FOSSIL FUELS, NUCLEAR POWER, & SOCIAL INJUSTICE:

BUILDING A SUSTAINABLE ENERGY POLICY FOR THE 21st CENTURY*

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I. ENERGY: LIFEBLOOD OF ECOLOGY & CIVILIZATION

- Basis of the biosphere & life support system
- Key variable driving history, economy, & society
- Key variable (with population & resource consumption) impacting our environmental future
- We can no more afford to ignore the Laws of Thermodynamics than we can ignore the Law of Gravity

**** Issues of sustainability = energy base, flows, & entropy levels relative to carrying capacity of pop/resources**

"The energy problem should be not how to expand supplies to meet the postdated extrapolative needs of a dynamic economy, but rather how to accomplish social goals elegantly with a minimum of energy and effort, meanwhile taking care to preserve a social fabric that not only tolerates but encourages diverse values and lifestyles" (Lovins 1977: 13).

- Where are America's formal/de facto energy policies leading us?
- Where can we choose to go instead?

**** "If we don't change the direction we are going, we will end up where we are headed" (Old Chinese proverb)**

II. RETHINKING THE CONVENTIONAL WISDOM

- The more energy we use, the better off we are
- Higher quantities of energy supplies = greater social welfare
- Energy supplies and production represent ends, not means
- Technology is the answer (but what is the ***question?***)
  - *Who* is going to require the energy?
  - *How much* energy?
  - What *kind* of energy?
  - For *what purpose*?
  - For *how long*?

III. ENV/SOC IMPACTS OF THE HARD ENERGY PATH

Oil, Coal, Natural Gas, and Nuclear Energy Production --->

- Environmental pollution, radiation, & toxic/nuclear wastes
- Militarism, terrorism, nuclear proliferation, & war
- Global warming & climate change ---> massive $$$/social dislocation
- Freshwater decline and degradation
- Habitat loss/species decline
- Human health impacts (asthma, bronchitis, birth defects, cancer)
- Concentration of economic wealth & political power ---> plutocracy
- Technological risks ---> disasters & corrosive communities

IV. THE NEW "CLEAN ENERGY" MYTHS

Myth 1: THE NUCLEAR RENNAISSANCE

* A new generation of nuclear power plants = a "game changer" **--->** a "clean, abundant, carbon-free" energy future

Reality = Nuclear-generated electricity is still:

A. DANGEROUS (as highlighted by Fukushima-Daiichi disaster)

- Insufficient backup power
- Vulnerable spent fuel rods
- Shortsighted evacuation planning
- Earthquake/tsunami risks
- Thermal water pollution
- Radioactive/carbon releases through entire nuclear fuel cycle (mining, milling, enrichment, reprocessing, plant operation, waste storage)
- A dismal safety record
- An aging system of reactors
- Increased chances for nuclear weapon proliferation/terrorism

B. EXPENSIVE ("too cheap to meter" ---> too expensive to matter)

- Industry impossible without "Atoms for Peace," massive federal subsidies, and Price-Anderson Act
- $75 billion spent since 1948 (60% of fed. energy R&D); Obama Adm. requests $54 billion for new loan guarantees/$38 million for new R&D
- $68 million ---> $9-10 billion for a new light water reactor; $12 billion liability cap on accidents = plants still uninsurable on open market
- Proposals to build a 'new generation' of reactors are not mere scams, but a predictable plan for national bankruptcy (Wasserman)
- Most expensive way to meet U.S. energy needs, slowest method for reducing carbon emissions

C. INEFFICIENT

- Thermodynamically like "cutting butter with a chainsaw"
- Centralized plants inefficient for producing decentralized daily needs
- Plants must run for years = energy to build/fuel/maintain plant
- Uranium also a *non-renewable/scarce* energy resource

D. IMMORAL

- 70,000 tons of n-waste to date; 104 plants ---> 20 tons/yr.
- Permanent storage issue *still* unresolved after 30+ years
- Ethical/economic issues of off-loading huge risks & costs onto future generations
- Do we have the moral right to saddle our children's children's children and beyond with plutonium & tritium etc. for periods longer than any civilization has existed? Languages have shorter half-lives!
- N-waste is ultimate exemplar of the "New Species of Trouble" (Erikson)

E. UNNECESSARY

- Nukes produce only 20% of U.S. electricity & 7% of total energy; yet we waste 40% of what we produce
- We can *more* than meet our long term energy needs without building one more coal or nuclear plant through incentives, conservation, and alternative technologies
- Nothing about the nuclear industry has significantly changed *EXCEPT* the $645 million it has spent lobbying Congress & the White House
- Fukushima has propelled Japan, Germany, and others to begin a measured exit from nuclear power

Myth 2: NATURAL GAS FRACKING

- Technological advances in horizontal drilling and hydraulic fracturing techniques = another "game changer" ---> "safe, abundant, & patriotic" energy source that will slow climate change, produce hundreds of thousands of new jobs, and reduce U.S. dependency on foreign oil.

Reality = Fracking is a controversial drilling technique whereby millions of gallons of water, sand, and hazardous/toxic chemicals are injected into deep underground shale deposits to fracture the rock and release trapped gas that was previously unreachable

- Tens of thousands of new shale wells drilled in 30 states since 2008; 35,000 gas wells fracked each year
- Releases large amounts of methane into the atmosphere, calling into question its "clean" and "climate-friendly" benefits

- Creates unsightly drilling rigs/infrastructure on rural/suburban lands
- Creates financial tensions between property owners who sign lucrative leases with gas companies vs. those who do not
- Creates air pollution, water/soil contamination, & the poisoning of fish, farm animals, and pets
- Creates blowouts, explosions, tap water that bursts into flames, and possible heightened seismic activity/earthquakes
- Creates headaches, neurological disorders, respiratory problems, kidney & liver damage, cancer
- Economic booms and community conflicts centered in Texas, New York, & Pennsylvania (*Gasland),* but LA poised to become the next national laboratory for the study of shale gas production (Haynesville Shale region) and its impacts on health, communities, & ecosystems

** Our continuing reliance on fossil fuels & nuclear energy (over 90% of energy use) --->

- More social/environmental injustice (disproportionate burdens on marginalized populations)
- An environmentally unsustainable future (failure of culture/political system to adapt to resource realities & risks)

V. ENVISIONING A SUSTAINABLE ENERGY FUTURE

*Heeding the disaster lessons of the last 40 years stemming from our force-fed addiction to fossil fuels/nukes, & beginning the transition to a clean economy & society represents the ***most*** important challenge of the 21st century and ***the*** key to a sustainable future

The Good News:

- Conventional energy becoming more expensive/dangerous to *produce* but cheaper/safer to *conserve*
- Conservation/efficiency/renewables = quickest, cheapest, cleanest way to meet U.S. energy needs & produce green jobs
- Energy crisis a function of *political economy & national will*, not lack of knowledge, technology, or wealth

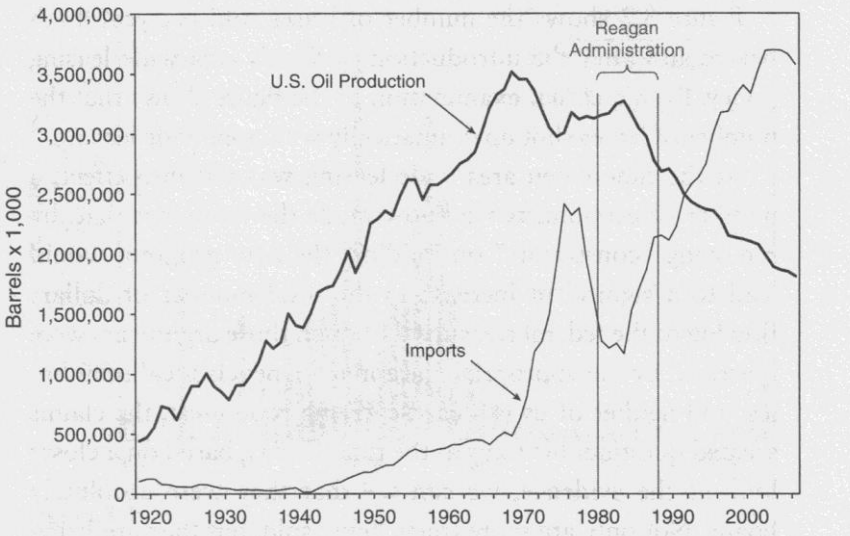


Figure 8.1
U.S. oil production and imports

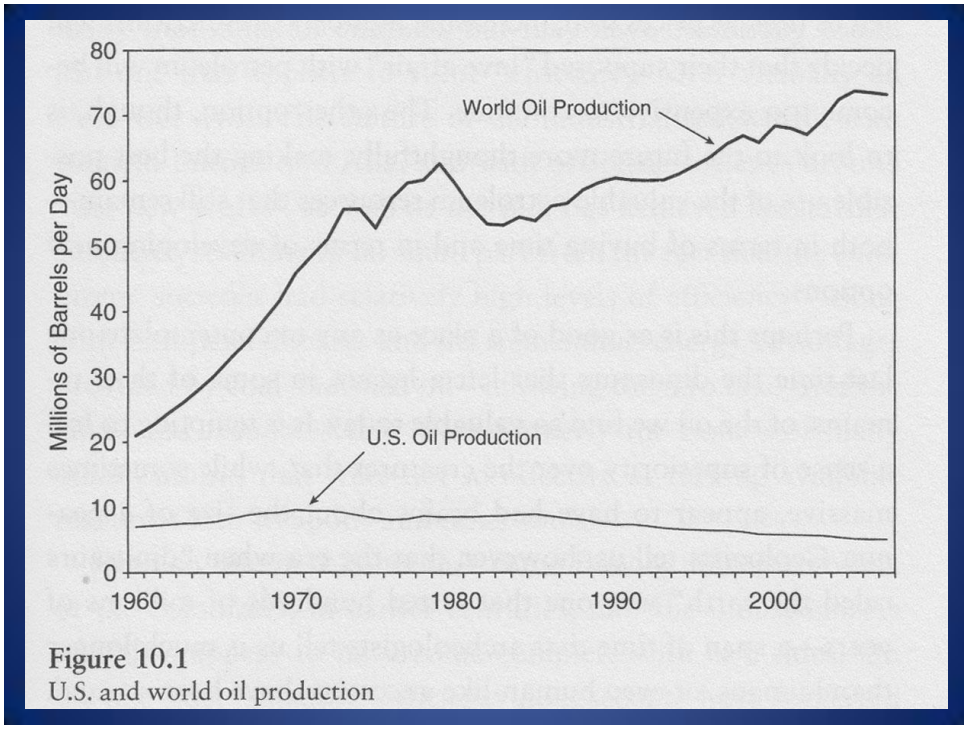
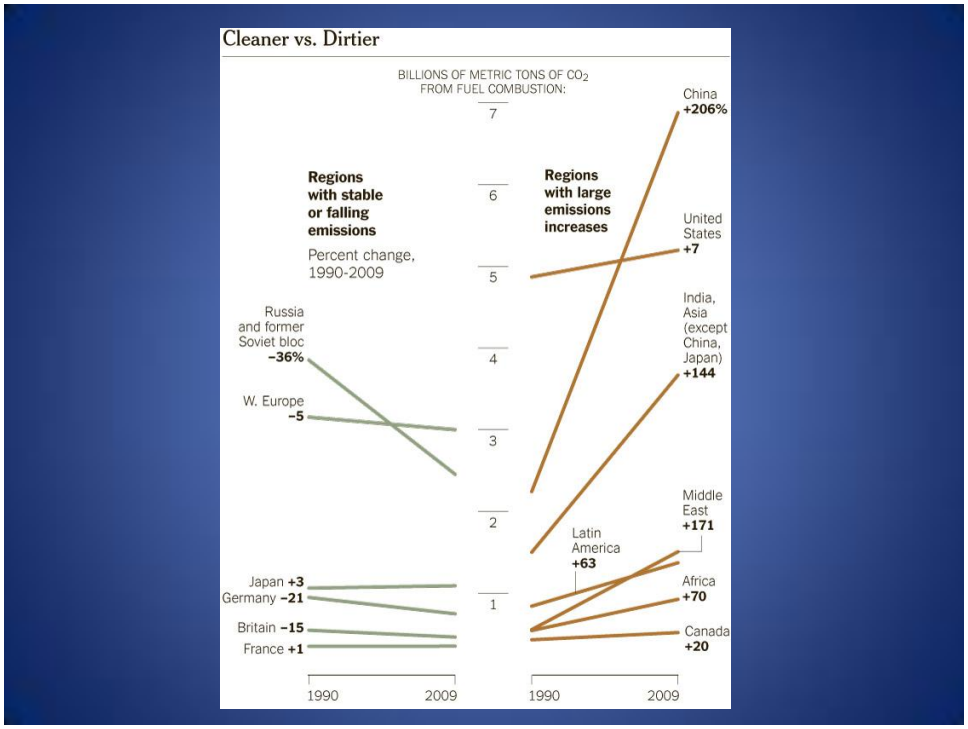
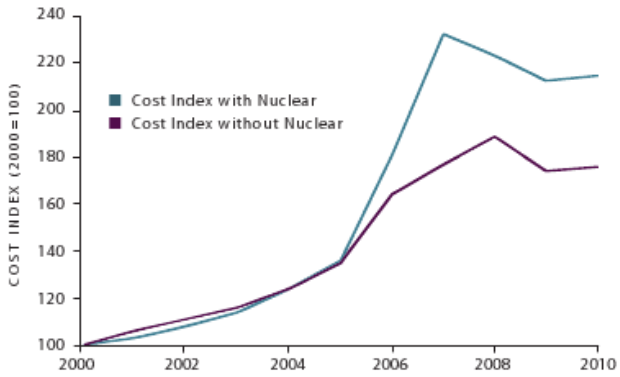


Figure 10.1
U.S. and world oil production



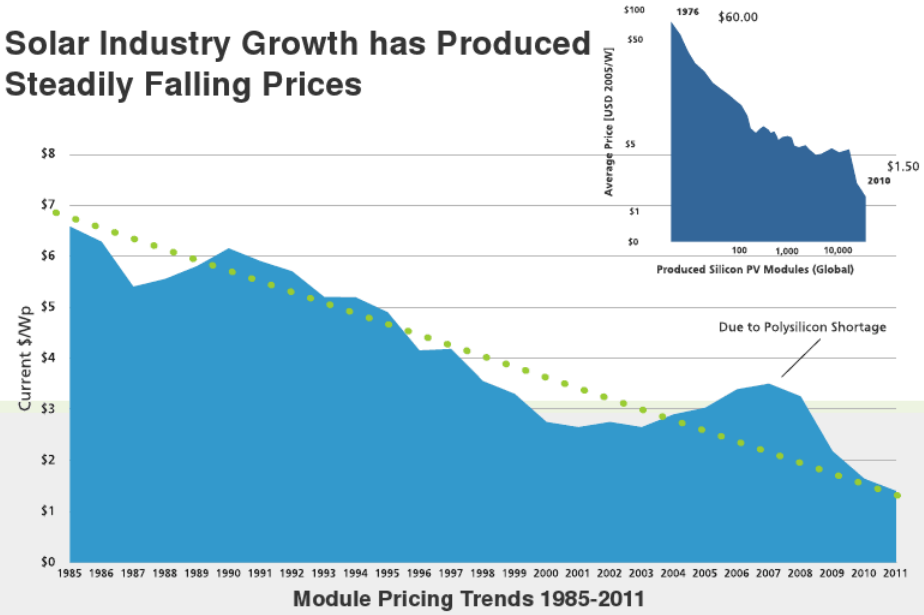
Construction Costs on the Rise

One of the economic factors making coal power increasingly risky is the cost of power plant construction in general, which roughly doubled between 2000 and 2008. Although these costs appear to have leveled out, they are still considerably higher than in 2000.



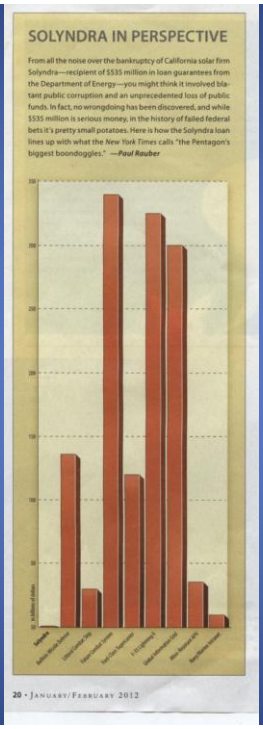
Sources: IHS CERA 2010a; IHS CERA 2008

Solar Industry Growth has Produced Steadily Falling Prices



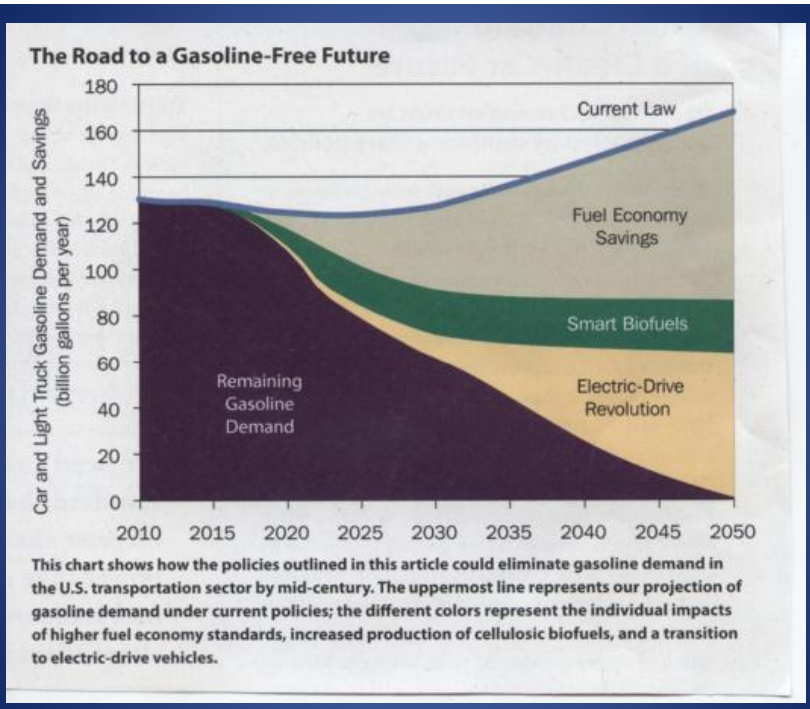
Module Pricing Trends 1985-2011

Sources: 1976 -1985 data from IPCC, Final Plenary, Special Report Renewable Energy Sources (SRREN), May 2011; 1985-2010 data from Paula Mints, Principal Analyst, Solar Services Program, Navigant; 2011 numbers based on current market data



SOLYNDRA IN PERSPECTIVE

From all the noise over the bankruptcy of California solar firm Solyndra—recipient of $535 million in loan guarantees from the Department of Energy—you might think it involved blatant public corruption and an unprecedented loss of public funds. In fact, no wrongdoing has been discovered, and while $535 million is serious money, in the history of failed federal bets it's pretty small potatoes. Here is how the Solyndra loan lines up with what the *New York Times* calls "the Pentagon's biggest boondoggles." —***Paul Rauber***



This chart shows how the policies outlined in this article could eliminate gasoline demand in the U.S. transportation sector by mid-century. The uppermost line represents our projection of gasoline demand under current policies; the different colors represent the individual impacts of higher fuel economy standards, increased production of cellulosic biofuels, and a transition to electric-drive vehicles.

VI. THE NEW SUSTAINABLE BARREL

SOLAR
I
WIND
I
BIOMASS
I
PLUG-IN HYBRIDS
I
PUBLIC TRANSPORTATION
I
ENERGY EFFICIENCY STANDARDS
I
RETROFITTING HOUSES & BUILDINGS
I
URBAN/LOCAL FOOD PRODUCTION

VII. A CLEAN ENERGY MANUFACTURING POLICY

- Long-term federal policy to actually *make things again* (wind turbines, solar cells, batteries, building materials, etc.)
- Long-term economic/investment incentives
- Market access for solar/wind power, low-carbon vehicles, zero-waste appliances, & energy efficient buildings
- Affordable financing for modernizing the grid, mass transit, and retrofitting the entire infrastructure

Clean energy can be mainstream, not a pipe dream
Let the future begin!