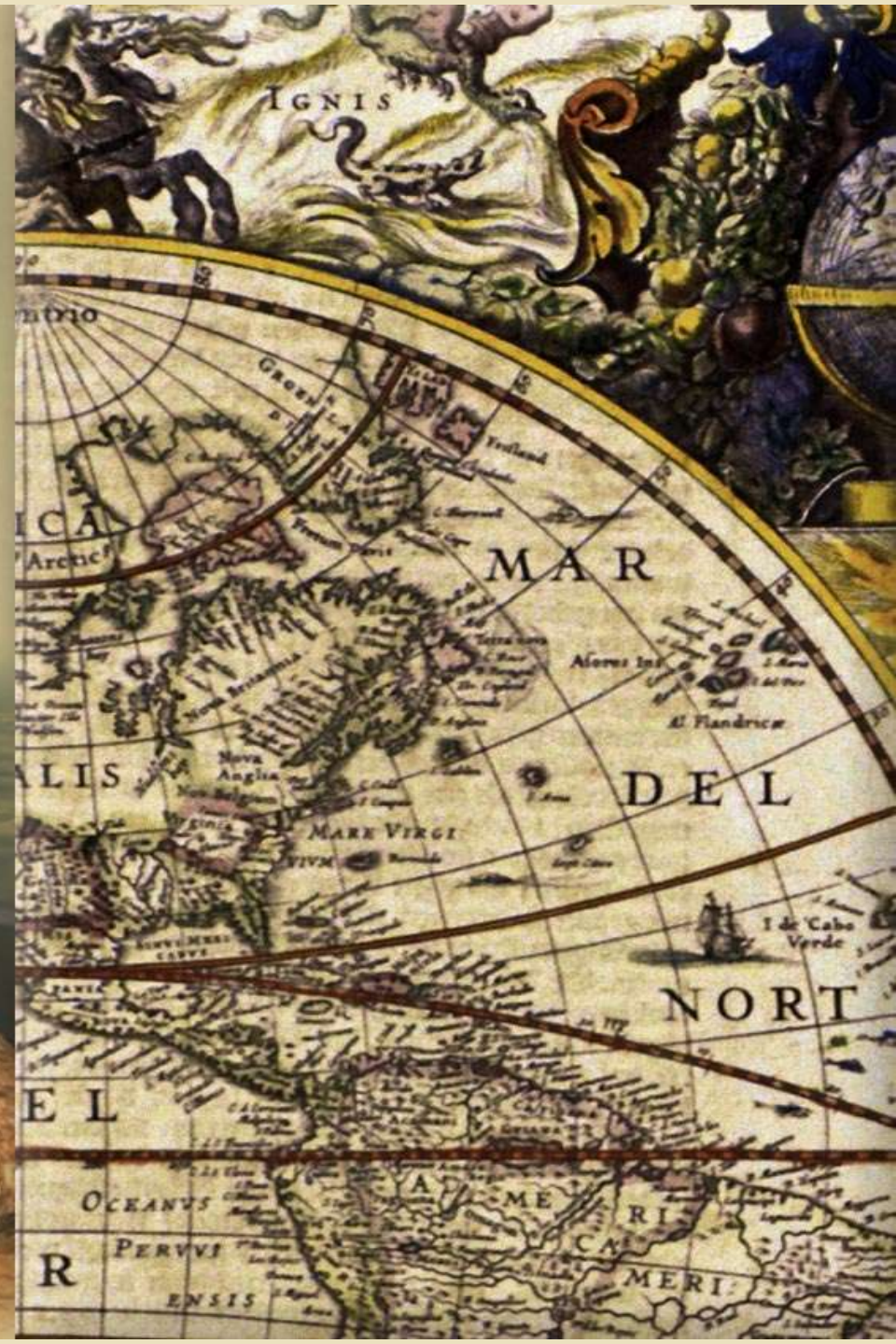


Energy Geopolitics



Michael J.
Economides



The Continuous Energy Crisis of the 21st Century

- ✓ Oil almost \$150, then fell to below \$40... headlines rule ... “crisis”
 - ✓ OPEC has little excess capacity “behind the valve”, Venezuela, Nigeria, Iraq
 - ✓ IEA (Nov. 2008) 9.1% decline in oil production
 - ✓ China still grows in economy and energy
- ✓ Saudi Arabia world regulator
- ✓ Less than \$40 to \$100 by end 2009

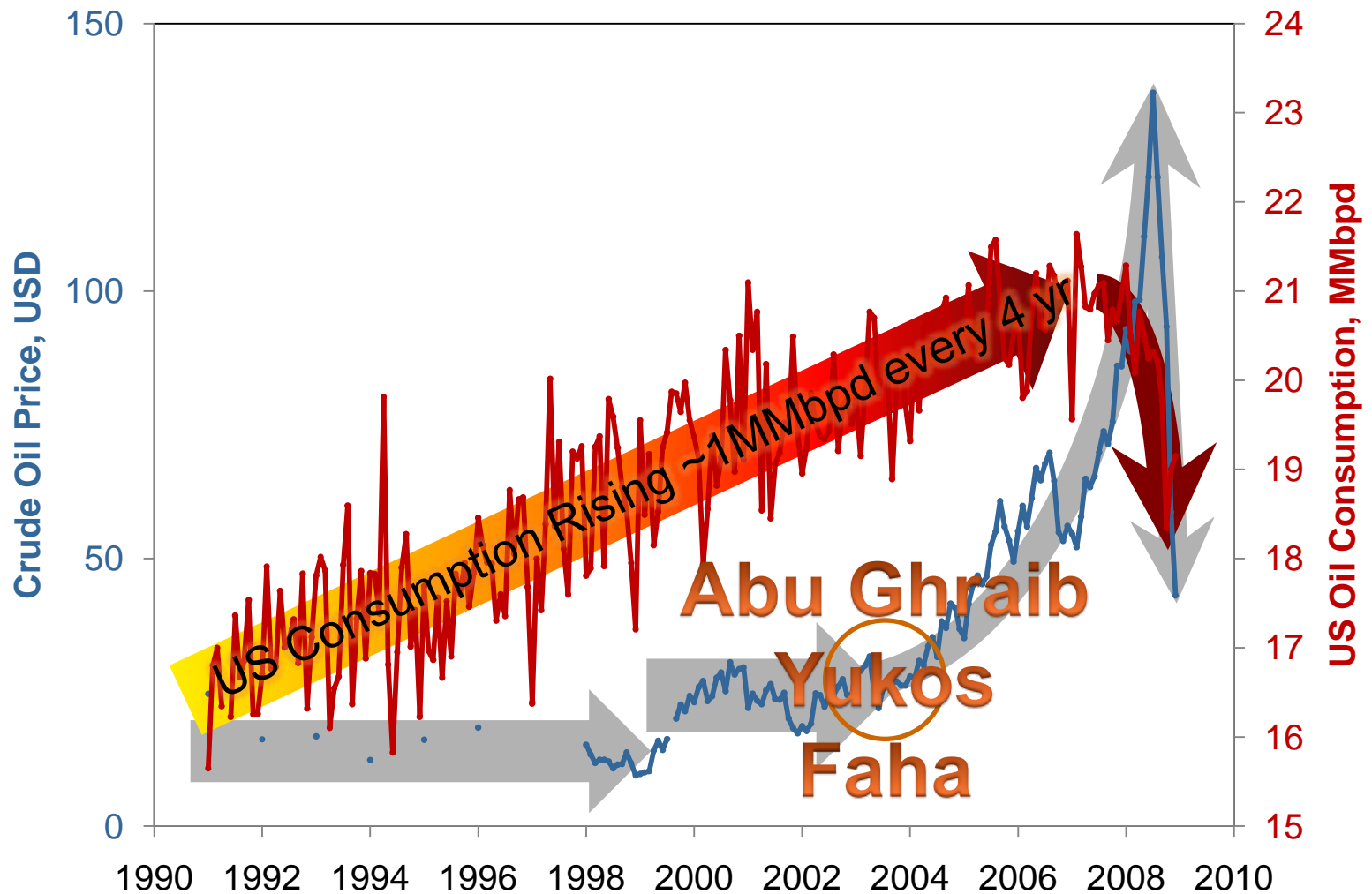


Natural Gas

- ✓ **International demand destruction is larger than was anticipated**
- ✓ **Because of LNG developments in Qatar, Egypt and Sakhalin 2, there could be 10 Bcf/d excess supply. Considerable impact on gas prices in Europe and the United States – Cheniere LNG**
- ✓ **\$4 gas for two to three years? Devastating impact on US shale gas**



Oil Demand and Price



\$100 OIL

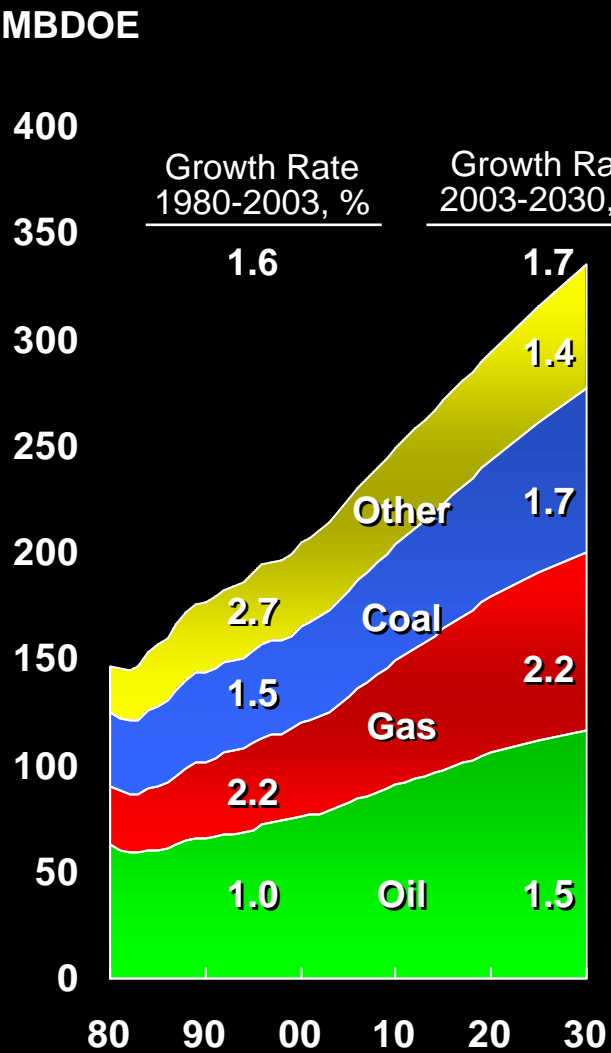


\$40 OIL

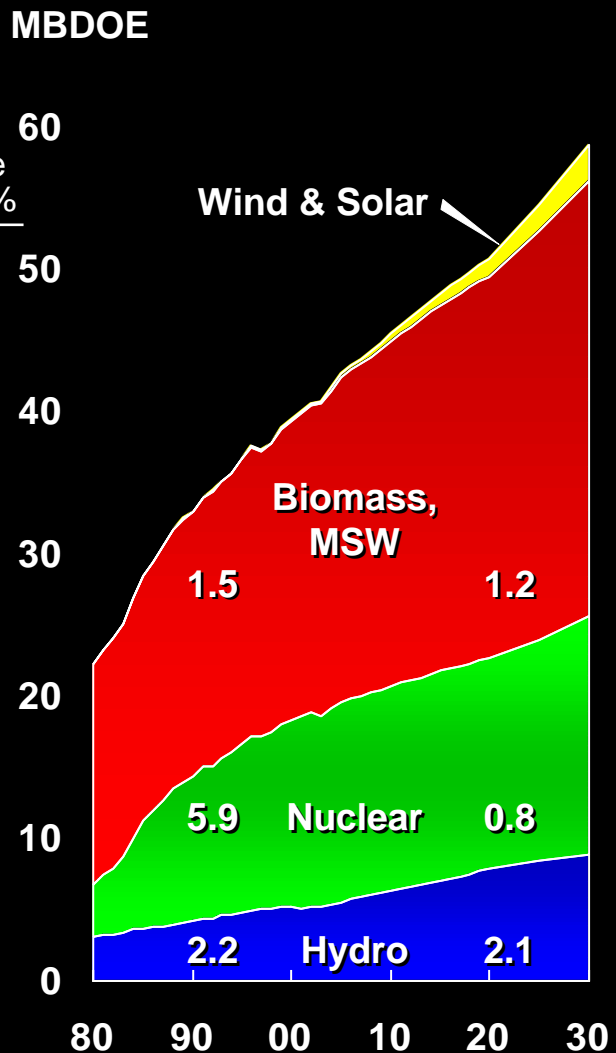


Oil & Gas Remain as Primary Energy Sources

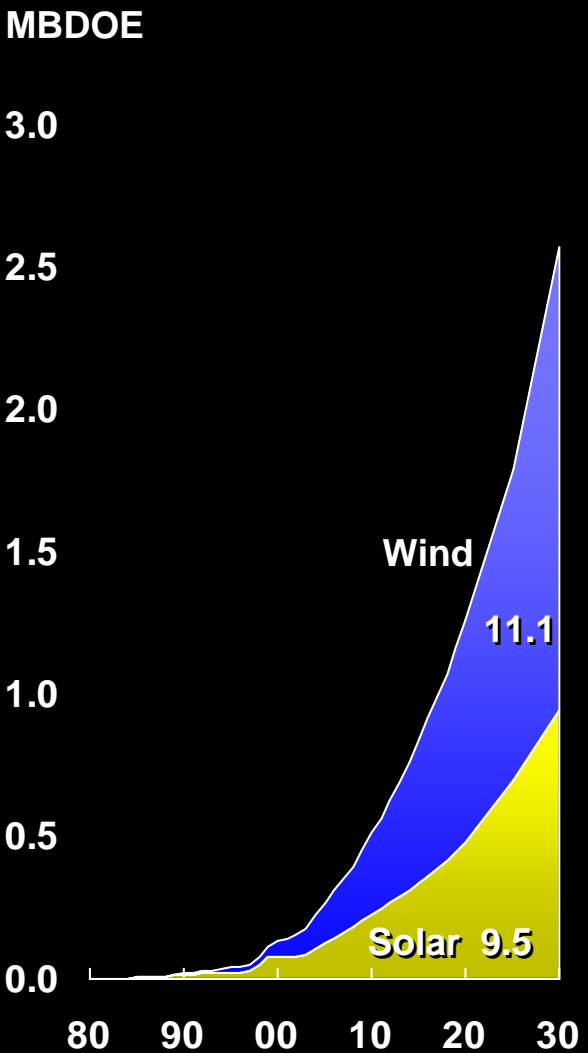
Total Energy



Other Energy



Wind & Solar



Obama Energy Radicalism

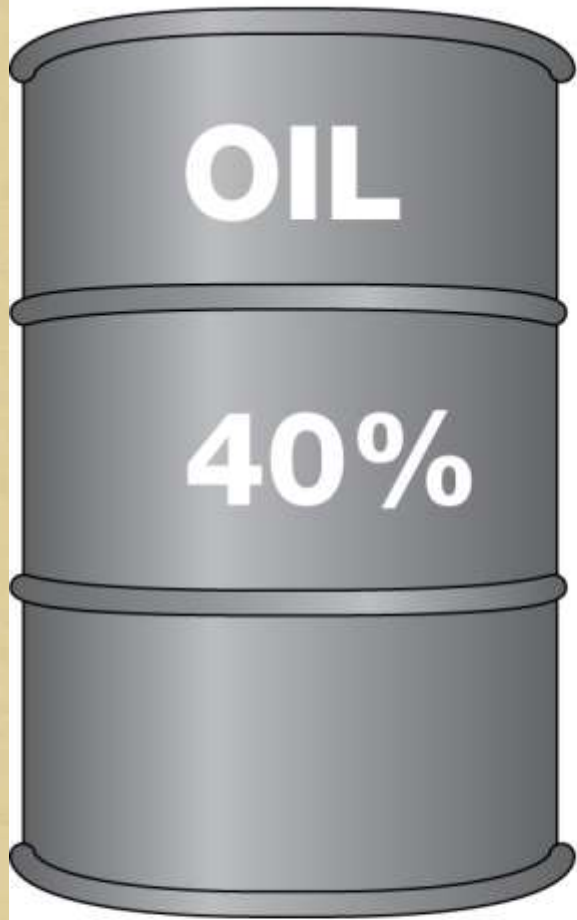
- Even the most radical environmentalists would be more circumspect 10 years ago
- EPA (April 17, 2009) “greenhouse gases in the atmosphere endanger the public health of current and future generations.”
- Secretary Chu (April 4, 2009) “advanced biofuels”, “conservation”, “white roofs”.
- Secretary Salazar (April 6, 2009) “wind farms could replace 3,000 coal-fired plants.”

What Congress and the President need is a Calculator

- Cardinal mine in Kentucky (35th-largest in the U.S., producing about 15,350 tons of coal per day, 66,000 barrels of oil equivalent)
 - All solar panels and wind mills
 - 76,000 barrels of oil equivalent
 - The US total energy use
 - 47,400,000 barrels of oil equivalent
 - Solar and wind 0.2 to 0.4%
- » (Robert Bryce, 2009)



US ENERGY MIX



23%



23%



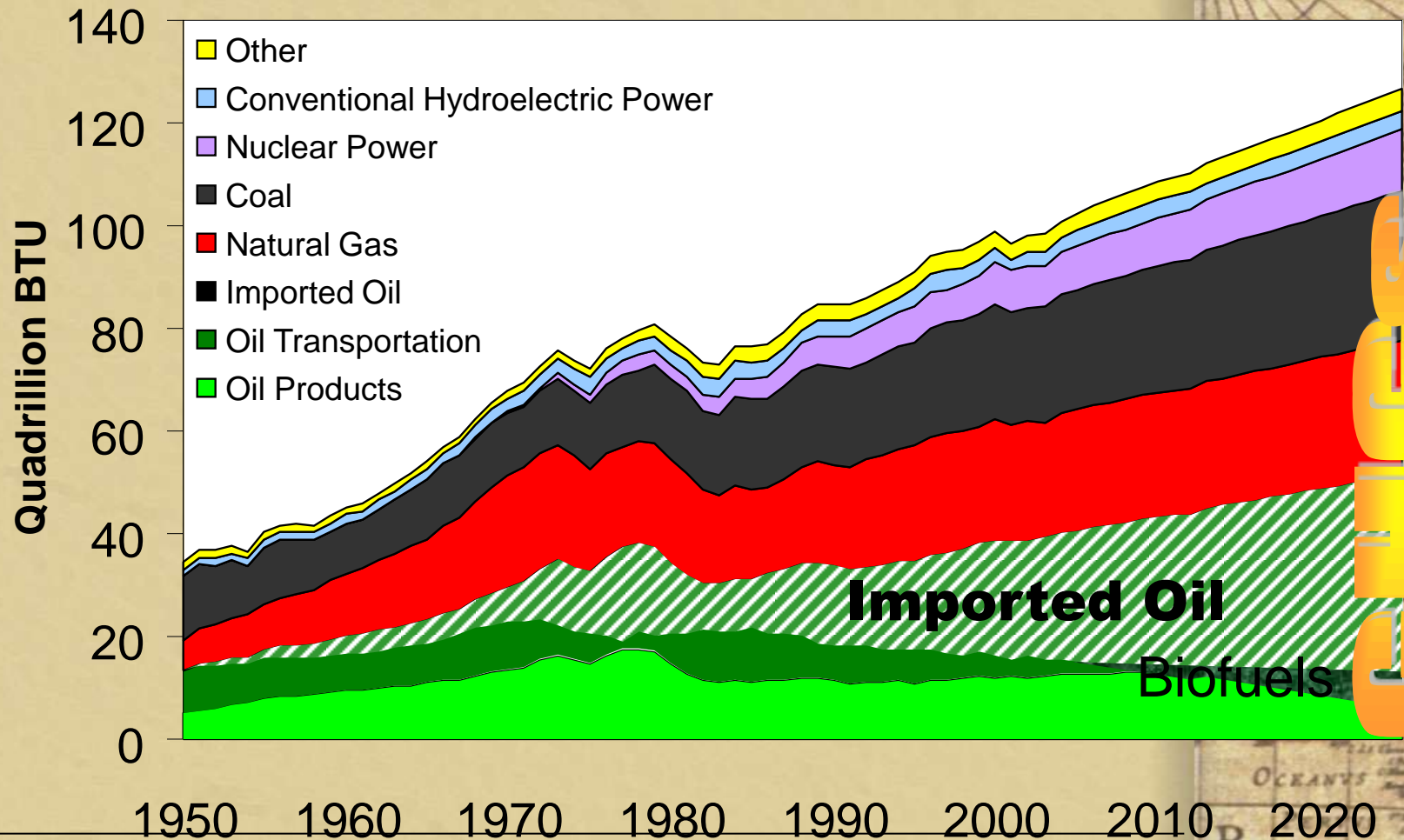
Solar & Wind
<0.4%

Let me make a prediction

- First do not choke on the daringness
- By the end of Pres. Obama's first term
 - The US will use more oil
 - It will import a larger percentage



National Transportation Energy Perspective



The New Energy Economy

- Wood (1800s)
- Coal
- Oil
- Natural Gas
- Hydrogen
(envisioned)

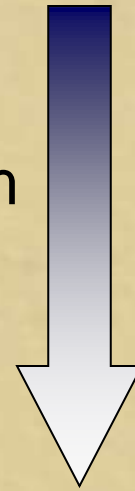
Carbon
content:

High

Medium

Low

(Zero)



Increasingly:

- Clean
- Energy intensive
- Technologically sophisticated
- Distributed

Energy

Renewable hydrogen may be 'grown'

Bloomberg News

LONDON — A clean, low-cost and renewable source of energy may be generated by making hydrogen fuel from plant material, a study in last week's edition of the journal Nature says.

The process converts sugar from plant materials like corn into hydrogen that could power energy-intensive consumer needs, according to study author Jim Dumesic, a chemical engineer at the University of Wisconsin at Madison.

Hydrogen is a power source for fuel cells, batterylike devices that convert hydrogen and oxygen directly into electrical energy with little or no waste. Hydrogen production is energy intensive, making fuel cells expensive to operate, Dumesic said.

"Right now, most of the hydrogen from fuel cells comes from petroleum," he said. "We're looking at making hydrogen from renewable resources, like corn stalks."

If it works, it would be possible to get large amounts of a clean, energy-rich fuel from waste plant



products, such as tons of leftover sugar cane, weeds and wood, and even from such animal byproducts as cheese whey.

Dumesic and his colleagues have devised a way of getting hydrogen from vegetable matter by heating it to about 437 degrees,

about 120 degrees lower than current methods of hydrogen production. The process produces only small amounts of carbon monoxide, which degrades fuel cells Dumesic said.

A number of automakers have built or are planning prototypes powered by fuel cells.



Golfing for Hydrogen

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Financial News

Enter symbol(s) Basic [Symbol Lookup](#)

Press Release Source: WCI Communities, Inc.

Golfers to Drive the Hydrogen Highway

Tuesday April 6, 10:09 am ET

Developer WCI Communities Embarks on One-Year Hydrogen Fuel Cell Research Project at Venetian Golf & River Club

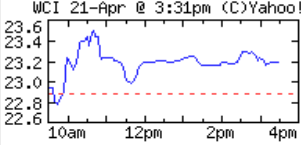
VENICE, Fla.--(BUSINESS WIRE)--April 6, 2004--Golfers driving the fairways at WCI's (NYSE: [WCI](#) - [News](#)) Venetian Golf & River Club are helping pave the way for what many believe will be the energy source of future generations: hydrogen.

ADVERTISEMENT

With the Country's dependence on fossil fuels hitting an all time high, and consumers paying the price at the gas pump with prices approaching the \$2.00 mark, the recent installation of a hydrogen fuel cell at the Venetian Golf & River Club in Venice, Florida marks the first partnership of its kind between Florida Power & Light Company (FPL) and a builder-developer for fuel cell research in the State of Florida. Other partners have included governments and universities.

Related Quote

WCI 21-Apr @ 3:31pm (C)Yahoo!




WCI 23.22 +0.33 [News](#)
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Delayed 20 mins
Quote data provided by Reuters

Related News Stories

- [ADVISORY/Media Advisory - Earth Day Feature](#) - Business Wire (1:30 pm)
- [WCI Announces Annual Shareholders' Meeting](#) - Business Wire (Tue Apr 20)
- [WCI COMMUNITIES INC Files SEC form 8-K, Financial Statements and Exhibits](#) - EDGAR Online (Fri Apr 16)
- [WCI Reports Record Quarterly Orders and Backlog](#) - Business Wire (Thu Apr 15)

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(1 item remaining) Opening page mhtml:file:///C:/_D/WrdFiles/Corps/EOL/MotorFuels/ATA/Golfers to Drive the  Unknown Zone

Bovine Brain Power > Mad Car Disease?

The screenshot shows a web browser window with the title "US cattle brains may be turned into biofuels-USDA". The browser's address bar shows the local file path: "C:_D\WrdFiles\Corps\EOL\Wacky\US cattle brains may be turned into biofuels-USDA.mht". The page content includes the Yahoo! Finance logo, a search bar, and a "REUTERS" logo. A navigation bar shows "Welcome, pelewis" with a "Sign Out" link and links for "Money Manager", "My Yahoo! View", and "Customize". Below this is a "Financial News" section with a symbol lookup form. The main article is titled "US cattle brains may be turned into biofuels-USDA" and is dated "Monday May 17, 5:32 pm ET" by "Richard Cowan". The article text states: "WASHINGTON, May 17 (Reuters) - Cattle brains and other remains that may carry the deadly mad cow disease would be turned into biofuels under a plan announced on Monday by the U.S. Department of Agriculture." To the right, a "Top Stories" sidebar lists several news items, including "Stocks Hit 2004 Lows on Iraq Oil Prices", "Average Gasoline Price Tops \$2 a Gallon", and "Lucent Employees Charged by SEC".

US cattle brains may be turned into biofuels-USDA

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Financial News

Enter symbol(s) Basic [Symbol Lookup](#)

GO! \$7 TRADES **HARRISdirect** get 20 FREE EQUITY TRADES **Learn more TD Waterhouse** Get Free Trades for a month.

Reuters
US cattle brains may be turned into biofuels-USDA
Monday May 17, 5:32 pm ET
By Richard Cowan

WASHINGTON, May 17 (Reuters) - Cattle brains and other remains that may carry the deadly mad cow disease would be turned into biofuels under a plan announced on Monday by the U.S. Department of Agriculture.

Top Stories

- [Stocks Hit 2004 Lows on Iraq Oil Prices](#) - Reuters (4:42 pm)
- [Average Gasoline Price Tops \\$2 a Gallon](#) - Reuters (4:43 pm)
- [Lucent Employees Charged by SEC](#) - Reuters (5:41 pm)
- [Oil Strikes High on Stubborn Supply Fears](#) - Reuters (3:36 pm)

[More...](#)

Internet

April 2006

Energy Tribune

Leading the debate. Beating the street.

The ETHANOL SCAM

pg. 11

**John Olson:
Bet on
Services**

pg. 9

**Idiocy of
the Energy
Isolationists**

pg. 14

**Apologizing
for Success?**

pg. 15

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Joe Klein: How Al Gore Could Save The Democrats



Hillary Clinton On Why She Won't Quit



R.E.M. Rises from The Dead

TIME

The Clean Energy Myth

BY MICHAEL GRUNWALD

Politicians and Big Business are pushing biofuels like corn-based ethanol as alternatives to oil. All they're really doing is driving up food prices and making global warming worse—and you're paying for it



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The Ethanol Scam



Wind Power Exposed: Expensive, Unreliable and Won't Save Natural Gas



**UK Ofgem: wind “grossly distorting the market”
29.7% of cost for 1.3% of electric supply
Load factor: 27.4%. Gas demand goes up**



**There are no alternatives
to hydrocarbon energy
sources in the
foreseeable future**



What Climate Change?

- **Three points:**
 - Highly politicized.... What to do about it? Can anything be done? At what cost?
 - **Confusion (at times deliberate) between “global warming” and man-made effects**
 - Preposterous: “science all in”. My offer: \$10,000 for ONE peer-reviewed paper showing causality between CO₂ and increased temperature. None exists





Warming may reduce number of hurricanes

■ Study says storms stunted by the increase of wind shear

By **KEN KAYE**

SOUTH FLORIDA SUN-SENTINEL

FORT LAUDERDALE, FLA.

— At least as it pertains to hurricanes, it seems global warming might be a good thing.

Two South Florida scientists have found that steadily warming oceans should translate to fewer Atlantic hurricanes striking the United States.

The reason: As sea surface temperatures rise, vertical wind shear increases. And wind shear makes it difficult for storms to grow, which was seen in the past hurricane season, when several systems were stunted.

"Using data extending back to the middle 19th century, we found a gentle decrease in the trend of U.S. landfalling hurricanes when the global ocean is warmed up," said Chunzai Wang, an oceanographer with the National Oceanic and Atmospheric Administration.

Sang-Ki Lee, a marine and atmospheric researcher at the University of Miami, worked with Wang on the study. Their findings are to be published today in the scientific journal

Geophysical Research Letters.

Wang and Lee's conclusions would seem to contradict several other studies, which hold that global warming is increasing the intensity, duration and number of tropical systems.

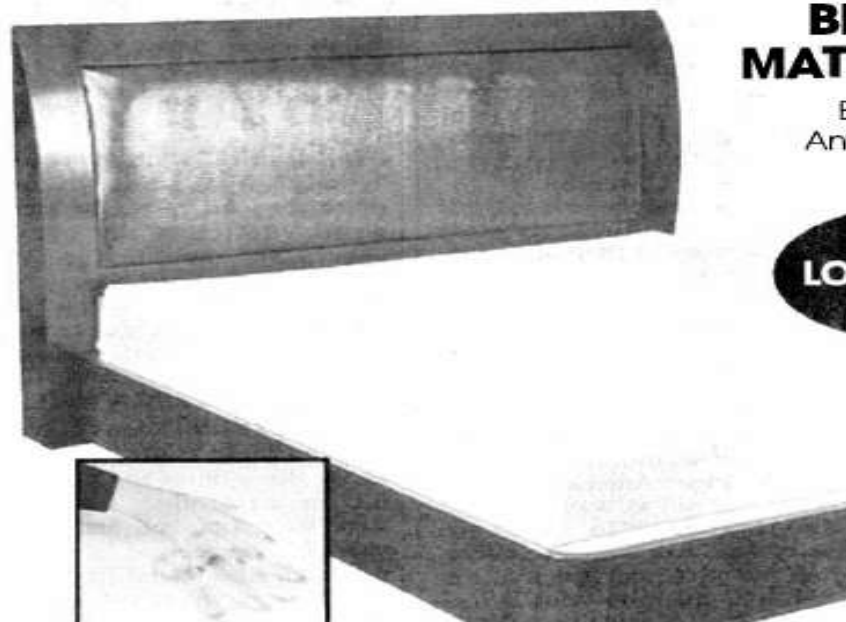
Their study isn't the first to proclaim that warmer oceans increase wind shear. Last April, another NOAA-backed study found an increase in greenhouse gases and warmer oceans also does so.

The main author of that

study, Gabriel Vecchi, a NOAA research oceanographer, in December followed up with another paper that had a similar conclusion.

He and Brian Soden, an associate professor of oceanography at the University of Miami, found that as the Atlantic basin becomes hotter, hurricane intensity likely won't increase and might even deflate.

The Wang-Lee study, however, is the first to assert the increased wind shear should result in fewer hurricanes striking the U.S. coastline.



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March 2008

Energy Tribune

Leading the debate. Beating the street.



Carbon Sequestration: How Realistic Is It?

800 Gessner Rd. - Ste. 1220 Houston, TX 77024





Energy Geopolitics

The Axis of Energy Militants

- Iran
- Venezuela
- Russia under Putin

- The quagmire that is Iraq

- China



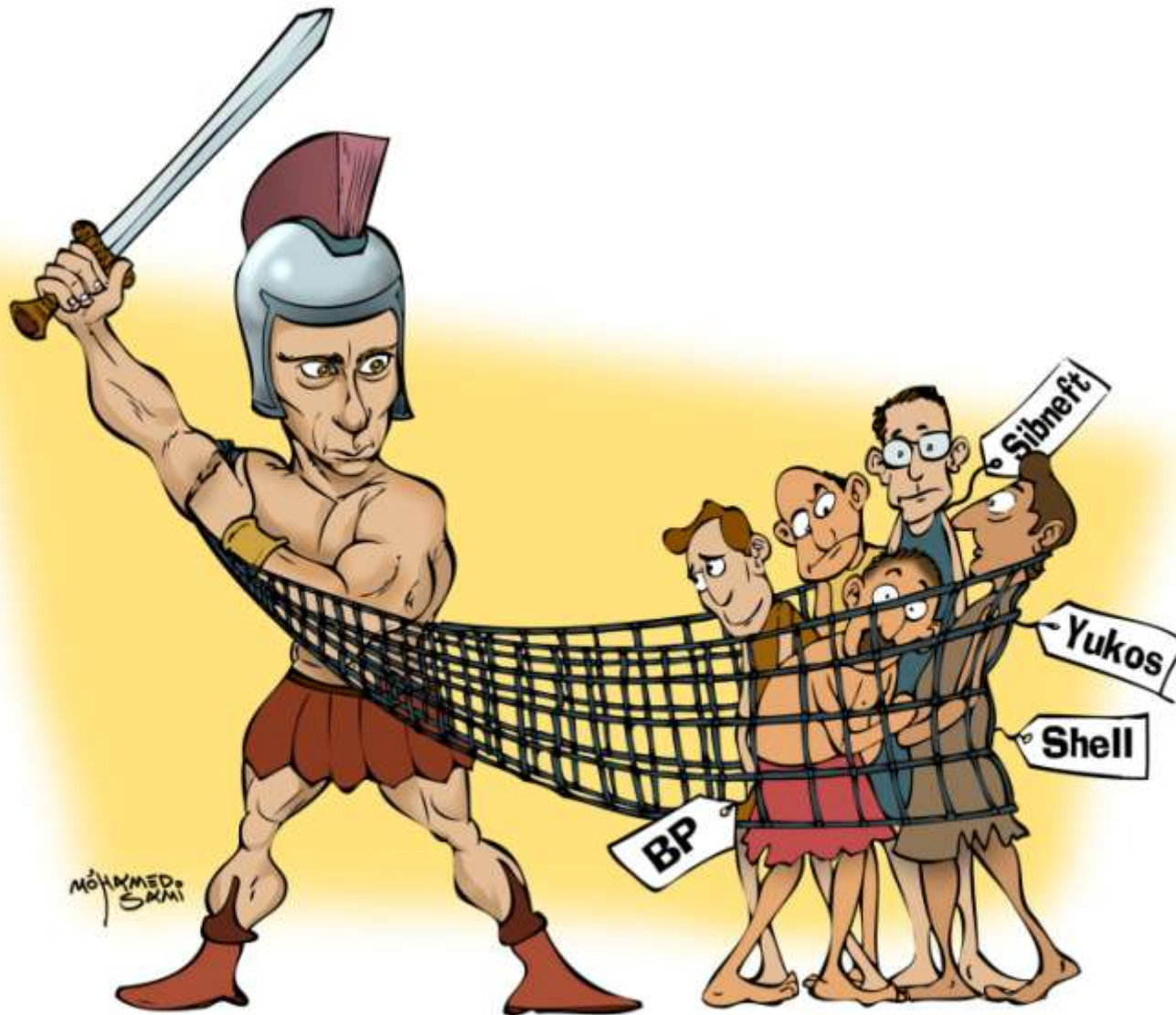




Russia under Putin

- Bright spot in oil is gone
- Re-Sovietization
- Corruption
- Total control of press
- Investment climate has cooled down
- Production is bound to decline





MOHAMMED SAMI

RUSSIAN ENERGY RE-CENTRALIZATION

Gazprom's New Imperium

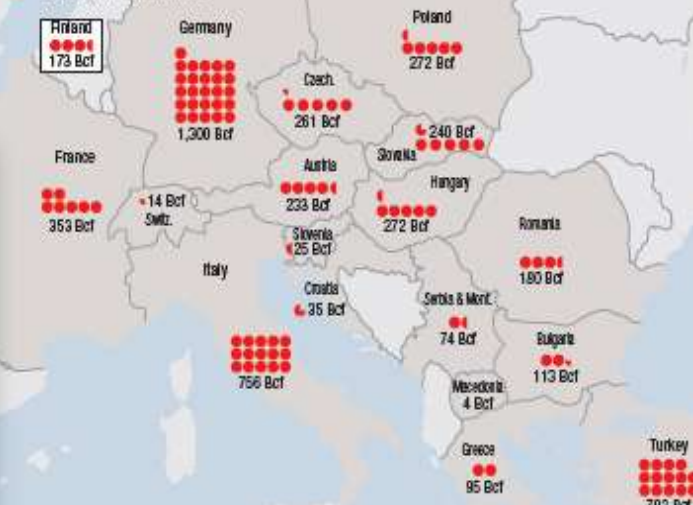


Russia's Energy Empire

Russia tightens its stranglehold on the European natural gas market. Gazprom, the world's largest supplier, already provides Europe with over a quarter of its gas, and has made a series of strategic moves to substantially increase this share. Recent deals and proposals with Libya, Iran and Turkmenistan are key indicators to Russia's future intentions.

Recipients of Russian gas

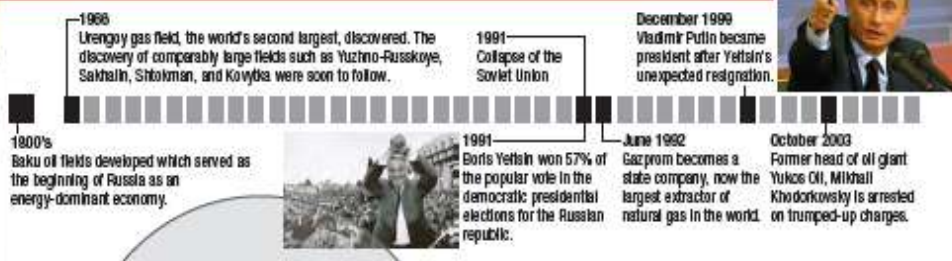
● = 50 Bcf exported from Russia



Percent of gas from Russia



Timeline of Russian energy



Russia Proved Reserves: 1,680 Tcf

Turkmenistan Proved Reserves: 71 Tcf

Iran Proved Reserves: 974 Tcf

3 key deals

1 Libya

Russia recently made a brazen move to buy all of Libya's gas destined for export.



Putin, Lib. and Ubyan Leader discuss Russia's role in the future of the country's energy resources. AP

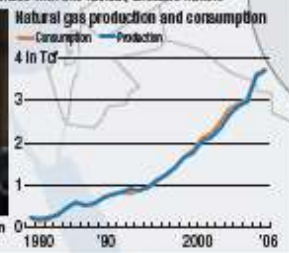
Libya Proved Reserves: 52.7 Tcf

2 Iran

Russia is capitalizing on the world's reluctance to associate with Iran by forging deeper alliances with this radical, unstable nation.



Iranian Oil Minister Ghobad Hossein-Nasrabadi

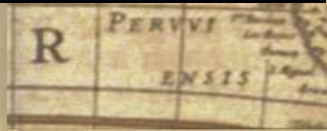
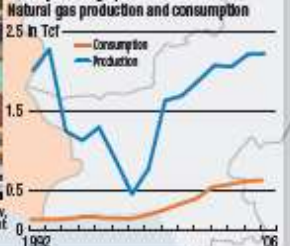


3 Turkmenistan

Russia buys lots of discounted gas from Turkmenistan for its own use, allowing Gazprom to spare its own resources to be sold outside the country at a huge premium.



Russian President Medvedev, left, and Turkmen President Berdimuhamedov. AP



RUSSIA

Messy Road to Energy Dominance

By MICHAEL J. ECONOMIDES
AND RONALD E. OLIGNEY

MOSCOW — As Americans worry about Middle East oil supplies, a much bigger energy drama is playing out in Russia. That country now produces about as much oil as Saudi Arabia, exports about 4 million barrels a day and is unabashedly moving toward increasing production. When this is considered alongside Russia's probable dominance in the natural gas market over the coming decades, it becomes apparent that the most radical energy realignment in the world since the creation of OPEC and the 1973 Arab oil embargo is underway.

But the road to energy dominance is not proving an easy one. Late last month, the government of President Vladimir V. Putin arrested oil magnate Mikhail Khodorkovsky on charges of fraud and tax evasion. Last week, the government impounded his shares — some 44% of the total — in the country's largest oil company, Yukos.

With a net worth estimated at \$8 billion and labeled by some as "Russia's Bill Gates," Khodorkovsky was allowed during the Boris Yeltsin era to purchase Yukos for a relatively small sum in a controversial 1996 privatization deal. In recent months, ExxonMobil and ChevronTexaco have been among the U.S. oil companies bidding furiously to acquire a piece of

Michael J. Economides is a professor at the University of Houston and is chief technology officer of the Texas Energy Center. Ronald E. Oligney is director of the center. They are co-authors of "The Color of Oil: The History, the Money and the Politics of the World's Biggest Business."

Yukos.

Speculation is rampant about the government's motivation in arresting Khodorkovsky. The Yukos chief had made his interest in reforming Russia's political structure apparent. He donated large sums to opposition parties, and he has been mentioned as a possible presidential candidate. One theory is that it was these political actions that prompted his arrest.

Others speculate that the move is part of a government bid to renationalize the energy industry.

Whatever the reason, the Khodorkovsky arrest complicates Russia's energy future. The country's ascendancy in the energy world has been an important counterbalance to the power of the Organization of Petroleum Exporting Countries. Many in the West hoped it would also point

the way to a new-style Russian economy and society.

Two decades ago, the Soviet Union's overreliance on oil revenues for foreign currency contributed to its demise. The oil price collapse of the mid-1980s, following deliberate overproduction by Saudi Arabia, caused many internal fractures in the Soviet regime to become gaping holes, in part because of the country's almost

exclusive dependence on oil revenues for hard currency. Some have worried that, in the wake of a collapse in the industrial sector after the fall of communism, Russia is now more dependent than ever on oil. But oil is only half of the story. The bigger Russian future is natural gas.

Gradually, over the last 15 years, the world — led by the United States — has moved toward making natural gas its fuel of choice. This is proving to be a revolutionary, though technologically disruptive, transition. But the benefits will prove considerable. Natural gas is a far more efficient and cleaner fuel that lends itself to the miniaturization of the engines it powers. It has a large role to play as we attempt to wean ourselves from carbon fuels.

There are many signs of this shift, the most obvious being that nearly all of the power plants planned or under construction in the United States will run on natural gas. There is little chance that renewable energy like wind and solar power will play a significant role for decades, and perhaps not even then. Consequently, the United States will soon become a massive importer of natural gas in the form of liquefied natural gas.

With by far the world's largest reserves, perhaps as much as 40% of the recoverable natural gas on the planet, Russia will be in the driver's seat for generations to come. China, conveniently on Russia's border, has increased its energy demand by an astonishing 110% in the last decade, and its needs continue to rise.

All of this adds up to one thing: Russia's dominance in energy. That is why the world will be watching closely as Putin moves forward — both with his prosecution of Khodorkovsky and with his country's move to exploit its considerable energy reserves.



From the Author of *The Color of Oil*

MICHAEL J. ECONOMIDES
and **DONNA MARIE D'ALEO**



From Soviet to Putin and Back

**THE DOMINANCE OF ENERGY
IN TODAY'S RUSSIA**





Georgia War



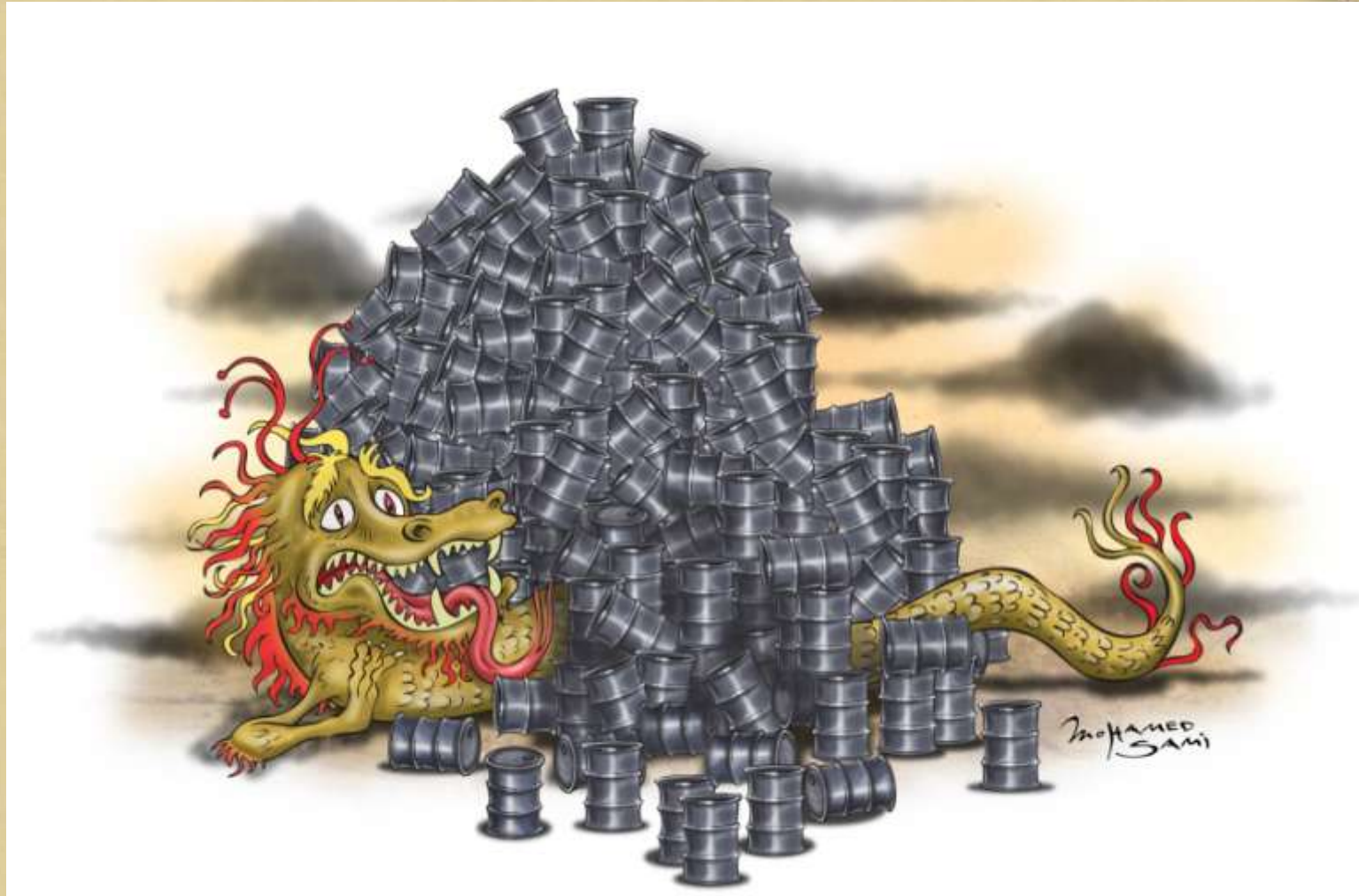


Can China

Keep the Lights On?



Energy: China's Choke Point



China and Russia

- Energy will be China's choke point
- Has become recently very assertive, if not belligerent.
 - Sudan, Nigeria
 - Canada
 - Venezuela
- China's energy future passes through Russia....



Russia and China



Russia, China and Japan



China will probably lead



Another view of oil prices

