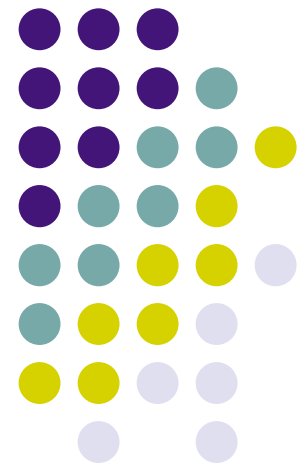


# The Future...

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## The Near Term



## A quote ...



“The problem with our time is that the future is not what it used to be...”

Paul Valery

# 21st Century Challenges (2020 and Earlier)

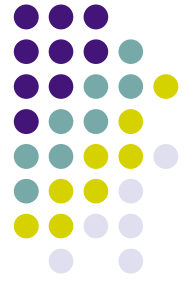


- The Age of Knowledge
- Demographics
- Globalization
- Energy
- Global Sustainability



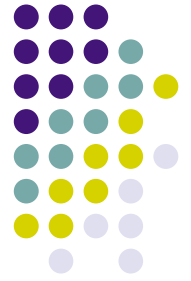
*The Age of Knowledge*

# The Age of Knowledge



- A radically new system for creating wealth has evolved that depends upon the creation and application of new knowledge.
- In this "Age of Knowledge", the key strategic resource necessary for economic prosperity and national security has become knowledge itself—educated people and their ideas.

# But...

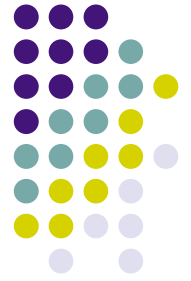


- But unlike natural resources such as oil or iron that have driven earlier economic transformations, knowledge is inexhaustible. The more it is used, the more it multiplies and expands.
- But knowledge can be created, absorbed, and applied only by the educated mind.
- Hence the true wealth of nations in a global, knowledge-driven society has become human capital: educated people!



# *Demographics*

# An Aging Society



- Something unprecedented and irreversible is happening to humanity. This year or next, the proportion of people aged 60 or older will surpass the proportion of under-fives. For the rest of history there are unlikely to ever again be more toddlers than gray heads.
- Actually three trends:
  - Bulge in retirement over next decade
  - Widespread fall in fertility rates (below replacement value)
  - Earlier retirement, longer life expectancy
- Thus a larger generation of old folks than ever before will need support for longer than ever before from a population of working age that is shrinking in absolutely size for the first time since the Black Death. In a decade's time many countries thus start to face a huge problem: how to support a vastly larger population of old folks.

*The*

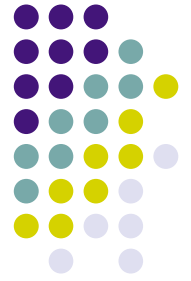
*Economist, March 2004*





# Aging Populations

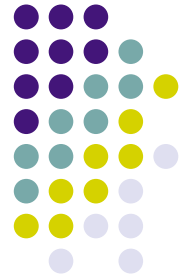
- Over the next decade the percentage of the population over the age of 60 will grow to over 30% to 40% in the U.S., Europe, and parts of Asia.
- Half of the world's population lives in countries where fertility rates are not sufficient to replace their current populations.
- Aging populations and shrinking work forces will have a serious impact, particularly in Europe, Russia, and some Asian nations such as Japan, South Korea, and Singapore.



# The United States

- The U.S. will be one of the few developed nations with a growing population, estimated to grow from 300 M to over 450 M by 2050 because of immigration from Latin America and Asia.
- Immigration will continue to diversify the American population with respect to race, ethnicity, and nationality, posing significant social and political challenges.
- Clearly the future of our nation depends on its capacity to draw strength from diversity, but political and economic barriers will continue to exist for many underrepresented populations.

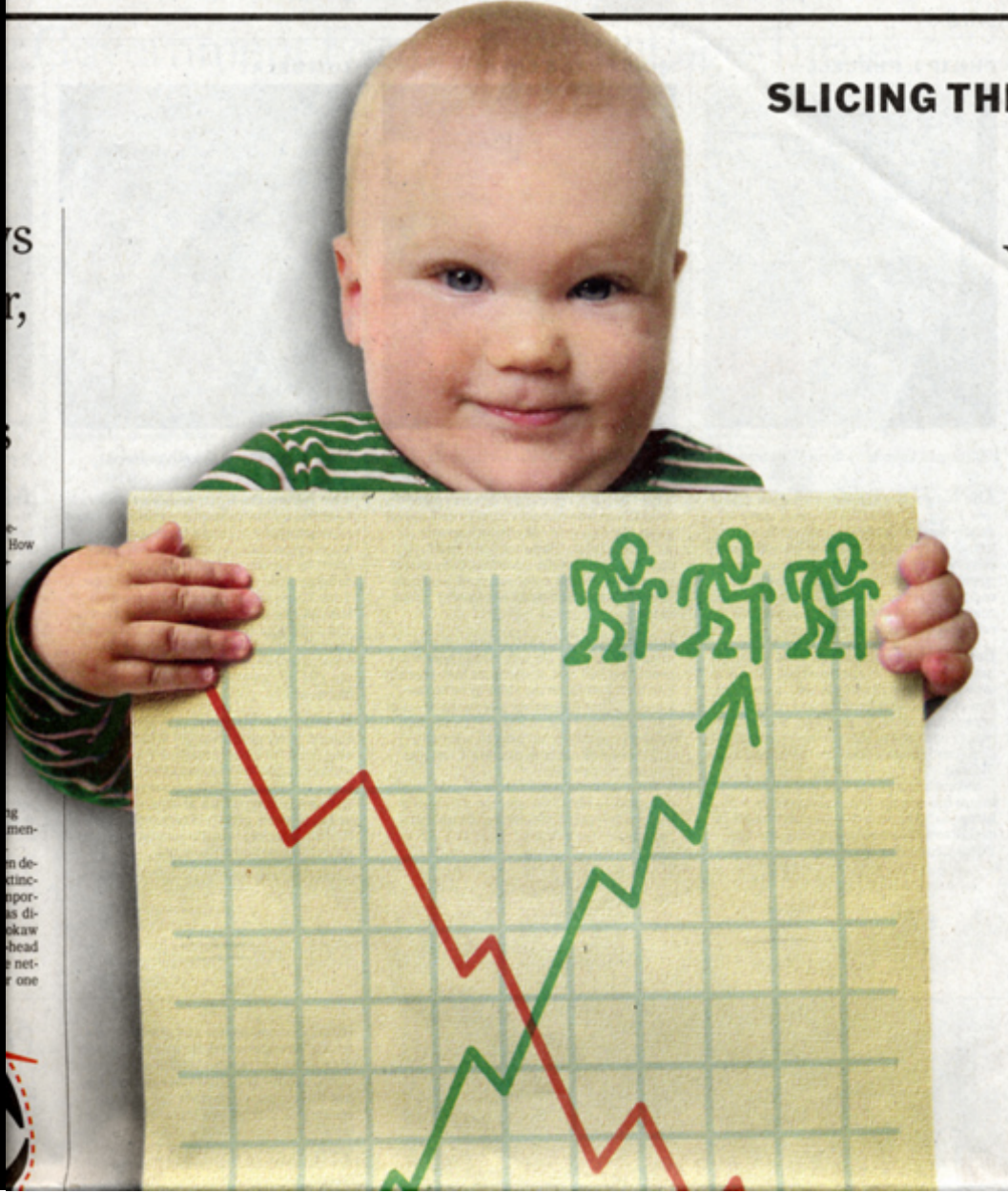
# The United States (cont)



- However a growing population of aging voters will increasingly focus national priorities on the concerns of the elderly (e.g., health care, tax relief) rather than the needs of the young (e.g., education).

# Week in Review

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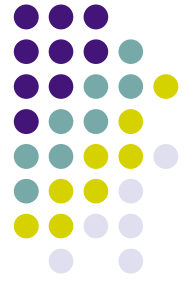
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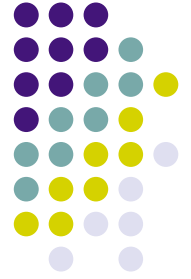
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# The Impact of the Baby Boomers



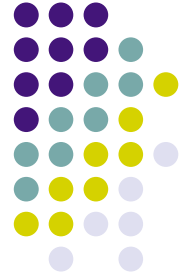
- In the 1950s a culture of immediate gratification developed in reaction to the massive economic clout of the millions of children born after WWII.
- The boomers dropped out, turned on, and protested against the establishment in the 1960s.
- In the 1970s - 1990s this "me" generation dictated a consumer ethic in which consumption was far more important than savings.
- Today this generation has moved beyond the consumer state to an age in which maintaining what they have is more compelling than buying new toys...or looking to the future.

# Today's Boomer Priorities



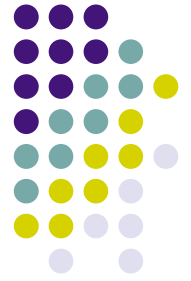
- Quality health care (no matter what it costs)
- Security from crime (more prisons)
- National and homeland security (no matter what it costs)
- Tax relief (although our taxes are already the lowest level among developed nations)

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# Today's Boomer Priorities



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- National and homeland security (no matter what it costs)
- Tax relief (although our taxes are already the lowest level among developed nations)
- (...and to hell with the kids...and to hell with the future.)
- "Eat dessert first; life is uncertain!"





## Worries (NYT 3-10-05)

- Social security spending is growing fast.
- The cost of Medicare is out of control.
- Companies across the country are buckling under weight of providing pensions and medical care to a growing pool of retirees.
- Cities are slashing public works budgets to deal with ballooning pension costs.
- "Are old people going to hog the resources, leaving children today with nothing but a few crumbs?"

# The Baby Boomer Challenge



- How much will it cost to get the baby boomers through retirement and on to their happy hunting ground:
  - Social Security: \$11 trillion
  - Medicare: \$65 trillion

# The Baby Boomer Challenge



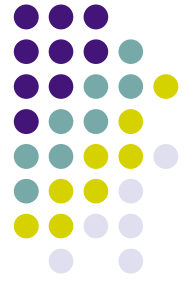
- How much will it cost to get the baby boomers through retirement and on to their happy hunting ground:
  - Social Security: \$11 trillion
  - Medicare: \$65 trillion
- **NOTE: The total estimated worth of the United States is only \$25 trillion!**



# The Elderly vs. the Kids

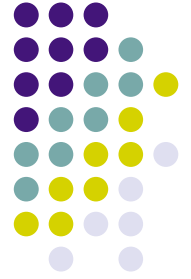
- Federal spending on people over 65 is 7 times the amount spent on kids under 18.
- Spending on Head Start is discretionary, at Congress's whim; spending on Social Security and Medicare is mandatory.
- 17.6% of children under 18 live in poverty; 10.2% of those over 64 live in poverty.
- Yet it is the elderly who received the \$600 billion Medicare prescription drug bill, while No Child Left Behind received only good intentions.

# The Developing World



- Most population growth will occur in the developing world with high fertility rates—Africa, Latin America, Asia—where the average age is less than 20 (with over 2 B teenagers).
- Unless the world can provide this rapidly growing population with the education necessary to compete in and survive in a global economy, the resulting despair and hopelessness among the young will continue to feed the terrorism that so threatens our world today.

# One More Concern



Last month the United Nation's projected the Earth's population in the year 2050 as 9.1 billion, 50% larger than today.

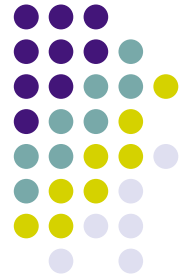
Can we sustain a population of that magnitude on Spaceship Earth?

(More on this later...)



# *Globalization*

# Globalization



- "We see globalization—the growing interconnectedness reflected in the expanded flows of information, technology, capital, goods, services, and people throughout the world—as an overarching mega-trend, a force so ubiquitous that it will substantially shape all the other major trends in the world of 2020."
  - National Intelligence Council Project 2020





## In 2020...

- China's GNP will exceed that of all individual western economic powers except for the U.S. India's GNP will be larger than European economies.
- Sheer size of China's and India's population (1.4 B and 1.3 B) along will make them powerful economies.
- The Asian mega-market—China, India, Russia, Korea, etc.—could become dominant—particular in human capital.



# The Developed Nations

The transition to a global, knowledge-driven economy will not be painless, and it will hit the middle classes of the developed world in particular, bringing more rapid job turnover and requiring professional retooling. Outsourcing and off-shoring on a massive scale will be disruptive.

Example: Compensation levels in China and India for engineers are roughly one-fifth those in the U.S. How can American workers produce FIVE TIMES the value-added necessary to be competitive in the global marketplace?









# An Example: "Off-Shoring"



- U.S. has already lost most low skill, high pay jobs in manufacturing to Asia and Latin America ("outsourcing")
- Today it is losing high tech jobs to India and China ("off-shoring")
- Tomorrow, the convergence of the gigantic source of human capital represented by India, China, and Russia threatens will have serious implications for sustaining our standard of living
- (We cannot maintain prosperity by just mowing each other's lawns...)



# The World Is Flat

A BRIEF HISTORY OF  
THE TWENTY-FIRST CENTURY

Thomas L. Friedman



# Tom Friedman

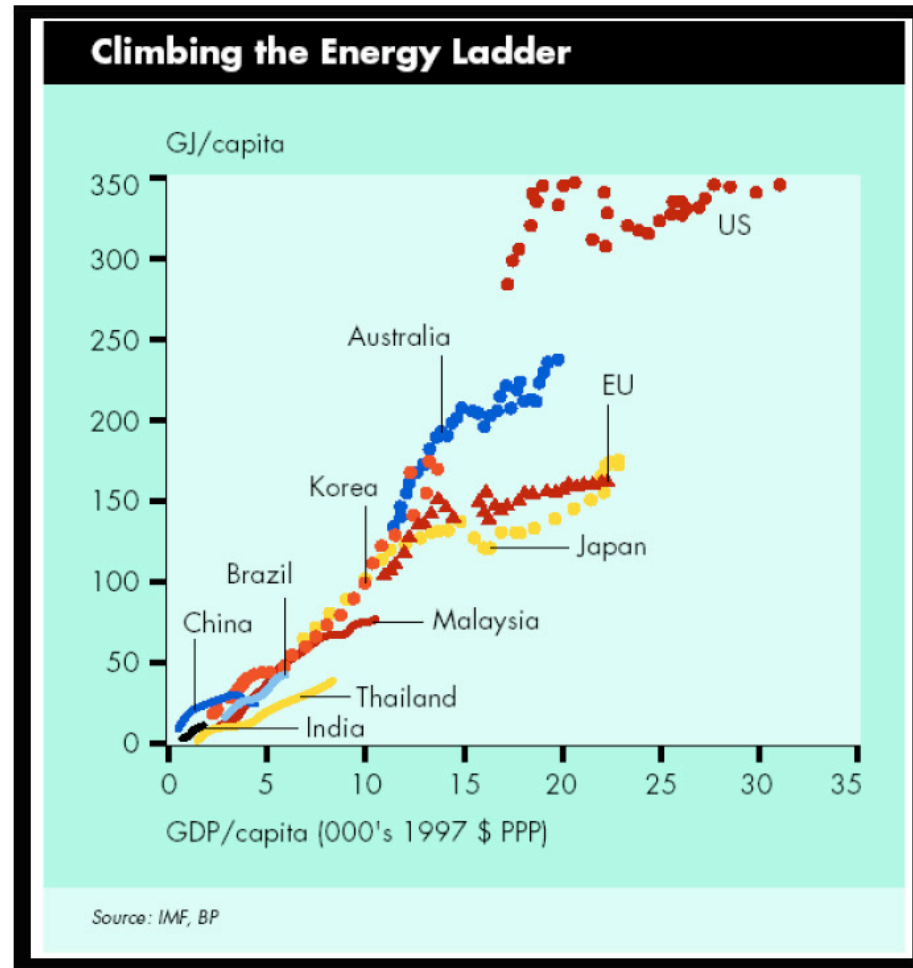


“The playing field is being leveled. Some three billion people who were out of the game have walked and often ran onto a level playing field, from China, India, Russia, and Central Europe, nations with rich educational heritages. It is this convergence of new players, on a new playing field, developing new processes for horizontal collaboration, that I believe is the most important force shaping global economics and politics in the early 21<sup>st</sup> century.”



*Energy*

# Economic Prosperity Requires Reliable and Affordable Energy



Source: Royal Dutch Shell, "Exploring the Future – Energy Needs, Choices and Possibilities"



## **M. King Hubbert's Peak**

- U.S. oil production peaked in the 1970s
  - The imbalance between domestic production and consumption has led to our extreme dependence on Middle East oil
- When will global oil production peak?
  - Certainly some time during this century.
  - Within next few decades?
  - Within next decade?
- Note the disruption that will occur when global consumption exceeds production!

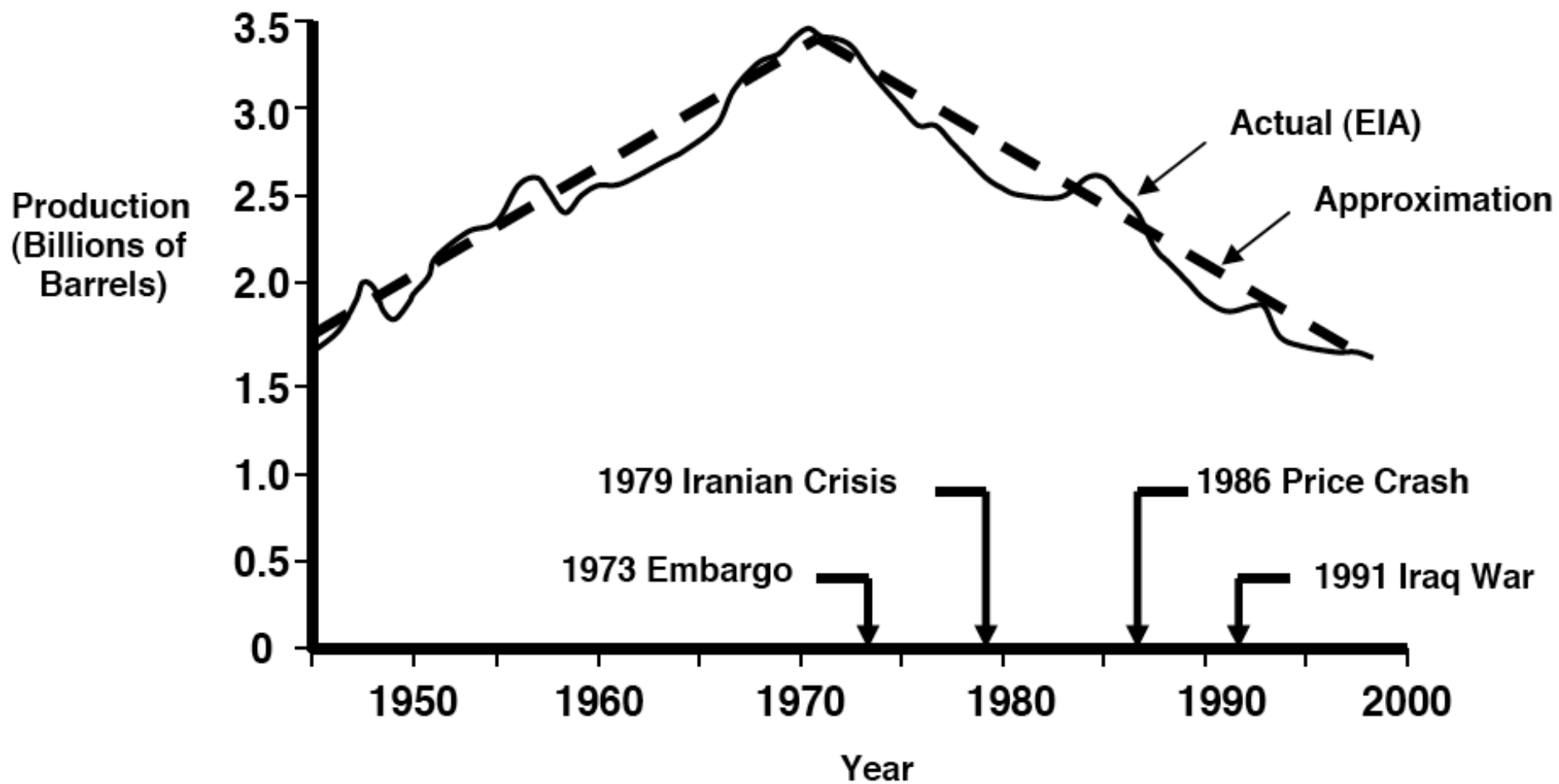


Figure II-2. U.S. Lower 48 Oil Production, 1945-2000



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**Table II-1. Projections of the Peaking of World Oil Production**

<b><u>Projected Date</u></b>	<b><u>Source of Projection</u></b>	<b><u>Background &amp; Reference</u></b>
2006-2007	Bakhitari, A.M.S.	Iranian Oil Executive <sup>11</sup>
2007-2009	Simmons, M.R.	Investment banker <sup>12</sup>
After 2007	Skrebowski, C.	Petroleum journal Editor <sup>13</sup>
Before 2009	Deffeyes, K.S.	Oil company geologist (ret.) <sup>14</sup>
Before 2010	Goodstein, D.	Vice Provost, Cal Tech <sup>15</sup>
Around 2010	Campbell, C.J.	Oil company geologist (ret.) <sup>16</sup>
<hr/>		
After 2010	World Energy Council World Non-Government Org. <sup>17</sup>	
2010-2020	Laherrere, J.	Oil company geologist (ret.) <sup>18</sup>
2016	EIA nominal case	DOE analysis/ information <sup>19</sup>
<hr/>		
After 2020	CERA	Energy consultants <sup>20</sup>
2025 or later	Shell	Major oil company <sup>21</sup>
No visible peak	Lynch, M.C.	Energy economist <sup>22</sup>

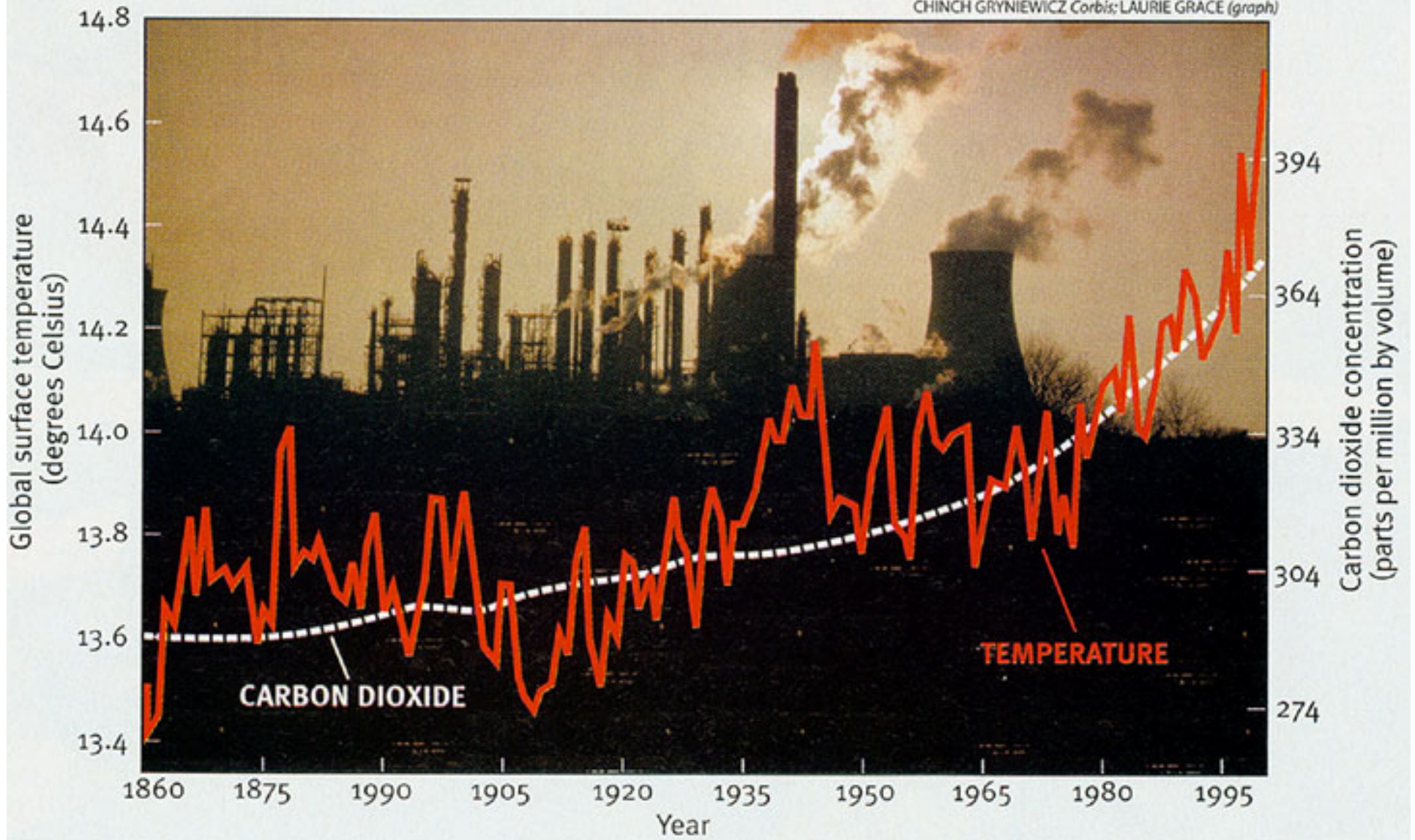
A blue-tinted image of the Earth from space, showing the Americas. The text "Global Sustainability" is overlaid in a bold, italicized font.

# *Global Sustainability*





CHINCH GRYNIEWICZ Corbis; LAURIE GRACE (graph)

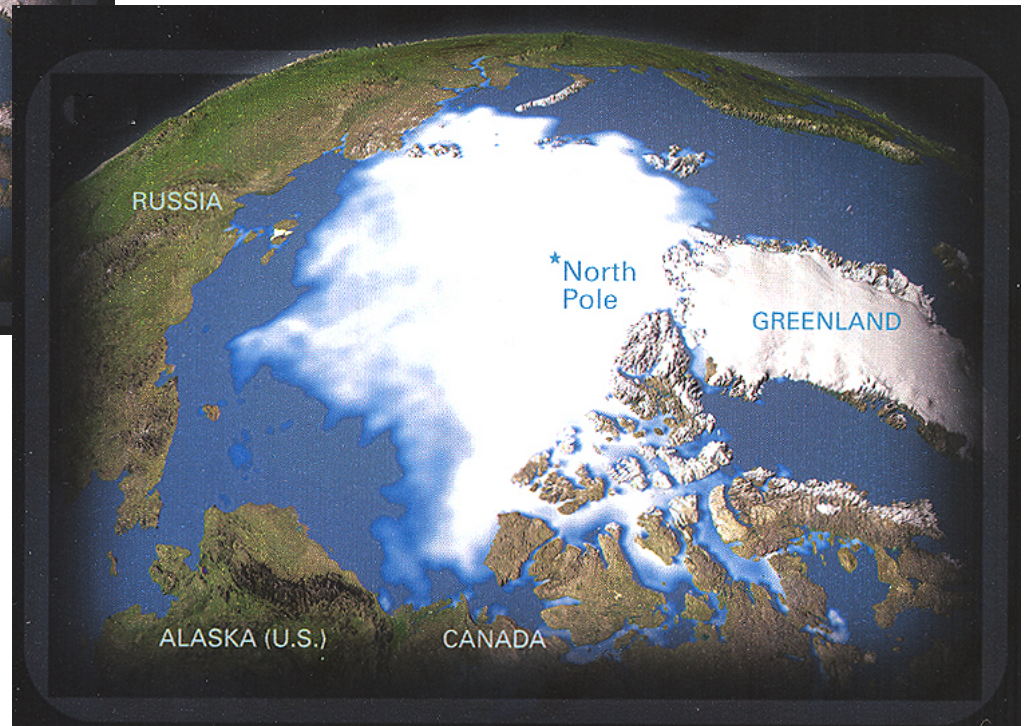


# Arctic Ice Cap Change

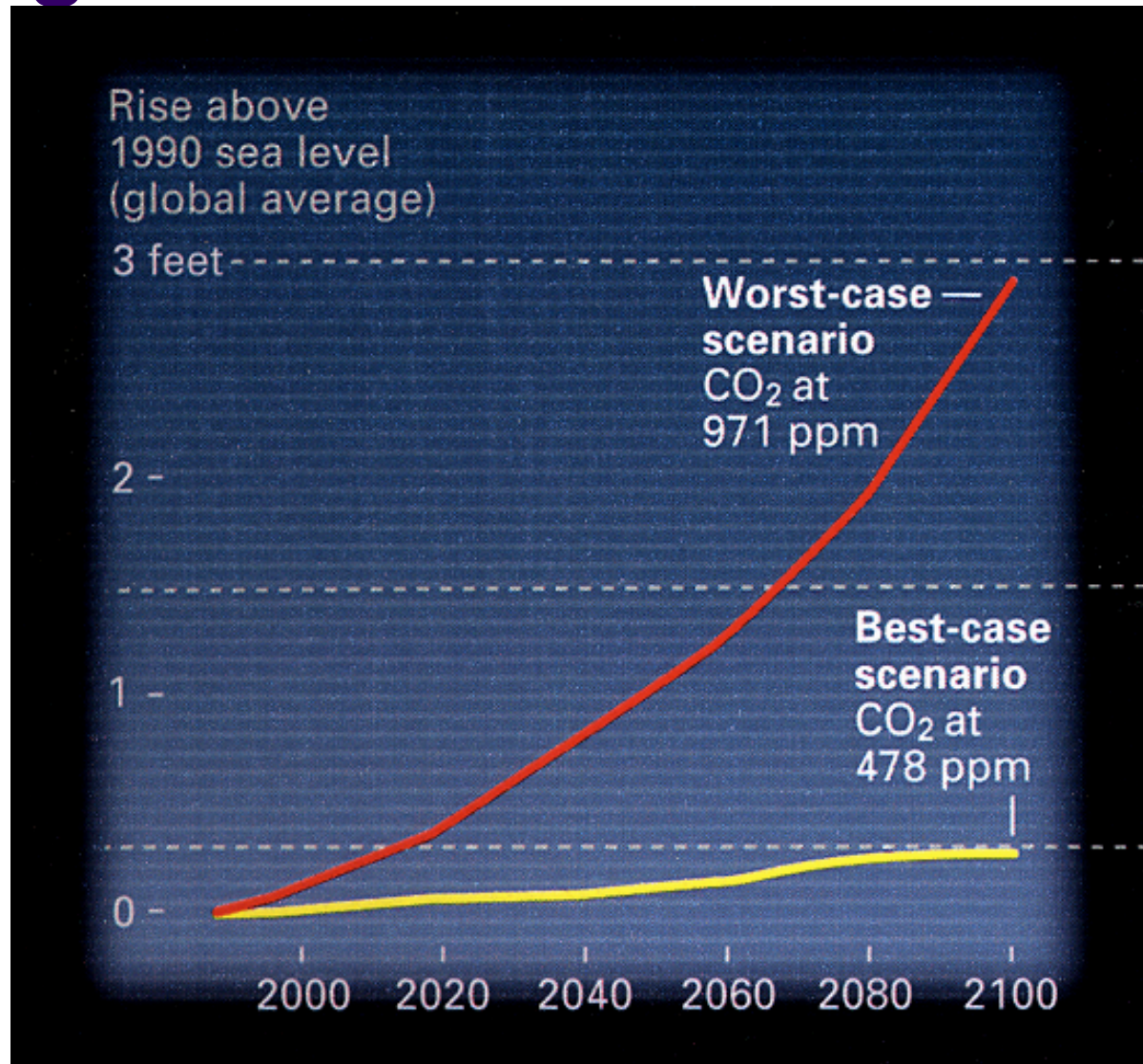


1979

2003



# Rising Sea Level





# What to do?

- It could well be that coming to grips with the impact of our species on our planet, learning to live in a sustainable fashion on Spaceship Earth, will become the greatest challenge of all to our generation. We must find new ways to provide for a human society that presently has outstripped the limits of global sustainability.
- This will be particularly difficult for the United States, a nation that has difficulty in looking more than a generation ahead, encumbered by a political process that generally functions on an election-by-election basis, as the current debate over global climate change makes all too apparent.