Gillespie Stack Grannell LLC

Who's Driving NH3 as a Fuel?

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A Hard Look at the Market Realities of NH3 as Fuel

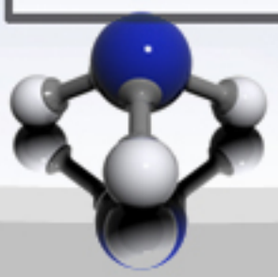
- Will it happen? Yes! But when & what apps?
- What parameters affect competition with other fuels?
- How is this field shaping up today?

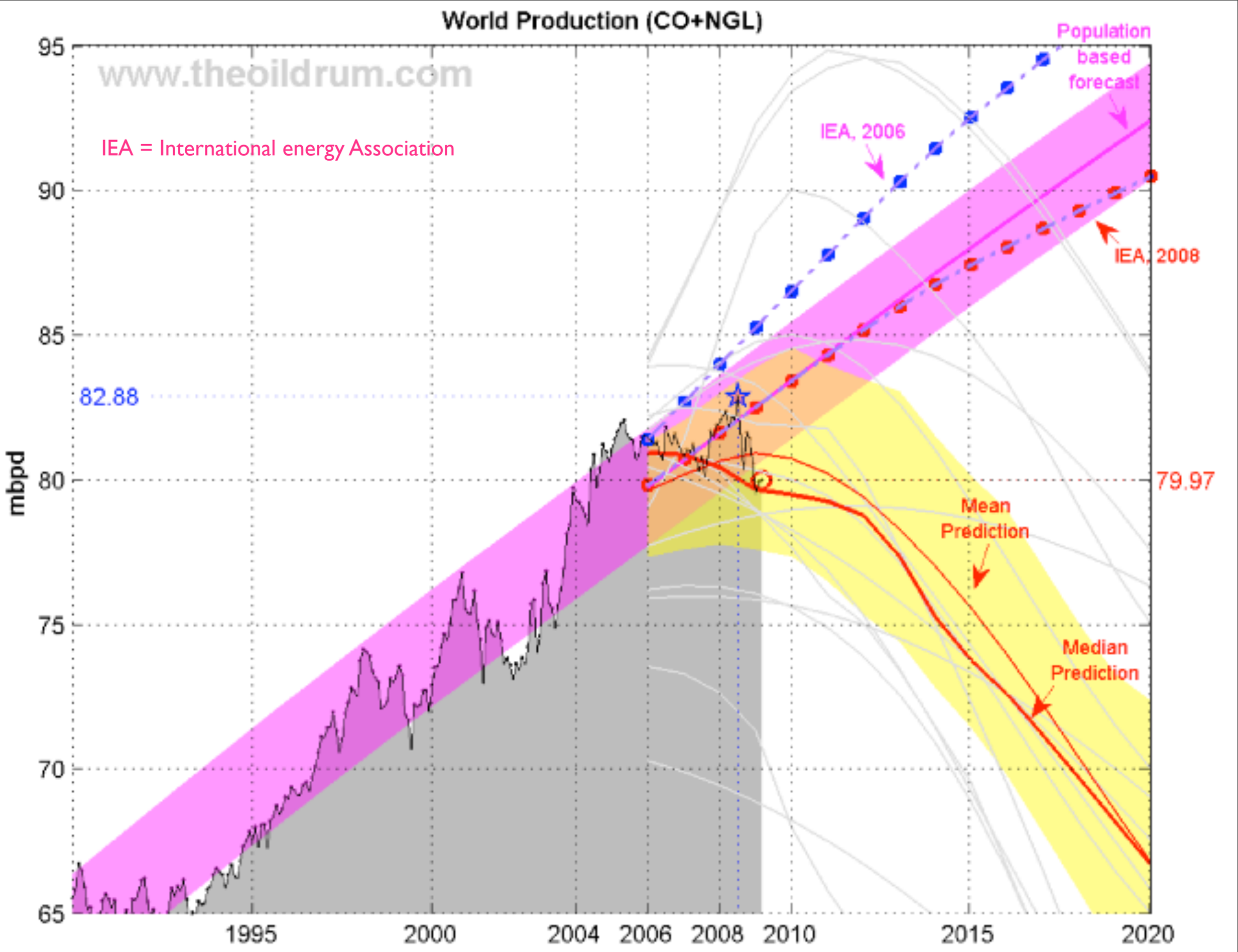
Outline

- The Coming Fuel Crisis
- Complexities of Market Economics
- Who are the Early Adopters and Who is Shaping up to Control the Market?
- Technology Breakthrough Announcement

The World Runs on Cheap Energy!

- For 100+ years energy from petroleum has powered the growth of our societies... the very source of our wealth
- One barrel of oil contains 12 man years of work energy. $240,000/man vs $80/bbl




World Production (CO+NGL)
www.theoildrum.com
IEA = International energy Association
Population based forecast
IEA, 2006
IEA, 2008
Mean Prediction
Median Prediction
82.88
79.97
mbpd
95
90
85
80
75
70
65
1995
2000
2004
2006
2008
2010
2015
2020

The physics of energy requirements in the ‘post peak oil’ era will continually lead back to the chemistry of NH3 until someone markets the “Mr. Fusion, Home Reactor”.

Market Complexities

NH3 vs Fossil Fuels is a Game with a Lot of Moving Parts

Regardless of any interesting technical discussions at these conferences, realization of this solution is dependent upon economically beneficial business plans!

Questions

What is the price point for oil before transportation makes a meaningful change to another fuel?

What market options might be adopted prior to NH3 for Transportation Fuel?

Oil $$ Somewhat Self Governing

Near term, the increasing price of oil results in economic slow down which reduces the demand and therefore the cost for oil.

CNG's Dramatic Advantages in Near Term Transportation Fuel Changes

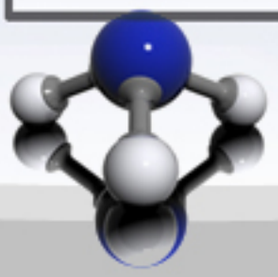
- Existing Distribution Infrastructure
- Current PR Regarding Plentiful Shale Gas
- Broad Existing Acceptance & Approvals
- Existing Manufacturing and Conversion
- Supports Institutional & Financial Status quo

Problem 1: Cost of NH3

- Subject to Commodity Pricing as Fertilizer
- Dependent upon Feed Stock Costs

NH3 Feedstock Pricing Near Term

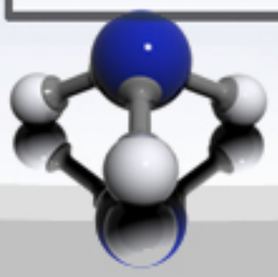
- 80% Global Production from Natural Gas
- Will 'Fracking' ultimately provide cheap NG, or is this hype akin to "Power Too Cheap to Meter"?
- 3:1 economic benefit to drill for oil rather than NG. This gap may widen with Peak Oil prices



NH3 'Feedstock*' Pricing Future - Green

- Future NH3 production may use some alternative energy sources with conventional or new production technologies
- Cost per MMBTU & Capital Investment?
- Availability Schedule?
- Energy Efficiency of Production?

* Energy



Problem 2: Agriculture Sets NH3 Pricing

- Corn production is the "Million Ton Gorilla" in the game
- Currently corn is approximately 2x the break-even price and driving NH3 prices higher. Russian famine, China/India Growth add to this

Problem 3: Competition with Other's Livelihoods

- Politics & Economics of US Institutional Opposition
- Expressed non-support, major U.S. NH3 producer, US auto manufacturer, US oil co.
- The "safety card" is easy to play against NH3, even though it is completely inaccurate.

Problem 4: No DOE Support

- Not Currently Designated as a US D.O.E. "Alternative Fuel"
- US Investment opportunities are near zero until federally recognized
- Highly competitive sanction which will require professional lobbying effort.

NH3 Has a Bright Future, but When & Where?

- At a minimum, the next five to ten years of NH3 fuel use will be based based on ‘brown ammonia’ and the agricultural driven pricing structure.
- Initial NH3 fuel applications depend upon additional use benefits, because many times it can’t be guaranteed to be ‘cheaper’ in the long run.

Will U.S. Vehicle use Lead the Way for NH3?

- Unfortunately, Unlikely
- CNG will probably dominate early conversions even with reduced range
- However CNG prices may rise as transportation demand moves to CNG with petroleum price increases. If so, NH3 prices will unfortunately rise accordingly, due to feedstock prices.
- Electric Vehicles also making greater than expected market advances

Will the U.S. Lead the Way in NH3 Fuel Usage for any applications?

- Unfortunately, Unlikely
- Nearly frozen US capital markets halted investments
- Lack of DOE Designation a Dramatic Roadblock to US investment, development and use

What Applications are Leading in NH3 Conversion?

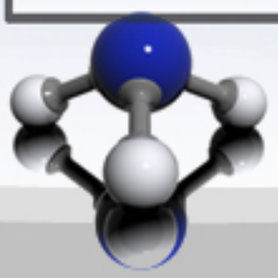
- Backup Power Generation
- Remote Prime & Peaking Power Generation
- Irrigation / Agriculture Tractors
- Mining

Where is the 'NH3 as Fuel' Business Happening Today?

- China
- India
- Misc. African Countries
- U.S., (procurement only)

CHINA

- Purchase of Potash Corp.
- Purchase of Australia's NW Methane Reserves
- Purchase of most shuttered global NH3 capacity / Plant Relocation
- IP procurement
- Implications on North American Food Security

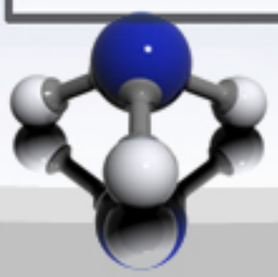


Wake Up America!

- Other Governments recognize that GDP IS the energy use graph, and are moving quickly to corner this technology in the US and elsewhere.
- Growing external control over North American NH3 production and distribution
- Control of the ‘use’ patents
- National Defense Initiatives...?

What You Can Do!

- The First Step for US NH3 fuel development is DOE listing as an approved alternate fuel.
- Before leaving the conference commit to the NH3 Fuel Association, your portion of the money needed to lobby NH3 onto the DOE's list of approved Alternative Fuels.
- See John or Norm this week to commit your funds!



New Technology Announcement

Gillespie Stack Grannell LLC

"From the Yellow Truck People"

Dual Fuel Operation was First.... 2007


KOHR
Wagstar Intl.
Eidon Engineering

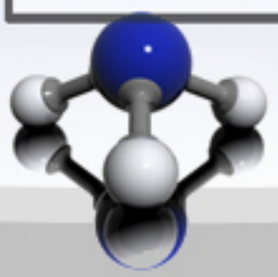
GSG DEMONSTRATION: DUAL FUEL

The prototype vehicle was driven across the US in August 2007 from Detroit Michigan to the Golden Gate Bridge in San Francisco to demonstrate the effectiveness of the NH3 dual fuel configuration.

Gillespie IP

GSG LLC owns the core intellectual property associated with the practical and clean operation of modern ICEs on NH3.

- **US patent #7,574,993. “Apparatus, system and method for operating a dual fueled spark ignition engine”**
- **Dual Fueled Operation (NH3 with any combustion promoter)**
- **Operating maps & control mechanism for smooth operation & clean emissions**
- **Patents Issued August 2009**
- **International patents pending**



New Technology Announcement

Gillespie Stack Grannell LLC

Ammonia Flame Cracker

Single Fuel Operation for all Internal Combustion Engines... 2010

AMMONIA FLAME CRACKER

The new GSG Ammonia Flame Cracker is the first practical & low cost device which allows NH3 to be handled and used in engines just like any hydrocarbon, CNG, Propane, Hydrogen, etc.

Flame Cracker I.C.E. Benefits

- NH3 Single Fuel / Instant Start Up
- Easy Low Temp Engine Starting
- High Operating Efficiency / Self-Sustaining
- Low Manufacturing Cost, No Palatinate Catalysts, No Strategic Materials
- Elimination of Vehicle Catalytic Converter
- Eliminates Corrosion Concerns

Ammonia Flame Cracker
More Information

- Dr. Shawn Grannell presents technical information on the new cracker technology: Tuesday @ 10AM. Don't miss it.
- Patents Pending

Conclusions

- Petroleum liquid fuels are going to be in crisis in the near future
- NH3 will ultimately play a critical roll in the solution.
- The commercial market is complex and subject to many forces. May develop slowly, esp. in the US.
- Initial applications are those which have multiple needs served well by NH3, not just energy/cost.
- Other governments are quickly positioning to exert significant control over the US production and use of NH3 as fuel.

Thank You

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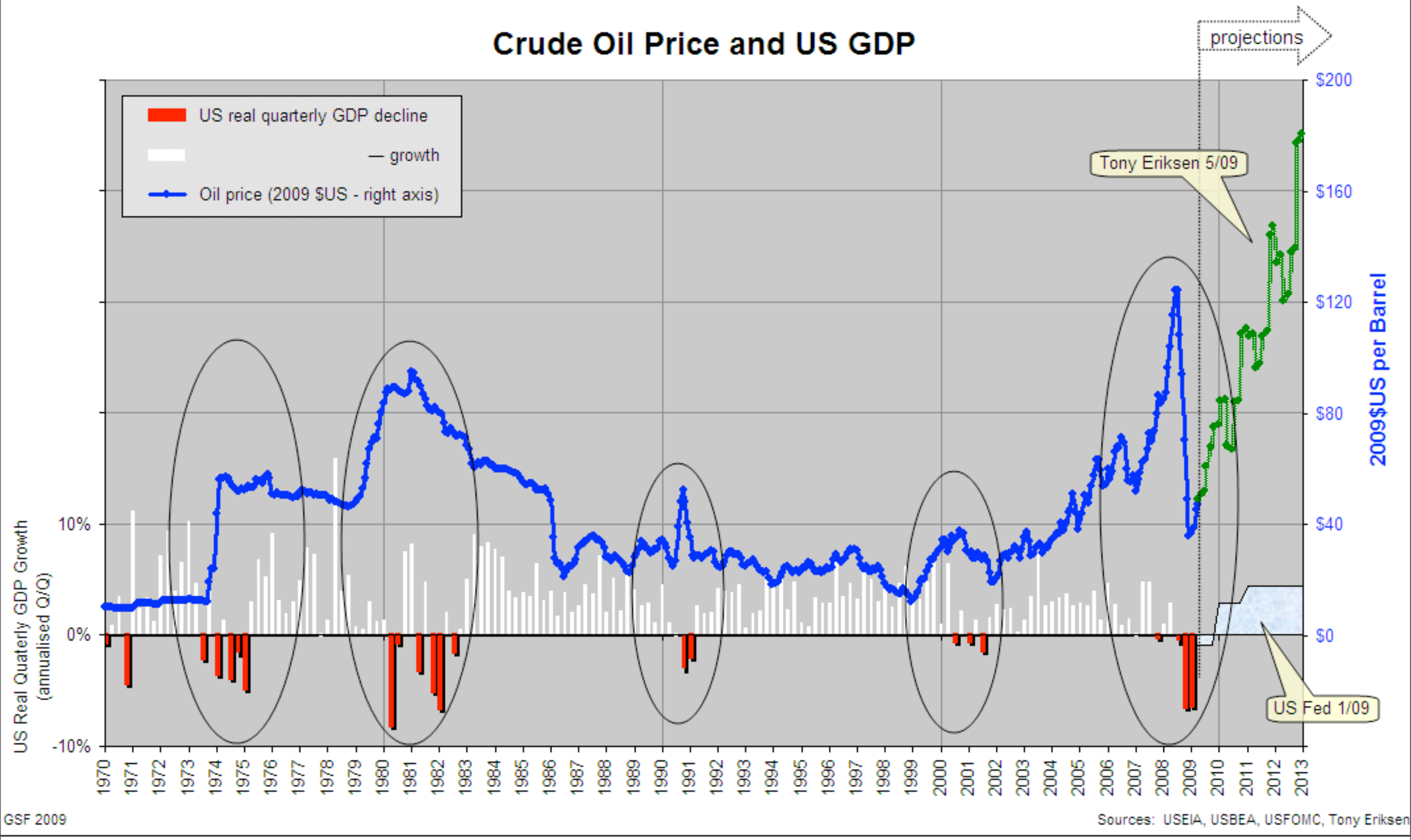
Crude Oil Price and US GDP



GSF 2009

Sources: USEIA, USBEA, USFOMC, Tony Eriksen