



Reality Energy

The case for embracing an energy policy based on truth and courage

Presentation prepared for Senator Obama

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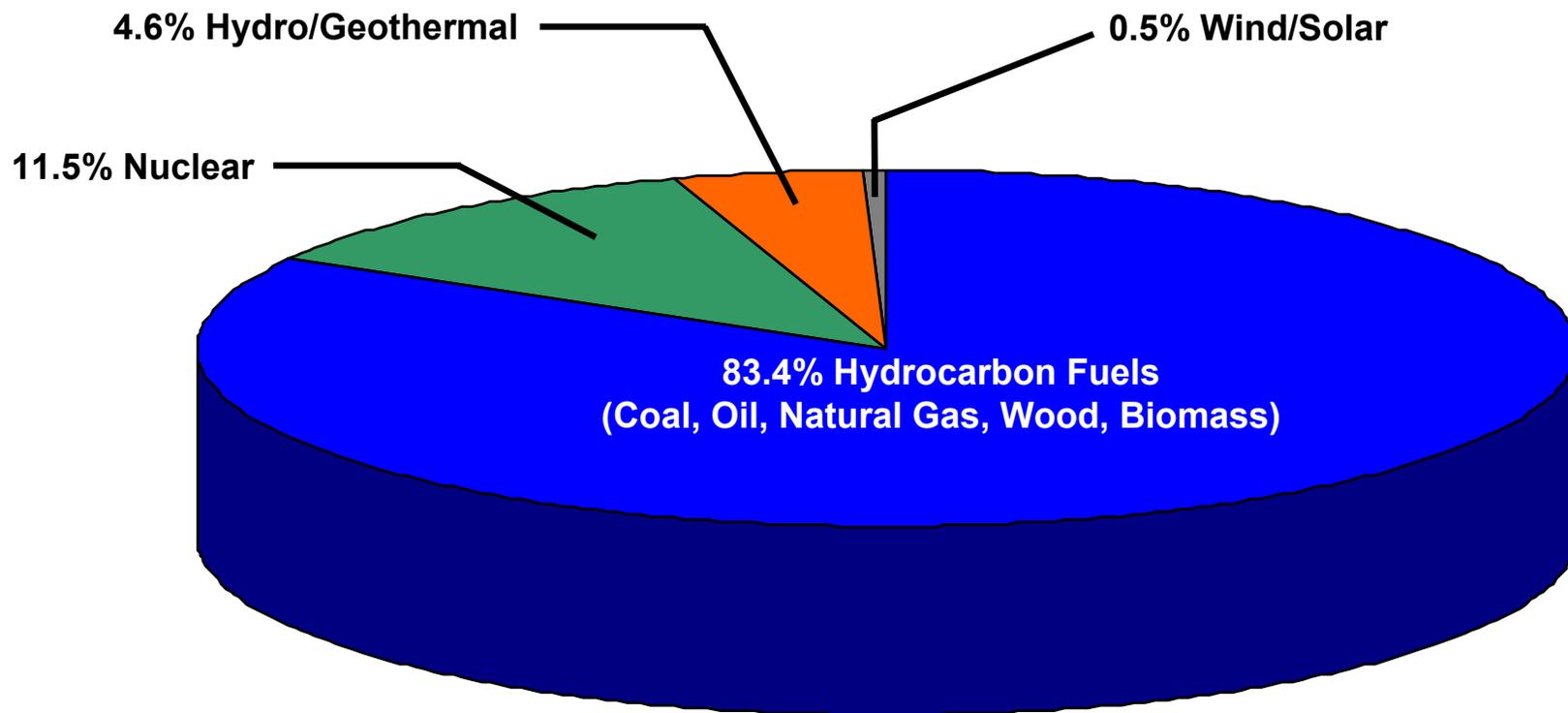
09 May 2008

As little as 3 decades ago, we were still the world's mightiest industrial nation and had an unrivaled standard of living. This was the result of ready access to plentiful, reliable energy, the cheapest in the world, invented and converted to reality by free men living in a nation enjoying the blessings of institutionalized human liberty.

Then, as today, 95% of our total energy supply came from nuclear and hydrocarbon sources and the immutable laws of physical and economic reality inform us that this will persist for the foreseeable future.

Present Sources for US energy Consumption

Source: Energy Information Administration / Annual Energy Review 2006



Unfortunately, during the 70's, our nation's leaders allocated billions of dollars to vigorously promote bizarre "Feeble Energy" schemes (aka "Alternative Energy") while passing laws and incentives to force the cancellation of 100 planned nuclear power stations, prevent the construction of any more refineries and severely hinder the building of new coal-fired power plants.

History will judge us harshly for allowing President Bush to persuade our nation to waste vast amounts of money to convert valuable food into inferior fuel, in what is now called the “ethanol scam” and a “crime against humanity”.

The result of all this misdirected government policy, so much against our proven American way of solving problems, has been:

- **soaring energy and food prices**
- **accelerating balance of payment deficits**
- **the final stages of the de-industrialization of the USA**
- **certainty of further energy price escalation, and**
- **continued degradation of the environment**

We are rapidly descending into 2nd rate nation status with its inevitable loss of liberty.

Our manufacturing and technological impotency will soon cause us to fall behind in our ability to produce the weapons with which to maintain a strong military.

**At present, we import about 10 million barrels of oil per day –
and hemorrhage at the rate of \$ 1.2 billion/day- or over
\$ 0.4 trillion dollars per year.**

**A substantial part of this money goes to countries with large
groups of people wishing to obliterate us.**

As a result of the \$ 50 billion investment over the past decade to “prove” a causal relationship between global warming and CO2 emissions due to burning fossil fuels, it has become politically expedient to fashion legislation to limit the production of energy from coal and thereby drive up the price of energy even more.

This will destroy the few remaining manufacturing companies who will have no hope of competing with the emerging industrial giants China and India who are exempt from any similar impediments to their energy production.

It should be noted the unlike our government, the Chinese and Indian governments consist mainly of superbly educated engineers and scientists. It is therefore unlikely they will agree with the IPCC conclusions on anthropogenic global warming.

Electrical power production from nuclear energy does not produce any CO₂ emissions and the 104 nuclear power plants in our country have produced reliable, low-cost electrical power without a single fatality over the past half century.

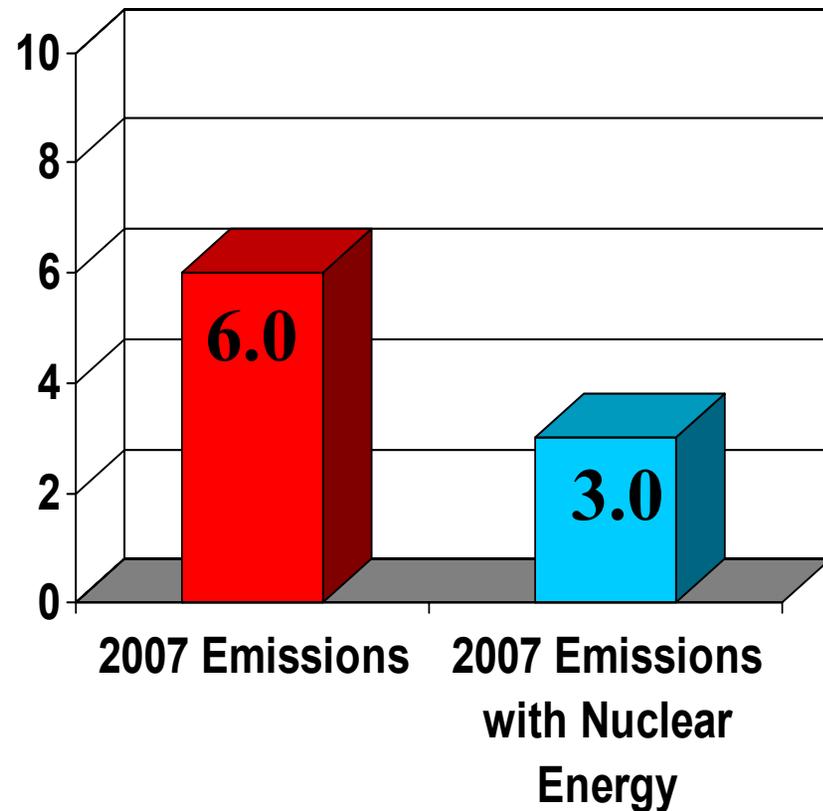
If the construction of nuclear power plants had not been halted during the late 70's, we would be getting most of our electricity from nuclear sources and use nuclear sources for “process heat” in chemical plants.

Our total CO₂ emissions would be less than 50% of what they are today – see Fig 2.

◆ **Substituting nuclear for hydrocarbon-sourced for electrical energy production and “process heat” would have resulted in a reduction of approximately 3.0 GT of CO₂ emissions/year**

◆ **Present annual USA
CO₂ emissions = 6.0 GT/year**

(1 GT = 1,000,000,000 Tons)
Source: eia.doe.gov



One would therefore think that opponents of coal-fired power plants would enthusiastically back nuclear energy.

One would be wrong.

All the so-called “champions” of clean energy, such as the NRDC, Sierra Club, Green Peace, Friends of the Earth , and Union of Concerned Scientists oppose nuclear energy.

A tale of three nuclear power stations and two windmills



Shippingport, PA

The worlds 1st large scale nuclear power plant

The nuclear age was ushered in the United States on 18 Dec 57 when the Shippingport nuclear power station on the Ohio River, near Pittsburgh first generated electricity only 39 months after ground was broken by President Eisenhower on Labor Day, 9 Sep 54.

Built at a cost of \$ 72 million it produced electrical power for 25 years without incident and was decommissioned in Dec 88 with the site cleaned up and released for “unrestricted use”.

A tale of three nuclear power stations and two windmills

In May 1966, a Construction Permit was issued for Connecticut's Millstone#1 nuclear power station.

Built for \$ 101 million, it started delivering power to the grid only 4 years later, in 1970, and delivered clean, cheap, reliable, electrical power for 28 years without incident until it was decommissioned on 21 Jul 98.

Two more plants were built on this site, and today, safely and cleanly supply a total of 2,000 MWe of electrical power to the people of Connecticut.

A tale of three nuclear power stations and two windmills

In 1973, construction started on the Shoreham nuclear power plant virtually identical to the one at Millstone #1 plant across the sound on Long Island, NY, a few miles away.

But it was completed 11 years later, in 1984, at a cost of over \$ 2 billion as a result of capricious design changes imposed by the NRC and incompetent management.

Although the plant went critical in 1984, litigation and bureaucratic obstruction caused the cost to further escalate to \$ 6 billion forcing the utility to abandon the plant in 1989 without it ever delivering as much as one kilowatt-hour of energy to the grid.

A tale of three nuclear power stations and two windmills



Millstone Nuclear Power Plant



Shoreham Nuclear Power Plant

A tale of three nuclear power stations and two windmills

**Today, two Feeble Energy windmills on the Shoreham site
produce a peak intermittent power of 50 kW only when the
wind blows**

**(which is 1/16,000 of the power that would have been produced continuously and at
a far cheaper rate had the original plant not been destroyed).**

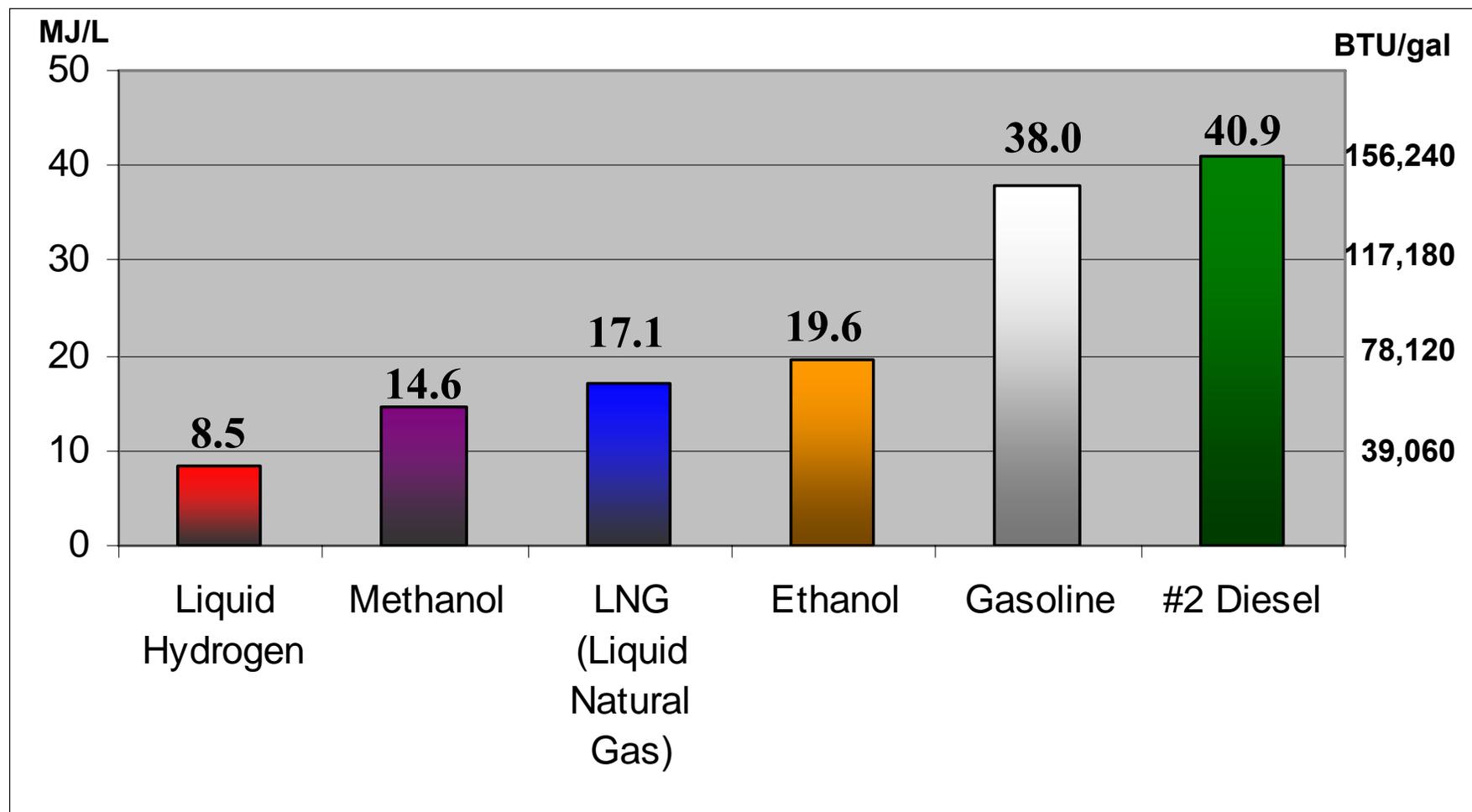


Shoreham South Windmill



Shoreham Windmills

Energy Content of Liquid Fuels (Lower Heating Value)



Best Transportation Fuel

- ◆ **Room Temperature Diesel Fuel is the best Transportation Fuel**
- ◆ **It is Safe and Clean in modern engines**
- ◆ **It has effectively 2x the specific energy of Ethanol and 10x that of Hydrogen**
- ◆ **Having been actively involved and witnessed the spectacular failure of the commercial viability of Hydrogen Fuel Cell Vehicles, I am convinced that Hydrogen is not a practical Transportation Fuel.**

Hydrogen Fuel Cell Bus Programs with Saminco Propulsion



Ballard Phase 5 - Amsterdam



Ballard Phase 5 - Luxemburg



Ballard Phase 4 – Demonstration Vehicle

Experimental Hydrogen Fuel Cell Vehicles with Saminco Propulsion



Ford P2000



Mercedes NECAR 4



Ford Fusion 999 at the LA Auto Show 2007



The Ohio State University Buckeye Bullet 2

Hydrogen Economy

◆ Hydrogen is not likely to be a viable Transportation Fuel. But there will be a great future for Hydrogen for making it possible to convert Coal to Diesel Fuel.

Basic Formula – CH_2

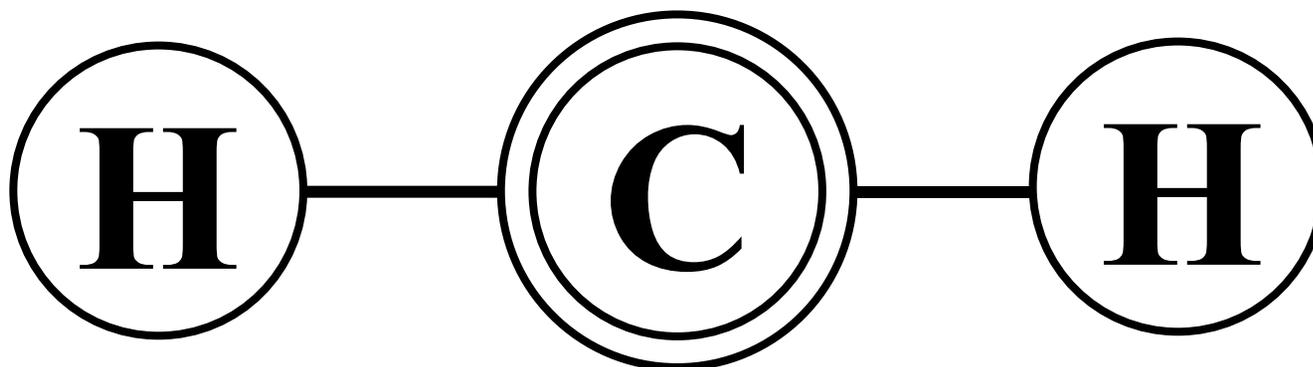
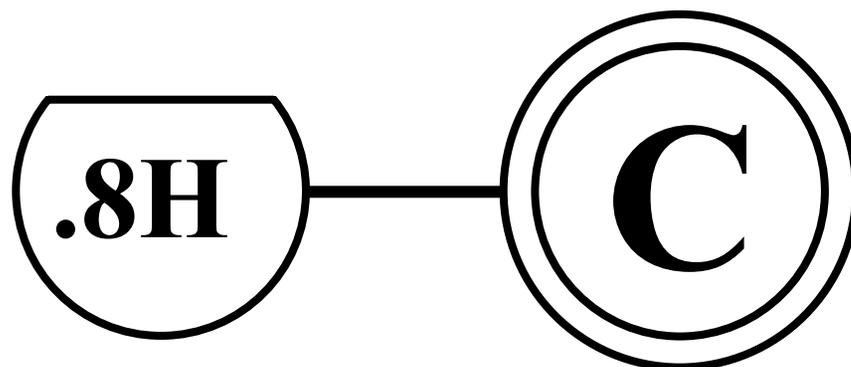


Fig 4 – Basic Hydrocarbon Fuel Molecule

Basic Formula for Illinois Coal – $\text{CH}_{0.8}$



Coal Liquefaction



Carbon Chains

C₁ – C₅ (Gases – CH₄ (methane) C₃H₈ (propane))

C₆ – C₁₈ (Liquid Fuels – Gasoline; Kerosene; Diesel)

C₁₉ – C₃₀ (Heavy Heating Fuels)

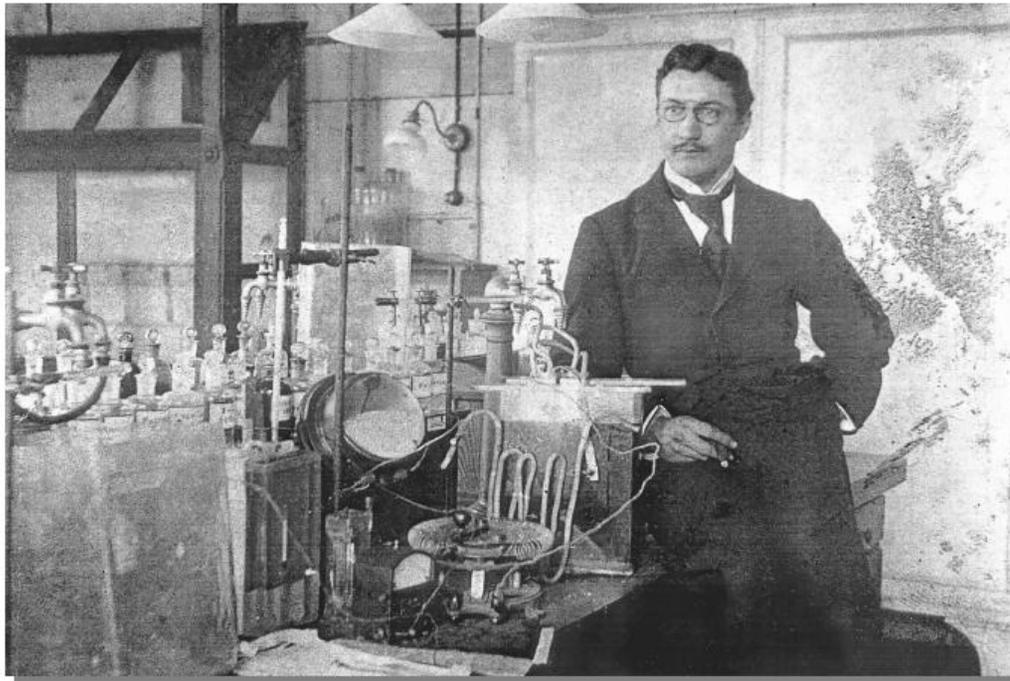
C₃₁ – C₂₀₀ (Solids, including Coal)

Fischer Tropsch (FT) Process

Invented by Fischer and Tropsch in the early 1900's.

Used by Germany during WWII and in South Africa today to provide 150,000 bbl/day of fuel, mainly Diesel fuel

Franz Fischer at Work in 1918



Financial Mail 2000

THE CONVERSION OF COAL INTO OILS

By Dr. FRANZ FISCHER
Director of the Kaiser-Wilhelm Institute for Coal Research, Bochum, Westphalia, Prussia;
Professor in the Technical High School, Berlin;
Member of the Royal Coal Council.

AUTHORISED ENGLISH TRANSLATION

EDITED

WITH A FOREWORD AND NOTES

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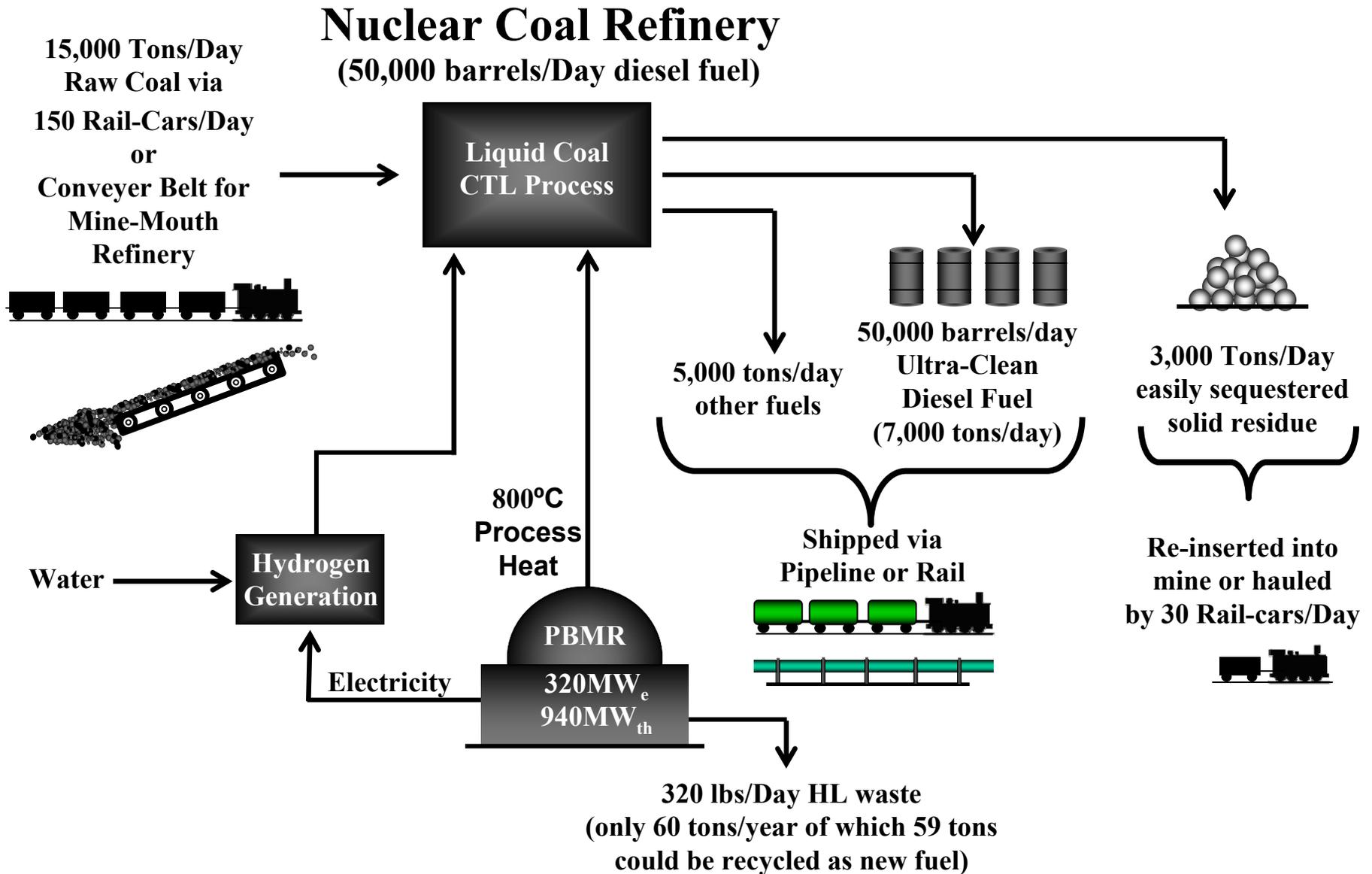
LONDON: ERNEST BENN LIMITED
8 BOUVERIE STREET, E.C.4

1925

Fischer Tropsch (FT) Process

Disadvantages

- ◆ **3 stage conversion process**
- ◆ **Wasteful! – burns coal to convert coal**
- ◆ **High temperature - ~ 2500°F**
- ◆ **Requires large amounts of water**
- ◆ **Causes significant pollution as presently applied**
- ◆ **Requires very expensive Carbon Sequestration to make new plants politically acceptable**
- ◆ **Vigorously opposed by Sierra Club and other environmental groups**



Advantages of Nuclear Coal Refinery

- ◆ **No Emissions of:**
 - ◆ **SO₂**
 - ◆ **Mercury**
 - ◆ **Arsenic**
 - ◆ **Other Harmful compounds**
- ◆ **Does not require Carbon Sequestration Equipment**
- ◆ **Uses only 40% of water required for F-T process**
- ◆ **Solid non-toxic wastes can be reinserted into mine**
- ◆ **Utilizes 50% less Coal as the F-T process**
- ◆ **Low temperature: about 1200°F maximum**
- ◆ **Allows for lower cost and more reliable plant cost and operation**

PUROLEUM



Using private funding, on June 6, 2007 the 1st batch of Puroleum™ was refined using natural gas process heat.

On a large scale, this process could convert coal to liquid fuel using nuclear process heat

**Developed by Liquid Coal Inc
Fort Myers, Florida.**

**The Only Coal-Based Premium Diesel Fuel
entirely developed and refined in the United
States of America.**

The history of human progress has been closely related to man's easy access to convenient forms of energy such as heat, motion and electricity.

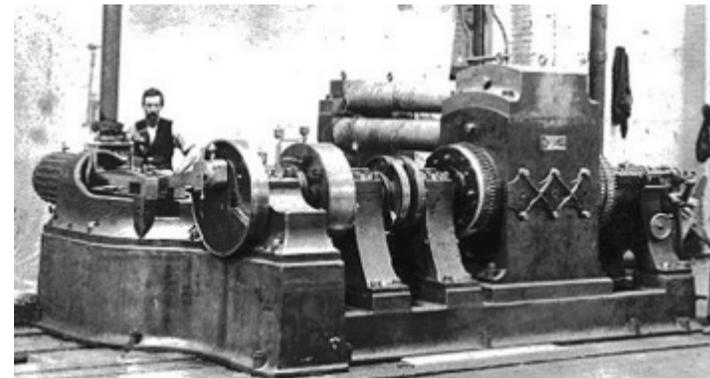
For about a million years, humans have relied on the sun, wind, water and wood to supply them only with useful energy in the form of heat. But about 500 years ago men discovered ways of converting wind and water flow to motion and were thereby able to grind grain and pump water and about 250 years ago, men found ways of converting new sources of energy such as peat, coal, gas and oil to propulsion and electricity.



CON EDISON'S ORIGINAL
POWER PLANT ON PEARL
STREET. (ILLUSTRATION:

CONSOLIDATED EDISON)

**In 1882, Thomas Edison built the
world's first coal-fired electrical power
plant in New York.**



Edison's Jumbo dynamo. Courtesy: National Park Service,

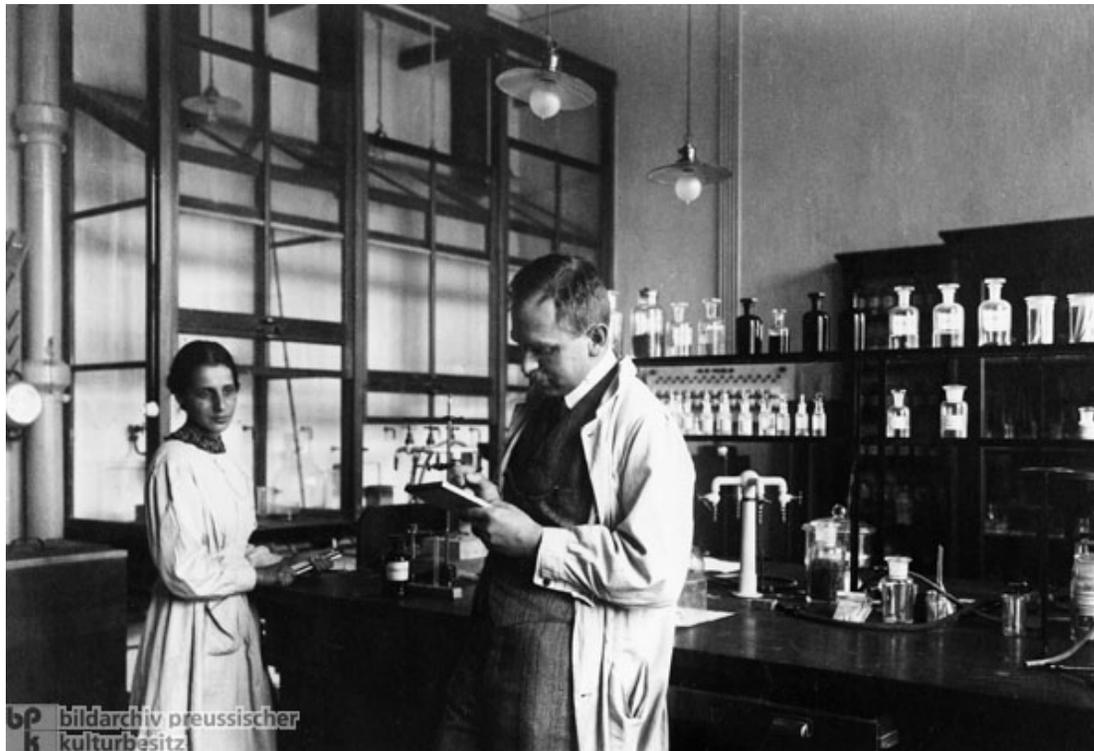
Edison National Historic Site.

**The World's First Hydroelectric Power
Plant Began Operation
September 30, 1882**



The dam across Fox River in Appleton, Wisconsin, the site of the first hydroelectric power plant in the world

In 1939, Otto Hahn and Lise Meitner discovered nuclear fission of uranium



Lise Meitner and Otto Hahn at the Kaiser Wilhelm Institute for Chemistry in Berlin (1928)

Energy Concentration

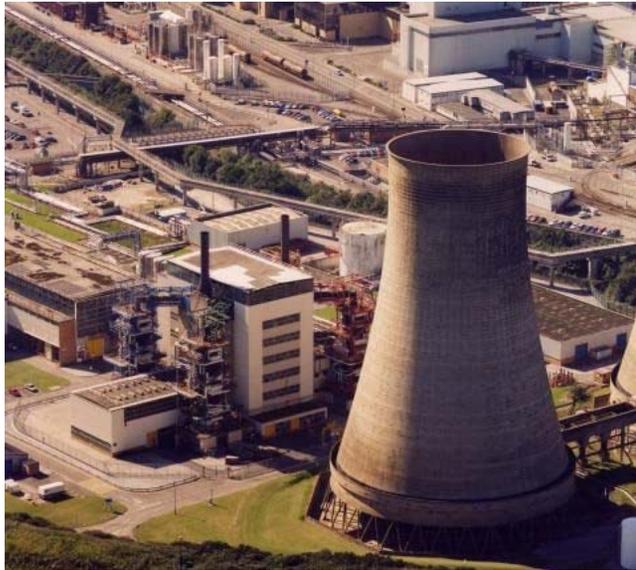


Image copyright (C) The British Nuclear Group Ltd

Calder Hall in the UK was the world's first commercial nuclear power station.

The design was codenamed PIPPA (Pressurized Pile Producing Power and Plutonium) by the UKAEA to denote the plant's dual commercial and military role.

Construction started in 1953. First connection to the grid was on 27 August 1956, and the plant was officially opened by Queen Elizabeth II on 17 October 1956.

When the station closed on 31 March 2003, the first reactor had been in use for nearly 47 years.

In 1954, the United States first nuclear power plant was started in Pennsylvania, only 15 years after the discovery of the nuclear fission of uranium.

(note: the small round structure next to the cooling tower is the containment building for the reactor)



Shippingport, PA

The 1st large scale nuclear power plant in the USA

When the Shippingport plant first supplied energy to the electrical grid, Lewis Strauss (President Eisenhower’s Energy Advisor) commented:

It is not too much to expect that our children will enjoy in their homes electrical energy too cheap to meter, will know of great periodic regional famines in the world only as matters of history, will travel effortlessly over the seas and under them and through the air with a minimum of danger and at great speeds, and will experience a lifespan far longer than ours as disease yields and man comes to understand what causes him to age.“

Lewis L. Strauss

*Speech to the National Association of Science Writers, New York City
September 16th, 1954.*

But it was not to be – reprehensible special interests initiated a relentless campaign of misinformation, exaggerating the dangers of nuclear energy.

This campaign was so successful that by 1978, all construction of nuclear power plants in our country was cancelled and not a single nuclear power plant has come on line since then.

In spite of the overwhelming evidence over the past 50 years that nuclear electric power as generated in the USA is reliable, safe, clean and amazingly affordable in spite of all the legislative obstacles against it, most so-called environmentalists today are still opposed.

(the Chernobyl type of liquid-cooled graphite-moderated reactor design was rejected as unsafe by the USA in 1948)

The chart below shows energy densities

Energy source	MJ/kg
Water(@ 5m height – flowing river)	0.000,05
Water(@ 100 m height – dam)	0.001
Wood (typical hard wood)	18
Oil	42
Coal	45
Natural Gas(@ 200 bar)	54
Hydrogen*	143
Nuclear Fission of U-235	90,000,000
Nuclear Fusion	300,000,000

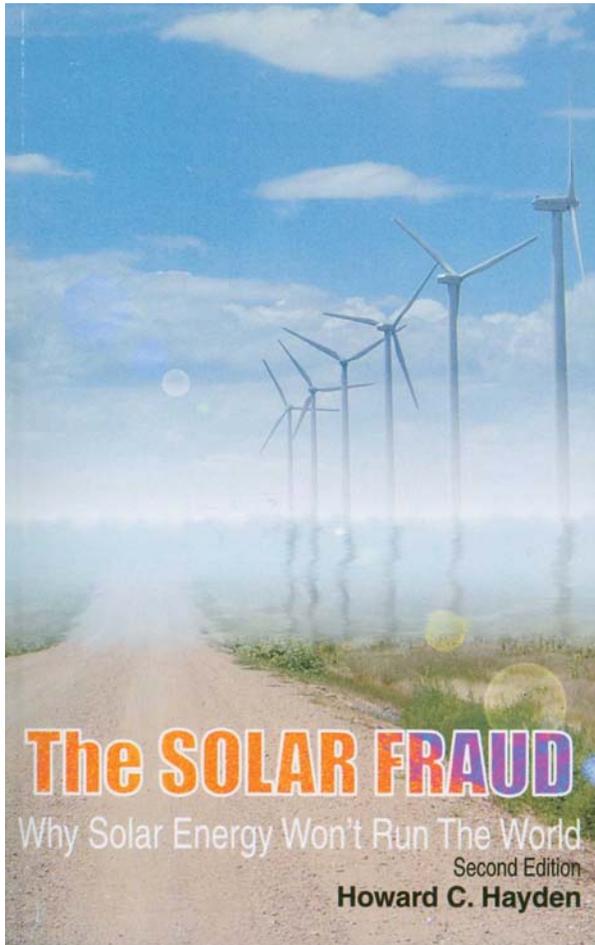
***Although hydrogen has the highest chemical energy density per unit mass, it has low chemical energy content per unit volume making it unsuitable for transportation fuel (8.5 MJ/L for liquid hydrogen compared to 41 MJ/L for room temperature diesel)**

It is self-evident that the higher the energy concentration, the smaller the energy-conversion facility and the more useful it will be for supplying useful energy forms.

This writer has held virgin U235 nuclear fuel in his bare hands and it is astonishing that a substance with so much energy content can be handled safely and conveniently before it is placed in a nuclear reactor.



A $\frac{3}{4}$ inch pellet of Uranium Oxide Fuel, only 0.3 inches in diameter can produce as much electricity as 1 Ton of coal



Howard Hayden, Professor Emeritus of Physics at University of Connecticut has written an easy-to-understand book – THE SOLAR FRAUD - on the folly of basing our nation's energy salvation on energy conversion methods using low density energy from wind, tidal and solar sources.

Every energy staffer in Washington should read this book,

Benefits of Nuclear energy to electric utilities and coal companies

Coal companies can expect huge increases in revenue, up to \$300/ton if they invest in “Mine Mouth Refineries”

Coal companies can expect long-term, highly profitable income from the transportation sector

Utilities will avoid prohibitive costs associated with compliance to SO₂, NO_X, Mercury and Fly Ash Capture requirements, and avoid the CCS nightmare

If Liquid Coal's energy recommendations were in effect today, it would result in:

- **Our total independence of imported oil**
- **Assurances of plentiful, cheap, clean energy for the next 2 centuries**
- **Creation of millions of high-paying jobs**
- **Wiping out our balance-of-payment deficits**
- **Invigoration of our automotive industry which would switch to manufacturing ultra-clean, highly efficient diesel cars**



Arthur Robinson, president of the Oregon Institute of Science and Medicine and one of this nation's foremost energy experts fully understands, more than most Americans, that we will not continue to exist as a sovereign, free country unless we again base our energy policies on our unique principles of freedom and the dignity of individual human beings, and moreover, that our existence as a free nation is crucial to the future of all humanity. He realizes that our policy makers must, on an urgent basis, find the courage and fortitude to immediately halt our decline into chaos by falling back on these fundamental American principles.

He has written that:

“There need be no vast government program to achieve this goal (American energy independence). It could be reached by legislatively removing all taxation, most regulation, and litigation, and all subsidies from all forms of energy production in the U.S., thereby allowing the free market to build the most practical mixture of methods of energy generation.”

Dr. Robinson has estimated that about \$1 trillion in capital for construction of new power plants is needed to reverse the current \$500 billion U.S. energy trade deficit and to create a \$300 billion U.S. energy trade surplus. He predicts that, if economic freedom is returned to American industry, the free market will spontaneously supply this capital.

In the event that Americans should choose to build the needed energy production capacity in as short a time as possible, Robinson suggests that:

“Every tax, regulation, law or other impediment that currently inhibits any energy-producing industry should immediately be abolished – and no new such tax, law, or regulation should be created until the flow of useful energy across the borders of the United States is strongly outwards... Simultaneously, and for the same period of time, all local, state, and federal taxes should be waived for all persons employed in the energy industries, and these industries should operate with no government oversight whatsoever.”

There is no doubt that if Dr. Robinson's Initiative were implemented, our nation would recapture its pre-eminence as the world's leading energy producer within a decade, while re-invigorating our domestic technological and industrial foundations.

Adopt the Robinson Initiative into law for a period of 20 years – to provide investors with assurance that their investment will not be wasted due to “whim-of-the-moment” legislative changes.

Call on the NRC to find ways of reducing the present delay in processing nuclear plant construction/operating licenses from the present 42 months to 12 months and to approve new designs such as High Temperature Helium-Cooled reactors in less than 36 months.

Abolish all impediments to spent-fuel processing and the construction of fast breeder reactors.

Abolish funding for CCS (Carbon Capture and Storage) technology which is a very expensive solution to a non-existing problem

Abolish all subsidies and federal PURPA mandates for Alternative Energy projects.

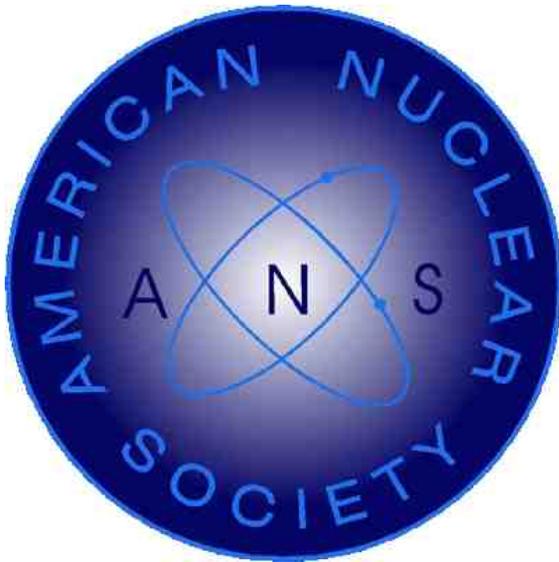
Abolish ethanol subsidies and import duties.

Regarding climate change issues, hasty action could well result in a disaster far greater than the Ethanol debacle.

I urge policymakers to be open to use the Best Science Available before setting our country on a course that would cause incalculable harm.

As a symbol of hopeful co-operation, this writer has for several years, promoted the sentiment expressed on the following poster:

Nuclear Energy and Coal



The Partnership that will Secure Coal's Future