

# **COOK INLET AREA GAS TO LIQUIDS PLANT ANCHORS A BULLET GAS LINE FROM THE NORTH SLOPE**

**NORTH SLOPE NATURAL GAS  
FOR ELECTRIC POWER GENERATION  
FOR TRANSPORTATION FUELS  
ENHANCED OIL RECOVERY  
WHILE SEQUESTERING CO<sub>2</sub>**



**POSITIVE CHANGES FOR ALASKA**

# PICTURE

Two Glasses – Both Filled With A Clear Liquid  
One with Water - One with Diesel



**THEY LOOK THE SAME BUT**

This one won't run an engine  
This one won't burn  
This one is environmentally friendly  
This is EPA approved as non-toxic

**So pure you want to drink it**

This one will run an engine  
This one will burn  
This one is environmentally friendly  
This is EPA approved as non-toxic

**So pure you can drink it – but don't**



# F-T FUELS



**Imagine gasoline and diesel made from Natural Gas  
looks like water, feels like water  
so pure it's EPA approved as Non-Toxic**

**Now imagine that this gasoline and diesel  
can be made in here in Alaska**

**Now imagine that the market value for these  
gasoline and diesel fuels is always  
greater than the value of natural gas**



# F-T FUELS



**Understand that this diesel has been commercially produced since the 1940's, although not in the US, and is currently supplying a growing percentage of Europe's demand for diesel fuel in an environmentally friendly manner**

**Now imagine that we can build a gas to liquids plant in Alaska using this proven technology**

**Now imagine this gas to liquids plant can be built in the Cook Inlet area to justify a Bullet Natural Gas line from the North Slope  
Today**

**ARE YOU INTERESTED?**



# THE BULLET LINE



## WILL IT DOOM THE BIG LINE TO THE LOWER 48?

**THE BULLET LINE NEEDS LESS THAN 20% OF THE  
CURRENTLY PROVEN PRUDHOE BAY NATURAL GAS  
RESERVES WHILE PROVEN PRUDHOE BAY GAS  
RESERVES REPRESENT LESS THAN 1/3 OF THE  
CURRENTLY IDENTIFIED NORTH SLOPE NATURAL  
GAS RESOURCES  
- DRILL BABY DRILL -**



# THE BULLET LINE



**THE U.S. IMPORTS LESS THAN 1% OF IT'S CURRENT  
NATURAL GAS REQUIREMENTS**

**IS ALASKA NATURAL GAS REALLY NEEDED  
FOR LOWER 48 NATURAL GAS MARKETS?**

**ALASKA NORTH SLOPE NATURAL GAS IS NO  
DIFFERENT THAN NATURAL GAS FOUND IN THE  
LOWER 48, GULF OF MEXICO, QATAR OR RUSSIA**

**EXCEPT**

**IT HAS VERY HIGH CONCENTRATIONS OF CO<sub>2</sub> THAT  
REQUIRE EXPENSIVE CLEANING BEFORE IT CAN BE  
DELIVERED TO A MARKET**



# THE BULLET LINE



**IT IS LOCATED SOME 800 TO 3,000 MILES FROM THE MARKET REQUIRING AN EXPENSIVE GAS PIPELINE TO DELIVER THE NATURAL GAS TO THE MARKET**

**ALASKA NATURAL GAS MUST COMPETE WITH NATURAL GAS FROM AROUND THE WORLD!**

**ALASKA NATURAL GAS IS A RAW MATERIAL WITH LITTLE TO NO VALUE ADDED WHEN EXPORTED**

**VALUE ADDED PROCESSES LIKE F-T BRING THE HIGHER VALUE OF ALASKA'S NATURAL GAS HOME!**



# THE BULLET LINE



**WILL IT DOOM THE BIG LINE TO  
THE LOWER 48?**

**NO!**

**BUT IT WILL DELIVER ALASKA NORTH SLOPE  
NATURAL GAS RESERVES TO A MUCH HIGHER  
VALUE MARKET YEARS IF NOT DECADES BEFORE  
THE ALASKA GAS LINE WILL - WITH ALL OF THE  
JOBS AND CAPITAL EXPENDITURES IN ALASKA!**

**DO YOU WANT TO WAIT ANOTHER 25 YEARS?**

**I DON'T !**



# LOCATION - LOCATION



## WHY THE COOK INLET?

**BECAUSE YOU HAVE DEPLETED OIL AND NATURAL GAS RESERVOIRS TO DISPOSE OF CO<sub>2</sub>**

**BECAUSE YOU HAVE AN EXISTING RAIL BELT ELECTRIC GRID TO SELL WASTE HEAT ELECTRICITY**

**BECAUSE YOU HAVE A TIDE WATER LOCATION TO EXPORT GASOLINE AND DIESEL TO THE LOWER 48**



# Fischer-Tropsch Fuels

## A National Path to:



- Energy Self-sufficiency
- Eliminate the Refinery Gap
- Reduce Balance of Payments Deficit
- Mitigate Global Warming
- Reduce Air Pollution
- Increase Automotive Fuel Efficiency & Performance
- Enhance National Security
- Increase Domestic Employment
- Augment Local Tax Base
- Reduce Cost of Electricity

**FISCHER-TROPSCH  
THE TECHNOLOGY  
IS COMMERCIAL**

**OVER 50 BILLION  
GALLONS SOLD**

# A FEW OF THE F-T PLANTS ACROSS THE WORLD



South African Secunda 150,000 BPD Coal to Liquids (CTL)



South African Mossgas 47,000 BPD Gas/Condensate to Liquids (GTL)



Shell Bintulu 15,000 BPD Gas to Liquids (GTL)



CHOREN Freiberg 500 BPD Biomass to Liquids (BTL)



# SYNTHETIC DIESEL



**F-T DIESEL  
AS CLEAN AS  
NATURAL GAS**

**U.S. EPA\*  
APPROVED  
NON-TOXIC  
F-T WAX  
U.S. FDA  
APPROVED**



**ZERO SULFUR  
ZERO AROMATICS  
70 + CETANE  
PM10 ≤ CNG**

**A GTL/BTL/CTL PLANT PRODUCES  
FISCHER-TROPSCH (F-T)  
TRANSPORT FUELS AND PETROCHEMICAL  
FEEDSTOCKS - SOME OF THE  
CLEANEST FUELS IN THE WORLD**

**BUT WHAT IS THE F-T PROCESS?**

## The Fischer-Tropsch Synthesis



Okay, don't let the  
chemistry scare you!

Let's take a look.....

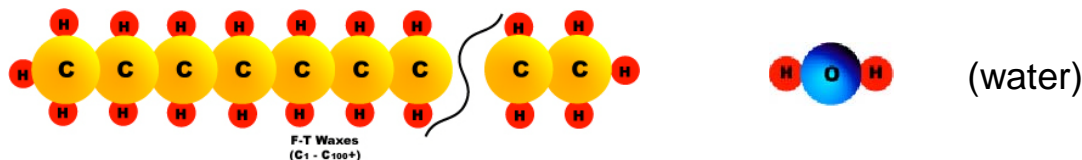
# Three Steps in GTL/BTL/CTL Refining to make F-T Fuels

The F-T Processes use 3 distinct steps, all commercially proven to convert a gas, liquid or solid into synthetic transport fuels like gasoline, diesel and jet fuel:

- Step 1 - Syn-Gas generation ( $H_2$  & CO)



- Step 2 - The F-T reaction (long paraffin chains  $\rightarrow$  wax)

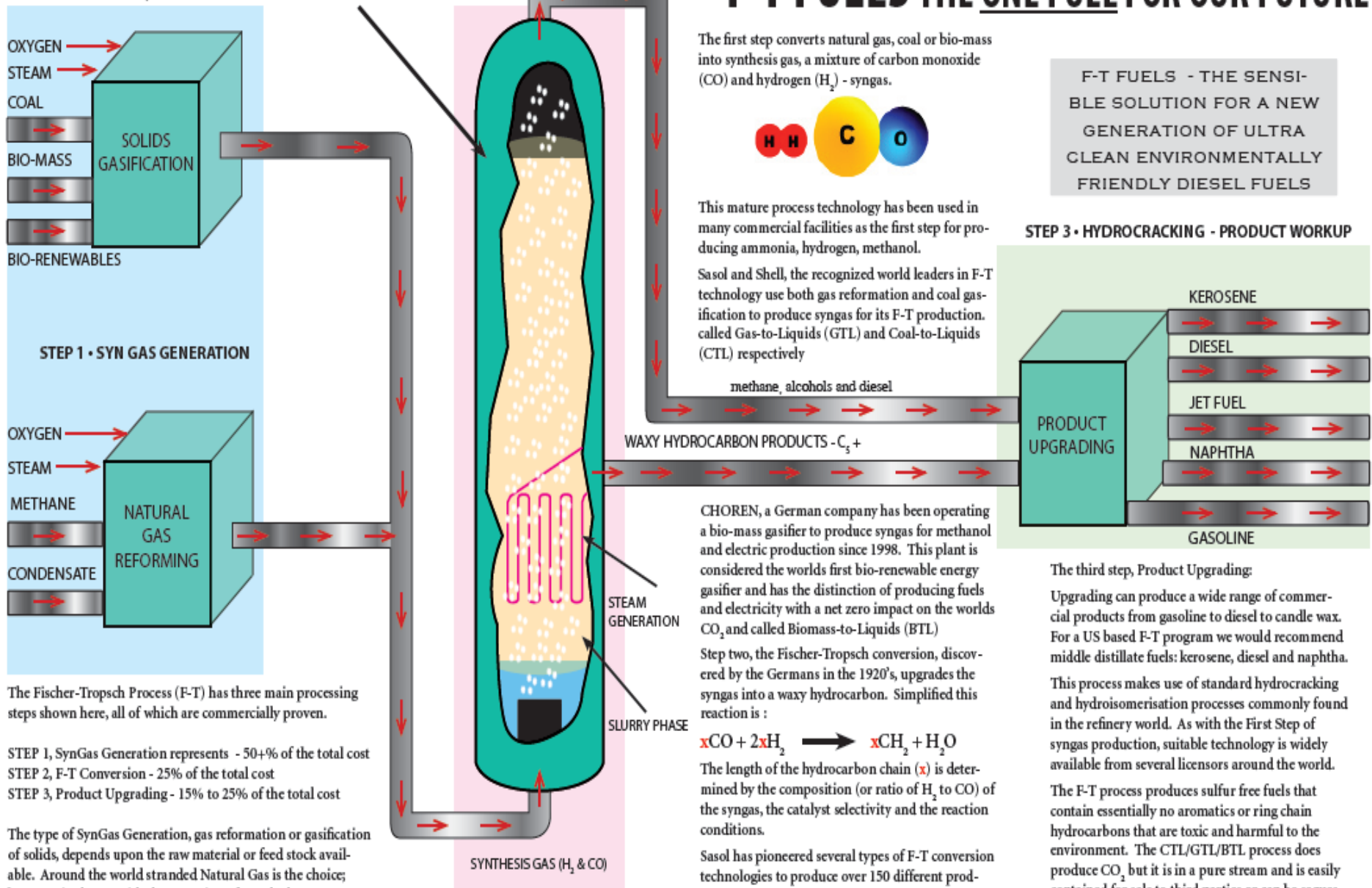


- Step 3 - Product upgrading (hydrocracking of the long chain F-T paraffin to produce the desired end product – similar to a crude oil refinery)

- Kerosene – Diesel – Gasoline - Jet Fuel – Naphtha
  - $C_{10}-C_{13}$        $C_{14}-C_{20}$        $C_5-C_{10}$        $C_{10}-C_{13}$        $C_4-C_{10}$

Note: Although the Sasol F-T reactor is illustrated here, the Shell F-T technology (SMDS) is also commercially proven

## FISCHER-TROPSCH REACTOR



# F-T FUELS THE ONE FUEL FOR OUR FUTURE

The first step converts natural gas, coal or bio-mass into synthesis gas, a mixture of carbon monoxide (CO) and hydrogen (H<sub>2</sub>) - syngas.

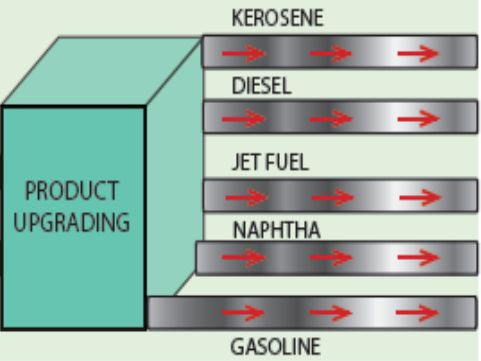


This mature process technology has been used in many commercial facilities as the first step for producing ammonia, hydrogen, methanol.

Sasol and Shell, the recognized world leaders in F-T technology use both gas reformation and coal gasification to produce syngas for its F-T production. called Gas-to-Liquids (GTL) and Coal-to-Liquids (CTL) respectively

F-T FUELS - THE SENSIBLE SOLUTION FOR A NEW GENERATION OF ULTRA CLEAN ENVIRONMENTALLY FRIENDLY DIESEL FUELS

### STEP 3 • HYDROCRACKING - PRODUCT WORKUP



CHOREN, a German company has been operating a bio-mass gasifier to produce syngas for methanol and electric production since 1998. This plant is considered the worlds first bio-renewable energy gasifier and has the distinction of producing fuels and electricity with a net zero impact on the worlds CO<sub>2</sub> and called Biomass-to-Liquids (BTL)

Step two, the Fischer-Tropsch conversion, discovered by the Germans in the 1920's, upgrades the syngas into a waxy hydrocarbon. Simplified this reaction is :



The length of the hydrocarbon chain (x) is determined by the composition (or ratio of H<sub>2</sub> to CO) of the syngas, the catalyst selectivity and the reaction conditions.

Sasol has pioneered several types of F-T conversion technologies to produce over 150 different products from their F-T plants in South Africa alone. The hydrocarbon stream (xCH<sub>2</sub>) is sent to product workup and the water (H<sub>2</sub>O) is sent to the water recovery unit.

The third step, Product Upgrading:

Upgrading can produce a wide range of commercial products from gasoline to diesel to candle wax. For a US based F-T program we would recommend middle distillate fuels: kerosene, diesel and naphtha.

This process makes use of standard hydrocracking and hydroisomerisation processes commonly found in the refinery world. As with the First Step of syngas production, suitable technology is widely available from several licensors around the world.

The F-T process produces sulfur free fuels that contain essentially no aromatics or ring chain hydrocarbons that are toxic and harmful to the environment. The CTL/GTL/BTL process does produce CO<sub>2</sub> but it is in a pure stream and is easily contained for sale to third parties or can be sequestered for injection into underground wells.

F-T Fuels, clean fuels for our future that will reduce US dependence on foreign crude oil and products.

The Fischer-Tropsch Process (F-T) has three main processing steps shown here, all of which are commercially proven.

- STEP 1, SynGas Generation represents - 50+% of the total cost
- STEP 2, F-T Conversion - 25% of the total cost
- STEP 3, Product Upgrading - 15% to 25% of the total cost

The type of SynGas Generation, gas reformation or gasification of solids, depends upon the raw material or feed stock available. Around the world stranded Natural Gas is the choice; however, in the US with the exception of North Slope Natural Gas, coal, bio-mass (garbage), bio-renewables (trees and plants) represent the majority of available feedstock for a US based F-T program!



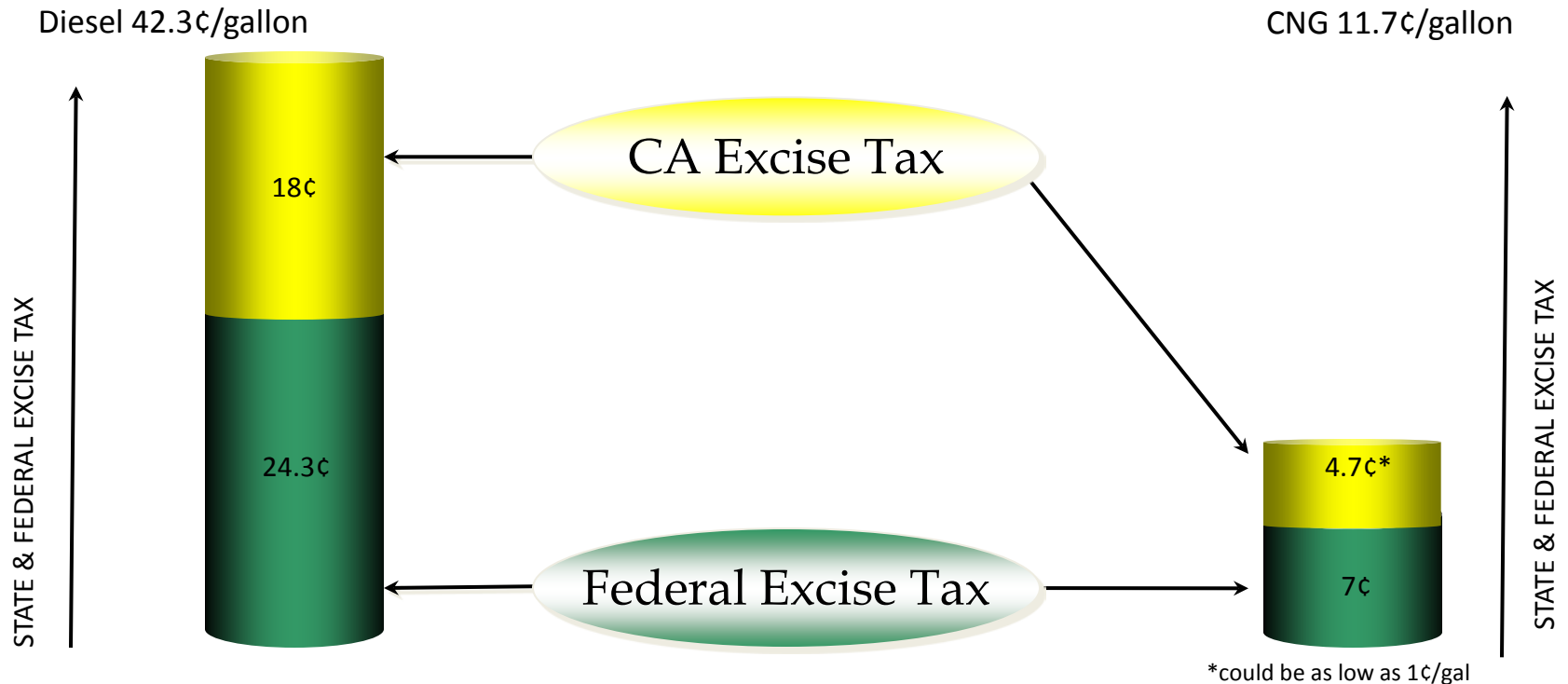
# EXISTING PROGRAMS THAT CAN IMPROVE F-T ECONOMICS

FEDERAL & STATE EXCISE TAX  
RATES FOR NATURAL GAS BASED  
ALTERNATIVE FUELS (CNG)  
IS 31¢/GALLON (\$13/BBL) LESS

NATURAL GAS BASED F-T FUELS  
(GTL's) SHOULD ALSO RECEIVE  
THIS LOWER EXCISE TAX RATE

# FEDERAL AND STATE (CA) TRANSPORTATION EXCISE TAX RATES FOR PETROLEUM BASED DIESEL AND CNG IN THE SAME VEHICLE

~savings 31¢/gal - \$13/bbl



**ALL ALTERNATIVE TRANSPORTATION FUELS ARE TAXED AT LOWER RATES THAN CRUDE OIL BASED FUELS  
SHOULDN'T GTL'S BE TAXED AT THE SAME RATE AS CNG?**



# FEDERAL SUPPORT

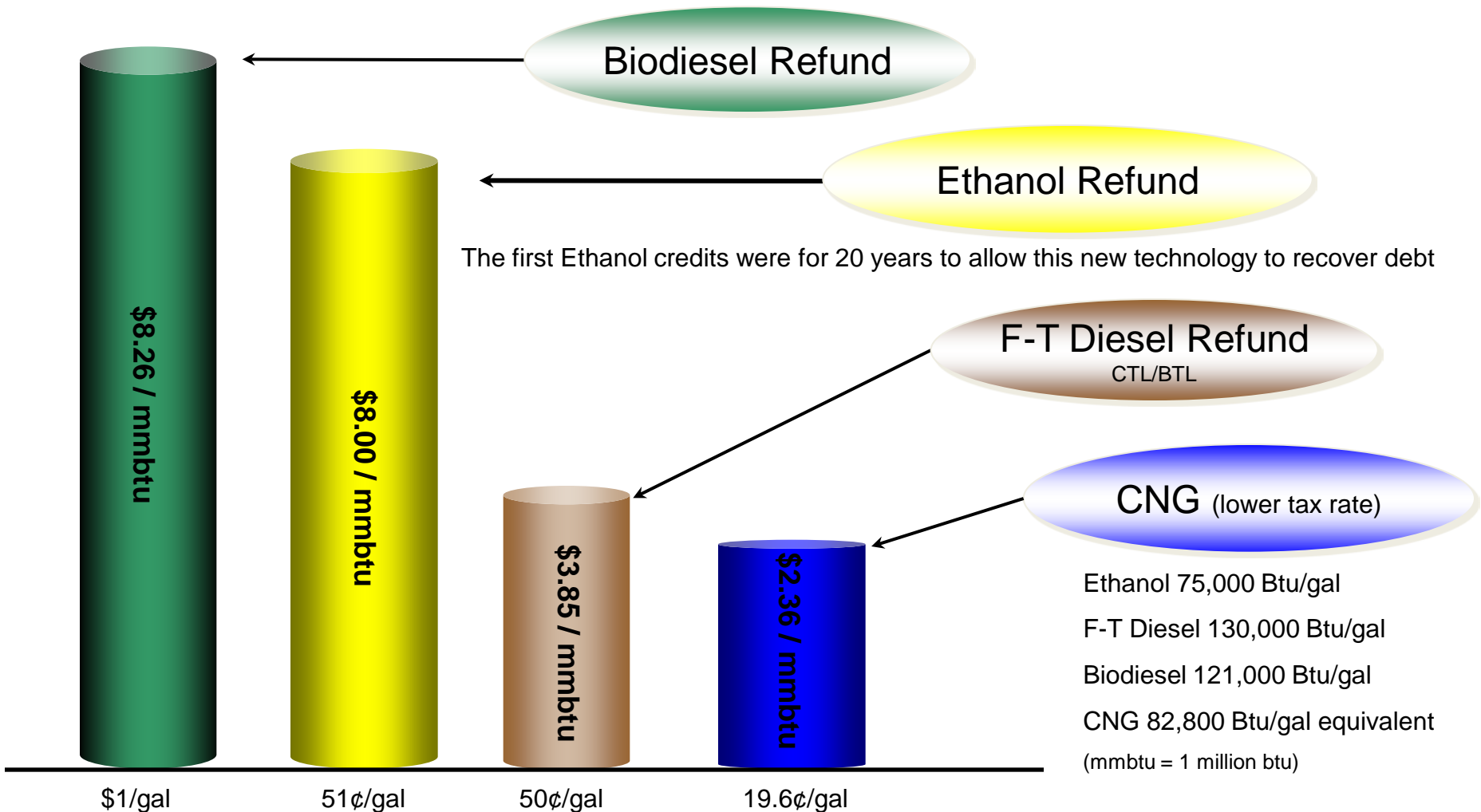


IN THE FORM OF A 50¢/GALLON  
(\$21/BARREL) ENERGY CREDIT FOR F-T  
FUELS (CTL AND BTL) WAS OBTAINED BY  
ALASKA SENATOR TED STEVENS AND  
ALASKA NATURAL RESOURCES TO  
LIQUIDS IN 2005

WE CAN ADD NATURAL GAS  
(GTL) TO THIS EXISTING LEGISLATION

# Current Energy Credits for F-T Fuels (CTL - BTL) On a \$/million btu basis vs Biodiesel & Ethanol

(At the Federal level only)



**Energy Credits that F-T Diesel receives is less than half the Energy Credit of Biodiesel & Ethanol on a \$/million btu basis**



# PRODUCT VALUE IN THE MARKET PLACE VS PROCESS EFFICIENCY

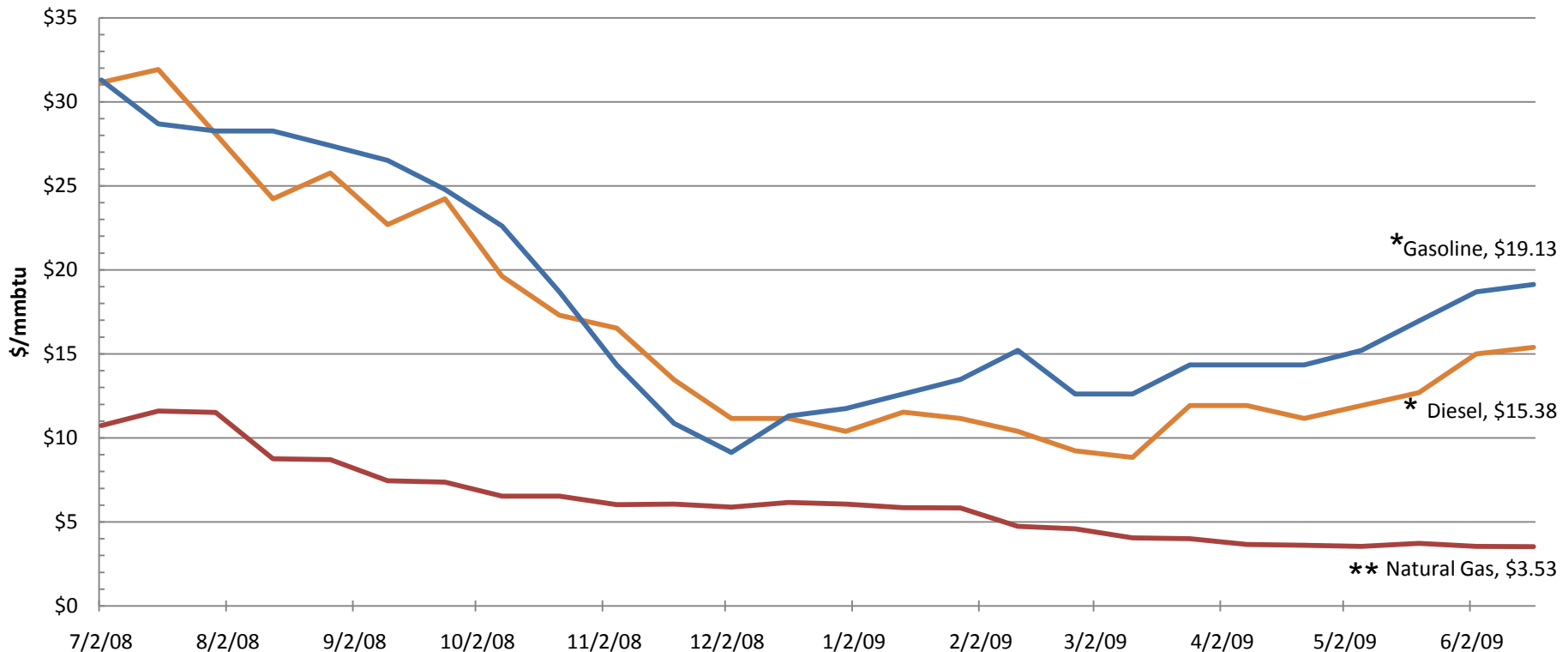


# Natural Gas Always Sells at a Discount to Gasoline and Diesel on a mmbtu Basis in the Market<sup>1</sup>



<sup>1</sup> Natural gas is sold \$/mmbtu (million Btu's) based upon the energy content of the natural gas as measured in Btu's or British Thermal Units. Gasoline and diesel are sold on the basis of \$/gallon but each contain a certain amount of Btu's per gallon. When you convert \$/gallon for gasoline or diesel to \$/mmbtu you can directly compare the value of natural gas to gasoline and diesel.

## Comparison of Diesel - Gasoline - Natural Gas on a mmbtu basis



\* California wholesale rack price at refinery outlet

\*\* Avg of AECO, Henry Hub, CA City Gate and US wellhead

# GTL vs LNG

## VALUE (\$) VS EFFICIENCY

IS THE LNG PROCESS MORE EFFICIENT - WITH 80 % OF THE WELL HEAD ENERGY REACHING THE MARKET ?

IS THE GTL PROCESS LESS EFFICIENT - WITH 70 % OF THE WELL HEAD ENERGY REACHING THE MARKET ?

TECHNICALLY, LNG IS A MORE EFFICIENT PROCESS IF YOU JUST LOOK AT DELIVERED ENERGY TO THE MARKET

IT IS HOWEVER TOTALLY FALSE IF YOU LOOK AT THE **VALUE (\$)** OF THE DELIVERED ENERGY IN THE MARKET

LNG BEGINS LIFE AS NATURAL GAS  AND ENDS LIFE AS NATURAL GAS 

GTL BEGINS LIFE AS NATURAL  AND ENDS LIFE AS A REFINED PRODUCT SUCH AS DIESEL 

WHILE BOTH ARE CARBON BASED, THEIR **VALUES (\$)** ARE TOTALLY DIFFERENT

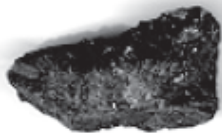
AS AN EXAMPLE:

A LUMP OF COAL AND A DIAMOND ARE BOTH CARBON BASED. UNDER TREMENDOUS PRESSURE AND HEAT (A MANUFACTURING PROCESS), A LUMP OF COAL CAN BECOME A DIAMOND. WHICH HAS MORE VALUE, A LUMP OF COAL OR A DIAMOND? DOES IT MATTER THAT A DIAMOND IS A FRACTION OF THE SIZE OR WEIGHT OF THE ORIGINAL LUMP OF COAL?

IF GTL PRODUCED DIESEL IS MORE VALUABLE THAN LNG DERIVED NATURAL GAS SHOULD YOU CARE IF THE GTL PROCESS IS LESS EFFICIENT IN CONVERTING ENERGY SO LONG AS THE VALUE RECEIVED FOR THE ORIGINAL ENERGY IS GREATER.

**WHICH WOULD YOU PREFER ?**

**A LUMP OF COAL**



**OR A DIAMOND**



**LNG PRODUCED NATURAL GAS** 

**OR GTL PRODUCED DIESEL** 

**THE CHOICE SHOULD BE SIMPLE  
GO FOR THE HIGHER NETBACK VALUE (\$)**



# F-T

One of the cleanest  
transportation fuels that can  
be manufactured from  
domestic resources in large  
volumes – millions of  
gallons per day



F-T is an expensive process because it captures impurities and contaminates including CO<sub>2</sub>

**F-T is really a clean technology because all of the impurities listed below if present are captured and disposed of:**

**Impurities that are removed from Syngas before it enters the F-T reactor. This is the main reason F-T fuels cost so much and are so clean**

**•CO<sub>2</sub> plus**

**•Catalyst Poisons depending on the feed stock used such as:**

–H<sub>2</sub>S

–COS

–HCN

–HCl

–Fe(CO)<sub>5</sub>

–Ni(CO)<sub>4</sub>

–Hg

–Traces of Cd, Se and other metal vapors



# SYNTHETIC F-T DIESEL “CLEAN DIESEL”



SOME PEOPLE CAN'T BELIEVE THAT F-T  
FUELS CAN ACTUALLY BE THAT CLEAN  
OR NON-TOXIC

GO TO ANGTL'S WEB SITE [WWW.ANGTL.COM](http://WWW.ANGTL.COM)  
AND SEE A VIDEO OF ANRTL'S PETER TIJM,  
DRINKING F-T DIESEL

*From the Home page go to [“F-T CLEAN FUEL FROM ALASKA”](#) page*



THE PROPOSED FEDERAL  
CARBON CAP AND TRADE  
PROGRAM WILL RAISE THE  
COSTS OF ALL CARBON  
GENERATING PROCESSES

THE F-T PROCESS ALREADY  
INCLUDES THE COST OF  
CO<sub>2</sub> CAPTURE



$\text{CO}_2$   
WHERE DO YOU STAND  
ON THE ISSUE?

IS THE SCIENCE  
SETTLED?

THE F-T PROCESS PRODUCES  
CO<sub>2</sub> DURING THE  
MANUFACTURING PROCESS  
SO MANY ENVIRONMENTAL  
EXTREMIST'S OPPOSE F-T

BUT IS CO<sub>2</sub> BAD?

# CO<sub>2</sub> IS NOT A POLLUTANT !

WITHOUT CO<sub>2</sub> LIFE AS WE KNOW IT WOULD BE ENDED

IT HAS BEEN SHOWN THAT WITH THE  
INCREASE IN ATMOSPHERIC CO<sub>2</sub> WE ARE  
GREENING THE EARTH

CURRENT ESTIMATES ARE THAT THE EARTH  
HAS INCREASED PLANT GROWTH BY 15%

# Statement on Global Warming Petition Signed by 31,478 Scientists

Congressman Ron Paul, 14th District of Texas

[http://www.house.gov/list/speech/tx14\\_paul/GlobalWarmingJune4.shtml](http://www.house.gov/list/speech/tx14_paul/GlobalWarmingJune4.shtml)

04 June 2009

- Mr. PAUL. Madam Speaker, before voting on the ``cap-and-trade" legislation, my colleagues should consider the views expressed in the following petition that has been signed by 31,478 American scientists:
- ``We urge the United States government to reject the global warming agreement that was written in Kyoto, Japan in December, 1997, and any other similar proposals. The proposed limits on greenhouse gases would harm the environment, hinder the advance of science and technology, and damage the health and welfare of mankind.
- There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth."
- Circulated through the mail by a distinguished group of American physical scientists and supported by a definitive review of the peer-reviewed scientific literature, this may be the strongest and most widely supported statement on this subject that has been made by the scientific community. A state-by-state listing of the signers, which include 9,029 men and women with PhD degrees, a listing of their academic specialties, and a peer-reviewed summary of the science on this subject are available at [www.petitionproject.org](http://www.petitionproject.org).
- The peer-reviewed summary, ``Environmental Effects of Increased Atmospheric Carbon Dioxide" by A. B. Robinson, N. E. Robinson, and W. Soon includes 132 references to the scientific literature and was circulated with the petition.
- Signers of this petition include 3,803 with specific training in atmospheric, earth, and environmental sciences. All 31,478 of the signers have the necessary training in physics, chemistry, and mathematics to understand and evaluate the scientific data relevant to the human-caused global warming hypothesis and to the effects of human activities upon environmental quality.

# Aliens Cause Global Warming

A lecture by Michael Crichton  
Caltech Michelin Lecture  
January 17, 2003



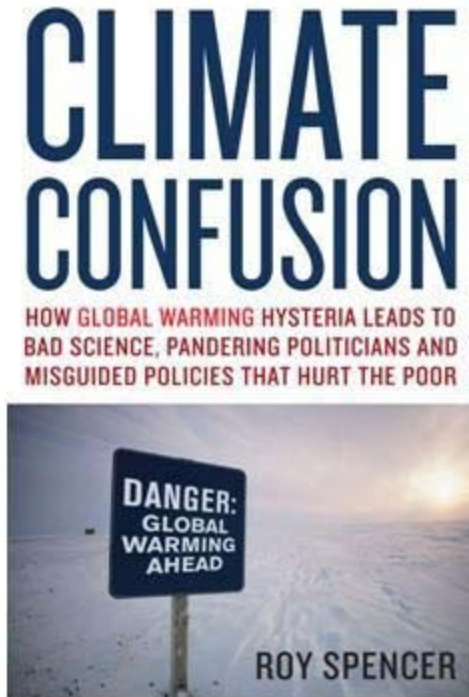
Manmade CO<sub>2</sub> is  
Causing Global  
Warming

- **THE GREATEST CHALLENGE FACED BY THE U.S. IS OUR DEPENDENCE UPON IMPORTED ENERGY**
- **ALMOST 70% OF THE PRICE OF FUEL AT THE PUMP GOES OVERSEAS**

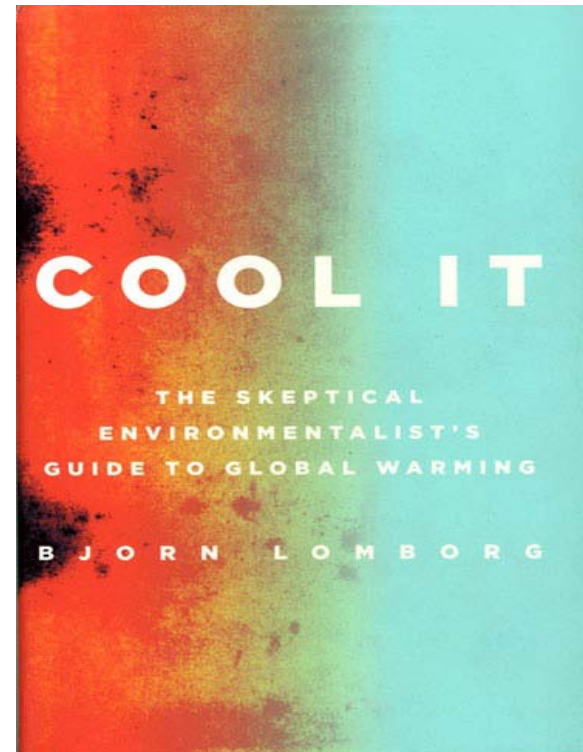
**THE GREATEST THREAT TO U.S. ENERGY  
INDEPENDENCE IS DOMESTIC  
ENVIRONMENTAL EXTREMISM!**

Americans are starting to understand H.L. Mencken's observation that  
**“The urge to save humanity is always a false front for the urge to rule it.”**

## TWO BOOKS WE WOULD RECOMMEND READING ON THE ECONOMIC IMPACTS WORLD WIDE OF DEALING WITH CLIMATE CHANGE



**HOW GLOBAL WARMING HYSTERIA  
LEADS TO BAD SCIENCE, PANDERING  
POLITICIANS AND MISGUIDED  
POLICIES THAT HURT THE POOR  
by DR. ROY SPENCER**



**Cool it - The Skeptical  
Environmentalist's Guide To  
Global Warming  
by BJORN LOMBORG**

# **FOUR PAPERS WE WOULD RECOMMEND READING ON THE POLITICS OF DEALING WITH CLIMATE CHANGE**

**Climate Science: Is It Currently Designed To Answer Questions?**  
by Richard Lindzen, October 30, 2008

<http://ecoworld.com/features/2008/10/30/climate-science-is-it-currently-designed-to-answer-questions/>

**Hot & Cold Media Spin Cycle:  
A Challenge to Journalists who Cover Global Warming**

<http://epw.senate.gov/repwhitepapers/6345050%20Hot%20&%20Cold%20Media.pdf>

**Nature, Not Human Activity, Rules the Climate**  
**Summary for Policymakers of the Report of the Nongovernmental International Panel on Climate Change (NIPCC)**

[http://www.heartland.org/custom/semod\\_policybot/pdf/22835.pdf](http://www.heartland.org/custom/semod_policybot/pdf/22835.pdf)

**United States & Global Data Integrity Issues – *(The issues of Temperature Sensor Locations, Heat Islands and the Latest NASA Data Manipulations)***

[http://scienceandpublicpolicy.org/images/stories/papers/originals/DAleo-DC\\_Brief.pdf](http://scienceandpublicpolicy.org/images/stories/papers/originals/DAleo-DC_Brief.pdf)