

# WPUI Advances in Nuclear Conference, March 26, 2008

*Changing climate and changing  
understandings; paths to new  
opinions on nuclear energy.*

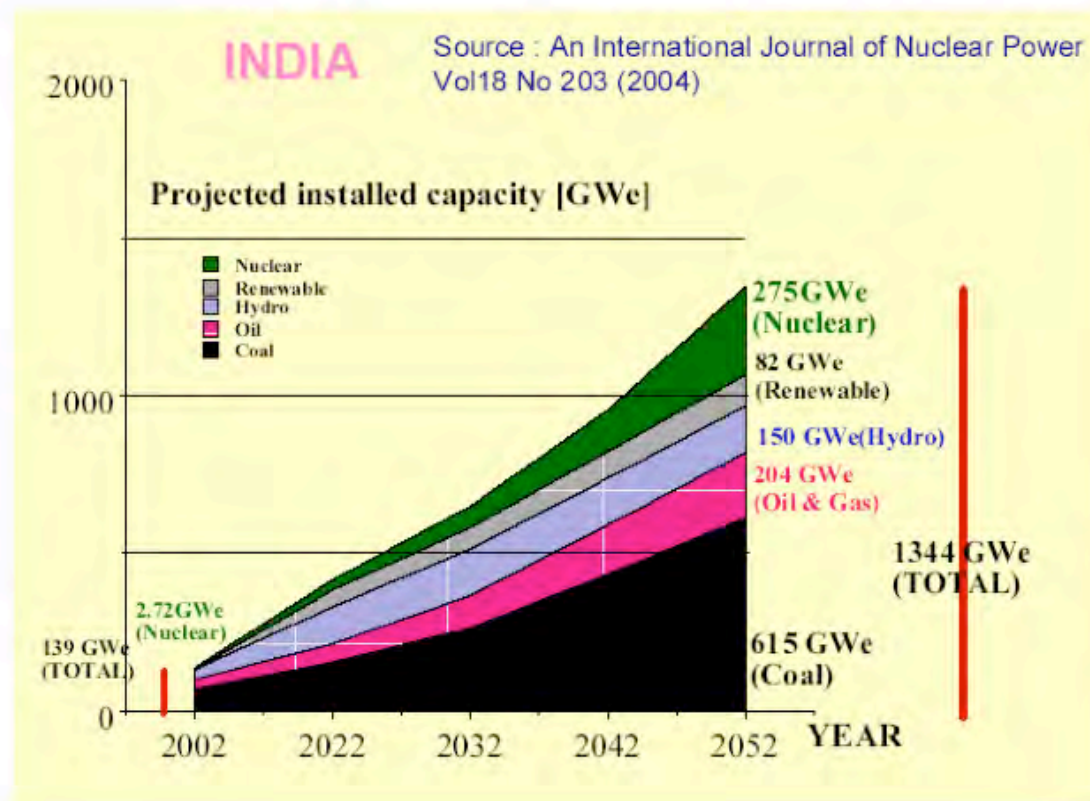
Frank Jablonski

# Bishop Hugh Montefiore

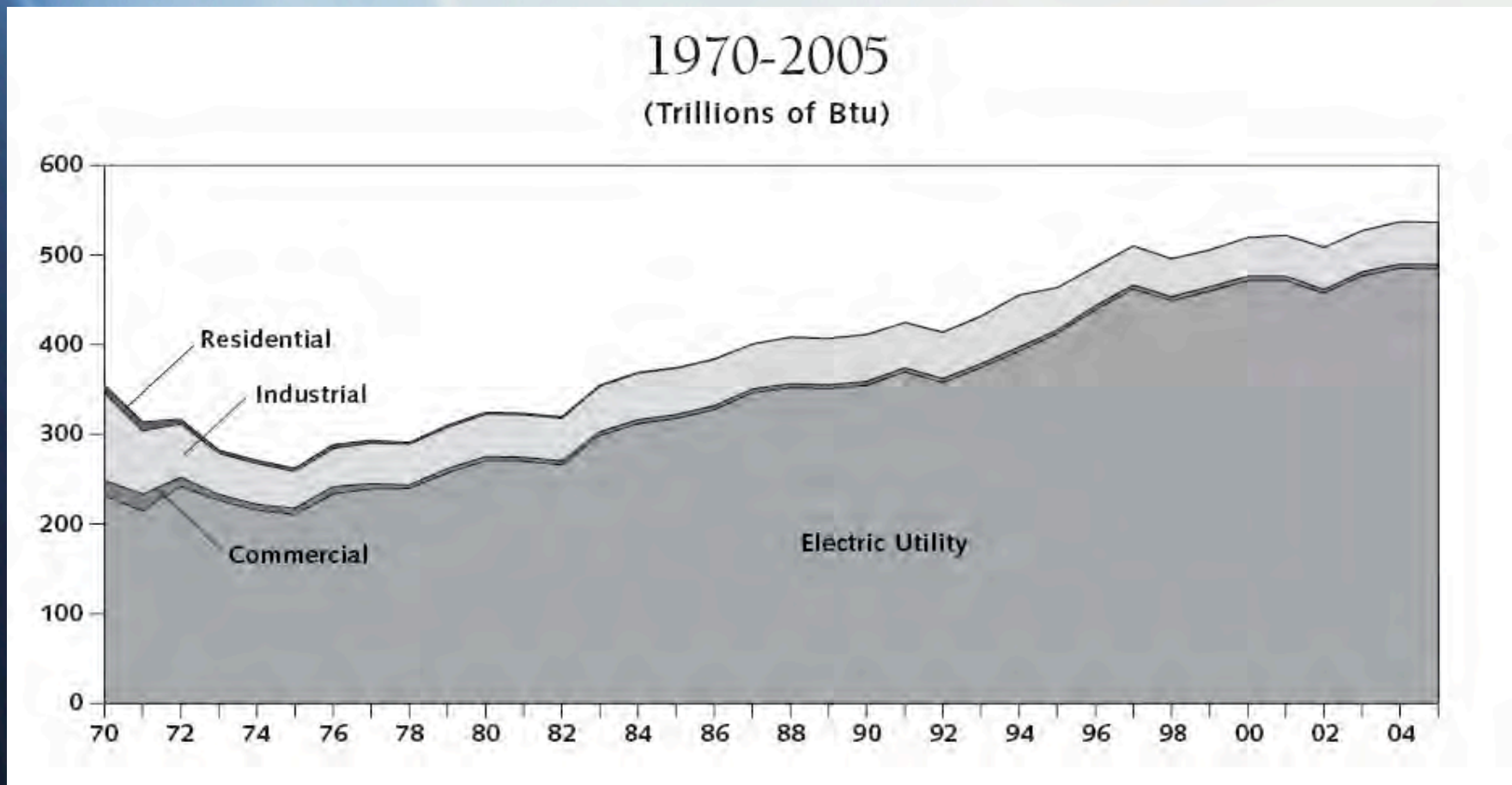
CURWOOD: Tell me, what prompted you to change your thinking and come to the conclusion that nuclear power is the way to respond to the dangers of global warming?

MONTEFIORE: I think that what prompted me to change my thinking on this was trying to work out in practice how we can reduce global warming gases by 60 percent by 2050. And when I worked that out, I realized we couldn't do it unless we changed human nature, deciding not to use cars so much, and so on and so forth—that we couldn't do it without nuclear energy. And the more I looked into it, the stronger this conviction came.

# India projections, power



# Trends closer to home (coal use, Wisconsin )

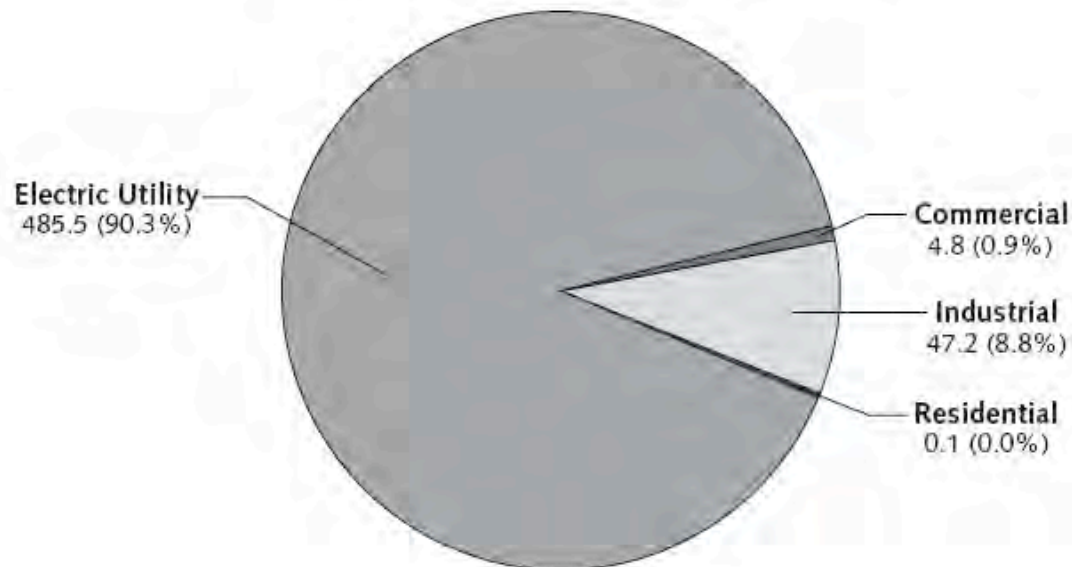


# Utilities and coal: 90%

## Wisconsin Coal Use, by Economic Sector

2005

(Trillions of Btu and Percent of Total)



# These are also moral issues:

- Worldwide, about 2 billion people are currently without electricity;
- Having available some electricity is highly correlated with levels of basic well-being;
- Impact of burning food for energy on world food prices.

# Apparent, but unstated presumptions.

Problematic externalities of nuclear energy are avoided if the United States, or the State of Wisconsin, refuse to expand use of nuclear energy technology.

Renewable energy will face no obstacles, or readily overcome all obstacles, to massive deployment, and has no materials or other bottlenecks that will impair massive deployment.

Renewable energy's externalities are not externalities, but something else.

Avoiding using nuclear energy will not relieve us of the obligation to deal with its potential problems.

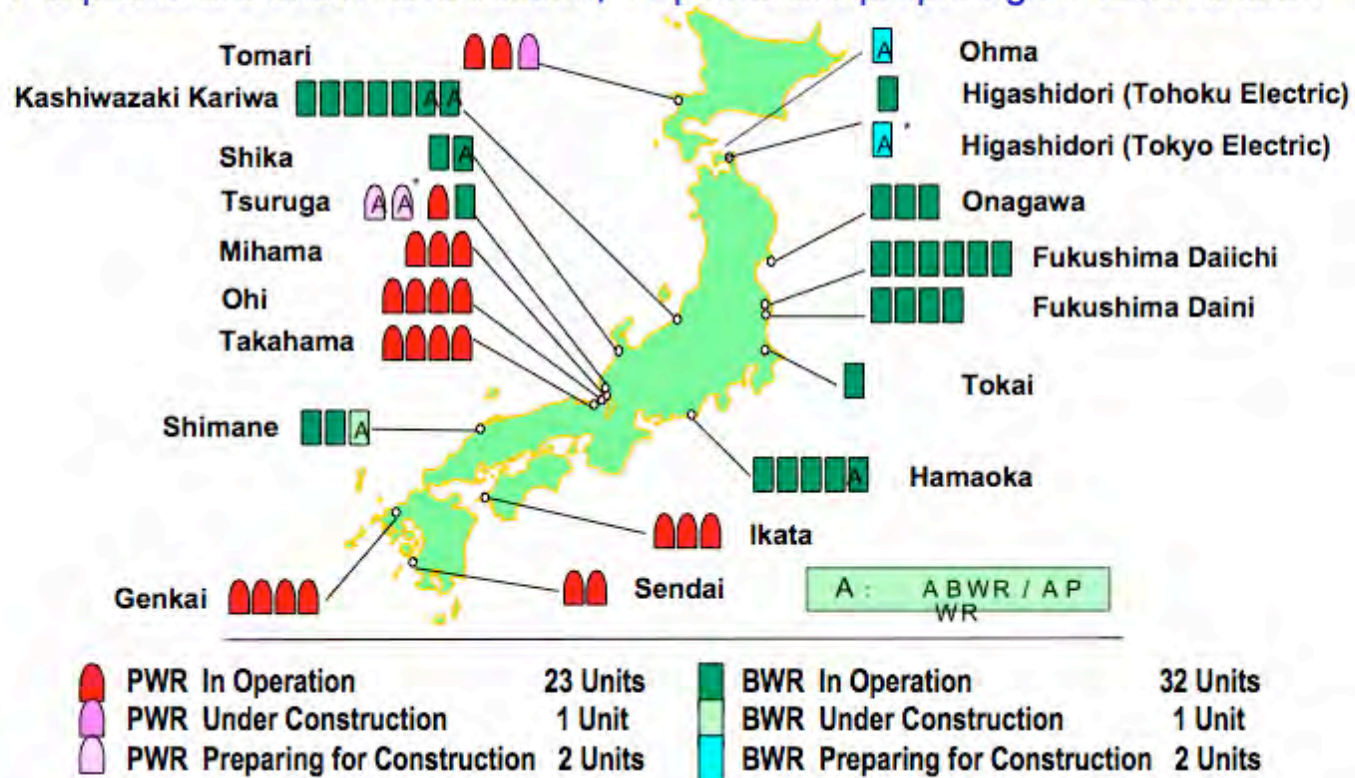


# Japan

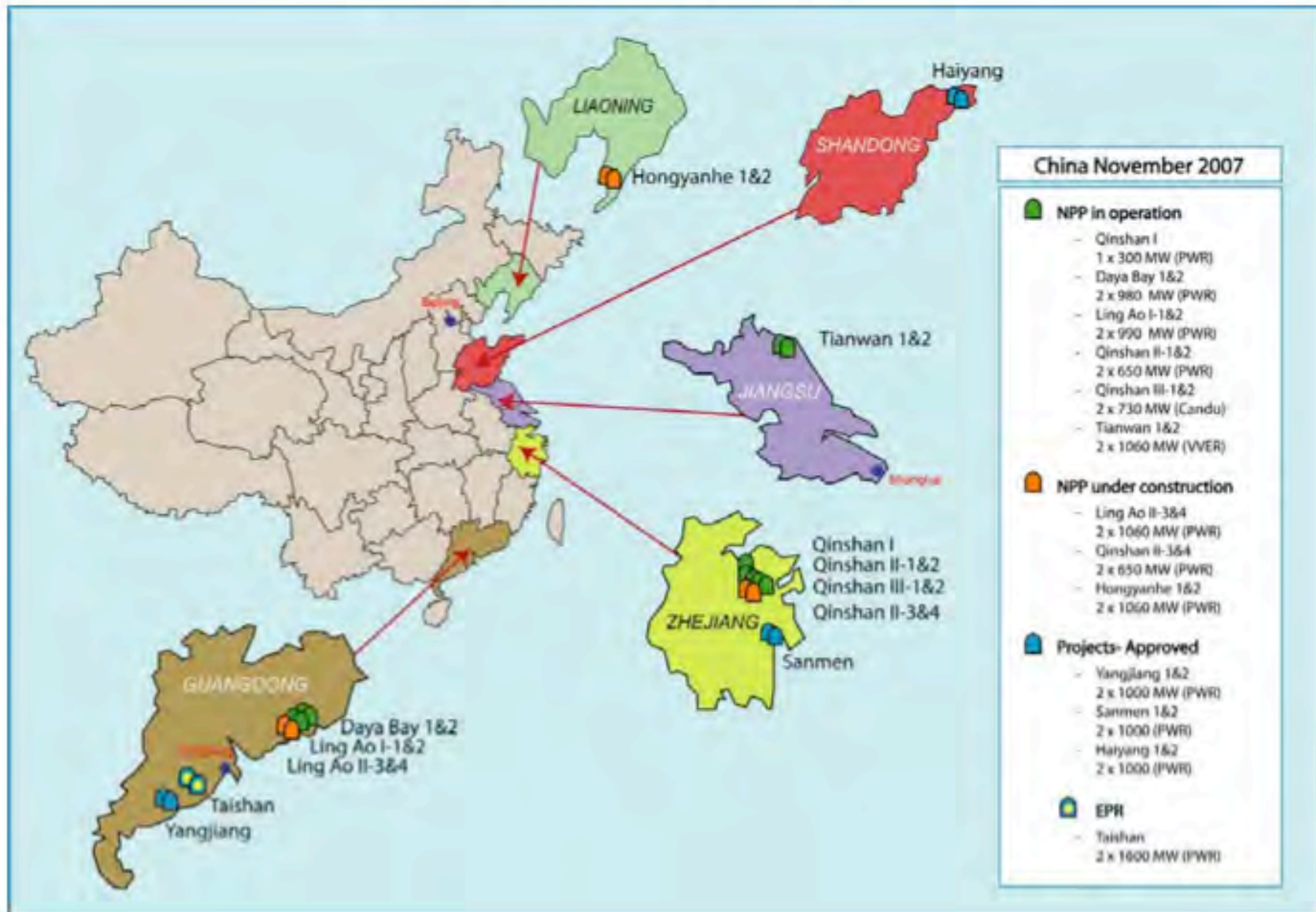
## 1. Background - Status of Nuclear Power Plants in Japan

### Status of Nuclear Power Plants in Japan

- 55 commercial nuclear power plants (BWRs and PWRs) are in operation.
- 2 plants are under construction, 11 plants are preparing for construction.



## Map of nuclear power plants in China



# South Africa

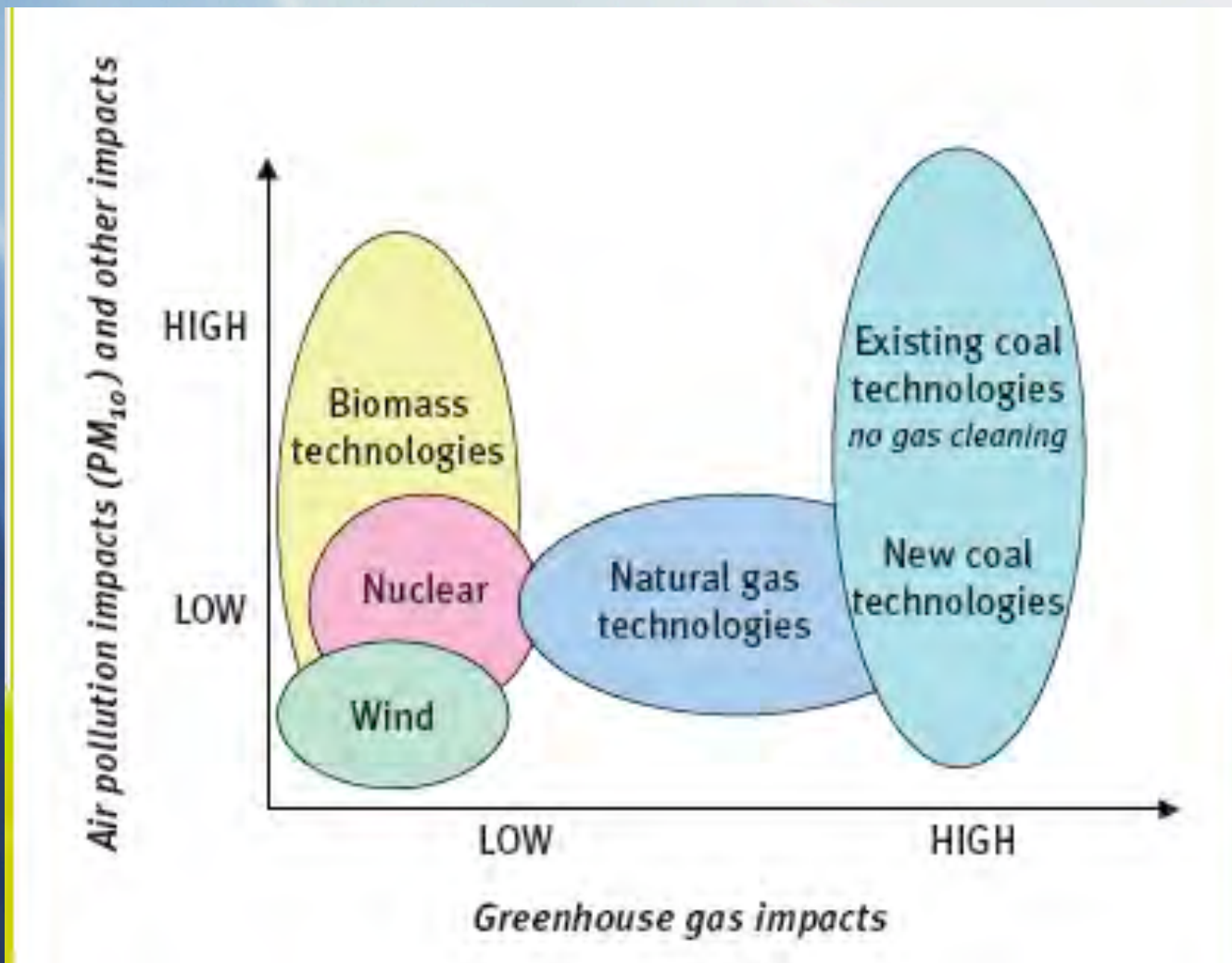
## “State of the Nation Address”

09 February 2007

- **President Mbeki stated, “with regard to energy, we will also expedite our work to ensure greater reliance on nuclear power generation, natural gas and the various forms of renewable sources of energy”**



# There is no free lunch in energy.



# Air impacts.

**AUSTIN BUSINESS JOURNAL**  
NEWS LETTER FROM THE UNIVERSITY OF TEXAS

**BUSINESS PULSE SURVEY:** [Who is Austin's most innovative tech company?](#)

## Concerns over air quality could sink biodiesel sales in Texas

Austin Business Journal - August 18, 2008 by [Margaret Allen](#) Contributing Writer

The fast-growing biofuels industry could be forced from the lucrative Texas diesel market unless it can convince state officials that its vegetable-based diesel fuel won't foul the state's air.

Texas is the country's largest producer of biodiesel, a mix of regular diesel and vegetable oil. A decision to allow or forbid the fuel is expected before year's end.

The state's chief environmental regulatory agency, the Texas Commission on Environmental Quality, has given the fledgling biodiesel industry the ultimatum to prove that the fuel is clean enough for Texas.



SARAH KERVER | ABJ  
Jeff Plowman leads Austin  
Biofuels LLC.  
[View Larger](#)

# Land Use - Greenhouse Impacts

The New York Times  
nytimes.com

February 8, 2008

## Biofuels Deemed a Greenhouse Threat

By [ELISABETH ROSENTHAL](#)

Almost all biofuels used today cause more greenhouse gas emissions than conventional fuels if the full emissions costs of producing these “green” fuels are taken into account, two studies being published Thursday have concluded.

The benefits of biofuels have come under increasing attack in recent months, as scientists took a closer look at the global environmental cost of their production. These latest studies, published in the prestigious journal *Science*, are likely to add to the controversy.

These studies for the first time take a detailed, comprehensive look at the emissions effects of the huge amount of natural land that is being converted to cropland globally to support biofuels development.

The destruction of natural ecosystems — whether rain forest in the tropics or grasslands in South America — not only releases greenhouse gases into the atmosphere when they are burned and plowed, but also deprives the planet of natural sponges to absorb carbon emissions. Cropland also absorbs far less carbon than the rain forests or even scrubland that it replaces.

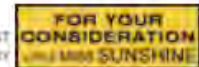
# Unintended and adverse secondary impacts.

Once a Dream Fuel, Palm Oil May Be an Eco-Nightmare – New York Times

01/31/2007 10:14 AM

**The New York Times**  
nytimes.com

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January 31, 2007

## Once a Dream Fuel, Palm Oil May Be an Eco-Nightmare

By [ELISABETH ROSENTHAL](#)

AMSTERDAM, Jan. 25 — Just a few years ago, politicians and environmental groups in the Netherlands were thrilled by the early and rapid adoption of “sustainable energy,” achieved in part by coaxing electrical plants to use biofuel — in particular, palm oil from Southeast Asia.

Spurred by government subsidies, energy companies became so enthusiastic that they designed generators that ran exclusively on the oil, which in theory would be cleaner than fossil fuels like coal because it is derived from plants.

But last year, when scientists studied practices at palm plantations in Indonesia and Malaysia, this green fairy tale began to look more like an environmental nightmare.

# Subsidies

Frontline Nuclear Program 1997 PBS

**RALPH NADER:** What do you say about a technology that wants to persist on the public dole because it can't meet a market test? I don't know anybody in Wall Street and I don't know anybody in the electric utility industry who wants to build any more nuclear plants.

|  
N.Y. Times, June 1, 2007  
THE ENERGY CHALLENGE  
Where Now, for the Wind?  
By CLIFFORD KRAUSS

The production tax credit for wind is becoming increasingly expensive at a time of tight budgets, especially for an energy source that still generates less than 1 percent of the country's power.

The extension from 2006 to 2007 cost the Treasury \$2.75 billion by one Congressional estimate, and that number will mushroom as the industry continues to grow.

"There is always the risk the tax credits aren't renewed," said Brian M. Youngberg, a utilities analyst for Edward Jones, the investment firm, "and the business essentially stops growing."

Hopes,  
dreams,  
realities  
(1934).

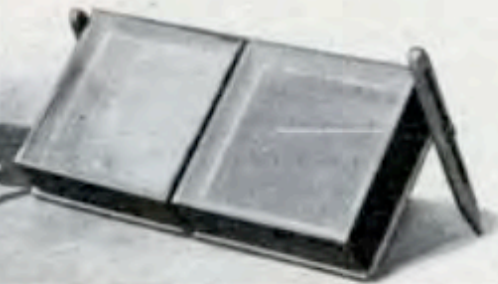


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# New Efforts May



Research worker in Russia making electrical measurements of the sun's energy as part of Soviet's program to harness the sunlight



**S**UNSHINE, our greatest source of potential power, is now largely wasted. It is highly probable, however, that a few years hence science will find a way to harness the mighty energy of the sun's radiation. Solar engines and solar heating apparatus will then make it economically practicable for us to use at least a small portion of our now-wasted sunshine to run our factories, light our streets, cook our food, and warm our houses.

In the United States we use, each year, something like a half billion tons of coal, a half billion barrels of oil, and fifty billion horsepower hours of water power for heat, light, and power. If it were possible to convert all this energy into power—which of course it isn't—it would produce seven trillion horsepower hours. If it were possible to convert completely into power all the solar energy that each year falls on the United States in the form of sunshine, it would amount to seven thousand trillion horsepower hours. Of course, some of the sunshine that comes to us through 93,000,000 miles of space is needed for the general heating of the earth and for the growing of plant life; but above those fundamental needs, solar radiation provides a potential supply of power many thou-

## Sierra Club: “almost all”

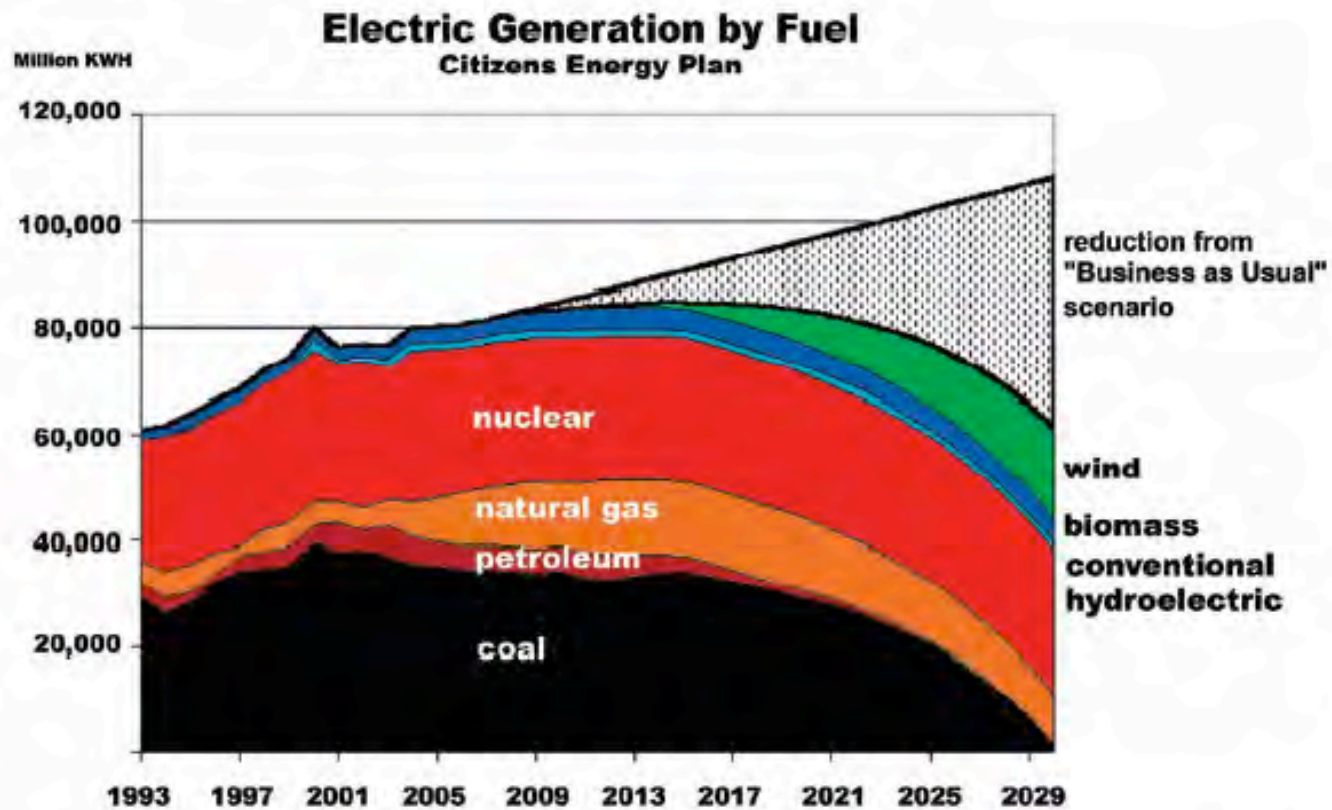
**W**e have the potential to produce almost all of our electricity from clean energy sources. Today, we have the technology and the know-how to move beyond our dependence on polluting power plants by using clean, safe, and affordable renewable energy.

# Same Brochure: goal of twenty percent

- ▶ Produce 20 percent of our electricity from renewable energy sources by 2020.

*How do we reliably displace massive amounts of carbon-based electricity in a way that is adequate to the task.*

# Sierra Club Virginia Plan



# Carbon intensity

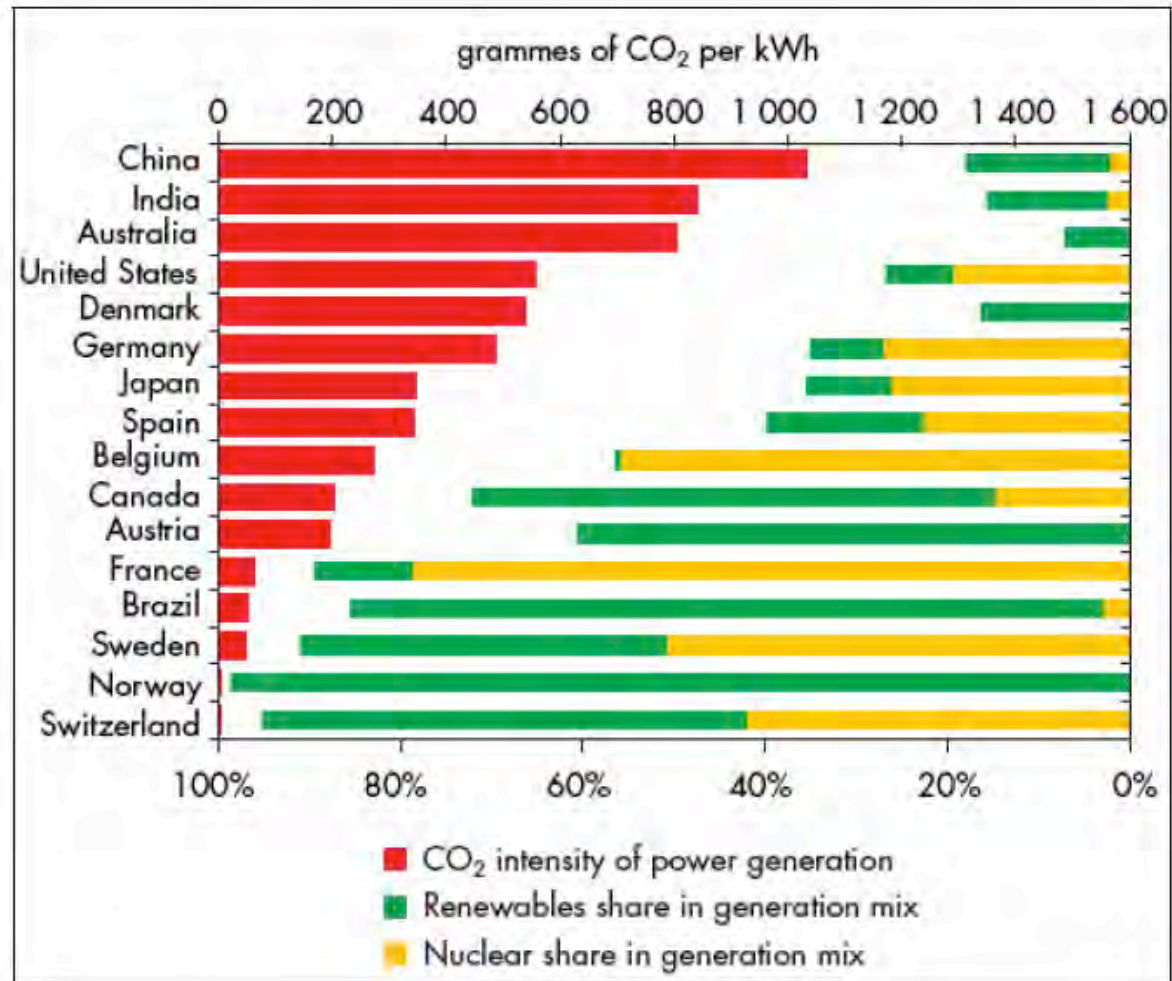
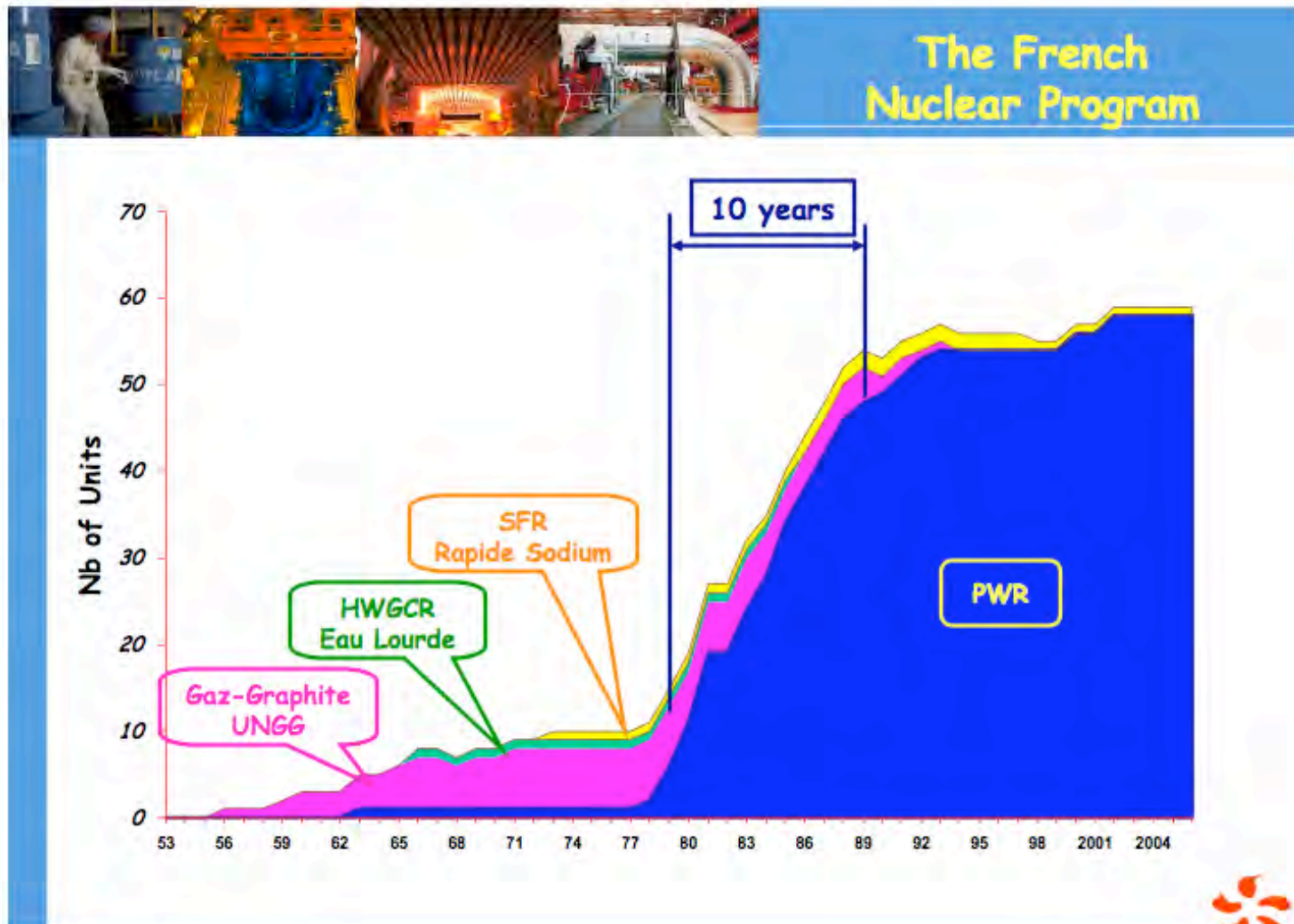


Figure: World Energy Outlook 2006

# Scalability (with caveats)



# Results.

