



Photo by: Jim LoScalzo

## A Trip Through

# THE ARCTIC NATIONAL WILDLIFE REFUGE

When you are perceived as an advocate for the energy industry, preparation for a visit to the Arctic National Wildlife Refuge (ANWR) takes on a rather different meaning than just buying cold weather gear. This is especially so, when you have been asked by Ilisagvik College at Barrow to provide a short course on energy economics for a group of traveling companions who have a clearly “green” bent. Rather than get into the details of oil production on the North Slope, or the fortunes of the companies involved, I focused on the global forces currently creating pressure to open the Refuge to oil exploration, and some of the trade-offs bound up in the decision. The current ANWR debate may be considered a microcosm of many of the same issues surrounding our macro energy view that we are in the early stages of a new *Incoming Energy Tide*.

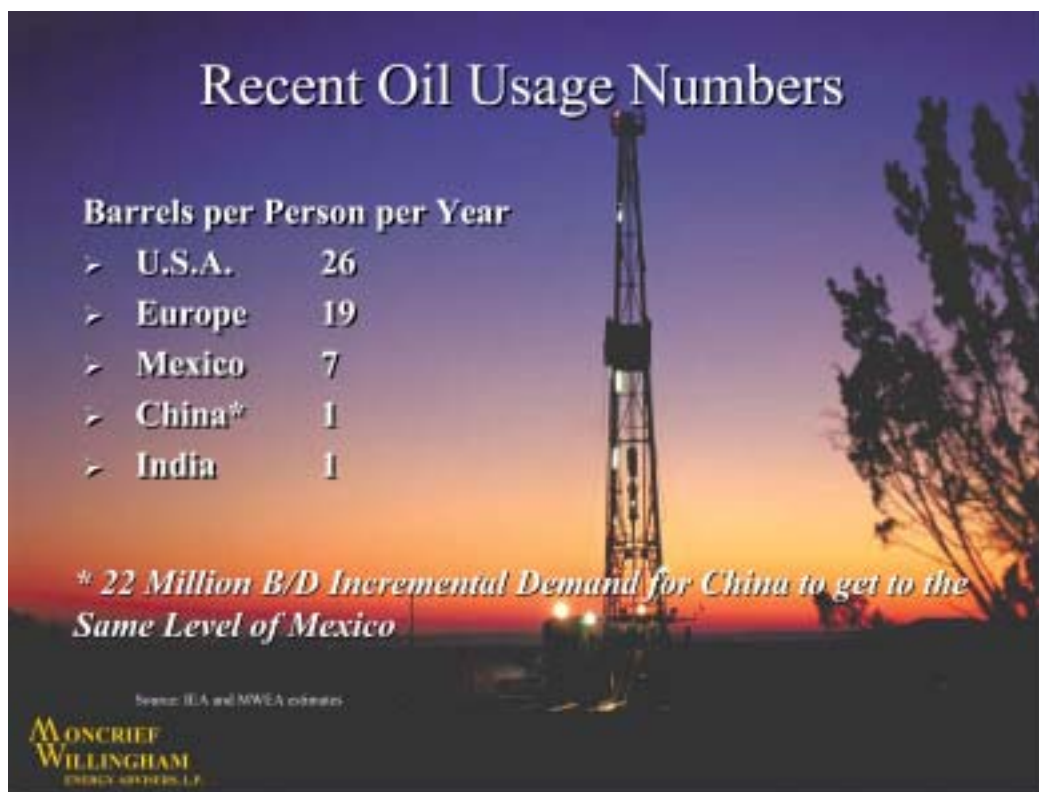
### THE MACRO DRIVERS

Perhaps no statistic captures the history of the oil industry better than a long-term look at demand (Chart 1). The remarkably stable 2+% secular growth trend reflects irresistible forces of global industrialization and population growth, and the at-least-partially countervailing force of ever-increasing energy efficiency. (The U.S. gets twice as much GDP from a barrel of oil as it did 30 years ago, with per capita usage flat despite the advent of the SUV.)



Chart 1 - Secular growth in demand for oil continues to average 2+% per year in spite of turmoil in the markets and recessions, just as it has for half a century.

Macro economic cycles are mere ripples compared to the growth forces unleashed by the move to more free enterprise oriented economic systems by the giant populations of Asia. Moving from muscle power to machine power involves hydrocarbons. Consider that in 1999 (latest available data) China manufactured 11 million motorcycles, essentially all of which represent incremental gasoline demand, and you get some perspective on the issue. Most of the growth in oil usage comes from developing economies, as they struggle to improve the quality of life for their citizens. For China to get to the same per capita oil usage as exists in Mexico today, world oil production would have to be increased nearly one third (Table 1), from its 2001 level that is estimated to average 76 million barrels per day (b/d).

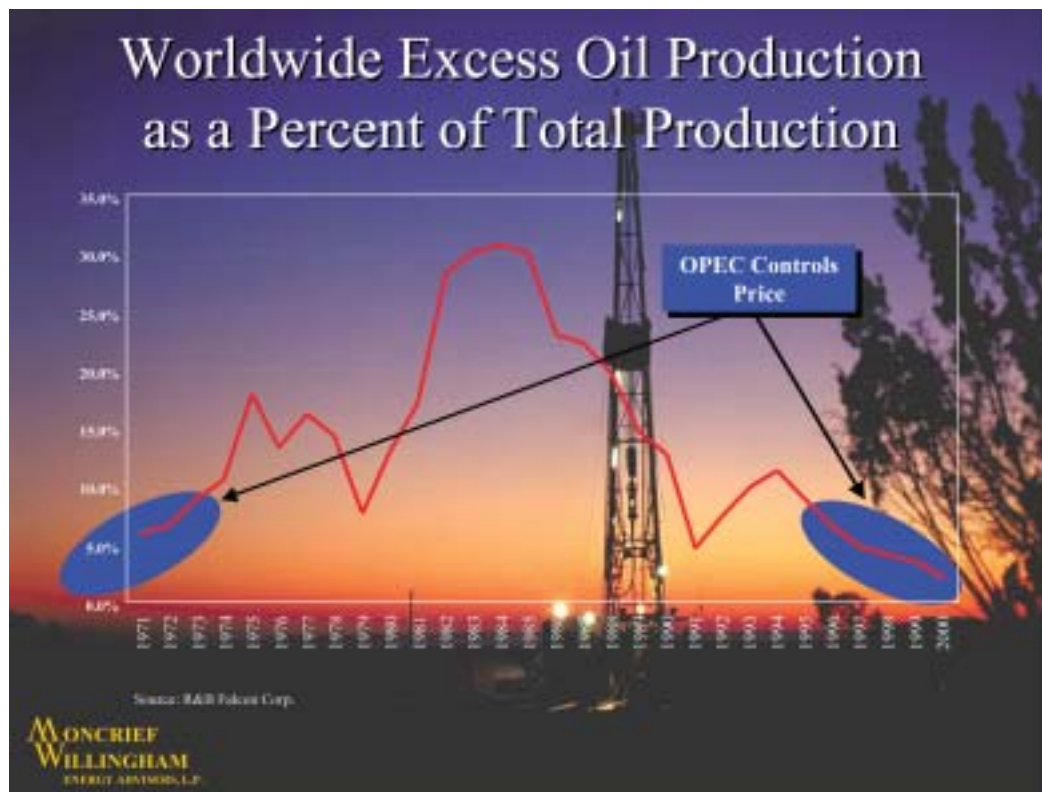


*Table 1 - Since the beginning of the last Incoming Energy Tide in 1970, global industrialization has pushed demand from 52 million b/d to 76 million b/d, while U.S. per capita consumption has remained flat.*

Interacting with the growth in oil demand is the ebb and flow of supply. All producers of oil fight a constant battle with depletion. The new oil well today produces less oil tomorrow, so new drilling is a constant requirement to grow production. It is a little like running up a down escalator. More important, as we have gotten better at getting the oil out of the ground (new technologies) that down escalator has speeded up! The shocking fact is that we (the world) have not found as much oil over the last 15 years as we have used. Meeting the growing demand was possible only because of that speed-up of recovery made possible by technology. The flip side of that coin is that we now get over 70% of our oil from fields 25 years old or older, and they are now generally in noticeable decline.

## OPEC CONTROLS PRICES!

Over the last hundred years, the oil industry has gone through three long (20+ year) cycles, beginning with up-cycle periods (1911-1922, 1948-1958, 1970-1982) of very rapid exploration and development drilling, which results eventually in excess supply, followed by long periods of low drilling. These latter periods lead inevitably to tight supply conditions, as depletion does its work, while demand just keeps on growing. Oil prices are the triggering mechanism in these cycles, rising when supply gets tight, falling when excess supply develops. (Chart 2 shows the history of spare capacity over the last 30 years.) As was the case at the beginning of the last *Incoming Energy Tide* in the 1970's, OPEC has again gained control of prices as spare capacity dipped below 10%.



*Chart 2 - Compared to the excess production capacity that topped at over 30% in the mid-1980's, today with less than 5% spare capacity, "Quota Cheating" is virtually irrelevant and we see OPEC again controlling prices, as it did throughout the 1970's.*

Currently there is even less spare capacity than existed in the early 1970's when the last up-phase of the energy cycle started with average daily usage at only 52 million b/d. The importance of this condition is that there is neither an alternative source of oil, should OPEC withhold supplies, nor enough "cheating" capacity among the members to wreck the effectiveness of group decisions. If the main swing members (Saudi Arabia, Kuwait, Venezuela) do a reasonably good job of adhering to quotas, they will control prices. That is why oil is trading nicely in OPEC's target range of \$22 to \$28, despite repeated Wall Street forecasts of sharp price declines. This brings us to Alaska.

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## THE REFUGE

This is a place of awesome expanse and the austere beauty often associated with other hostile environments such as deserts, or a lot of west Texas. I now understand why no one lives there. Despite the beauty, it is cold and harsh – 3 inches of snow on the summer solstice when I was there, and more sharp rocks than you can imagine. And this is positively balmy compared to the total darkness and temperatures as low as minus 70 degrees in mid-winter. There are lots of animals – we saw bear (two species), moose, caribou, two varieties of fox, ground

Photo by: Jim LoScalzo



*A hiker in our group surveys the vast 1002, which covers over 1.5 million acres. By contrast, the proposed 2,000 acres to be set aside for drilling is as small as Dulles Airport.*

squirrels, and roughly three dozen different species of birds. And you don't see much evidence of mankind. It is truly one of the wild places of the earth. It is easy to understand why the intense solitude and enormity of it lead people to use religious terms to describe it. It is also, in reality, much larger than they tell you. Immediately adjacent to and south of the Refuge is the even larger Gates of the Arctic National Park, which is also a total wilderness area. Therefore, when you hear comments about the 19 million acre ANWR being about as big as South Carolina, you should have in your mind an area almost as big as North **and** South Carolina together. It is an immense wilderness! There is plenty of open space for wildlife, and only from a very tiny corner on the coastal plain (called the 1002) could you even see an oil facility placed on the most prospective areas.

This coastal area (the 1002) of the Arctic National Wildlife Refuge is a place where meaningful production could probably be developed fairly quickly. Reasonable estimates of the oil potential based on the U.S. Geological Survey of 1998 point to a mean estimate of over 10 billion barrels of recoverable oil. The study used economic factors and recovery factors that are clearly too conservative in light of current North Slope technology realities, implying a mean estimate that should be closer to 16 billion barrels. Even at 10, it would represent a giant new province equal to anything found in the world in the last 30 years. Since infrastructure is literally on the edge of the 1002 (Sourdough field actually extends under the edge of the Refuge) production could commence in three years or less and ultimately reach levels of one million barrels per day. That production would last 20 to 30 years!

The heat generated by arguments over the Refuge is so intense that I wanted to see for myself what is at stake; hence my trip in late June. As a rabid trout fisherman who grew up hiking, camping, and fishing in the Smokies, I was particularly looking forward to seeing the Brooks Range mountains and the waters flowing out of them to the Beaufort Sea. Our group flew from Fairbanks to Arctic Village, then on to the Aichilik River for eight days of rafting, a visit to the Inupiat village of Kaktovik (which is in the middle of the 1002), and a visit to Prudhoe Bay so we could compare the wilderness with the largest oil field ever found in North America. Issues that I hoped to resolve in my own mind were the risk to the wildlife, likely impact on the ANWR ecology and aesthetics, the true pristine character of the ANWR, the native positions, and anything else I could learn. There were some surprises.

My first observation is that neither birds nor animals would be threatened by exploration. All one has to do is see how all of these species have thrived at Prudhoe to realize that development poses minimum threat to the wildlife. Would their environment be changed? Yes. Would they still have plenty of room? Yes. With a coastal plain of two million acres, the argument is silly that 1/10 of 1% less of just that small part of the ANWR would somehow crash an animal population. Keep in mind also that most of the activity that might be disruptive would be during the harshest part of dark winter, when very few animals are around, especially the oft-discussed caribou. This is why the Inupiat (represented by the 90,000 strong Alaska Federation of Natives) are not afraid of development, passionately support it, and see it as the key to the long-term prospect of survival of their indigenous culture. As a side note, one hears much about the caribou calving grounds being at the heart of the exploration area. Actually, they calve all over the Refuge, depending primarily on the weather and how fast the routes to the coastal plain open up in spring. Hard late winters (like this year) mean calving even occurs south of the Brooks Range, and recent studies have shown that less than half of the Porcupine herd even uses the 1002.

Photo by: Jim LoScalzo



*We spotted these Caribou on the eastern border of the 1002, some 75 miles from the most prospective drilling sites to the west, as we rafted out of the Brooks Range.*

Photo by: Jim LoScalzo



My second observation is just that: an observation. Our group spotted several oil seeps where crude oil is percolating gradually to the surface from underground reservoirs. (See picture.) Therefore, exploring in the ANWR is not about “if” there is oil in place; there is definitely oil there. The only question is how much. (Over the history of the oil industry, much of the oil has been found drilling over seeps).

*Our group observed this oil seep in the 1002, along with several others during our trip. “Closeology”, using seeps, was key in the discovery of the original Oil City field, Spindle Top, and the early fields in Iran, Iraq and Venezuela, to name a few.*

My final observation is about the pristine character of the Refuge. In actuality, one sees little sign of humans; however, one does see some signs. The natives go all over the Refuge to hunt and fish, mainly in winter on snow machines. They do leave detritus like fuel barrels behind. There are places where regular camping occurs that show wear and tear. Anyone can walk in, and many do, and visitation is not controlled in any way. While the professional guides take great care to leave no trace, others do not. The

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native villages themselves are rather a shock. There is no effort to collect thrown-away items, everything is considered a source of “spare parts,” and nothing disintegrates because of the extreme cold. The villages, therefore, have something of the feel of a junkyard (see picture of Kaktovik). Thus, the image of an untouched wilderness is not quite right. Prudhoe Bay, by comparison, is spotless (see picture of Pump Station #1). There is no litter, no trash, none of the disruption of the tundra that you might expect, and lots of animals. There are oil spills every year on the

*Kaktovik - The Inupiat Village in the heart of the “Pristine” 1002.*

North Slope – mostly very small, – but they are meticulously cleaned up and the tundra restored. If the oil companies spill a barrel of oil, it costs them roughly \$3,000 to clean it up. If they sell it, they get \$25. These economics give them powerful incentive to prevent all possible spills. When you see their operations you come immediately to the conclusion that the oil companies are very good stewards of the land. As one source put it, the North Slope industry operates “in the harshest of physical conditions while setting the highest standards of environmental protection...” The sad irony is that the men and women working on the North Slope are usually portrayed as villains when the reality is that they are among the world’s most conscientious environmentalists.



Photo by: B.J. Willingham

*Pump Station #1 - Prudhoe Bay, Alaska*

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## SHOULD WE DRILL IN THE ANWR?

So, what should we do in the Refuge? Drilling will impact the aesthetics of a small corner of this very beautiful place. You can't hide it, no matter how small the footprint, on the flat, treeless, bushless plain that makes up the 1002. However, most of the ANWR, especially the vast Brooks Range with its spectacular scenery, would be unaffected; and the animals would not be endangered.

Oil is priced by the *marginal barrel*. If there is even a little "too much," that excess forces the price of all barrels lower. If there is even a small amount "too little," prices float sharply higher until some demand is forced out of the system (i.e. inelastic supply/demand in the short run). In our current world with little spare oil production capacity, the development of up to one million barrels per day of **new North American production** should be enough to make a dramatic difference in price. In my opinion prices would be from \$2 per barrel to \$5 per barrel lower (depending on seasonal tightness) over the course of a year. Notwithstanding the 1 million reduction in our imports, a \$3 per barrel differential calculated across total imports means that the American public is paying a **\$120 Billion per year "tax"** to OPEC and friends to keep the ANWR undrilled. That extra cost of energy impacts every industry and every aspect of life. As we found out this past summer even technology needs affordable energy to function successfully. The rest of the world also pays this "ANWR Tax." It means world economic well being is less than it otherwise would be, hurting especially the people just moving out of more primitive lifestyles into the first stages of industrialization. That is an awesomely high price to pay for the minor intrusion that would occur in this vast space. We should drill and develop this badly needed resource now!

Photo by: Jim LoScalzo



*Polar Bear - Photographed at the end of the Kaktovik runway.*

Photo by: Jim LoScazio



*"Yes, I did sample the trout streams with some success." - B.J. Willingham*

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