What I want to do today is give you a sense of how Petroleum has transformed the Alaska economy beyond the obvious statement that most of us in this room would not be here today but for petroleum.
But first I want to acknowledge the generous support I have received from NRB and the UA Foundation in support of the research I am going to report on today. Of course the opinions presented are mine alone and represent neither the bank or the university.
Our story starts with a quick look back at the Alaska economy in 1960. This is for both those of us who were not here at statehood and those who were, but, as is normal human nature, tend to romanticize the past and view it thru rose colored glasses.

The reality is that the economy was small, thin, and seasonal. Total employment, averaged over the year, was about 90 k. There were few businesses providing services to our natural resource producing industries or to households. Someone has remarked that in those days you had to go to Seattle just to get a haircut. Fishing and construction associated with federal spending meant there were lots of private jobs in the summer, but the economy virtually shut down when winter arrived.

Half the jobs, and the most stable, were with the federal government. Transportation, communications, and other infrastructure was primitive by today’s standards. And finally, there was very limited capacity for paying the operating costs of running the new state, let alone for building it up to 20th century standards.
Hope for economic development rested primarily on the natural resource extraction industries depicted on the Alaska state seal (one might call them the seal industries). If you look closely you can see these included mining, seafood, agriculture, timber, (and seals). I keep looking for a tourist in the seal, but have not been able to find one yet.
Economic growth since statehood has been a success story measured by jobs, personal income, and population. Employment has increased by 300% from 90 to 361 thousand. Income, in constant $$$, has increased even more rapidly, and population has almost tripled. Not only is the economy much larger today, its strength is reflected by the fact Alaska is weathering the current national recession much better than most of the nation.
Growth of Seal Industries: Not Enough to Account for Today’s Economy

Job Growth, 1961-2006 (Thousand)

- Tourism
- Seafood
- Mining
- Agriculture
- Timber
- Air Cargo

The seal industries contributed to that growth, but can take credit for only a modest share. This graph shows the increase in the number of jobs in each of those seal industries (now augmented to include tourism and air cargo).

Tourism, starting from a very small base, has grown by over 20 k jobs, on an annual average basis.
Seafood increased by about 10k, from 7 to 17
Mining from 1 to 2
Agriculture for export has yet to become a reality.
Timber, also expected to be a strong driver at the time of statehood, has suffered an absolute decline in jobs
Air Cargo, building off our locational advantage in the pacific rim, has added some 4 k jobs

Taken together these seal industries directly contributed perhaps 30k jobs to the nearly 300k added to the economy since statehood.
Two other economic drivers, not depicted on the state seal account for the majority of our economic growth--federal spending and petroleum. We might want to amend the state seal to include these drivers if we want the seal to depict the economic foundation of the state.

Although both these drivers are fascinating, today I will concentrate on petroleum, and save federal spending for another day.
Here is a list of measures of the importance of petroleum to the economy. They range from a high of 85% of state general fund revenues to a low of 3% of total jobs. In between are indicators like the one showing that 74% of the value of natural resources produced since the purchase from Russia has been petroleum. Given this range, it is easy to understand that people might be confused about how petroleum fits into the overall economy of the state.
To get at the role of petroleum in the economy, I want to ask this question—what would Alaska look like today if there had never been a petroleum industry. And I want to answer it by doing what is called a thought experiment (or gedankenexperiment), a technique not so common to economics, but one popularized by this famous physicist, and one anyone can try.

My thought experiment traces the path of economic growth and development of Alaska if, for example, on April 1 1968, Alaskans opened their morning papers to find the headline which read—Another Dry Hole at Prudhoe Bay, companies say we give up. And this came after an unsuccessful decade of exploration in Cook Inlet.
The first part of the answer is straightforward and you likely already know it, since it was presented right here last year.

The state would not have had these jobs associated with exploration, development, production, transportation, refining, and manufacturing of petroleum—what I call the oil patch jobs.

That amounts to perhaps 42 k jobs throughout the economy when all the effects of instate spending by the industry are tracked down and accounted for.

But these 42 k jobs are only the tip of the iceberg.
No production also means no petroleum revenues. Those revenues pay the wages of about 31 thousands government workers. Government purchases from the private sector and government worker consumption purchases in turn support another 18 thousand private sector jobs, for a total of about 49 thousand additional jobs lost.
No petroleum revenues also means no permanent fund, and no permanent fund dividend. In 2008 the dividend pumped $2 billion in discretionary income into our economy. It was like having another industry at work because that cash infusion was larger than the earnings of the trade, construction, or even the combined oil and mining industry. Without this discretionary there would be many fewer jobs in trade and services and other support industries.
If we add together the oil patch jobs, the public sector jobs, and dividend jobs attributable to petroleum, they sum to roughly 1/3 of all the jobs in the economy. That is reflected in the petroleum leg of the 3 legged stool representing the foundation of the Alaska economy. The other two legs of course are federal spending and other resources (or the seal industries as I have called them).

But we would be missing many of the economic benefits from petroleum if we only considered the jobs generated in the oil patch and from the expenditure of revenues. It is easy to make a list of some of these benefits that represent what I would call spillover and maturation benefits from petroleum. As I will argue, these spillovers have both strengthened and increased the size of the other two legs of the stool. Without petroleum not only would there only be two legs, but those other two legs would also be considerably shorter.
I want to concentrate on 3 characteristics of the petroleum industry that have contributed to these spillover and maturation benefits—value added, stability, and size.
State petroleum revenues, thru 2008, have been $141 billion, in today’s dollars. Of that total $35 billion has been saved in the PF and the CBR. We have spent the other $106 billion.

As I mentioned, this spending has created a lot of jobs, but it has also had two other important effects. It has allowed us to keep the tax burden low for both Alaska non petroleum businesses and Alaska households (here estimated at $54 billion), and at the same time it has allowed us to fund public programs at a higher level per capita than any other state (an estimated $52 billion).

Of course parsing all that spending between tax breaks and increased spending is somewhat of a judgement call, and that is why this is a thought experiment) but clearly we are talking big numbers here. What has this meant for the economy?
Think about our seal industries—fishing, tourism, mining, timber, agriculture. Their combined average tax burden in recent years has been about $200 million. If asked to fund their share of the light tax burden of $54 billion shown on the previous slide, their incremental burden might be $900 million, a tax increase of 400%.

Such an increase would not be possible for some, if not most businesses in these industries. So a higher tax burden would result in a significant hit to the employment numbers for the mining, tourism, fishing, and timber sectors. How big the hit would be is impossible to say, but the numbers are sobering.

Remember this is a thought experiment. I am not advocating this!
Our resource industries have also benefited from the high level of government spending, and not only because our legislators tell us their appropriations are generating economic development. Some capital spending specifically targets assistance to resource industries, such as the assistance provided for the construction of the road at the Red Dog mine. Probably of greater importance is the boost that has come from infrastructure development that has not directly targeted an industry but rather, like the development of a port, has increased access and reduced costs generally. Also important is the capital spending that is directed not toward making business more viable, but at making living in Alaska more attractive—better schools, local assistance, etc. This makes it easier to attract a skilled work force.

Spending from the operating budget has also enhanced the viability of our resource industries through a number of support programs aimed at our seafood, mining, and tourism, and timber industries.

Finally, petroleum revenues have bankrolled aidea, fisheries loan programs, and other programs designed with economic development in mind.

Together the low tax burden and high level of public spending have given our resource industries a boost that has increased their employment levels.
Impact on Households from Lighter Tax Burden

34%*

$13,150 Per Capita in 2006

* Average State Income Tax Rate to Replace Oil Revenues—1970 to 2006.

Just for perspective, households have also been the beneficiaries of a low (almost non existent) state tax burden and higher public expenditures, and this in turn gives a boost to the economy in a number of ways. To give you a sense of the magnitude of that boost, if all state revenues from petroleum had instead come out of the pockets of Alaskans as an income tax, the average rate over the last 30 years would have been 34% instead of the 0% we enjoyed.

One of the more interesting economic boosts from this has been the growth of the retiree population and the consumer spending that these seniors pump into the Alaska economy instead of Florida.
As I indicated, when Alaska became a state there were lots of jobs in the summer, but the economy essentially closed down in winter. Under those circumstances businesses supporting the resource industries or Alaska households had a hard time taking root. Those seasonal industries are still with us today, but account for a much smaller share of the total.

On the left are the graphs of monthly employment levels in 2007 in two Alaska boroughs dominated by seafood, BBB, and tourism, the Denali B. There is almost no employment at the start of the year, a dramatic run up for a few summer months, and then a sharp drop back down. It is no wonder that non residents account for a large share of the jobs in those regions.
In contrast here are the employment profiles for 3 regions where the effects of the petroleum industry dominate. There is no seasonality and economic development can put down permanent roots.

This is true not only in the oil patch on the NSB, but also in places like Bethel, where 44% of the jobs are in state and local government, funded mostly by oil, and in the Matsu Borough, where household consumption dominates the economy.

Stability means more businesses can thrive locally and the share of workers with roots in the state is larger.
The 1/3 of all state jobs from the oil patch and petroleum revenues has boosted the size of the economy, and this in turn has fostered maturation of the economy.

This graph shows the growth in Alaska employment divided into the economic drivers in red and all support sectors—trade, services, finance, transportation, public utilities—in green. Support employment growth has dominated since statehood, bringing with it many benefits. It means for example, you no longer need to go to Seattle for that haircut. It also means greater competition and economies of scale that have lowered the cost of living and the cost of doing business.

But this graph tells another important story. In a very rough way the ratio of green to red represents the economic multiplier—the number of support jobs added to the economy for each new basic sector job. Because petroleum has expanded the size of the economy that ratio is much higher today than it otherwise would have been. For example, opening a new mine today will generate more jobs than would be the case with a smaller, and thinner, economy.

Another result of a larger Alaska with petroleum is a higher level of federal spending since some federal programs that pump money into the economy are based on population size. So without oil we would also have fewer federal $. 
If we account for these spillover and maturation benefits of petroleum, then a projection of growth since statehood without petroleum might be only 1/3 of the growth we experience, and the economy might only be half its current size.

Of course everyone who does this thought experiment would come up with a different result. Would the federal government have provided more assistance, would we have worked harder to develop our other resource industries, etc. etc. etc. The possibilities are endless and the exercise is fascinating.

However, I am convinced that the general conclusion is valid. The spillover and maturation benefits from petroleum development have been real and significant, and they have transformed the economy.
So here are some new indicators of the importance of petroleum.
Without Petroleum: Today’s Alaska Economic Base

<table>
<thead>
<tr>
<th>Economic Driver</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military</td>
<td>35%</td>
</tr>
<tr>
<td>Federal Civilian</td>
<td>23%</td>
</tr>
<tr>
<td>Tourism</td>
<td>20%</td>
</tr>
<tr>
<td>Fishing</td>
<td>16%</td>
</tr>
<tr>
<td>Mining</td>
<td>3%</td>
</tr>
<tr>
<td>Air Cargo</td>
<td>3%</td>
</tr>
<tr>
<td>Timber</td>
<td>0%</td>
</tr>
</tbody>
</table>

And this is what the composition of economic drivers might look like without petroleum (as a share of jobs).

The federal government might account for nearly 58% with the two largest private sector drivers, both highly seasonal and relatively low income,—tourism and fishing accounting for 36%.
Is there another state that we might look like? Here are some possibilities based on share of Native Americans, resource extraction, or tourism.
Maine Is Not Like Alaska

- Physically attached to Lower 48
- Federal land ownership 1%
- Native American population 1%
- Lobsters instead of crabs
- Unusual accent
- Presidential hangout

I think Maine is the most likely, even though there are a number of differences.
Maine is Like Alaska

- Many moose
- Few humans
- Cold
- Remote
- Independent streak

There are a number of similarities.
Maine and Alaska

- Fish / Tourism / Timber / Mining / Agriculture
- Limits on sustainable harvests
- Challenged by globalization
- Small and declining manufacturing
- Dependence on federal $$$s
- Conflicting visions about use of resources
- “Zero Sum Game” development mentality

And a surprising number of economic similarities.
Throughout the second half of the twentieth century, Maine has struggled to find a proper balance between resource-based industrial development and environmental protection.

The state has come to rely heavily on tourism, small manufacturing enterprises and defense-related activities and installations for much of its economic base.

Maine economic history has not been one to envy.
Maine Economic Performance: Some Evidence

- Gross State Product per capita: 43rd (Ak 7th)
- Job Growth: 66% (Ak 144%)
- Population Growth: 46th (Ak 5th)
- Median Age: 1st (Ak 49th)
- Housing Built Before 1939: 31% (Ak 2%)
- Median Paycheck: 77% as high as Alaska
- Projected Population Growth = 1/3 US average (Ak 30% above)

The indicators support the view that Maine’s performance has been lacksadaisical, in spite of several advantages over Alaska, including:

- The capital Augusta is only 130 miles by road from Boston.
- The state is much more compact and has a more developed infrastructure
- Maine does have some economic base that we do not, including
  a major ship building facility
  LL Bean manufacturing
  3 quality private colleges—Bates, Bowdoin, and Colby
In addition to describing what Alaska might look like today if petroleum had never been discovered, we can bring it down to a personal level and calculate the annual Alaska family of 4 bonus compared to our neighbors in Maine (represented by their first family on the left). With a higher average wage, no state taxes, 4 pfds, and public services valued at nearly $50k, the annual Alaska Bonus is $50K.

Different families will have different circumstances, but clearly not only has the economy benefited from petroleum, we all share in those benefits.
Although not like Maine, we still face many of the same economic challenges we faced at statehood. The modest market value of our seal industries demonstrates they cannot alone carry the economy at the level we have attained and come to expect. Petroleum is still a critical element of our economic future.
Petroleum Resources for a Sustainable Economic Future
(Billion Barrels of Oil)

Production History:
- North Slope: 15.4
- Cook Inlet: 1.3

Reserves Today:
- Central North Slope: 5.9
- Cook Inlet: 0.1

Potential Additional Reserves (Technically Recoverable—USGS, MMS):
- ANWR: 10.4
- NPRA: 10.6
- OCS: 23
- Central North Slope: 4

Fortunately petroleum has not only been transformative, and a sustainable industry for more than a generation, it has the potential to help sustain the economy for generations to come. No one knows how much petroleum remains to be found and produced, but this table demonstrates that potential.
Realizing that potential requires that we understand the role of petroleum in the economy. Although the movie of Alaska economic growth would not run exactly in reverse if petroleum were to disappear as one of the legs of our stool, it would have serious negative consequences for the other two legs. Making sure that is not our economic future will be a challenge for us all.
How Oil Has Transformed the Alaska Economy

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ANCHORAGE CHAMBER OF COMMERCE
“MAKE IT MONDAY”
July 6, 2009
Anchorage, Alaska