

CTL – 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 and Power Performance
- Enhance National Security
- Increase Domestic Employment
- Augment Local Tax Base
- Reduce Cost of Electricity

What is CTL?

Coal to Liquids – conversion of coal into ultra-clean transport fuels utilizing gasification and Fischer-Tropsch refining processes that have been in commercial, continuous operation for over 50 years. This is a proven technology which has only recently become economic with increased prices of crude oil.

Energy Self-Sufficiency

- United States consumes over 20,000,000 barrels of oil per day on an annual basis.
- This is more than double the amount in 1973 at the time of the first Oil Shock.
- Even as our consumption of oil has increased in the last 30 years, the percentage of imported oil has nearly doubled.

- Competition for oil has increased even more dramatically. China alone counted for over 40% of the world's increase in consumption last year. China plans to add 120 million vehicles to its fleet over the next 10 years, requiring nearly 12,000,000 barrels a day more fuel. India will increase its fuel consumption nearly 30% in the next five years.
- It is imperative that our nation develop alternative fuels and CTL will be one of the prominent answers.

Eliminate the Refinery Gap

- On an annual basis, the U. S. imports more than 3,000,000 barrels a day of refined product.
- Congress has begun to provide incentives to alleviate this costly problem.
- CTL will be an important part of the solution.

Reduce the Balance of Payments Deficit

- The cost in U. S. dollars to pay for imported energy comprises nearly 350 billion.
- The Balance of Payments deficit increases every American's cost of doing business, borrowing money, and purchasing goods in someone else's currency.
- CTL keeps the dollars at home and reverses the above equation.

Mitigate Global Warming

- To the extent that Global Warming is caused by emission of greenhouse gases, CTL can reduce these emissions in a very meaningful way.
- Over half of the CO₂ emitted in the United States comes from the combustion of coal, primarily to make electricity.
- The gasification of coal in a CTL plant provides for efficient capture and sequestration of CO₂. Practically all emissions are eliminated.

Reduce Air Pollution

Remember how we referred to F-T fuels as ultra-clean?

- Contaminants in the coal such as sulfur are removed in the gasification stage and therefore are not present in the fuel produced by the process.
- F-T Diesel has zero sulfur, zero aromatics, and is approved by the U. S. EPA as Non-Toxic.
- F-T fuels run the same engines as petroleum-based fuels but do so more efficiently, much more cleanly, and with less maintenance.

Increase Automotive Fuel Efficiency and Engine Performance

Although the F-T process allows the production of jet fuel, gasoline, diesel and petrochemicals, we will concentrate on diesel.

- Diesel engine technology has been greatly enhanced. Today diesel engines deliver up to 40% better fuel economy than their gasoline counterparts. They are quieter and more powerful; delivering more torque at lower rpm. Now with F-T, diesel is also much cleaner.

- An automobile powered by F-T diesel won this year's Le Mans. As an American, I think it would be pretty cool to drive the most powerful automobile, get better fuel economy and still contribute to cleaning up the atmosphere, all powered by domestic fuel.

Enhance National Security

We intuitively know that if we are importing such a high percentage of our fuel that our military and civil-defense apparatus is at risk. Having a strong, diversified domestic fuel supply is the answer and it is a plus that F-T is so environmentally friendly.

Increase Domestic Employment

- The CTL program employs domestic miners, engineers, dock workers, fuel distributors and all who service them; educators, finance, health care workers, recreation and entertainment, retail --- you get the picture.
- Over time, and in order to achieve self-sufficiency, we are talking millions employed here in the United States.

Augment Local Tax Base

If we are moving all those energy production jobs back into the United States, we will increase local property, sales or income tax revenues. More on this later.

Lower the Cost of Electricity

A CTL plant will generate a great deal of waste heat. The heat will be used to operate steam turbines that will provide the electricity needed to operate the plant. There will still be waste heat left over and this can generate low cost electricity to export to the local grid.

I think you will agree that CTL is in the national interest.

Now, let's take a look nearer home and see what would be the impact on Alaska.

AIDEA is working with Chinese Petroleum Corporation of Taiwan and ANRTL of Anchorage to do a pre-feasibility study for a CTL plant in Western Cook Inlet.

This plant would be of commercial scale, would cost over \$5 Billion dollars and would produce 80,000 barrels per day of transport fuel and other liquids.

Prior to development of such a plant there will need to be attraction to the project of a long term coal supply and involvement by a proven technology provider such as Sasol or Shell or both.

We do not have time today to discuss much about the plant and its operation, so instead I have decided to focus on why AIDEA is involved with this exciting project.

Benefits to Alaska

- Jobs
- Production over time of 2.1 billion barrels of transport fuels and other liquids
- Energy Equivalent to 6 Trillion Cubic Feet of Natural Gas from waste heat recovery
- Up to 400 million barrels of oil from EOR
- State and Local Tax Revenue
- Dramatic Increase in production of coal
- Manufacture of Value Added products locally
- National environmental leadership

Jobs

- Construction of the plant would involve about 5000 jobs. Construction would take several years.
- More important, about 1300 permanent jobs would result.
- These are high paid, primary jobs that would come with a strong economic multiplier effect.
- Whether these jobs are in the mine or in the plant or in electricity production or CO2 Enhanced Oil Recovery, they would have a long life. The plant will have an estimated life of 50 years. Because of the high level of maintenance on a plant of this type its actual useful life could extend well over 50 years.

Production of over 2.1 billion barrels of transport fuels and other liquids

- 2 billion barrels of product is equivalent to about 6 billion barrels of crude oil.
- If this were a 6 billion barrel oil field, it would be only behind Prudhoe Bay as the largest in the U.S.
- The plant will make diesel, naphtha and liquefied petroleum gas.
- About 80% of the product will be ultra clean diesel, 15% will be naphtha and the remainder will be LPG.

- The products will be shipped to markets outside the state. One exception may be a small amount of diesel that would be utilized in rural Alaska due to its non-toxic characteristics.
- It is expected that most diesel would find its way to the Pacific Coast markets where there is great demand today for ultra clean diesel.

Energy Equivalence of 6 trillion cubic feet of Natural Gas from waste heat recovery

- This waste heat would be used to produce low cost electricity.
- About 400MW of low cost electricity could be exported from the plant to customers of railbelt utilities.
- This represents about 40% of today's railbelt electrical consumption.

- The low cost of this electricity could save railbelt consumers around \$1 Billion over 15 years.
- Gas turbine generation of about 350MW at the Chugach Electric facility at Beluga is only a few miles from where the plant would be located. The Chugach gas turbines are approaching the end of their life cycle.

Up to 400 million Barrels of Oil from EOR

- Enhanced Oil Recovery utilizing CO₂ could prolong the economic viability of the Cook Inlet Oil fields by more than 25 years.
- According to a Department of Energy study 300-400 million barrels of oil could be lifted from 6 identified oil fields in the Inlet using CO₂ injection.
- At a price of \$50 per barrel, the State of Alaska would receive \$2.5 billion just from royalty oil alone.
- Having an inexpensive source of CO₂ available may make some marginal wells economic and add further resources to the Inlet from a renewal of exploration activity.

State and Local Tax Revenue

- In Addition to the Royalty Oil revenue, the state will receive petroleum production taxes on the incremental oil recovered.
- The state and borough governments will receive in excess of one billion dollars in taxes from the CTL plant over a 20 year period.
- The multiplier effect of the 1300 primary jobs in the local economy will have significant indirect tax benefits.

Dramatic Increase in Mining of Coal

- The CTL plant will use upwards of 16 million tons per year.
- Alaska's only operating coal mine today, Usibelli Coal Mine, produces, I believe, less than 2.5 million tons per year.
- The consumption of the coal at the CTL plant would be more stable than international export markets that have historically been very price sensitive. Alaska has not been the low cost producer.

Manufacture of Value Added Products

- For those of us that have been involved in economic development in Alaska the concept of value-added is the Holy Grail.
- It is quite distressing to see logs exported in the round, crude oil shipped to refineries out of the state, fish processed at sea, and zinc concentrates and other minerals exported to a smelter somewhere else.

- It is gratifying to see a refinery at North Pole or a fertilizer or LNG plant at Nikiski. That these jobs are very meaningful is demonstrated by the effort to keep Agrium open.
- Besides the value add from the products already mentioned at the CTL plant, we can look at the experience of Sasol in Segunda, South Africa, where they have operated CTL continuously for over 50 years. In Segunda, they manufacture over 150 products from the CTL production, just about everything petroleum based from jet fuel to lipstick.

National environmental leadership

- Our nation needs to impede global warming and clean up its air.
- Alaska needs to escape its status as being the poster of the day for environmental opposition to commercial development.
- In my view, it will be of immense benefit to Alaska to show the rest of the nation how to produce an ultra clean fuel in the most environmentally sensitive manner.

- We possess the necessary attributes to demonstrate to all of America that coal can be combusted without emitting great quantities of CO₂, that electricity can be generated from coal without greenhouse gas emissions, and an ultra clean diesel fuel can be used in automobiles, trucks and buses made from a plentiful domestic resource.

Conclusion

Alaska is in a race with other domestic coal producing regions of the U.S. for the first world class CTL project.

There will be smaller projects built, but Fischer-Tropsch is a process that requires scale for maximum economy.

We face competition from Powder River coal, Montana coal, Illinois coal, Kentucky coal, Utah coal, Pennsylvania coal, West Virginia coal, Indiana coal and others.

Outside of the U. S. there are projects in various phases of readiness in China, Australia, India and others with abundant coal resources.

We have competition from areas that have stranded natural gas such as Qatar and Nigeria who are doing Fischer-Tropsch Gas to Liquids projects.

All of this activity has strained the manpower resources of the only two technology providers with world class operating experience – Sasol and Shell.

At first there will only be one or two projects in the United States. Even though the U.S. has one quarter of the world's coal resources, there simply aren't enough technicians and engineers to start up an unlimited number of plants.

I don't have time today to go into the economics of why Alaska can win this race, but please rest assured that the race will be won on economics and Alaska's economics are very attractive at this early stage of the race.

Obviously, from what has been outlined above,

WE HAVE MUCH TO WIN

**AND LOOK FORWARD TO YOUR
SUPPORT.**



The above information and supporting data
such as the history of Fischer-Tropsch is
posted on our website for any of you that have
an interest at www.aidea.org

THANK YOU!