



Worldview Two Planning
INSIGHT FOR A CHANGING WORLD

IT ALL STARTS WITH ENERGY

Planning Implications for a World
With Resource Constraints

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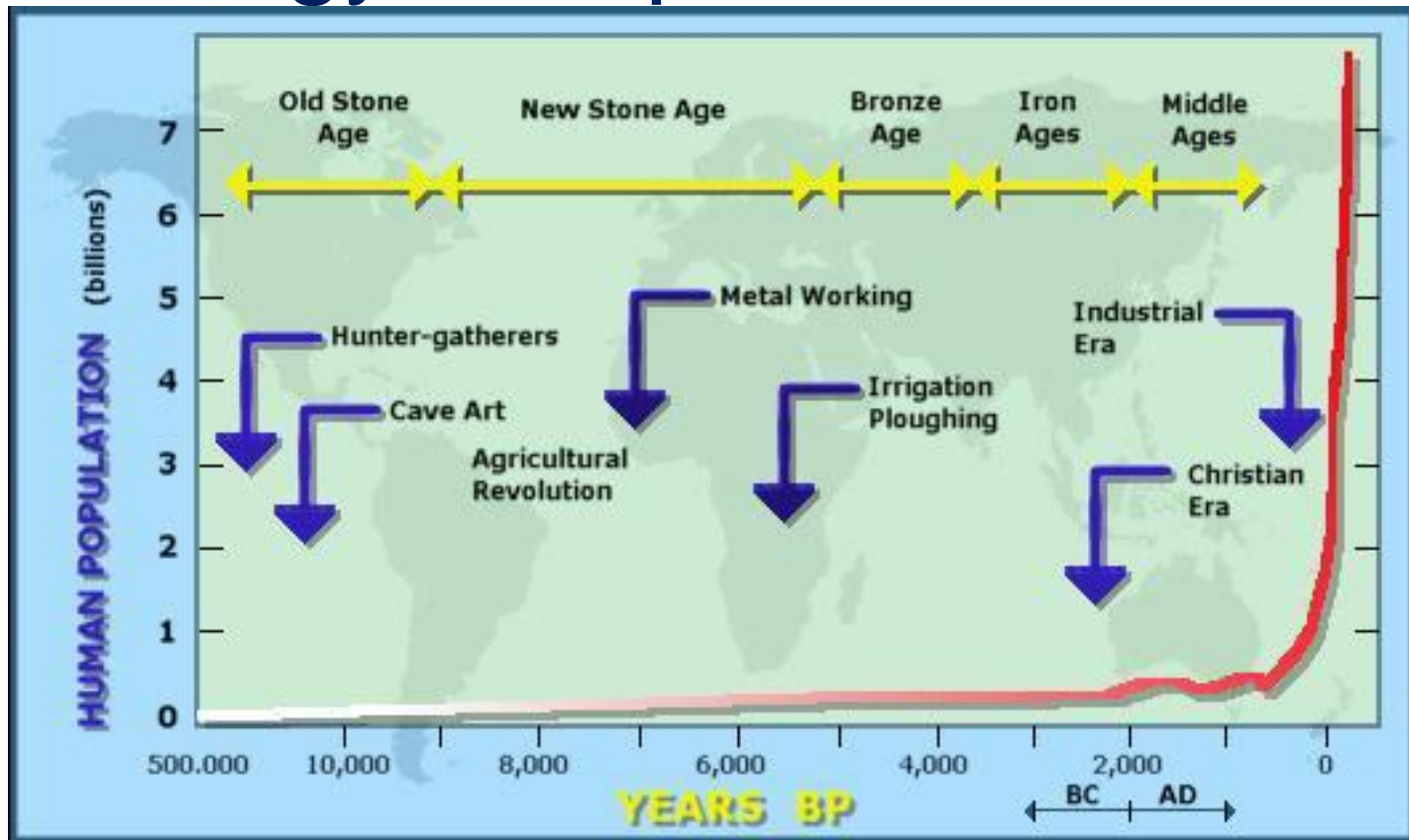
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AN OVERVIEW OF ENERGY



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Energy = Population = GDP

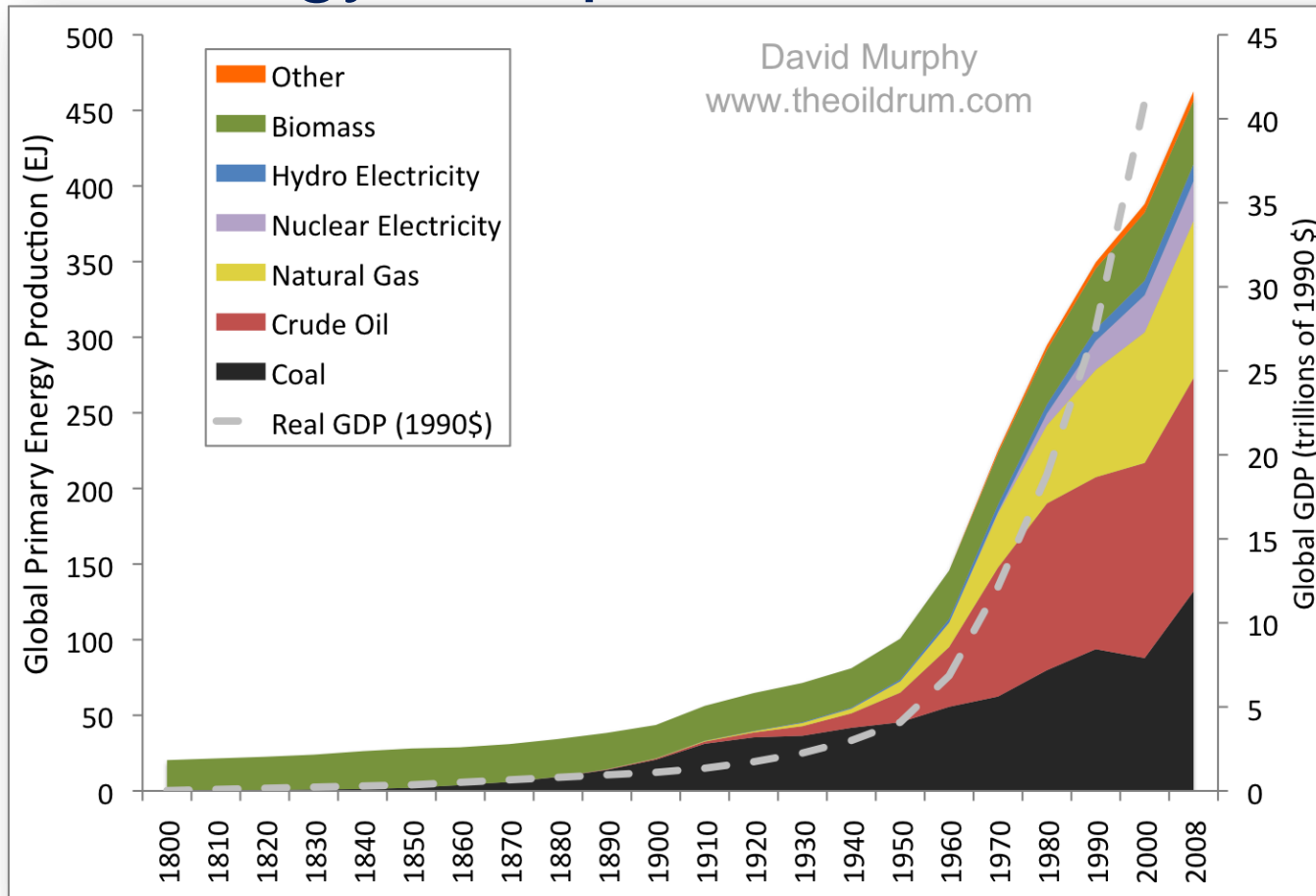


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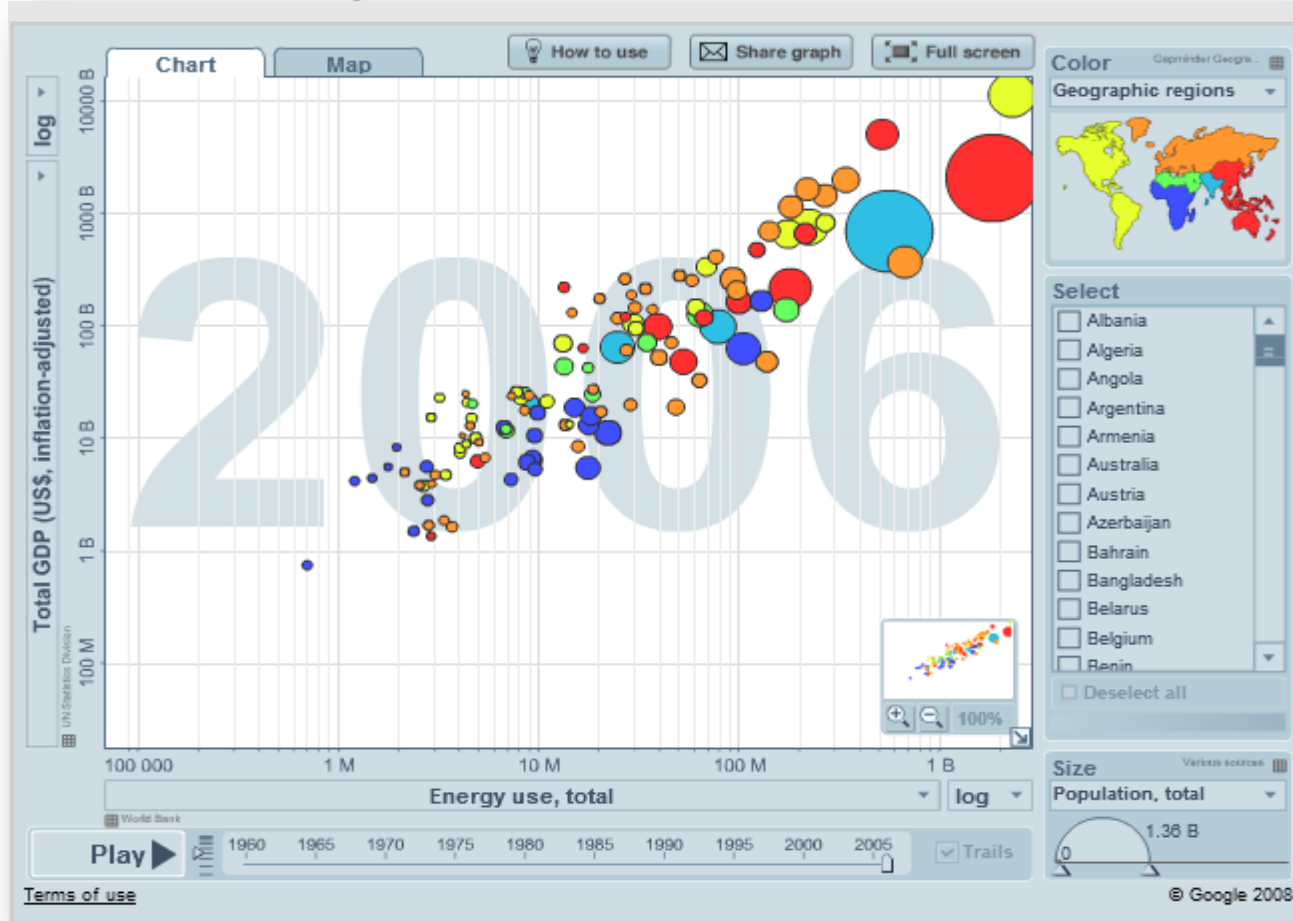


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Energy = Population = GDP



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“Energy” = power available to increase
what we can do

- Historical – wood, water, animals, wind, slaves
- Modern – coal, oil, natural gas, hydro, nuclear, electricity
- Energy systems are physical, not “technology”

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Energy makes modern life possible

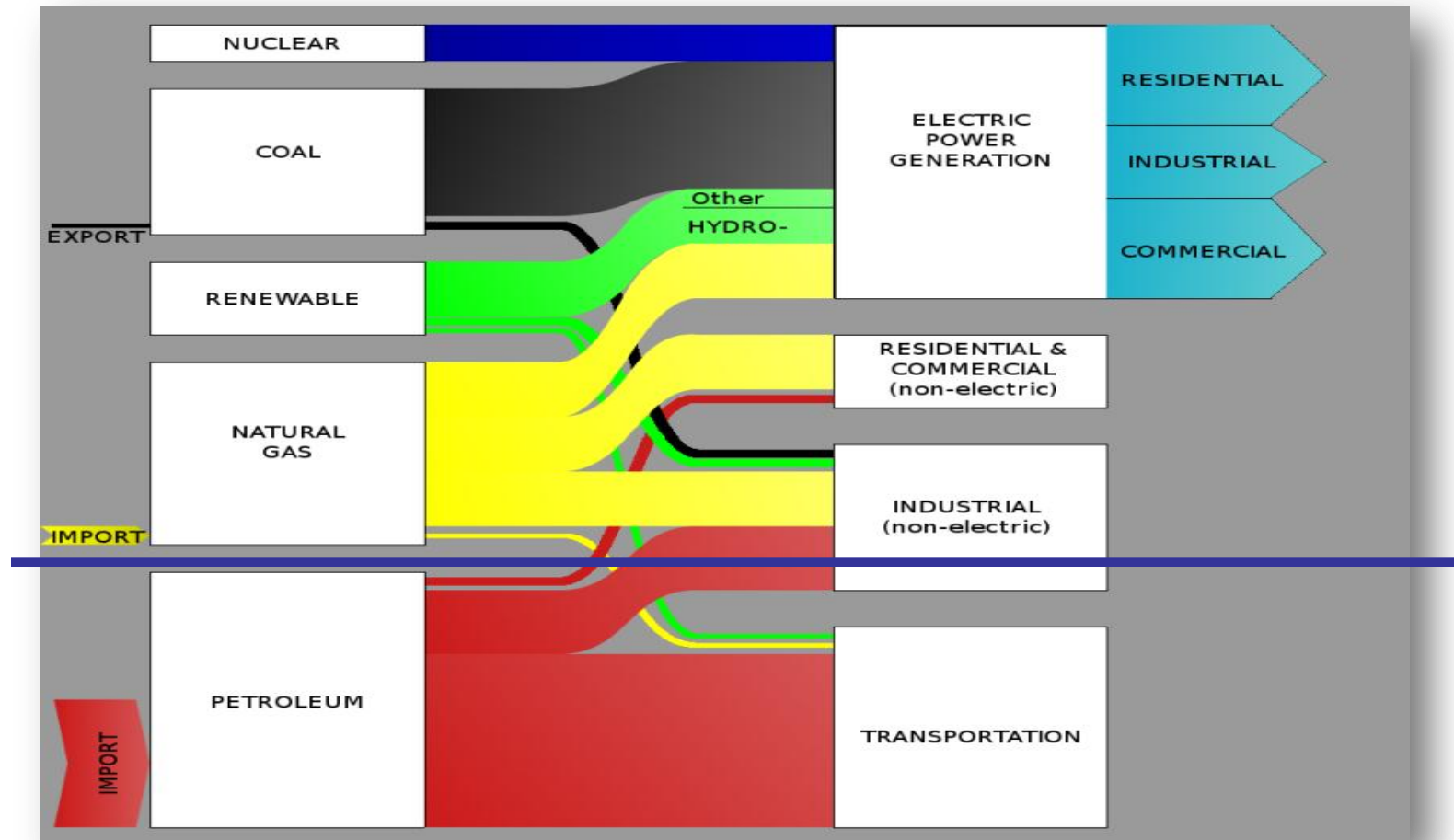
- Agriculture and diet
- Health
- Cities
- Transport
- Leisure, education, and mass culture
- Communications

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We have TWO parallel energy systems



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Desirable attributes of an energy source

Plentiful

Available

Low cost

Concentrated

Portable

Storable

Easy to use

Reliable

Safe

No single source is good at all of these,
but oil comes closest.

INTRODUCTION



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A Planning Perspective

Imagine a prosperous-looking client family comes into your office...



The planning perspective and the financial planning process:

1. What is the current situation?
2. What may happen if current trends continue?
3. How did this situation happen?
4. Is the client ready to deal with it?
5. What financial planning perspectives are useful here?
6. What can we recommend?
7. How do we present it to the client, and help them make changes?



Temptations we will try to avoid in this talk:

- A detailed discussion on energy sources and uses
- A technical discussion of Peak Oil and Global Climate Change
- An engineering discussion of responses to PO+GCC



We'll focus on other concepts

- Why are PO and GCC so hard to deal with, emotionally, socially, and technically?
- Why is there such resistance to accepting them?

- What responses are likely or possible?
- How can our advice reflect our understanding of PO+GCC?



The magnitude of the oil problem

- Of all oil used worldwide since 1859:
 - Only 10% had been used by 1962 – 90% has been used since then
 - 50% had been used by 1989 – 50% has been used since then
- The world will use more oil in the next six months than was used by everyone on earth during the six years of World War II



The magnitude of the oil problem, cont'd

- Oil use (and production) is now about 87 million barrels per day, or 32 billion barrels per year
- Current use is now 1000 barrels per second
- Over one trillion barrels have been used so far
- The world's remaining supply of liquid oil is estimated to be about one trillion barrels, according to the Association for the Study of Peak Oil and Gas



Peak Oil defined

- The point at which the people of the world can no longer increase the amount of oil they regularly produce on a daily, monthly, or annual basis.



The Peak Oil Concept

- The amount of oil on earth is limited
- We use the easiest-to-get first
- The maximum extraction rate occurs when reserves are about half gone
- The rate declines after that, but oil is still produced
- M. King Hubbert, an engineer for Shell, developed the concept in 1950's
- He predicted the US would reach its peak about 1970. It did.
- The key number is the rate of production, not the amount of reserves left



When will the global peak occur?

- Discoveries peaked in 1960's
- Discoveries have been less than production since 1981
- Production has been in narrow band since 2005
- Many experts say peak date will be (or was) between 2005 and 2014
- Peak production will be between 85 and 91 mbpd

**My conclusion – we're there now,
especially in oil available for export**

WHAT PEAK OIL LOOKS LIKE



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Peak Oil in Oklahoma – 1928, 1967

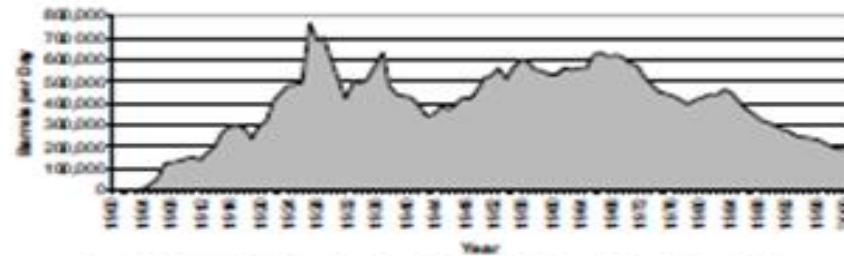


Figure 5. Historical oil and condensate production in Oklahoma. From Claxton (2001).

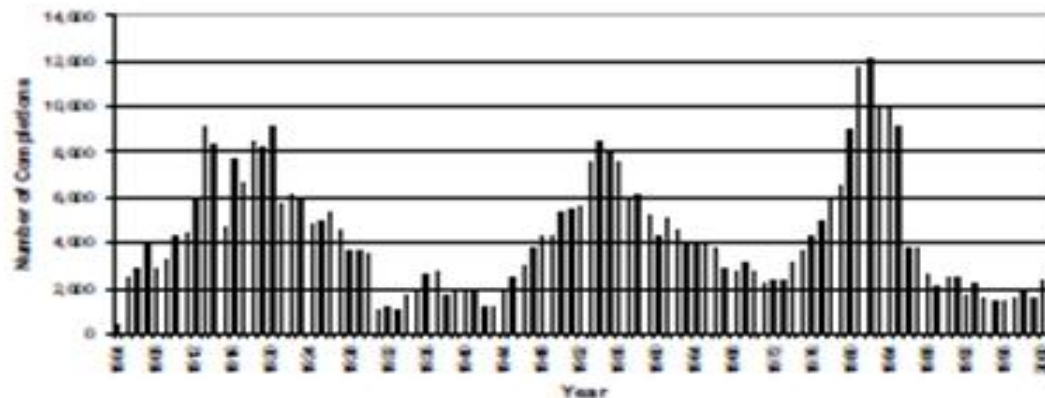


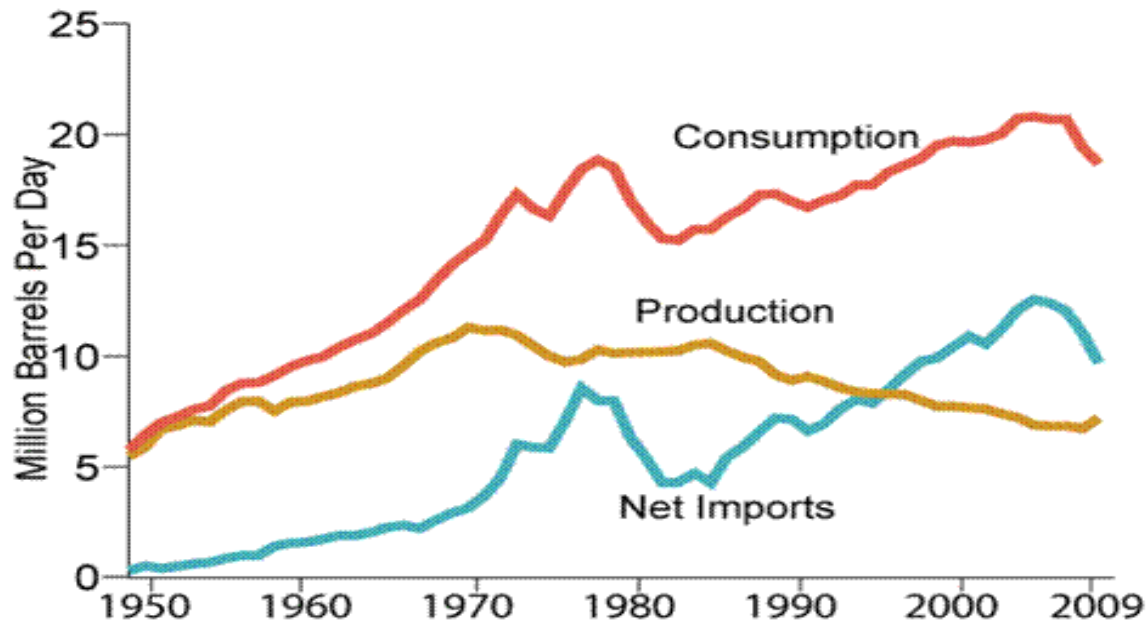
Figure 6. Oklahoma's well-completion history (producers and dry holes). From Claxton (2001).

WHAT PEAK OIL LOOKS LIKE



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Consumption, Production, and Import Trends (1949-2009)

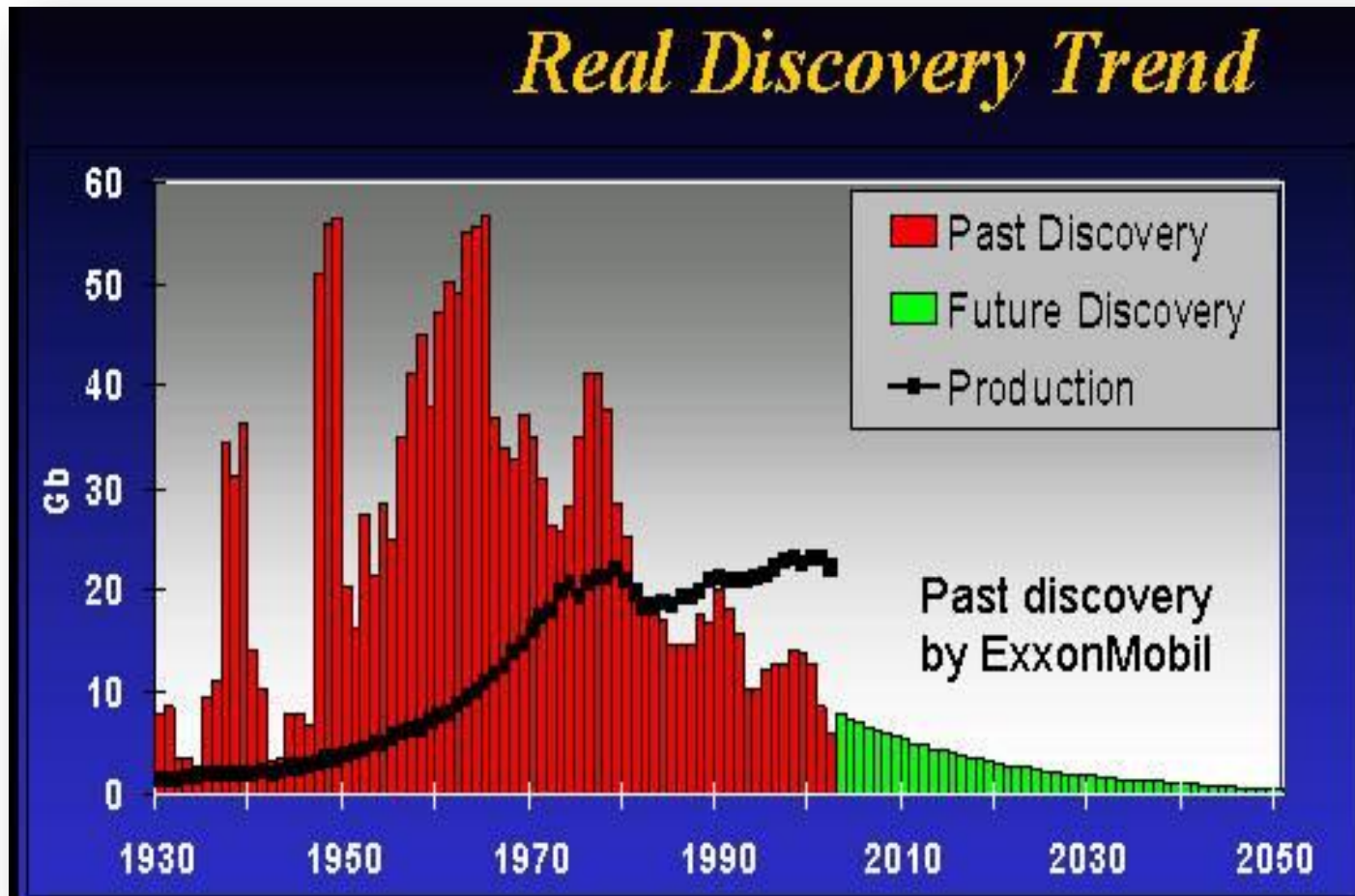


Source: U.S. Energy Information Administration, *Annual Energy Review 2009*, Table 5.1 (August 2010).

WHAT PEAK OIL LOOKS LIKE



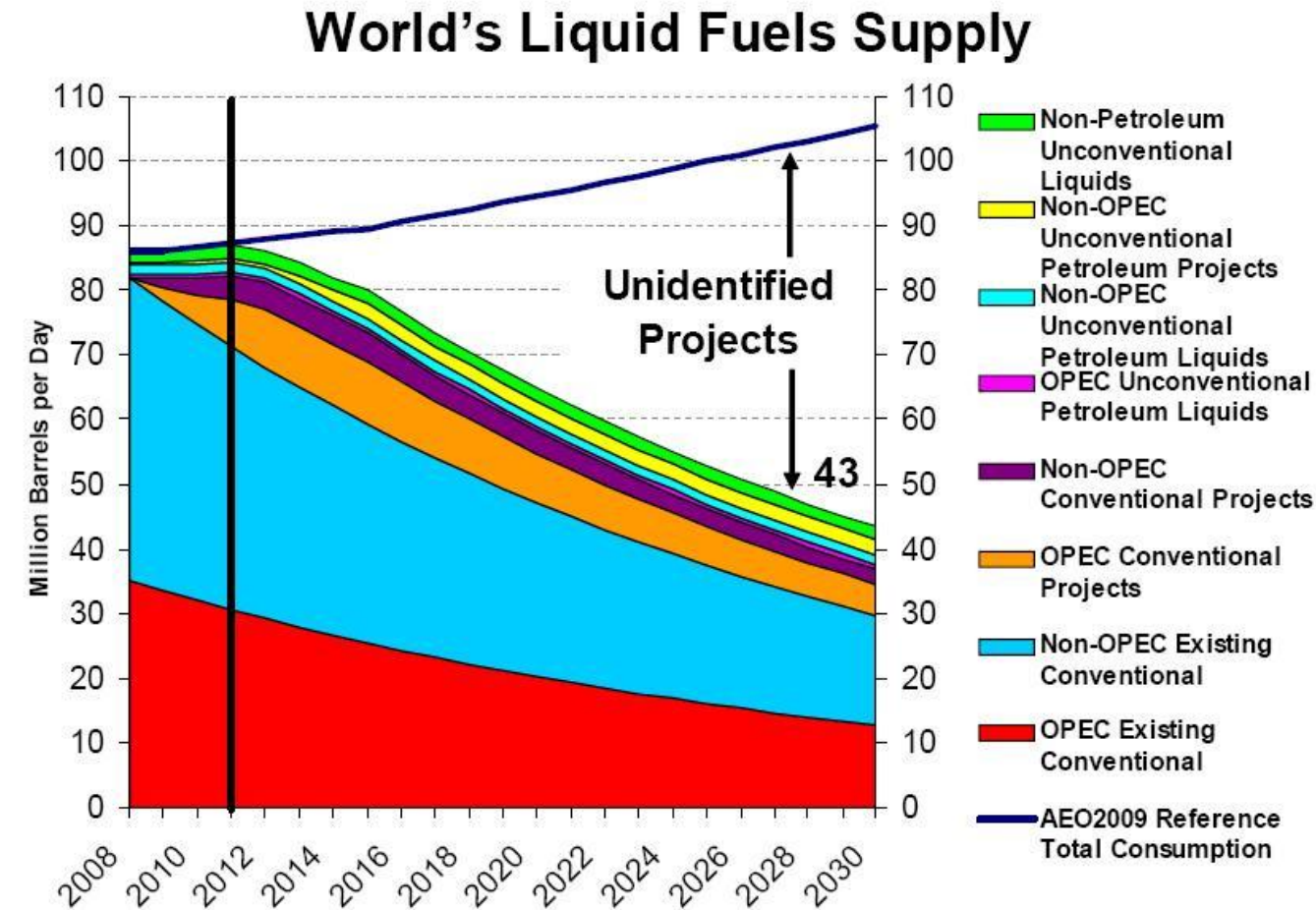
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WHAT PEAK OIL LOOKS LIKE



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Source: EIA, AEO2009



What happens after Peak Oil?

- At first, bounce along plateau, peaking won't be clear
- Then declines will be undeniable
- Current demand projections – 100-110 mbpd by 2020, at current prices
- Current supply projection – 70 mbpd by 2020
- Shortage – 30-50 mbpd
- Current Saudi production less than 10 mbpd



Likely consequences from Peak Oil

- Initially, highly volatile prices, as we've seen since 2004
- Ultimately, much higher prices to reduce demand and develop alternatives
- Economic disruption and contraction
- Political and international conflict
- Portion of total energy available for trade declines a lot
- Biggest impacts – transportation and agriculture
- Other surprises we cannot predict



Global Climate Change defined

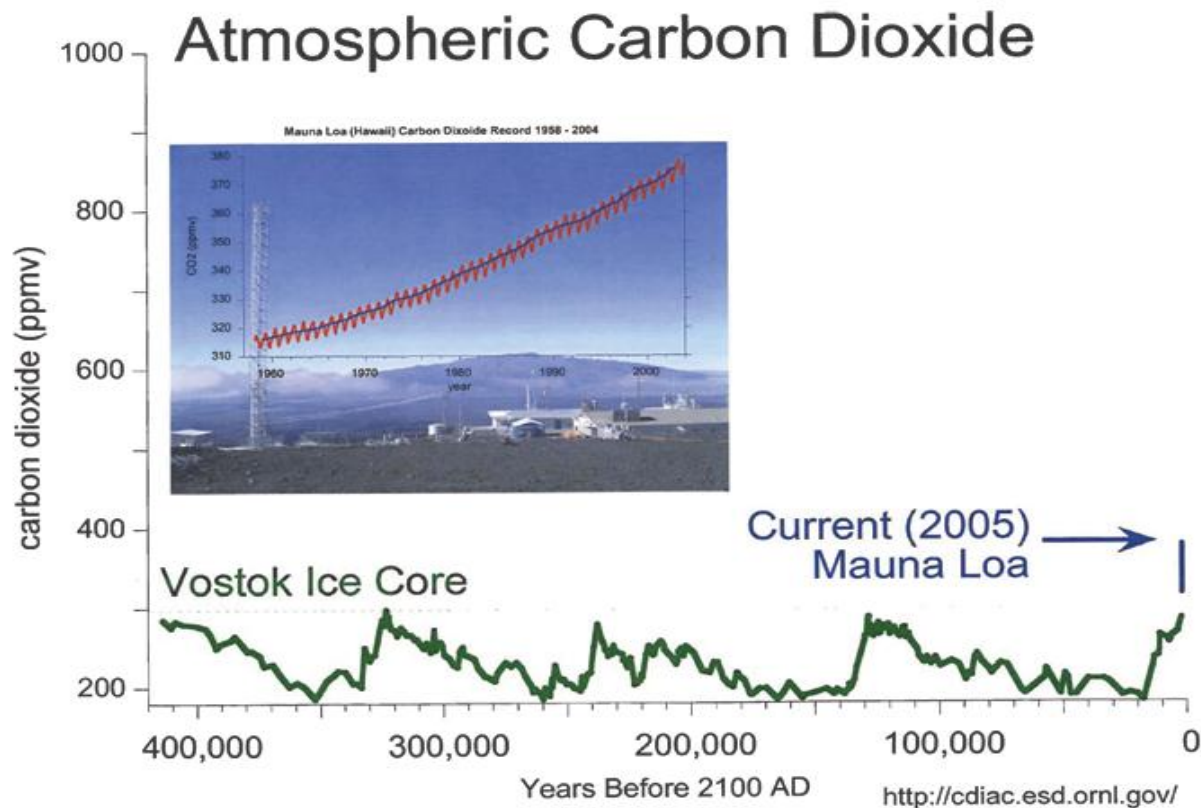
- The process in which people are increasing the average temperature on the earth's surface, and altering other environmental systems, as a result of increasing levels of carbon dioxide (CO₂) and other greenhouse gasses.
- Since both Peak Oil and Global Climate Change are aspects of human use or, or need for, fossil fuels and other energy sources, we will treat them together under the abbreviation **PO+GCC**.

UNDERSTANDING GLOBAL CLIMATE CHANGE



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What this looks like: CO₂ concentrations since 400,000 BC

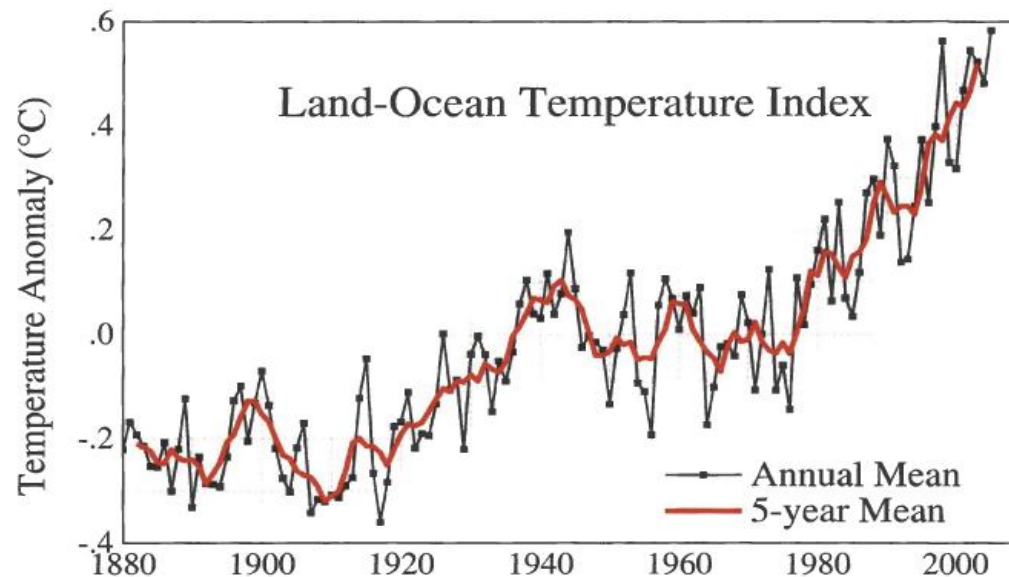


UNDERSTANDING GLOBAL CLIMATE CHANGE



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What this looks like: Global Temperatures since 1880



Global mean surface temperature change based on surface air measurements over land and SSTs over ocean

Source: Update of Hansen et al., *JGR*, **106**, 23947, 2001; Reynolds and Smith, *J. Climate*, **7**, 1994; Rayner et al., *JGR*, **108**, 2003.

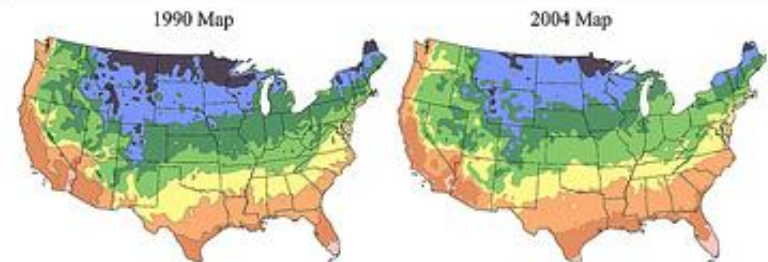
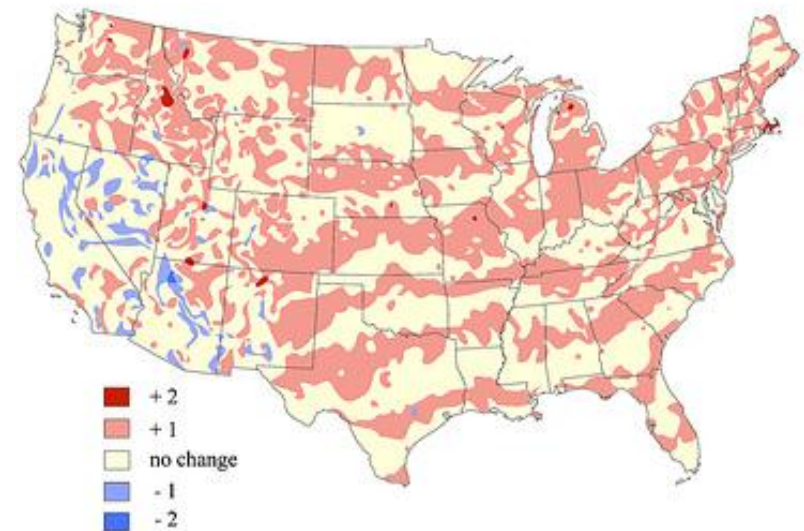
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- This is not just a problem for the future
- The current impacts are significant
- The average winter temperature in US is 3-10 degrees warmer than 50 years ago

Difference between USDA (1990) and National Arbor Day Foundation (2004) Hardiness Zones



After USDA Plant Hardiness Zone Map, USDA Miscellaneous Publication No. 1475, Issued January 1990

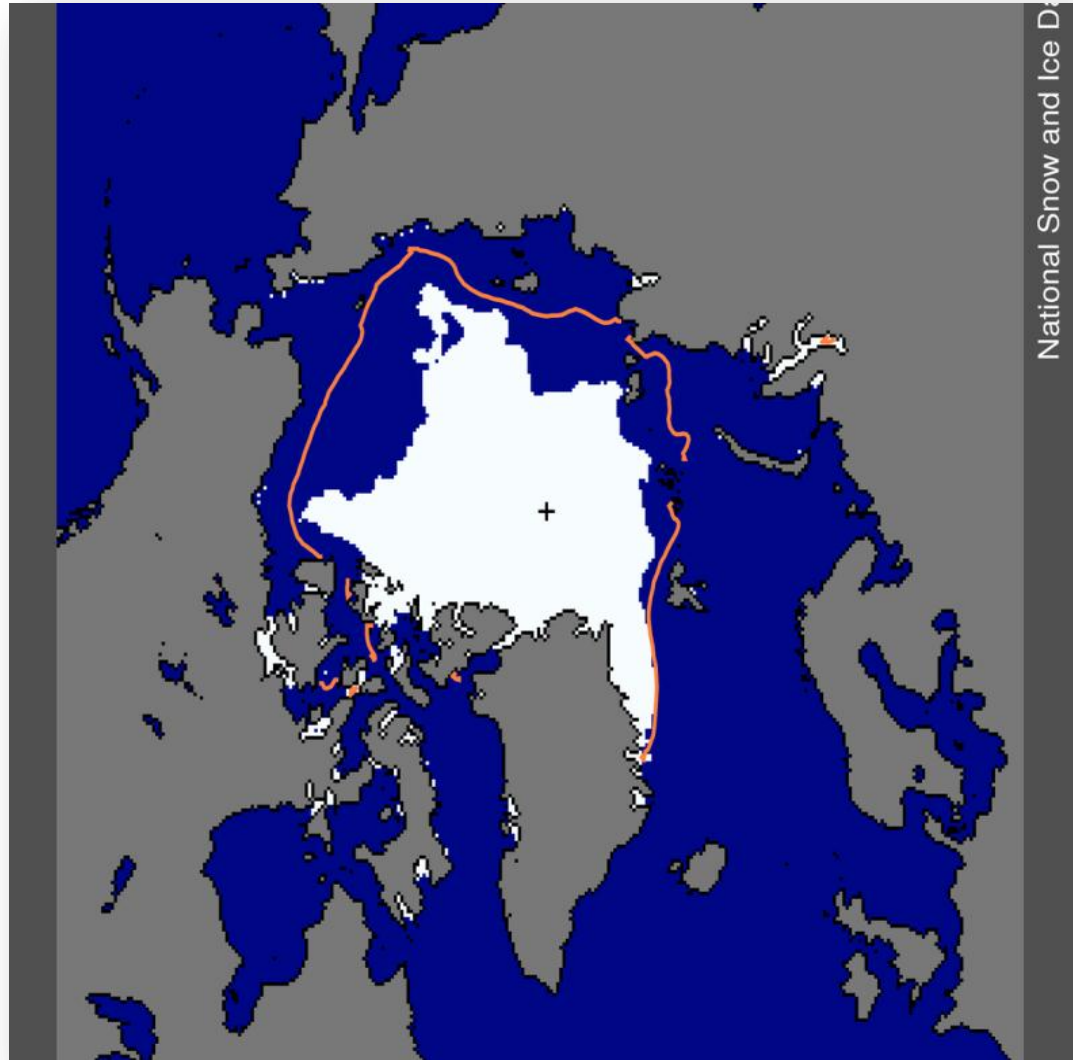
National Arbor Day Foundation Plant Hardiness Zone Map published in 2004.

Zone
2 3 4 5 6 7 8 9 10

CLIMATE CHANGE PICTURES



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National Snow and Ice Data

UNDERSTANDING GLOBAL CLIMATE CHANGE



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Ice is melting all over the planet

- Snowpack in Washington and western USA down 30-50% in 50 years
 - Source of hydropower
- Glaciers in Andes melting
 - Source of drinking water for Quito, Lima, other cities
- Greenland Ice Cap losing 50 cubic miles per year
 - The melting rate is accelerating
- Permafrost in Alaska, Canada, Russia melting
 - Disrupts economy, destroys towns, roads, pipelines
 - Potential to release frozen CO₂ and methane

“Moving at a glacial pace” has a new meaning!

UNDERSTANDING GLOBAL CLIMATE CHANGE



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Impacts already being seen from global warming

- Major heat waves killing vast numbers in Europe
- Intensity of tropical storms has increased
- Plants and animals losing ecological niches
- Ocean changes killing coral reefs, plankton
- Ocean food chain disrupted
- Higher temperatures allow diseases to spread
- Temperature and rainfall changes hurting agriculture

Impacts magnify other human pressures on the planet

UNDERSTANDING PO + GCC



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- Peak Oil – there will be less oil available
- Global Climate change – there will be less cheap electricity available
- This leads to an end to a century of cheap and plentiful energy
- This opens a new energy and economic system
- No one knows what it will look like



Four 21st century paths

- **Business as Usual** – maybe there's no problem
- **Technofix** – “Science” will save us
- **Powerdown** – We'll respond rationally, creatively, cooperatively
- **Catastrophe** – We can't, or won't, adjust in time



There are five ways to cope with shortages

1. Substitution
2. Efficiency
3. Curtailment
 - Voluntary
 - Involuntary
 - Rationing
4. Possession
 - Hoarding
 - War – crime – force
5. Ignore the problem as long as possible
 - Shift the problem to others



Four ways to ration

- By price – market
- Per capita – coupons
- Inconvenience – lines
- By edict – policy or arbitrary power

YES, BUT WHAT ABOUT...



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- **Shale Gas and Oil**
 - Expensive process
 - Average well costs \$10 million, up 40%
 - Uses lots of water
 - Fast declines, low productivity per well
 - Average Bakken (ND) well 100 bpd
 - Most oil and gas in a few “sweet spots”

YES, BUT WHAT ABOUT...



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- **Alternative energy sources**

- Wind
- Solar
- Geothermal
- Algae

Problem 1 – Large inputs, low efficiency

Problem 2 – liquid fuel vs electricity

YES, BUT WHAT ABOUT...



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- **Electric Cars**
 - Engineering
 - Cost
 - Scale
 - Source of electricity
 - Infrastructure

HOW DID THIS HAPPEN?



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How did we get into this mess?

- Evolutionary pressures = eat and exploit when you can
 - New energy sources = new power to grow
 - New prosperity = new population pressures
- An illustration of exponential growth
 - Start with 1, double 30 times, get 1.03 billion
 - Start with 1, double 25 times, get 0.03 billion

Only 3% of total – no limits in sight
In five more intervals, the space is full

HOW DID THIS HAPPEN?



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PO+GCC is the product of a series of system or “market” failures

Failure 1 – We treat resource depletion as a benefit, not a cost

- Depletion is included in GDP, not deducted from it
- Nobody pays for the resources they claim first

HOW DID THIS HAPPEN?



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Failures 1- cont'd

As a result, we've been living off "capital" –

Oil

Natural Gas

Coal

Water

Climate

Open space

Soil

Fish

Metals

Forests

Clean air

Diversity of Species

HOW DID THIS HAPPEN?



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Failure 2 - We do not treat disposal of waste as a cost of production or use

- This is changed only sometimes, and mostly by laws and regulation
- If some competitors don't pay for resource depletion and waste disposal, they have economic advantage over those who do pay

HOW DID THIS HAPPEN?



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Failure 3 – our discount rates are too high

- The future is valued too little
- But these are long-term problems slow to appear

Years ahead	Value of \$100 today, at different rates		
	+3%	+10%	-5%
5	\$95	\$62	\$124
20	\$82	\$15	\$279
100	\$5	\$0.07	\$17,000

HOW DID THIS HAPPEN?



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Failure 4 – We confuse the financial world with the real world

A. Real resources are irreplaceable, especially in systems

- Soil
- Fossil fuels
- Fish
- Climate
- Forests
- Heritage

B. It matters little how many green stamps you have, except in the short term. Supply and demand can be highly inelastic

C. Money is inadequate as the sole measure of value

HOW DID THIS HAPPEN?



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Failure 5: Large scale problems are hard to deal with

- Many problems exceed the interest, capacity, or time frames for responses by individuals or private organizations

HOW DID THIS HAPPEN?



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Failure 6 – We don't encourage actions that do not produce profits

- Responses to Peak Oil and Global Climate Change involving efficiency are hard to encourage, unless they involve spending money (like buying compact florescent lights).
- Decentralized solutions (rooftop solar) are less profitable to utilities and other entities than centralized solutions (nuclear power), even if they save costs on a community-wide basis.
- Almost no one in a public position is seriously suggesting that we buy less, drive less, live in smaller homes, or otherwise “powerdown.”

HOW DID THIS HAPPEN?



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Failure 7 - Collective actions are driven strongly by power and politics as much as the pursuit of long-term goals

- Current example number one: ethanol

HOW DID THIS HAPPEN?



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Failure 8 – Our money system requires continued growth to maintain itself

- Money is created through debt instruments
- Equity is purchased based on future (growing) income streams
- Can the system survive a steadily shrinking, or even non-growing, economy?

HOW DID THIS HAPPEN?



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Conclusion –

- PO+GCC is a situation our current political-economic-social system is poorly designed to address
- Our system is designed to encourage economic growth through resource use
- We can respond collectively when we decide to challenge these rules:
 - Environmental laws
 - Social Security
 - Infrastructure development, from canals to the internet
 - Banking and security regulation

WHY IS THIS SO CONTENTIOUS?



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PO+GCC is a novel problem, the mechanisms are unclear, there is lots of doubt about the details.

BUT the level of resistance and denial cannot be explained by uncertainties in the probability that these observations are true.

- “Public” opinions break sharply on ideological lines
- Actual public opinion seems much less divided
- Why is this truth “inconvenient”?

WHY IS THIS SO CONTENTIOUS?



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- Some of us believe in “progress”
- We equate progress with more and newer material things
- BUT, we sense that PO+GCC will lead to less, not more

WHY IS THIS SO CONTENTIOUS?



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- Some of us believe in the “free market system”
- BUT we sense that responding to PO+GCC will need more than free market responses

WHY IS THIS SO CONTENTIOUS?



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- Some of us believe it is our destiny to grow and expand without limits
- BUT accepting PO+GCC means accepting limits to growth

WHY IS THIS SO CONTENTIOUS?



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- Some of us believe the end of the world is near, and that the end would be a good thing.
- They think disasters are preconditions of the plan.
- Addressing PO+GCC is challenging or frustrating God's will

WHY IS THIS SO CONTENTIOUS?



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PO+GCC have become weapons for other battles

- Argument has become partisan in the US
- Some see PO+GCC as way to attack capitalism, materialism, suburban blight, corporatism, etc.
- Some see PO+GCC as attack on their positions, power, profits
- Responses to PO+GCC will change power relationships, both nationally and globally. The relative position of the US may get worse.

WHY IS THIS SO CONTENTIOUS?



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Some of us (especially many financial planners) believe that everyone can live their dream and realize their vision.

- “If you can conceive it, you can do it”
- Accepting limits is “poverty thinking,” which should be replaced by “prosperity thinking”

WHY IS THIS SO CONTENTIOUS?



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We live like gods, and we like what we have.

We refuse to believe this is happening to us.

PO & GCC -- FINANCIAL PLANNING PRINCIPLES



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Applying financial planning principles to PO+GCC

- What are positive – or at least less depressing – ways to think about these issues?
- How would we plan for clients who have comparable problems?



PO+GCC is a risk management problem

- PO+GCC presents a meaningful (but hard to quantify) chance of outcomes that range from unpleasant to really bad
- Risk management is what financial planners do



Resiliency is key to responding to PO+GCC

- Our economic and social system is too fragile
- There are few reserves or inventories, little redundancy
- We're all very dependent on the system
- We need to create resiliency at both individual and social levels



What are the options for a risk situation?

- a. Purchase insurance
- b. Reduce the likelihood of the event happening
- c. Reduce the impact of the event if it happens
- d. Improve the capacity of the client to respond to the event



PO+GCC creates an opportunity for Values based planning

- Pursue “real” values
- Interior work, spiritual work
- Appreciative inquiry – “abundance vs stuff”
- Material prosperity does not equate with happiness



Two kinds of responses to PO&GCC we can suggest with clients:

- Investment based decisions
- Life decisions

FINANCIAL PLANNING RESPONSES



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IMPACT: PO+GCC will likely cause disruption and new rules at all levels

RESPONSES: Reduce risk exposure generally
Reduce personal debt

FINANCIAL PLANNING RESPONSES



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IMPACT: PO+GCC will likely create a world in which traditional energy sources are much more expensive, much less reliable, or much less available

RESPONSES: Prepare now to live in that world
Reduce your energy and carbon “footprint”

- Downsize
- Live close to family
- Live close to work
- Take vacations now

FINANCIAL PLANNING RESPONSES



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IMPACT: PO+GCC is likely to create a world where transportation of all kinds is much more expensive than we have now.

Agriculture will be especially affected.

Response: Localization can become a way of dealing with transparent issues

- Support farmers markets
- Support local retail and production
- Participate in community organizations
- Know your neighbors
- Support alternative transportation

FINANCIAL PLANNING RESPONSES



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IMPACT: PO+GCC is likely to affect the availability of products and services. Repairing and reusing will become common again. Self-reliance will be more important

RESPONSES: Become and stay healthy
Learn new skills



Investment planning for PO+GCC

Investment policy statements and the missing step

The way we do it now:

1. Define goals, horizons, resources, risk limits, and so on
2. Describe the investment process and set the model portfolio



Investment policy statement process

The way we should do it:

1. Define goals, horizons, resources, risk limits, and so on
- 2. Clearly define the worldview and investment assumptions being used.**
3. Describe the investment process and set the model portfolio

FINANCIAL PLANNING RESPONSES



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Worldview One = Business as Usual

- The 20th Century's lessons and returns are still relevant
- More money can produce as many resources as we need
- Economic and material growth will go on forever
- There are no real limits
- This is the world we've traditionally planned for
- This is what clients are familiar with



Worldview Two = The Coming Durable Society

1. There are real constraints to what we can do materially
 - From energy
 - From climate
 - From other resources
2. As energy and environment become more expensive, the transition will require a lot of capital. Consumer products will become less available. Uncertainties and new relationships will emerge, but not in a way that can be predicted

FINANCIAL PLANNING RESPONSES



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3. Some different economic rules will apply
 - All (or more) costs will be included in markets
 - Depletion
 - Disposal
 - Justice and power
 - Time frames will lengthen
4. The transition will not be abrupt, but it will last a long time.
 - This is new territory for most clients (and planners)



Choosing between Worldviews One and Two

- Present both to client
- Let the client decide what part of portfolio to invest each way
- Develop a blended mix



THANK YOU FOR PARTICIPATING IN THIS CONVERSATION

I welcome your feedback at
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