Discussion Slides:
Alaska Senate Finance Committee

March 22, 2012
Janak Mayer
Manager, Upstream & Gas
PFC Energy
Contents

1. Historical Data Analysis: Value of Alaskan Production Over Time
2. Re-Examining Previous Analysis of ACES
3. Impact of CSSB 192 Revised Production Tax Floor
4. Options for Incentivizing New Production
Historical Data Analysis: Value of Alaskan Production over Time
ANS West Coast Crude Historical Average Price (Real vs Nominal)

ANS Price of $35/bbl in 1981 equates to $75/bbl in 2010 dollars
Earliest years of production were high value years – and recent years have marked a new, high-value period.
ANS West Coast Crude Historical Average Price (Real vs Nominal)

ANS Price of $35/bbl in 1981 equates to $75/bbl in 2010 dollars
ANS West Coast Crude Historical Average Price (Real vs Nominal)

ANS Price of $35/bbl in 1981 equates to $75/bbl in 2010 dollars
ANS West Coast Crude Historical Average Price (Real vs Nominal)

ANS Price of $35/bbl in 1981 equates to $75/bbl in 2010 dollars
Re-examining Previous Analysis of ACES
“ACES Preserves Investment Climate”: What has changed since 2007?

ACES Preserves Investment Climate

An Economic Evaluation

Anthony Finizza, Ph. D.
October 21, 2007
Revisiting the Previous Modeling Work

**Characteristics of the Seven Fields**

<table>
<thead>
<tr>
<th>Field</th>
<th>Legacy Field</th>
<th>Satellite</th>
<th>Stand Alone</th>
<th>Heavy Oil</th>
<th>Reserves (MMB)</th>
<th>Ownership</th>
<th>Capital ($ / B)</th>
<th>Expense ($ / B)</th>
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**New Field Tax Analysis - NPV Impact**

**Stylized Project Cash Flow**

- **Net Cash Flow from Production**
- **Up-front Capital Investment**

**Industry NPV @ 10% at $40/bbl real ANS WC (mm$)**

<table>
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<tr>
<th>Scenarios</th>
<th>Mature Fields</th>
<th>Other Fields</th>
<th>Trigger</th>
<th>Rate</th>
<th>Progressivity</th>
<th>Capital Investment Credit</th>
<th>Field A</th>
<th>Field B</th>
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<td>25.0%</td>
<td>25.0%</td>
<td>$30</td>
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<td>20%</td>
<td>0.0020</td>
<td>10</td>
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<td>ACES - NO Floor</td>
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<td>25.0%</td>
<td>$30</td>
<td>0.002</td>
<td>20%</td>
<td>0.0020</td>
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<td>22.5%</td>
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<td>20%</td>
<td>0.0030</td>
<td>150</td>
<td>50</td>
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Key Assumptions to Consider

• Regime modeled is ACES as proposed, not as enacted:
  – 0.02% progressivity above the $30 level, not 0.04%
  – 50% maximum production tax rate, not 75%

• Cost assumptions are much lower than recent experience suggests:
  – $10/bbl capex and $9/bbl opex, vs
  – $17/bbl capex and opex

• Analysis performed from $20 to $100 crude oil price, with focus on $40 “stress-test” price, and $60 “base case”

• Assumed production profile is one that will maximize economic returns for a given field size
  – High peak production rate with high decline rate means most production value occurs within 10 years
### Benchmarking Government Take – at $60/bbl

**“Cradle to Grave” Government Share of Pre-Tax Income Discounted at 10% @ $60 (Applicable to New Fields)**

<table>
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<tr>
<th>Median Government Take By Tax Structures</th>
<th>Median (Mid-Point)</th>
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<tbody>
<tr>
<td>All Governments</td>
<td>48%</td>
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<td>Profit Sharing Governments</td>
<td>76%</td>
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<td>Tax Royalty Governments</td>
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<td>Norway</td>
<td>81%</td>
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<td><strong>Alaska - ACES Six Potential New Fields</strong></td>
<td>68% to 74%</td>
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<td></td>
<td>(Median 70%)</td>
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<tr>
<td><strong>Alaska - PPT Six Potential New Fields</strong></td>
<td>65% to 72%</td>
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<td>(Median 68%)</td>
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<td>UK</td>
<td>51%</td>
</tr>
<tr>
<td>Gulf of Mexico</td>
<td>48%</td>
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*Source: PFC Study September 2007, Alaska data by DOR*
Regime Competitiveness: Average Government Take

Average Government Take of Global Fiscal Regimes at $100/bbl

- **OECD**
- **ACES**

Regime Competitiveness: Average Government Take

Average Government Take of Global Fiscal Regimes at $140/bbl

- OECD
- ACES

Countries listed from highest to lowest government take:
- Uzbekistan
- Syria
- Azerbaijan
- Turkmenistan
- Oman
- US – AK – ACES (New Development)
- Pakistan
- Angola
- Trinidad
- Algeria
- Bolivia
- US – AK – ACES (Existing Producer)
- Norway
- Vietnam
- Kazakhstan
- Venezuela
- Indonesia
- Malaysia
- Thailand
- Libya
- Russia
- Congo, Rep. of the
- India
- China
- US - LA (Haynesville)
- Cote d’Ivoire
- Netherlands
- US - TX (Eagleford)
- Yemen
- Egypt
- Argentina
- UK
- Nigeria
- US - LA (conventional)
- UAE
- US - ND (Bakken)
- Equatorial Guinea
- Australia
- Philippines
- US - TX (conventional)
- Canada - Alberta Conv.
- US - TX (Barnett)
- Colombia
- Canada - Alberta OS
- Brazil
- Gabon
- Denmark
- Canada - Nova Scotia
- US - GOM
- New Zealand
- Peru
- Ireland
ANS West Coast Crude Spot Price – Last 30 Days
“Field B” in our model, under ACES as proposed

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take
“Field B”, under ACES as enacted

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take
“Field B”, under ACES as enacted, with $17/bl costs

Cash Flow Analysis - $100 ANS West Coast

<table>
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<td>$60</td>
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<td>$100</td>
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Level & Composition of Government Take

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<th>Production Tax</th>
<th>Property Tax</th>
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<th>Total State Take</th>
<th>Federal CIT</th>
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Level & Composition of Relative Government Take

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<th>Property Tax</th>
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<td>2%</td>
<td>2%</td>
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"Field B", under ACES as enacted, with $17/bl costs and flatter production profile

Cash Flow Analysis - $100 ANS West Coast

Price  NPV  IRR
$40  $-241 -3%
$60  $-69  7%
$100 $  59  13%

Level & Composition of Government Take

Price  Royalty  Production Tax  Property Tax  Total GT  Federal CIT
40  269% -229% 178%  0% 218% 0% 218%
50  53% -16% 28%  1% 66%  6% 71%
60  34%  6% 15%  3% 59% 12% 70%
70  27% 19% 10%  3% 60% 10% 73%
80  24% 27% 8%  3% 63% 13% 75%
90  22% 34% 6%  3% 65% 13% 77%
100 20% 38% 5%  3% 67% 11% 78%
110 19% 42% 5%  3% 68% 11% 80%
120 18% 44% 4%  3% 69% 11% 80%
130 18% 46% 4%  3% 70% 11% 81%
140 17% 47% 3%  3% 70% 10% 81%
150 17% 49% 3%  3% 71% 10% 81%
160 16% 50% 3%  3% 72% 10% 82%
170 16% 51% 3%  3% 73% 10% 82%
180 16% 53% 2%  2% 73%  9% 83%
190 16% 54% 2%  2% 74%  9% 83%
200 15% 55% 2%  2% 75%  9% 84%
210 15% 57% 2%  2% 76%  8% 84%
220 15% 58% 2%  2% 77%  8% 85%
230 15% 59% 2%  2% 78%  8% 85%

Level & Composition of Relative Government Take

Price  Royalty  Production Tax  Property Tax  Total State Take  Federal CIT
40  269% -229% 178%  0% 218% 0% 218%
50  53% -16% 28%  1% 66%  6% 71%
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110 19% 42% 5%  3% 68% 11% 80%
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130 18% 46% 4%  3% 70% 11% 81%
140 17% 47% 3%  3% 70% 10% 81%
150 17% 49% 3%  3% 71% 10% 81%
160 16% 50% 3%  3% 72% 10% 82%
170 16% 51% 3%  3% 73% 10% 82%
180 16% 53% 2%  2% 73%  9% 83%
190 16% 54% 2%  2% 74%  9% 83%
200 15% 55% 2%  2% 75%  9% 84%
210 15% 57% 2%  2% 76%  8% 84%
220 15% 58% 2%  2% 77%  8% 85%
230 15% 59% 2%  2% 78%  8% 85%
Impact of Revised Production Tax Floor
CSSB 192 Using ACES Minimum PTV (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

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Level & Composition of Government Take

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<th>Royalty</th>
<th>Production Tax</th>
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<th>State CIT</th>
<th>Total State Take</th>
<th>Federal CIT</th>
<th>Total GT</th>
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<tr>
<td>40</td>
<td>32%</td>
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<td>4%</td>
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<td>16%</td>
<td>72%</td>
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Level & Composition of Relative Government Take

ANS West Coast Crude Price

Federal CIT
State CIT
Property Tax
Production Tax
Royalty
CSSB 192 Using 10% of Revenues for Minimum PTV (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take

ANS West Coast Crude Price

ANS West Coast Crude Price
Incentivizing New Production
• ACES appears to work well as a “harvest” regime
  – Existing **mature fields remain profitable**, including capital work required to achieve ~6% decline (renewal capex)
  – **Maximum ‘rent’** extracted from a declining production base is captured for the state
• ACES inhibits the development of new projects and resources that might help stem or even reverse the decline
  – ACES is **not progressive with regard to costs**, so high government take applies even to very high cost projects
  – Existing system of capital credits etc appears to do more to encourage ‘renewal capex’ than it does new production spending
  – Progressivity can have a major **detrimental impact on breakeven prices** for high-cost projects at current oil prices
Central to understanding the impact of the “allowance for ‘new oil’” is an understanding of the impact of new source production on a company’s total production volumes, when that new source production is added to a declining base portfolio.

- The charts below assume a 6% decline rate for an existing North Slope producer currently producing 200 mb/d, and examine hypothetical new source projects that peak at 10mb/d, 50 mb/d and 100 mb/d respectively (on a working interest basis).
- Given the pace at which such projects typically reach peak production, only the 100 mb/d peak production new source development is actually capable of adding production that is incremental to prior years’ volumes.
A new source development that produced 100 mb/d at peak for a working interest partner would be a very significant new development. By way of comparison, Kuparak, the second largest field in North America, peaked at ~320 mb/d gross production
- This represented **working interest production** to ConocoPhillips (the operator and majority shareholder) of 170 mbo/d
- Kuparak took 11 years (from 1981 to 1992) to reach this peak level of production

Since it would take a development on the scale of 100 mb/d (working interest) to achieve “new oil” for an existing producer under the terms of the amendment, a development of this size has been modeled in the following analysis
- A 7 year ramp-up to peak production has been assumed
- Such a development would likely eclipse today’s production from Kuparak (122 mb/d gross, 66mb/d working interest to the majority shareholder)
- It is important to note that this is a significantly more aggressive new-source production profile than is currently foreseen in recent statements by the major operators on their current development pipelines, even in the most optimistic circumstances
Assumptions

• The following analysis assumes
  – A 6% base portfolio decline, in the case of a producer currently producing 200 mb/d
  – Costs for the base production portfolio of:
    ▪ $12/ flowing bbl operating expenditure
    ▪ $5/ flowing bbl maintenance capital expenditure
  – Costs for the 100 mb/d (working interest) New Development project of:
    ▪ $13/ flowing bbl operating expenditure
    ▪ $13/bbl reserves development capital expenditure
    ▪ $1/ flowing bbl maintenance capital expenditure
  – These costs are deliberately somewhat lower than the previously referenced 10 mb/d new development, since the hypothetical development modeled is significantly larger, and thus likely to have somewhat lower costs on a $/bbl basis
CSSB 192 Excluding New Oil Allowance (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Price | NPV  
--- | ---  
$40 | $(181)  
$60 | $6,615  
$100 | $16,307

Level & Composition of Government Take

- Federal CIT
- State CIT
- Property Tax
- Production Tax
- Royalty

Level & Composition of Relative Government Take

- Federal CIT
- State CIT
- Property Tax
- Production Tax
- Royalty
CSSB 192 Including $10 New Oil Allowance Over 1 Year (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take
CSSB 192 Including $20 New Oil Allowance Over 7 Years (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take
CSSB 192 Including $60 New Oil Allowance Over 7 Years (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Price | NPV
--- | ---
$40 | $ (181)
$60 | 7,032
$100 | 17,054

Level & Composition of Government Take

Price | Royalty | Production Tax | Property Tax | CAT | Federal CIT | State CIT
--- | --- | --- | --- | --- | --- | ---
40 | 37% | 9% | 17% | 3% | 66% | 12% | 78%
50 | 26% | 13% | 10% | 4% | 54% | 16% | 70%
60 | 22% | 17% | 7% | 4% | 51% | 17% | 68%
70 | 20% | 23% | 5% | 4% | 52% | 17% | 69%
80 | 19% | 27% | 4% | 4% | 54% | 15% | 70%
90 | 18% | 31% | 4% | 4% | 56% | 15% | 72%
100 | 17% | 34% | 3% | 4% | 58% | 15% | 73%
110 | 16% | 37% | 3% | 4% | 60% | 14% | 74%
120 | 16% | 39% | 3% | 4% | 61% | 14% | 75%
130 | 16% | 41% | 2% | 3% | 62% | 13% | 75%
140 | 15% | 42% | 2% | 3% | 63% | 13% | 76%
150 | 15% | 44% | 2% | 3% | 64% | 13% | 77%
160 | 15% | 45% | 2% | 3% | 65% | 12% | 77%
170 | 15% | 46% | 2% | 3% | 65% | 12% | 78%
180 | 15% | 47% | 2% | 3% | 66% | 12% | 78%
190 | 15% | 47% | 1% | 3% | 66% | 12% | 78%
200 | 14% | 48% | 1% | 3% | 67% | 12% | 78%
210 | 14% | 48% | 1% | 3% | 67% | 12% | 78%
220 | 14% | 48% | 1% | 3% | 67% | 12% | 79%
230 | 14% | 49% | 1% | 3% | 67% | 12% | 79%

Level & Composition of Relative Government Take
CSSB 192 Excluding New Oil Allowance (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take
CSSB 192 Including Tax Holiday Based on 3 Year Rolling Decline (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

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Level & Composition of Government Take

Level & Composition of Relative Government Take

ANS West Coast Crude Price

Opex, Capex, Revenue, ATCF
CSSB 192 Including Tax Holiday Based on 3 Year Rolling Decline for 7 Years (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take

Price | Royalty | Production Tax | Property Tax | State CIT | Total State Take | Federal CIT | Total GT |
------|---------|----------------|-------------|----------|-----------------|------------|---------|
40    | 37%     | 9%             | 17%         | 3%       | 66%             | 12%        | 78%     |
50    | 26%     | 14%            | 10%         | 4%       | 55%             | 16%        | 71%     |
60    | 22%     | 19%            | 7%          | 4%       | 53%             | 17%        | 70%     |
70    | 20%     | 24%            | 5%          | 4%       | 54%             | 16%        | 70%     |
80    | 19%     | 29%            | 4%          | 4%       | 56%             | 15%        | 71%     |
90    | 18%     | 32%            | 4%          | 4%       | 58%             | 15%        | 73%     |
100   | 17%     | 35%            | 3%          | 4%       | 59%             | 14%        | 74%     |
110   | 16%     | 38%            | 3%          | 4%       | 61%             | 14%        | 74%     |
120   | 16%     | 40%            | 3%          | 3%       | 62%             | 13%        | 75%     |
130   | 16%     | 42%            | 2%          | 3%       | 63%             | 13%        | 76%     |
140   | 15%     | 43%            | 2%          | 3%       | 64%             | 13%        | 77%     |
150   | 15%     | 44%            | 2%          | 3%       | 65%             | 12%        | 77%     |
160   | 15%     | 45%            | 2%          | 3%       | 65%             | 12%        | 77%     |
170   | 15%     | 46%            | 2%          | 3%       | 66%             | 12%        | 78%     |
180   | 15%     | 47%            | 2%          | 3%       | 66%             | 12%        | 78%     |
190   | 15%     | 47%            | 1%          | 3%       | 66%             | 12%        | 78%     |
200   | 14%     | 48%            | 1%          | 3%       | 67%             | 12%        | 78%     |
210   | 14%     | 48%            | 1%          | 3%       | 67%             | 12%        | 78%     |
220   | 14%     | 49%            | 1%          | 3%       | 67%             | 12%        | 79%     |
230   | 14%     | 49%            | 1%          | 3%       | 67%             | 12%        | 79%     |

ANS West Coast Crude Price

$mm

Price

$mm

Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take

ANS West Coast Crude Price

$mm

ANS West Coast Crude Price

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Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take

ANS West Coast Crude Price

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Cash Flow Analysis - $100 ANS West Coast

Level & Composition of Government Take

Level & Composition of Relative Government Take

ANS West Coast Crude Price

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## Differences in Incremental Production

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**Incremental**

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**Decline above fixed forecast**

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CSSB 192 Including 20% Gross Revenue Allowance Above Fixed Decline Rate (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

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Level & Composition of Government Take

Level & Composition of Relative Government Take

CSSB 192 Including 40% Gross Revenue Allowance Above Fixed Decline Rate (Existing Producer)

Cash Flow Analysis - $100 ANS West Coast

Price NPV
$40 $ (181)
$60 $ 7,344
$100 $ 18,820

Level & Composition of Government Take

Level & Composition of Relative Government Take
Conclusions – New Oil Allowance

• Even under highly aggressive assumptions regarding the potential for a new-source development for a given company, the impact of CSSB192’s $10 allowance for “new oil” is almost undetectable
  • By increasing the time horizon and value of the allowance, it is possible to increase the impact to the point at which it becomes noticeable in the specific hypothetical case of a 100 mb/d new development for an existing producer
  • This, however, is a highly unlikely scenario. Under any foreseeable scenario, regardless of rate or duration, it is unlikely to have any impact because it does not incentivize new production above the existing decline, only volumes incremental to prior years’ production

• Senate Resources Amendment B2 instead proposed a tax holiday based on production above a target rate, set based on the rolling average decline rate for the prior 3 years
  • While the decline-curve approach is a sounder one, the impact of this proposal is also highly limited, for two reasons
    • The allowance applies each year only to production that year which exceeds the target
    • After a few years of production growth, the incentive no longer applies to new production, due to changes in the rolling-average decline curve

• An allowance based on a set decline-curve, based at a particular point in time, has a significantly greater impact than either of the other forms of allowance.
  • Determining the appropriate decline basis to use could pose difficulties
  • The decline curve concept could also be complemented with other incremental production definitions, such as production from new areas, and from approved development plans
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