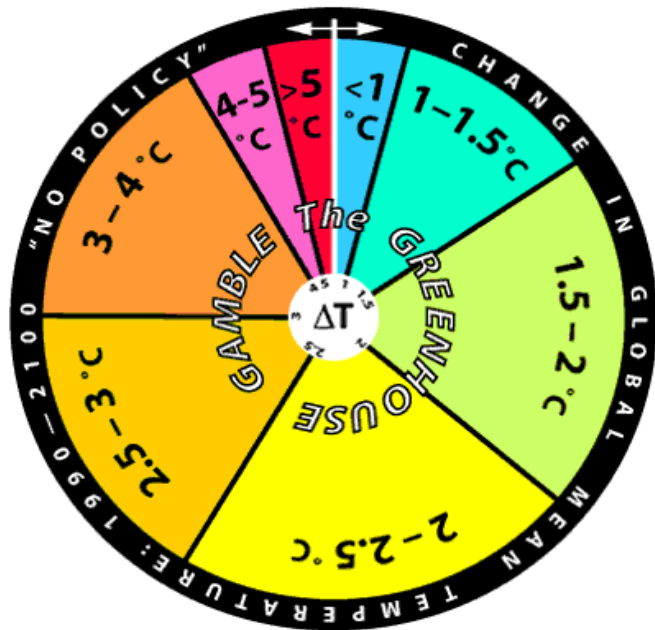


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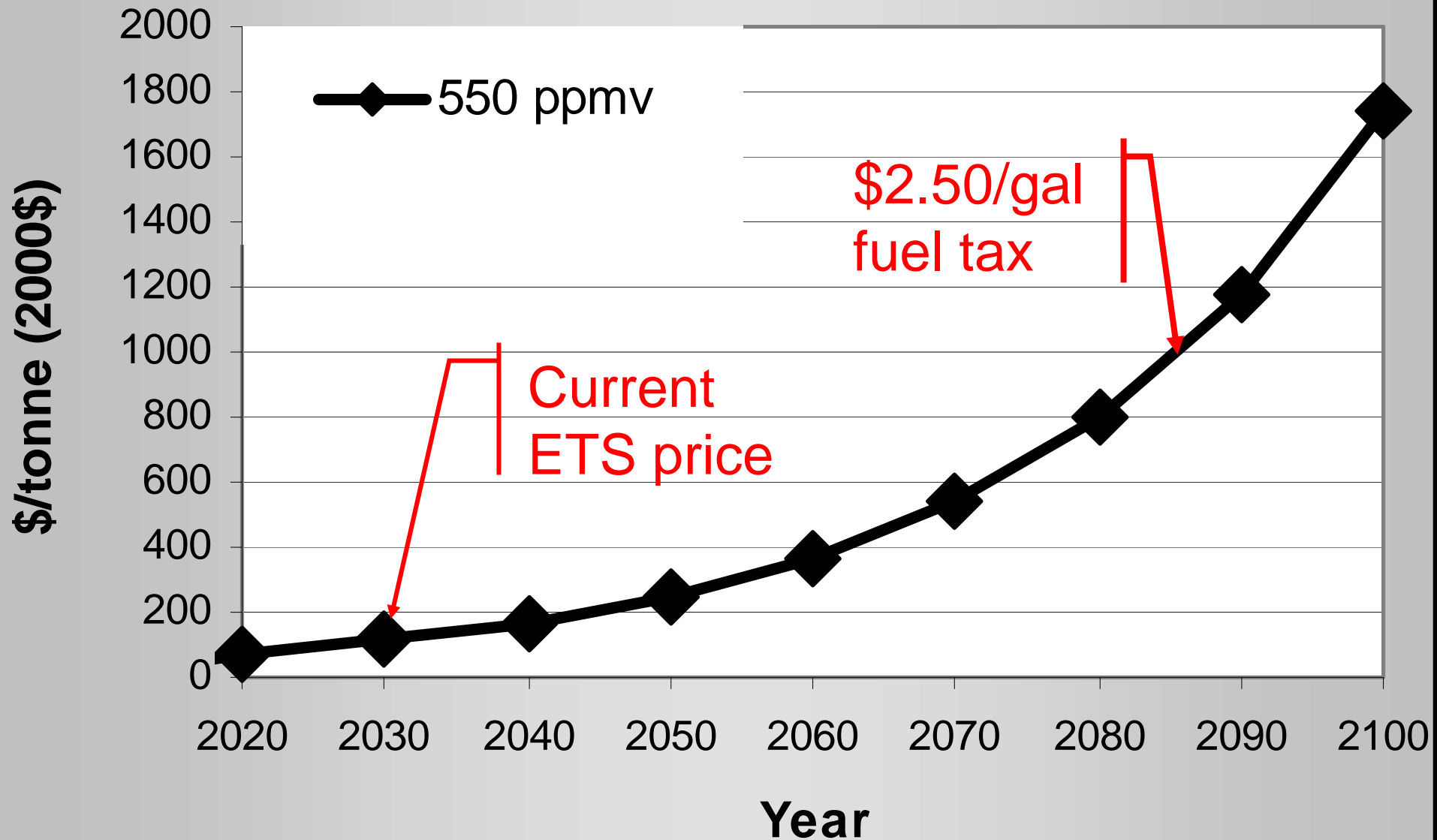
# CO2 Concentrations



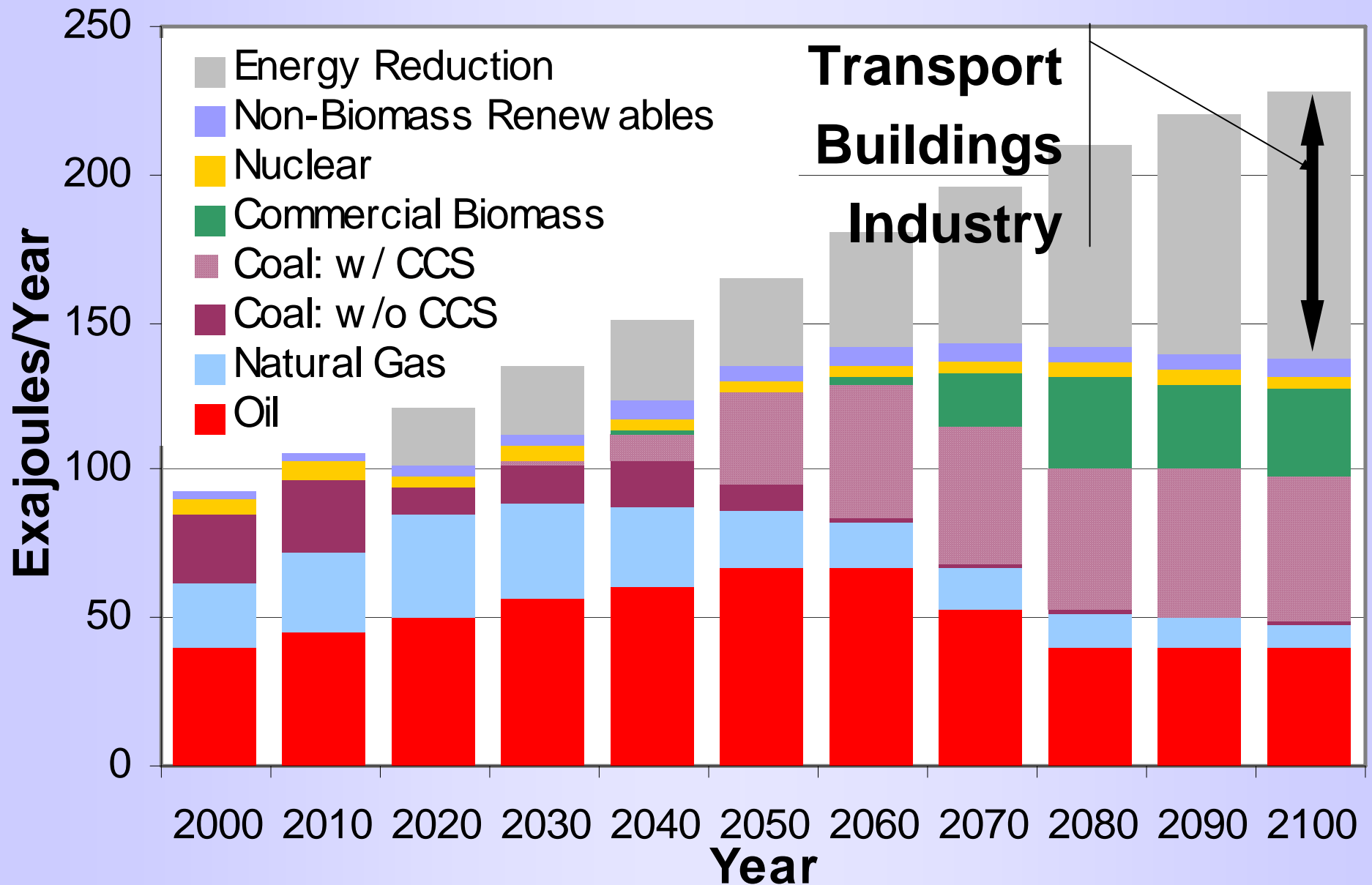
What would we gain with stabilization & 550 ppm?



# Penalty on Carbon Emissions

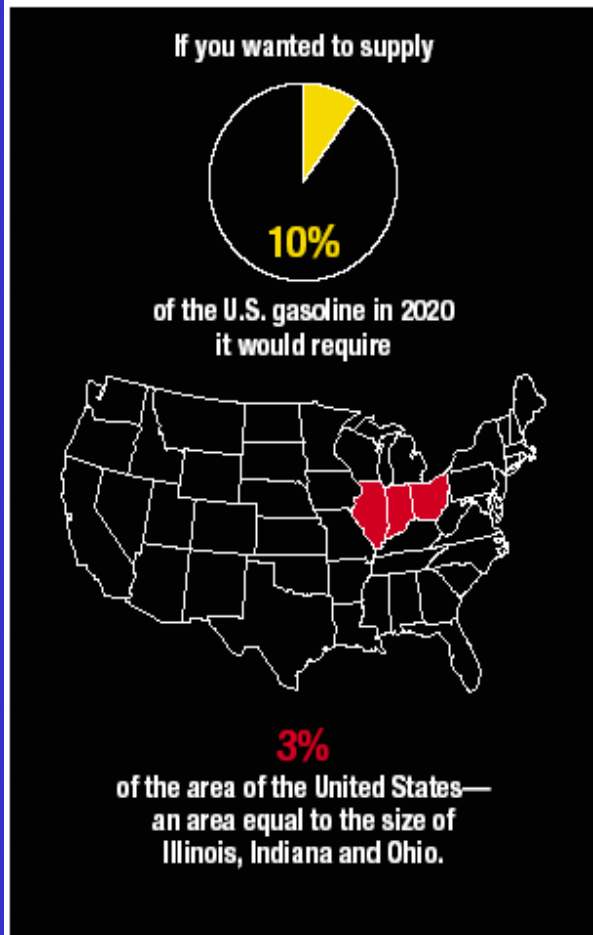


# U.S. Primary Energy: 550 ppmv

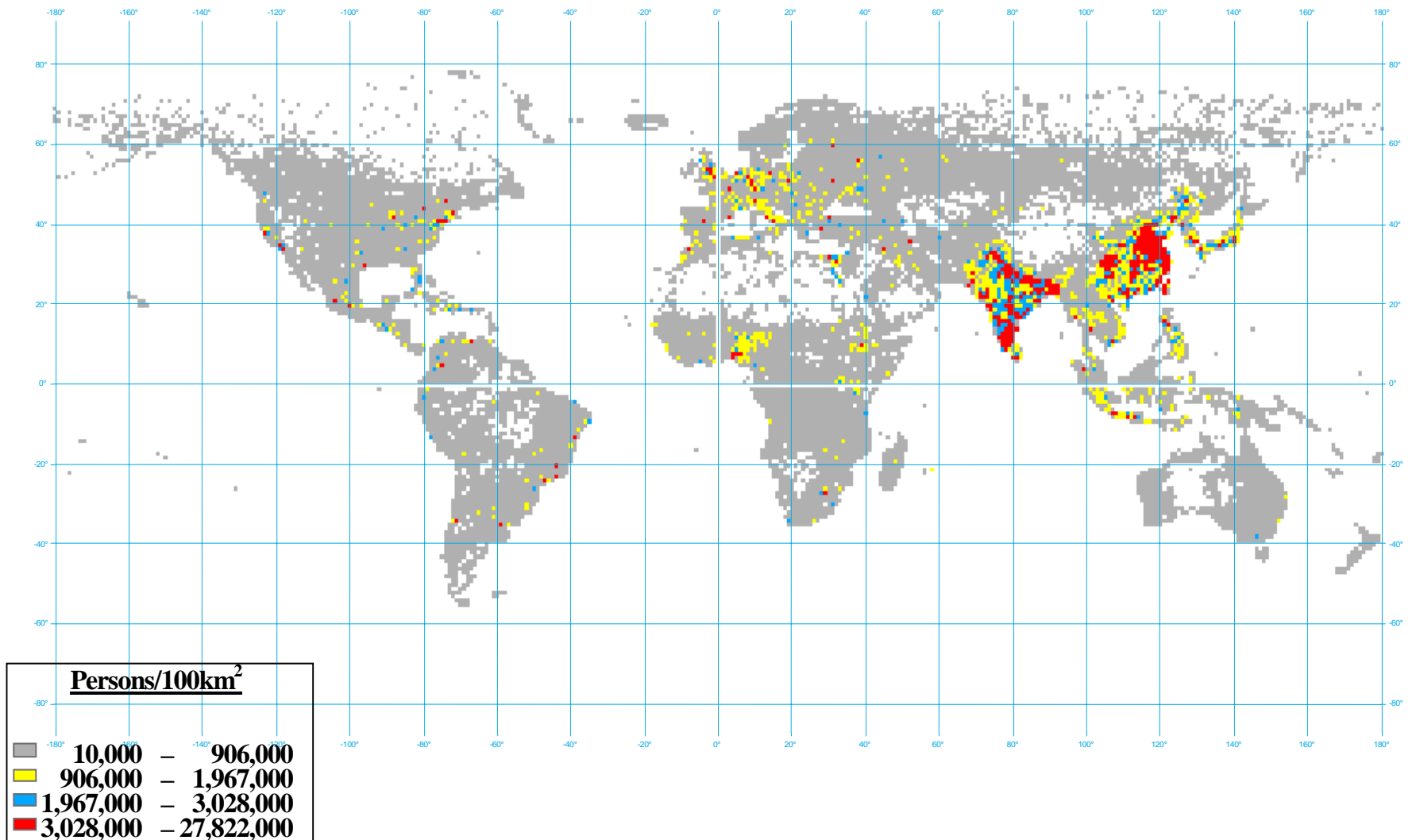


# Biomass Land Area to Supply Gasoline in US

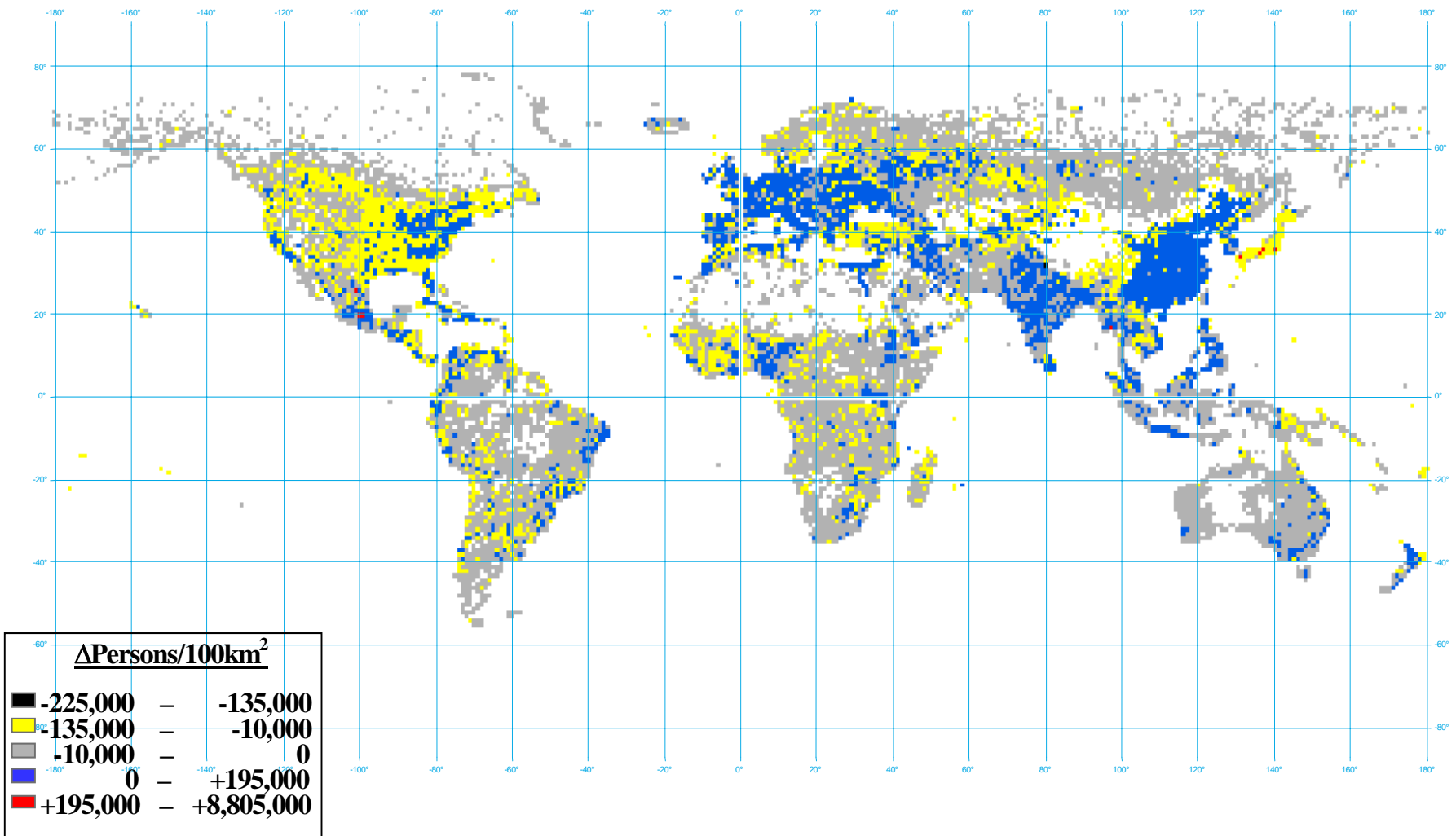
% of Land area needed to supply corn ethanol



# 1997 Actual Global Population Density



# Change in Population Density: 1997 to 2100



# What Might All This Mean for Real Estate, Loosely Defined?

- Great uncertainty about the business environment, including
  - Economic incentives driven by fuel prices
  - Taxes & regulations driven by climate concern
- Potential pressures/conflict regarding
  - Land use (agriculture, forestry)
  - City/regional design—old and new
- Opportunities for those who see clearly