

# Government Take

A multi-client study from Wood Mackenzie

Special Focus:  
Alaska



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- › The information upon which this report is based comes from our own experience, knowledge and databases. The opinions expressed in this report are those of Wood Mackenzie. They have been arrived at following careful consideration and enquiry but we do not guarantee their fairness, completeness or accuracy. The opinions, as of this date, are subject to change. We do not accept any liability for your reliance upon them.

## Contents



- › **Study Overview**
- › **Government Take from Existing Assets**
  - methodology
  - Alaska results
  - Alaska in global context
- › **Government Take from New Investment**
  - methodology
  - Alaska results
  - Alaska in global context
- › **Fiscal Terms Index**
  - methodology
  - fiscal attractiveness
  - fiscal stability
- › **Appendix: Government Take vs previous studies**



1

## Study Overview

2

Existing assets

3

New Investment

4

Fiscal Terms Index

5

Appendix: Government Take vs. Previous Studies

## Government Take Study Overview



- › The past three years has been one of the most volatile periods in the relationship between upstream investors and host governments for several decades.
- › While investors continue to seek attractive fiscal terms around the world, it has become increasingly important for these terms to remain stable for the duration of the projects in which they invest.
- › Wood Mackenzie's clients requested an update of its ranking tables for Government Take around the world (last published in 2004) to take account of recent fiscal changes. They also requested that the study:
  - address issues of fiscal stability and drivers behind fiscal changes
  - consider the impact of Government Take on producing fields as well as new investment
  - analyse the impact of recent fiscal changes on industry values
- › Following the announcement of a special legislative session on taxation in Alaska, several subscribers requested a summary of Alaska's results and rankings from the study, which is the subject of this report.

# Government Take Study Coverage



In countries where multiple fiscal regimes co-exist (e.g. concessions and PSCs) results are shown separately



1 Study Overview

**2 Existing assets**

3 New Investment

4 Fiscal Terms Index

5 Appendix: Government Take vs. Previous Studies



# Methodology



## Government Take Study

### Existing assets: methodology



- › Remaining value of all existing assets in Wood Mackenzie's *Global Economic Model (GEM)* database, as of 2Q 2007, calculated at 1.1.2007
  - base price = US\$50/bbl
  - low price = US\$25/bbl; high price = US\$75/bbl
  - base price costs assumed to decrease/increase 25% under low/high price assumptions
  - oil prices and all costs inflated 2.5% p.a. from 2008 on
  - gas prices linked to oil prices as per gas price formulae modelled in GEM
  
- › **Government Take: (duties, royalty, taxes, profit share, etc.) / remaining pre- take cash flow**
- › **State Take: Government Take + NOC equity cash flow**
- › **Pre-Take cash flow: remaining gross project revenues – remaining gross project costs**
- › **Cash flows & values calculated on undiscounted and discounted (nominal 10%) bases**
  - this report focuses on discounted (NPV10) results



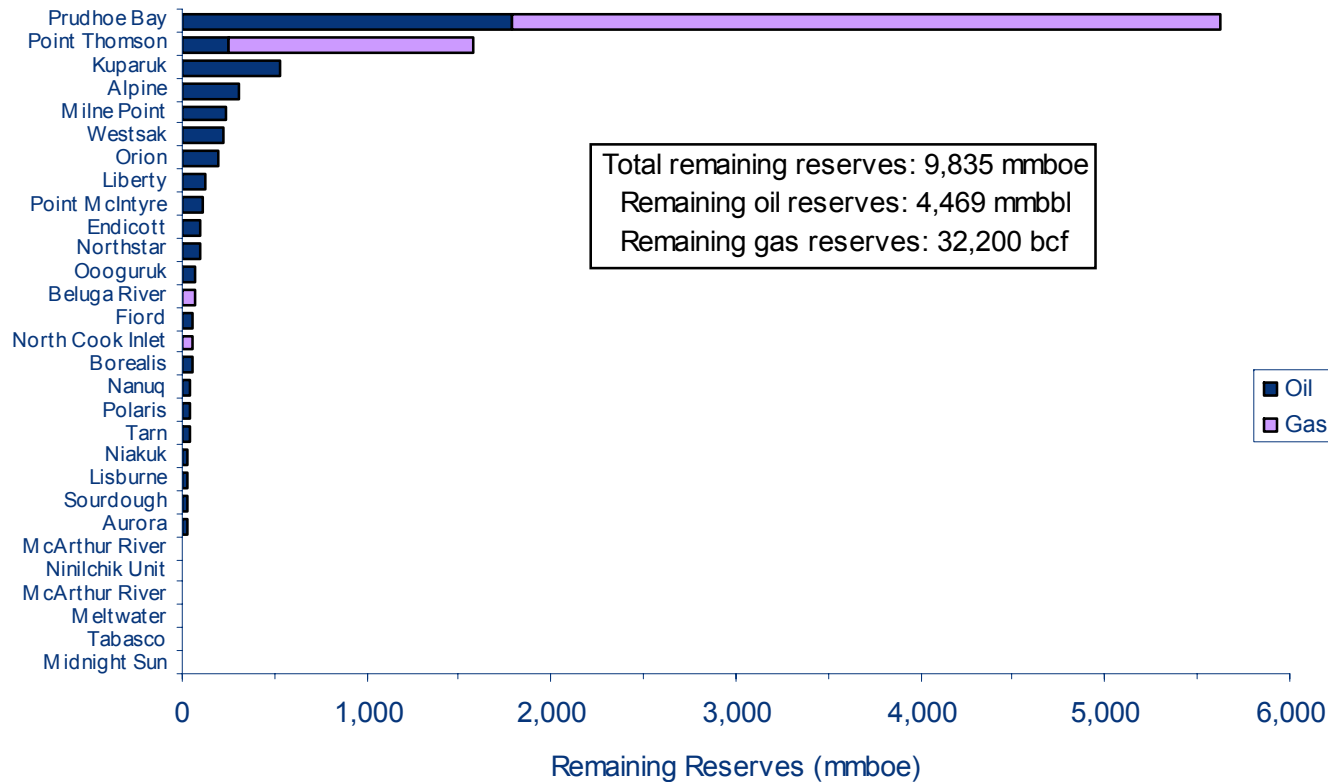
# Alaska results

# Government Take Study

## Existing assets: Alaska remaining reserves



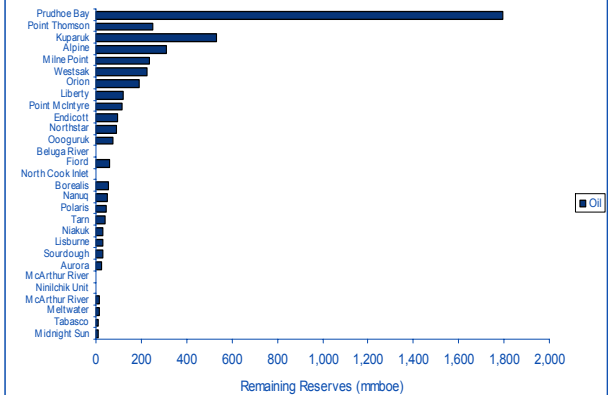
Alaskan Assets: Remaining Reserves @ 1.1.2007



Total remaining reserves: 9,835 mmboe  
 Remaining oil reserves: 4,469 mmboe  
 Remaining gas reserves: 32,200 bcf

- > Prudhoe Bay
- > 40% total remaining oil
- > 71% total remaining gas
- > Gas
- > 55% remaining reserves
- > gas onstream in 2021

Alaskan Assets: Remaining Oil Reserves @ 1.1.2007



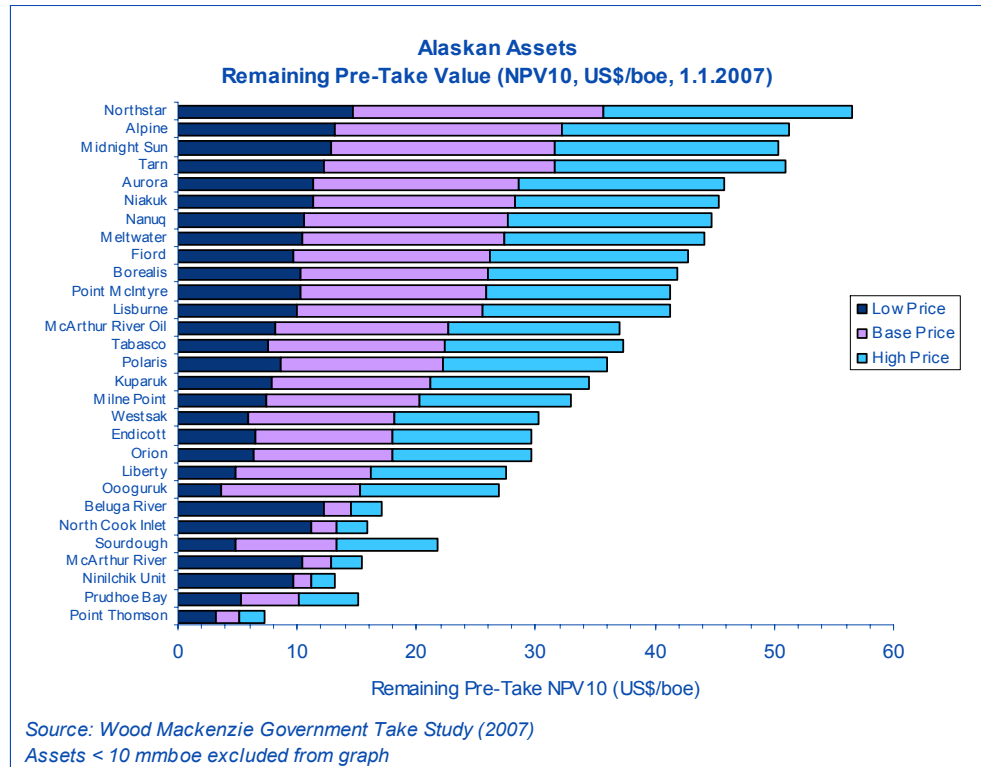
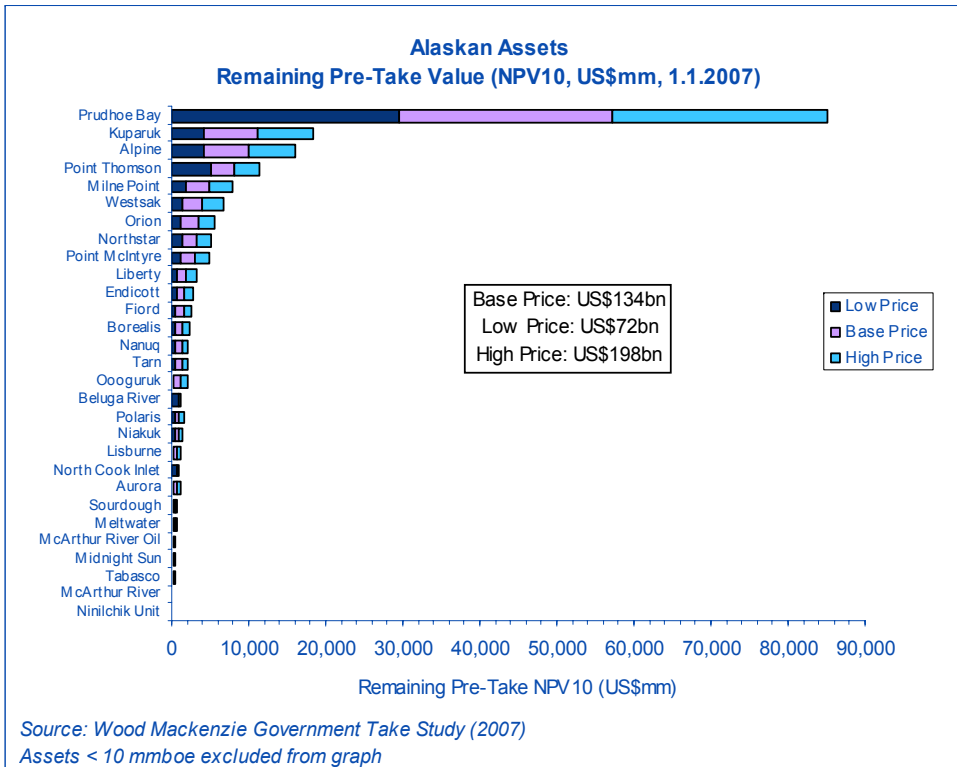
Source: Wood Mackenzie Government Take Study (2007)  
 Assets < 10 mmboe excluded from graph

# Government Take Study

## Existing assets: Alaska remaining Pre-Take NPV10



- › Prudhoe Bay = 43% total value
- › Prudhoe Bay & Point Thomson lowest NPV10 per boe because of gas reserves
- › Alaska weighted average NPV10 (US\$/boe): 13.7 (base price); 7.1 (low); 20.1 (high)

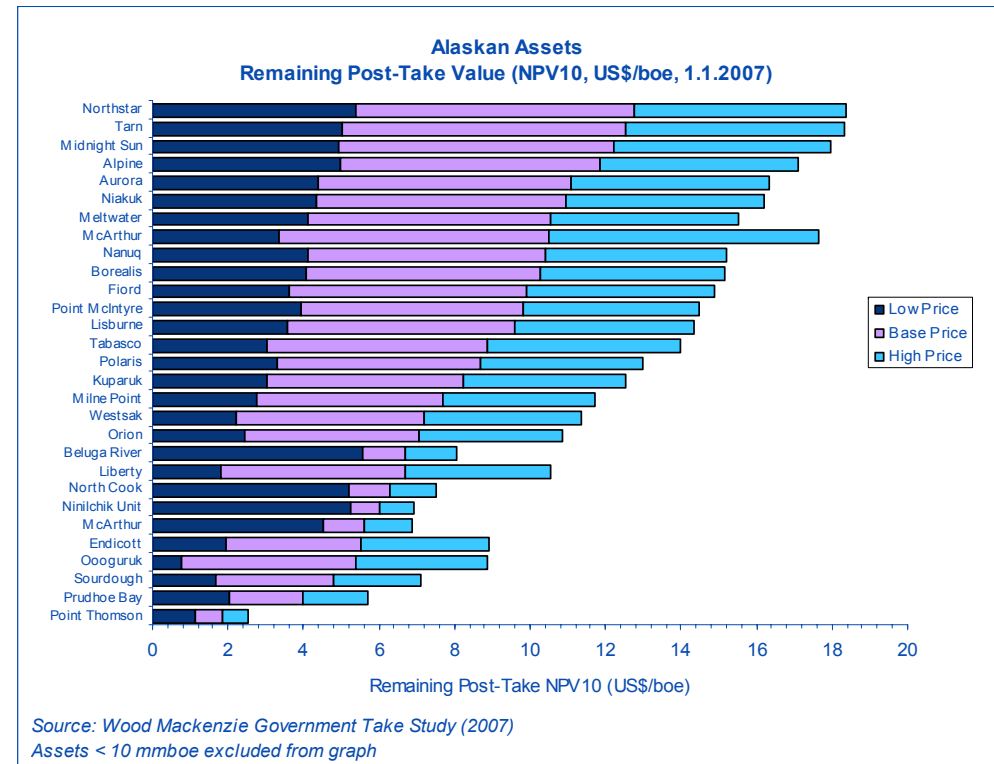
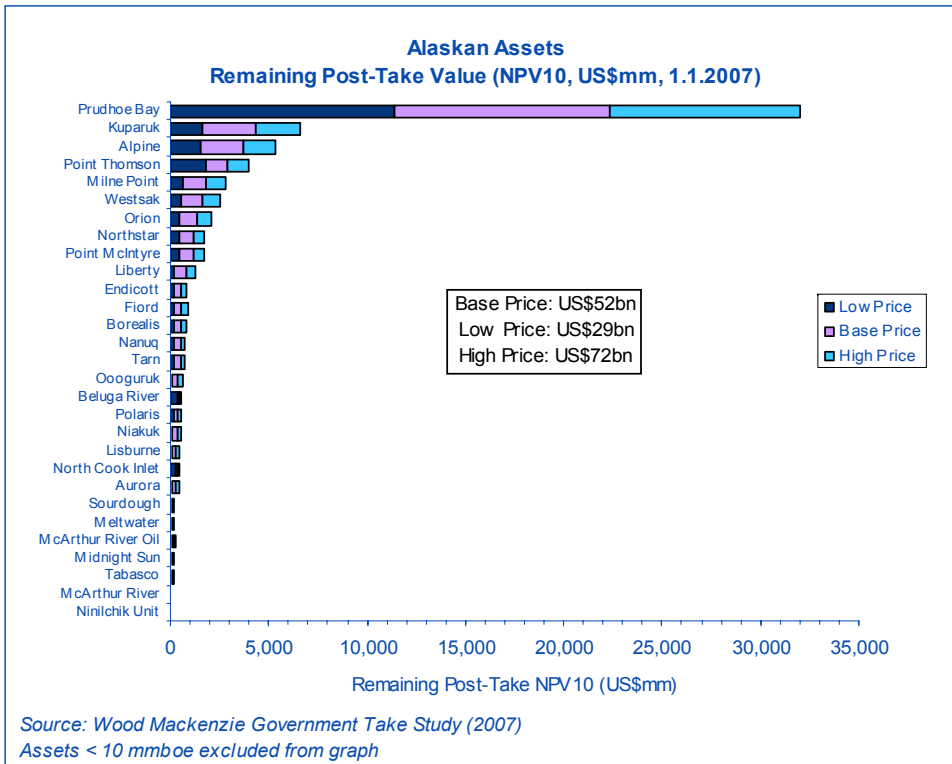


# Government Take Study

## Existing assets: Alaska remaining Post-Take NPV10

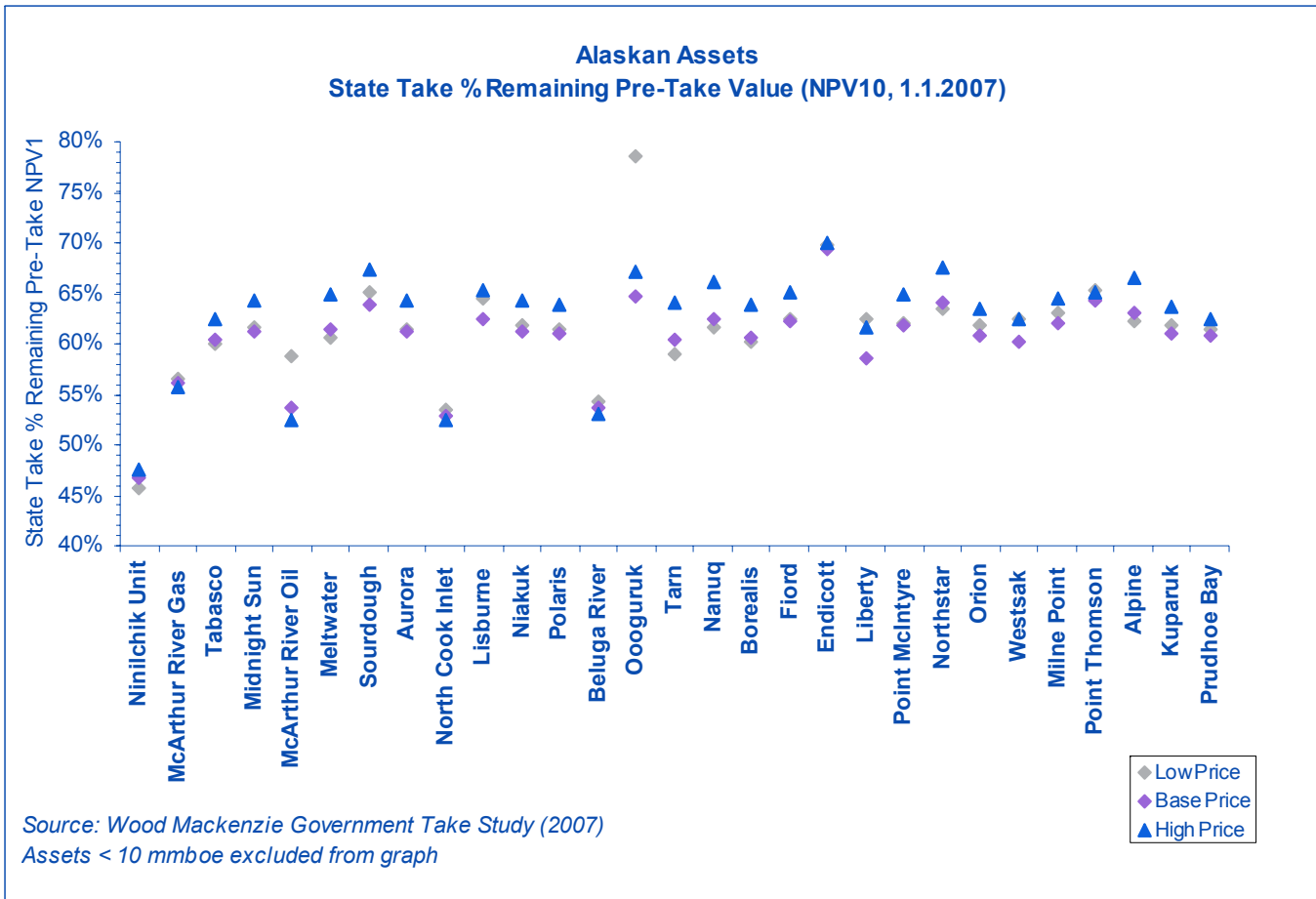


- › Prudhoe Bay = 43% total value
- › Prudhoe Bay & Point Thomson lowest NPV10 per boe because of gas reserves
- › Alaska weighted average NPV10 (US\$/boe): 5.3 (base price); 2.9 (low); 7.3 (high)



# Government Take Study

## Existing assets: Alaska Government Take % Pre-Take NPV10



- › **Weighted Average**
  - Base Price: 61%
  - Low Price: 59%
  - High Price: 64%
- › **Overall, results suggest regime is mildly progressive, based on weighted average of remaining values**
- › **Several assets generate higher % take under low prices (regressive impact of royalty)**
- › **Range of take = 60% to 70%, depending on asset and price**
- › **2% - 4% higher overall take from most oil projects under high price**

## Government Take Study

### Existing assets: adjusting Alaska values to exclude NS gas



- › North Slope (NS, i.e. Prudhoe Bay and Point Thomson) gas represents 55% of total remaining reserves in Alaska, yet development plans are undecided and subject to ongoing discussion
- › Given the sensitivity of the results to these assumptions, Wood Mackenzie has generated an additional set of results for Alaska, which excludes development of North Slope gas – i.e. removes gas reserves and costs from the Prudhoe Bay asset and removes the Point Thomson asset
- › These results are not included in the study and are only provided in this report
- › NS gas reserves add value but discounting effects mean the NPV10 per boe values are significantly lower than the existing, producing oil assets
- › Government Take from NS gas is calculated to be virtually the same as the current weighted average, i.e. the overall take % is the same with / without NS gas

Alaskan Government Take	Low Price		Base Price		High Price	
	Study	exc. NS Gas	Study	exc. NS Gas	Study	exc. NS Gas
Values remaining at 1.1.2007						
Reserves (mmboe)	9,835	4,418	9,835	4,418	9,835	4,418
Pre-Take NPV10 (US\$bn)	71.5	38.0	134.5	96.1	198.0	154.3
Post-Take NPV10 (US\$bn)	29.0	14.7	52.4	37.3	71.7	55.3
Pre-Take NPV10 (US\$/boe)	7.3	8.6	13.7	21.7	20.1	34.9
Post-Take NPV10 (US\$/boe)	2.9	3.3	5.3	8.4	7.3	12.5
Government Take % Pre-Take	59%	61%	61%	61%	64%	64%

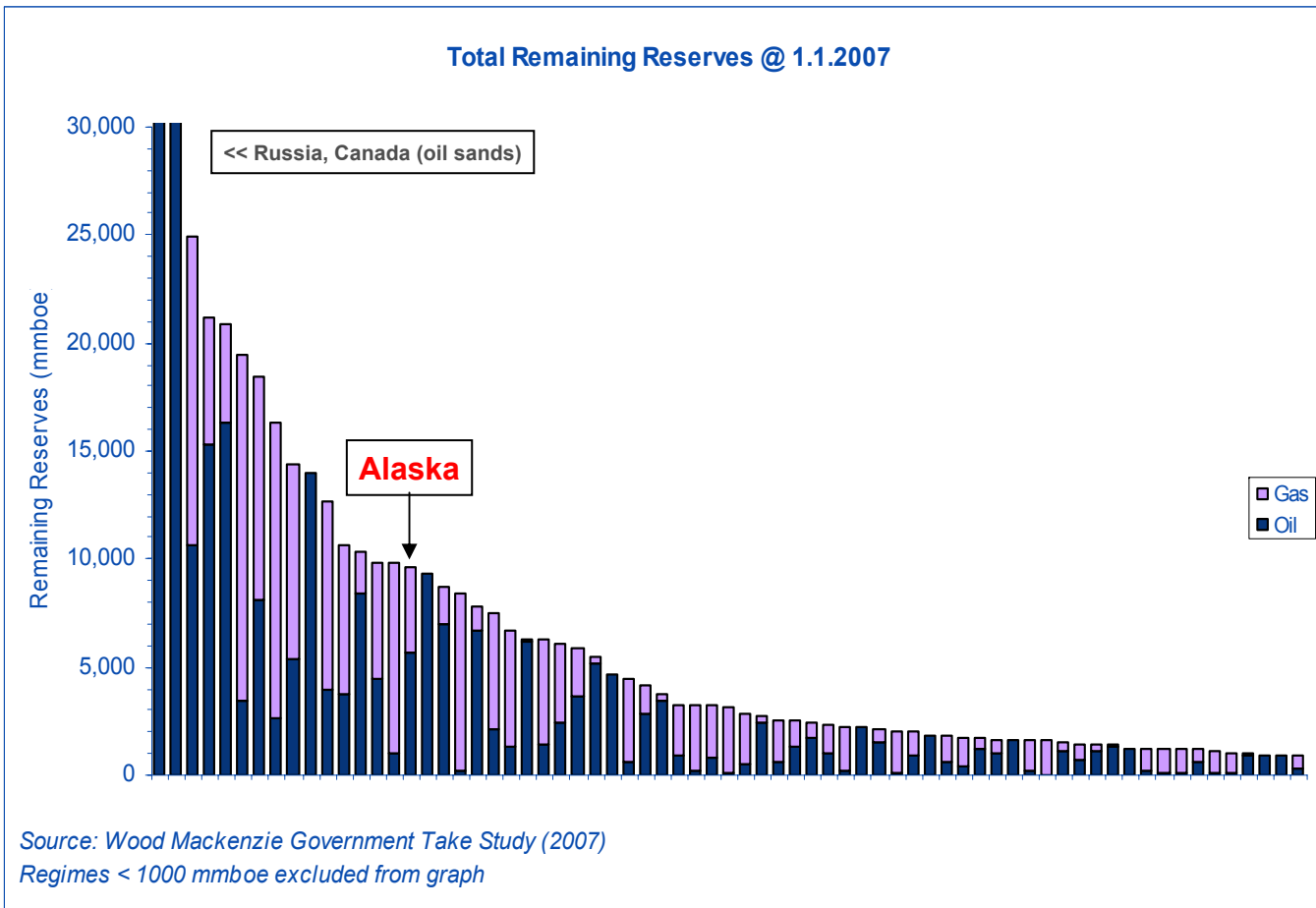


# Alaska in a global context



# Government Take Study

## Existing assets: global remaining reserves



### Global remaining reserves

- › Oil = 713 bn bbl
- › Gas = 2,818 tcf
- › Total = 1,183 bn boe
- › 100% NOC reserves = 54%

### Study global reserves

- › Oil = 300 bn bbl
- › Gas = 1,454 tcf
- › Total = 542 bn boe

### Alaska ranks (of 104):

- › Oil = 17 (17 exc. NS gas)
- › Gas = 12 (63 exc. NS gas)
- › Total = 14 (30 exc. NS gas)

# Government Take Study

## Existing assets: global remaining Pre-Take NPV10



### › Global Results

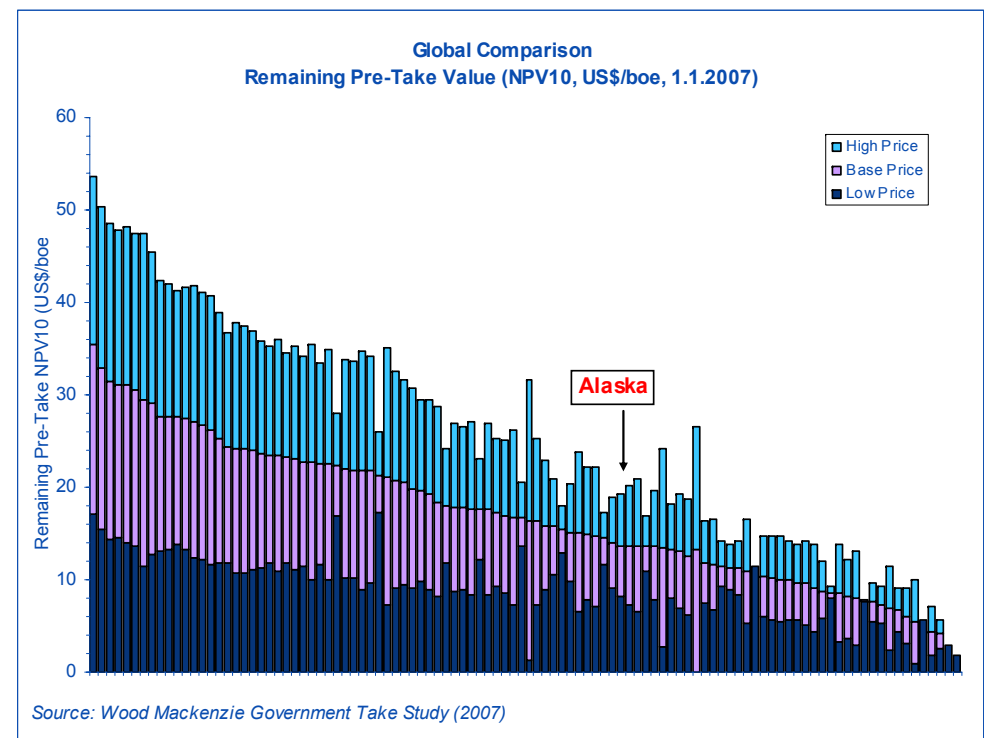
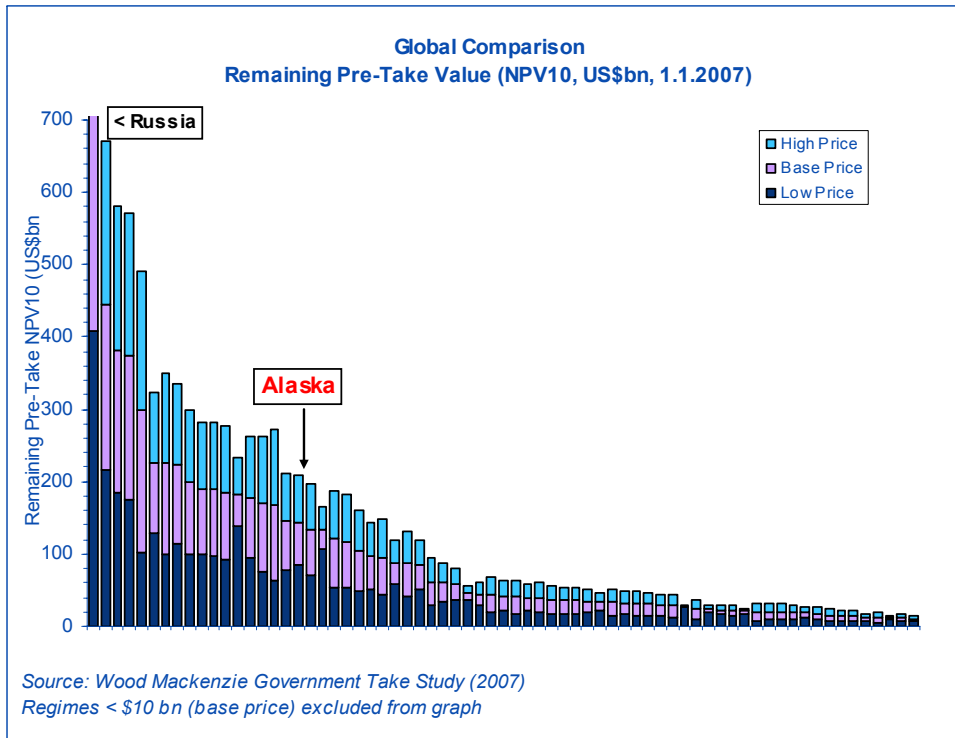
› Base price = US\$ 7,227 bn (US\$ 13.3/boe)

- Low price = US\$ 3,673 bn (US\$ 6.8/boe)
- High price = US\$ 10,738 bn (US\$ 19.8/boe)

› Alaska ranks (of 104, US\$/boe basis)

› Base price = 65 (35 exc. NS gas)

- Low price = 72 (57 exc. NS gas)
- High price = 64 (28 exc. NS gas)



# Government Take Study

## Existing assets: global remaining Post-Take NPV10



### › Global Results

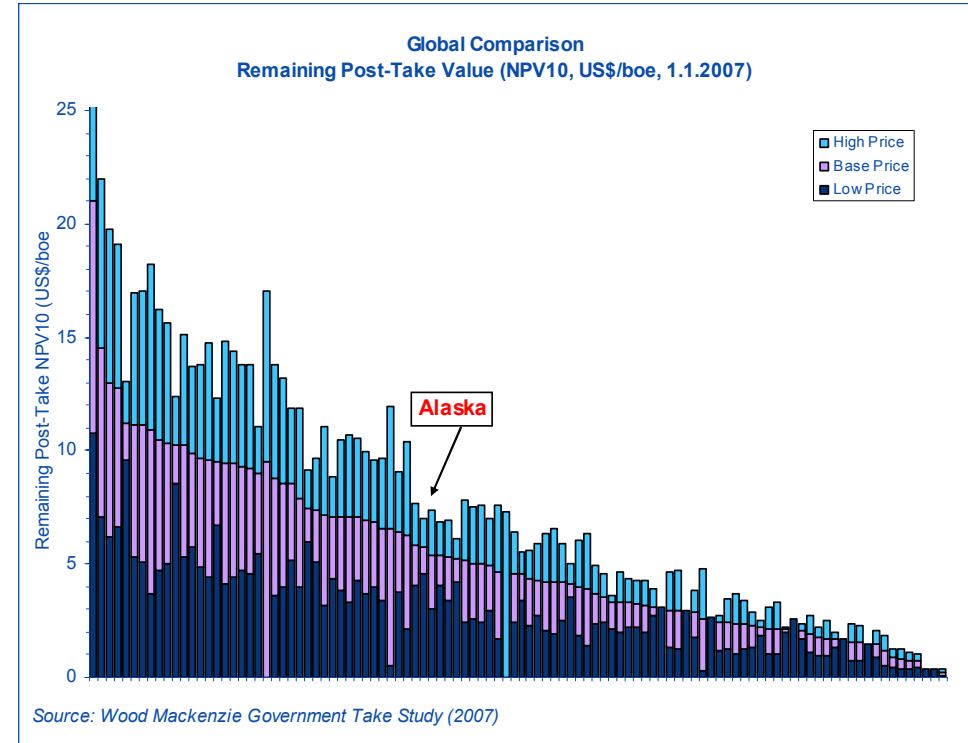
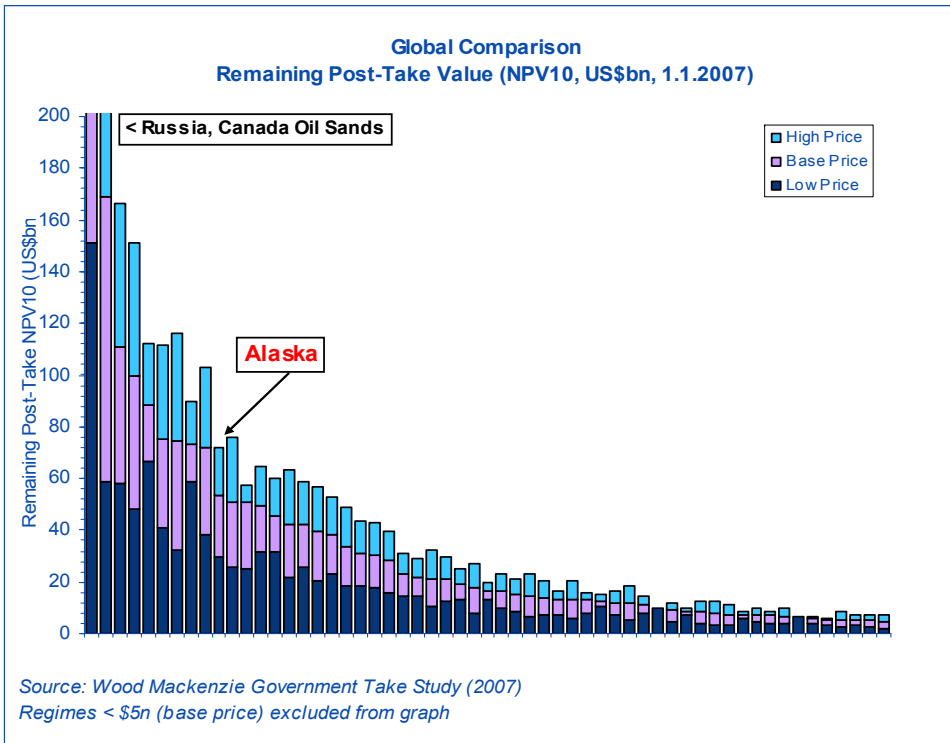
#### › Base price = US\$ 2,039 bn (US\$ 3.8/boe)

- Low price = US\$ 1,156 bn (US\$ 2.1/boe)
- High price = US\$ 2,849 bn (US\$ 5.3/boe)

### › Alaska ranks (of 104, US\$/boe basis)

#### › Base price = 42 (26 exc. NS gas)

- Low price = 45 (42 exc. NS gas)
- High price = 46 (22 exc. NS gas)

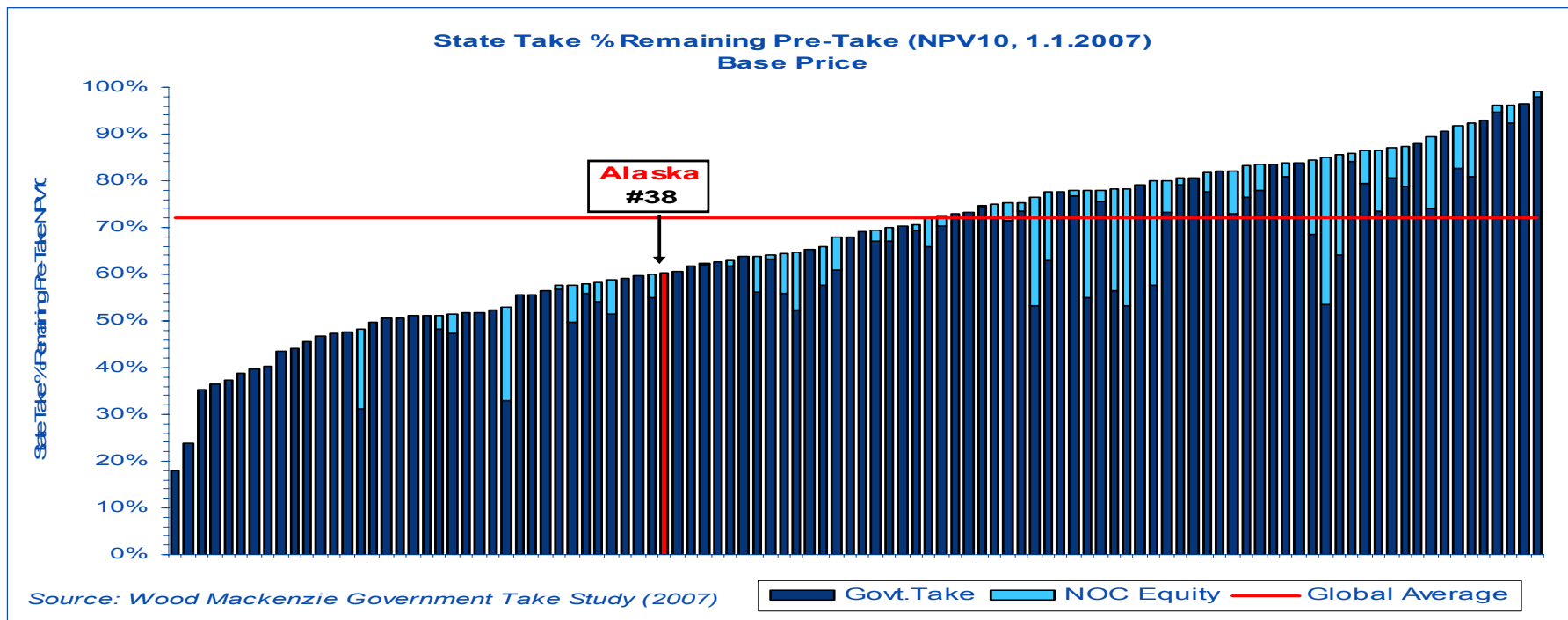


# Government Take Study

## Existing assets: global State Take % Pre-Take NPV10

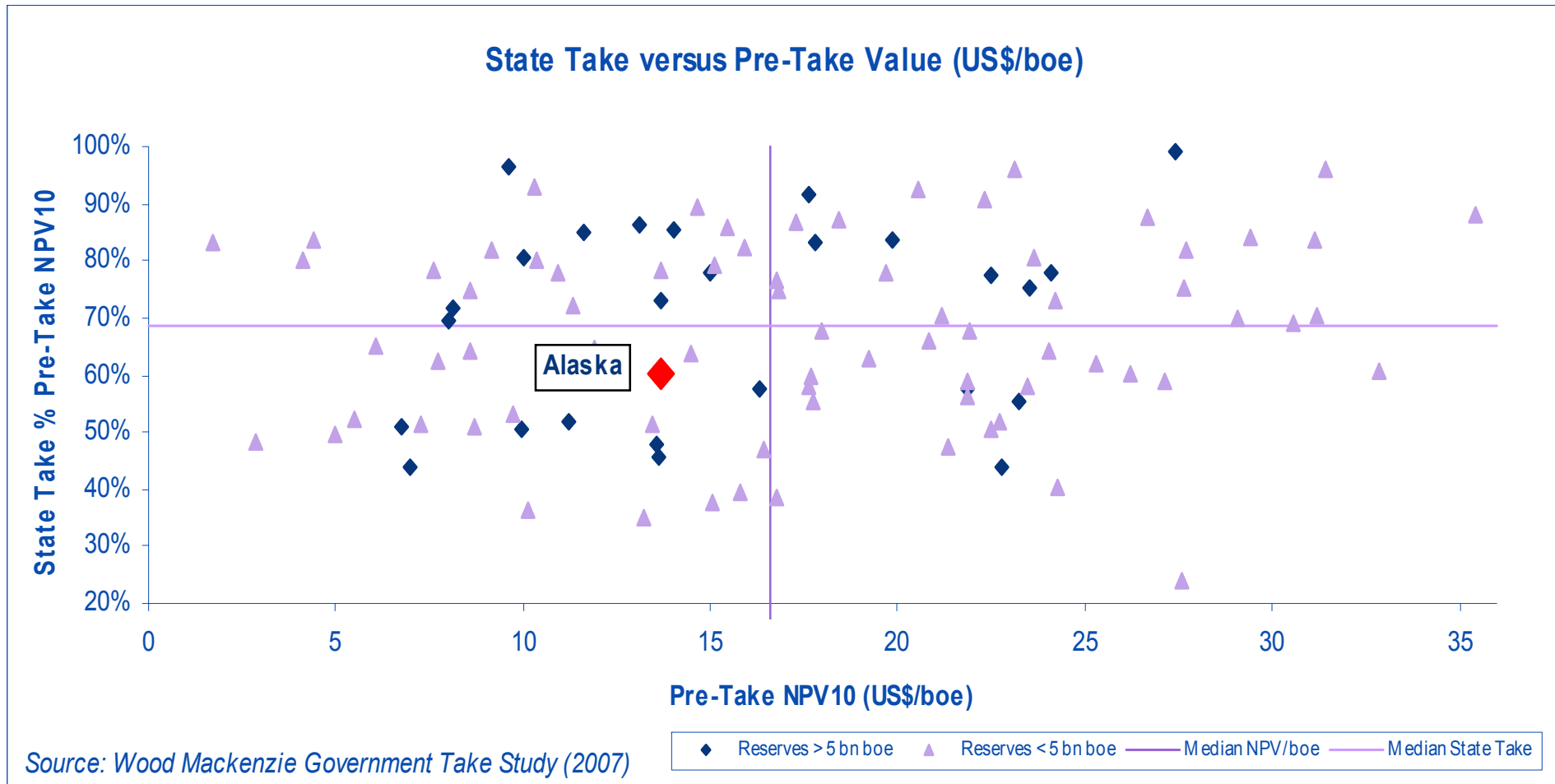


- › Global Results
- › Base price = 72% (Govt Take = 67%)
  - Low price = 69% (Govt Take = 63%)
  - High price = 73% (Govt Take = 69%)
- › Alaska ranks (of 104, State Take basis)
- › Base price = 38 (61%)
  - Low price = 34 (59%)
  - High price = 40 (64%)



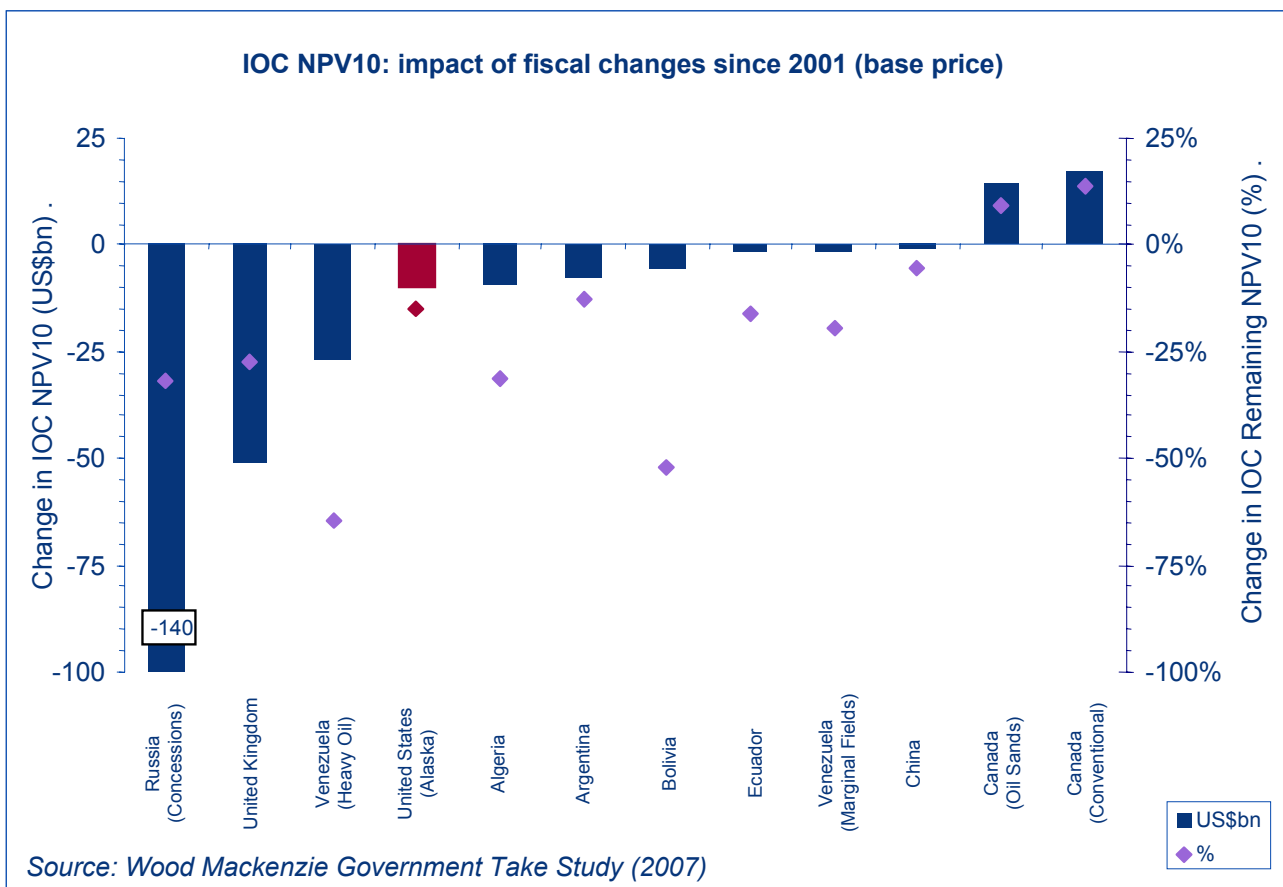
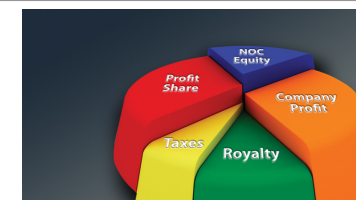
# Government Take Study

## Existing assets: global State Take vs Pre-Take NPV10



## Government Take Study

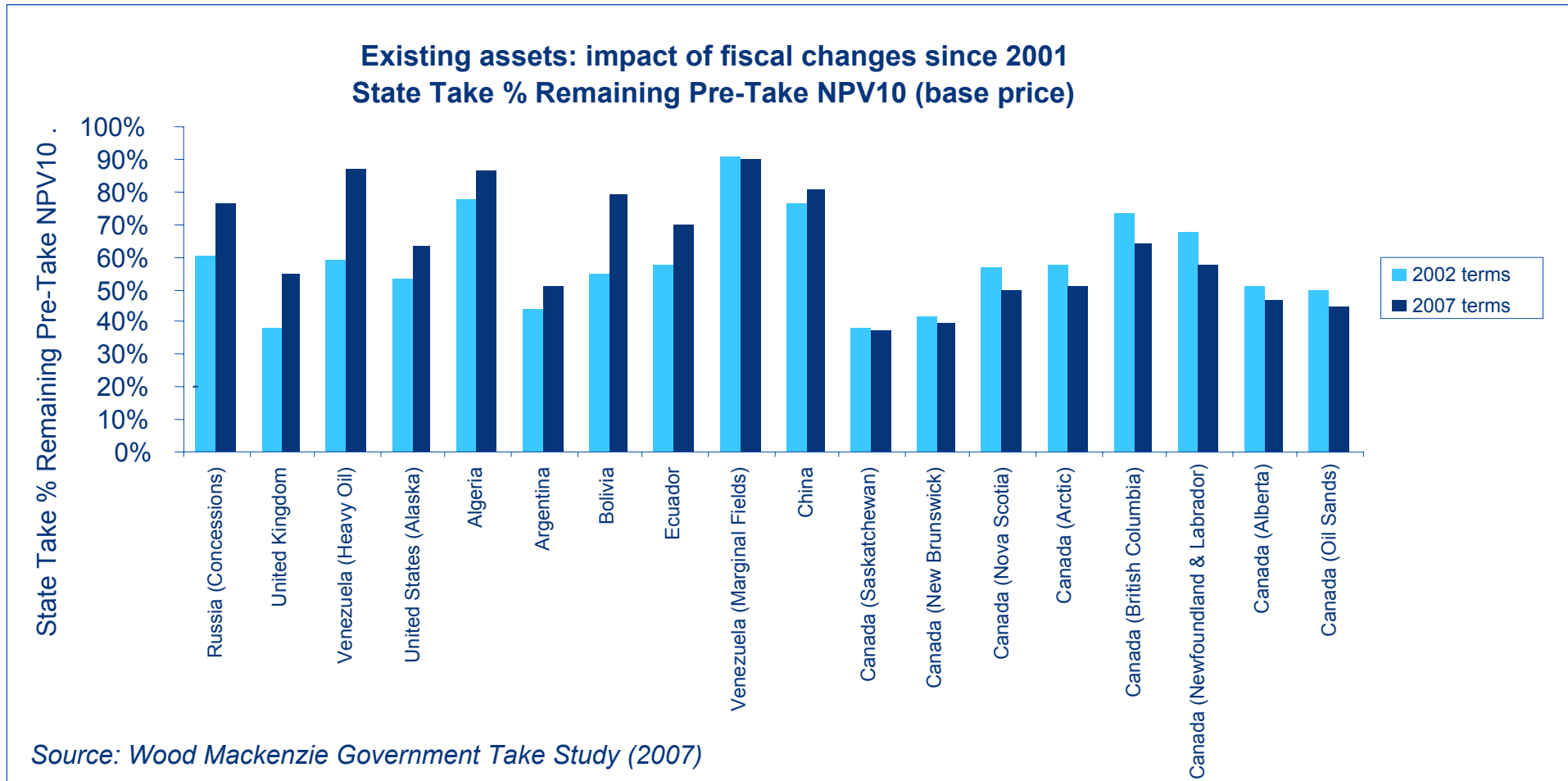
### Existing assets: impact of recent fiscal changes



- › **Impact of fiscal changes =**  
 Remaining Post-Take NPV10 under 2002 fiscal terms –  
 Remaining Post-Take NPV10 under 2007 fiscal terms –  
 2002-06 difference
- › 9 regimes increased fiscal take from existing assets; only Canada reduced take
- › **Changes in Alaska**
  - PB satellites included in PB ring fence for severance tax
  - replacement of severance tax with PPT
- › Base price: - US\$ 10.1bn (-15%)
- › Low price: - US\$ 4.2bn (-10%)
- › High price: - US\$ 20.9bn (-22%)

# Government Take Study

## Existing assets: impact of recent fiscal changes





1

Study Overview

2

Existing assets

**3****New Investment**

4

Fiscal Terms Index

5

Appendix: Government Take vs. Previous Studies

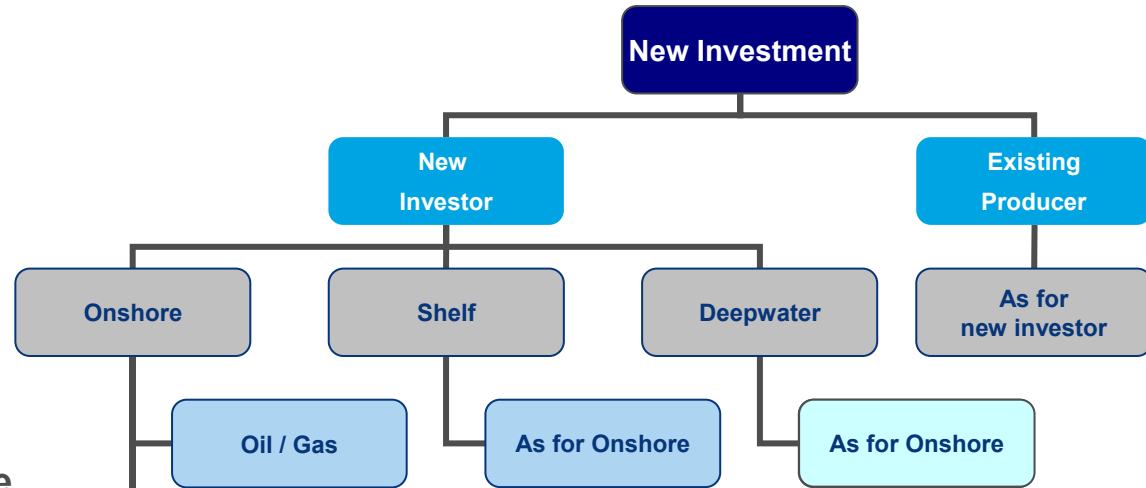


# Government Take Study

## New investment: methodology



- > Modeled range of hypothetical new oil and gas field investments in onshore, offshore and deepwater locations
- > Agreed 4 model field sizes for each location with industry steering group
- > Discussed current costs in different locations with steering group
- > Generated 3 versions of each field: +/- 25% on base case cost assumptions
- > Generated field economics under 3 price assumptions
  - Oil: US\$25, \$50 & \$75/bbl
  - Gas: US\$2.5, \$5.0 & \$7.5/mcf
- > Considered differences in economics for new investor and existing producer (i.e. fiscal synergies)
- > This report focuses on results for onshore fields, assuming a new investor



**New Investment Field Sizes**

Onshore	Small	Medium	Large	Giant
Oil (mmbbl)	5	10	25	100
Gas (bcf)	30	75	150	1000
Shelf	Small	Medium	Large	Giant
Oil (mmbbl)	20	50	100	200
Gas (bcf)	150	300	1000	2000
Deepwater	Small	Medium	Large	Giant
Oil (mmbbl)	50	100	250	500
Gas (bcf)	500	1000	3000	5000

# Government Take Study

## New investment: methodology



### New investment: Onshore fields: Base case assumptions

Oil Fields	Small	Medium	Large	Giant
<b>Reserves (mmbbl)</b>	5	10	25	100
<b>Costs (US\$mm, 2007)</b>				
Cost per well	10	10	10	10
E&A	14	14	28	42
Field Capex	50	101	182	562
Field Opex	23	51	113	420
<b>Total Costs</b>	<b>87</b>	<b>166</b>	<b>323</b>	<b>1,024</b>
<b>Costs (US\$/bbl)</b>				
E&A	2.8	1.4	1.1	0.4
Field Capex	10.0	10.1	7.3	5.6
Field Opex	4.6	5.1	4.5	4.2
<b>Total Costs</b>	<b>17.4</b>	<b>16.6</b>	<b>12.9</b>	<b>10.2</b>
Low Case Total Costs	13.1	12.5	9.7	7.7
High Case Total Costs	21.8	20.8	16.2	12.8
<b>Pre-Take NPV10 (US\$/bbl)</b>				
Base Price	17.1	17.2	17.5	16.7
Low Price	1.9	2.6	4.8	5.6
High Price	32.3	31.7	30.2	27.8
<b>Pre-Take IRR</b>				
Base Price	47%	51%	59%	64%
Low Price	15%	18%	28%	36%
High Price	71%	75%	80%	82%

Gas Fields	Small	Medium	Large	Giant
<b>Reserves (bcf)</b>	30	75	150	1000
<b>Costs (US\$mm, real)</b>				
Cost per well	10	10	10	10
E&A	14	14	28	42
Field Capex	46	92	144	663
Field Opex	30	62	115	564
<b>Total Costs</b>	<b>90</b>	<b>168</b>	<b>287</b>	<b>1,269</b>
<b>Costs (US\$/mcf)</b>				
E&A	0.5	0.2	0.2	0.0
Field Capex	1.5	1.2	1.0	0.7
Field Opex	1.0	0.8	0.8	0.6
<b>Total Costs</b>	<b>3.0</b>	<b>2.2</b>	<b>1.9</b>	<b>1.3</b>
Low Case Total Costs	2.3	1.7	1.4	1.0
High Case Total Costs	3.8	2.8	2.4	1.6
<b>Pre-Take NPV10 (US\$/mcf)</b>				
Base Price	0.8	1.0	1.0	1.4
Low Price	-0.7	-0.2	-0.1	0.4
High Price	2.1	2.2	2.3	2.3
<b>Pre-Take IRR</b>				
Base Price	22%	27%	26%	50%
Low Price	n/a	5%	9%	26%
High Price	37%	42%	40%	65%

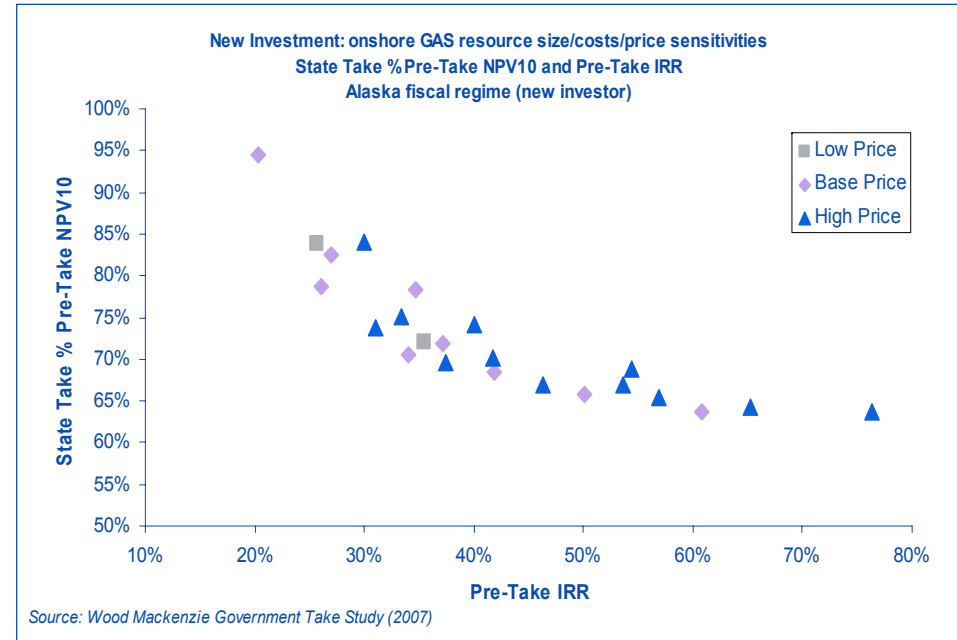
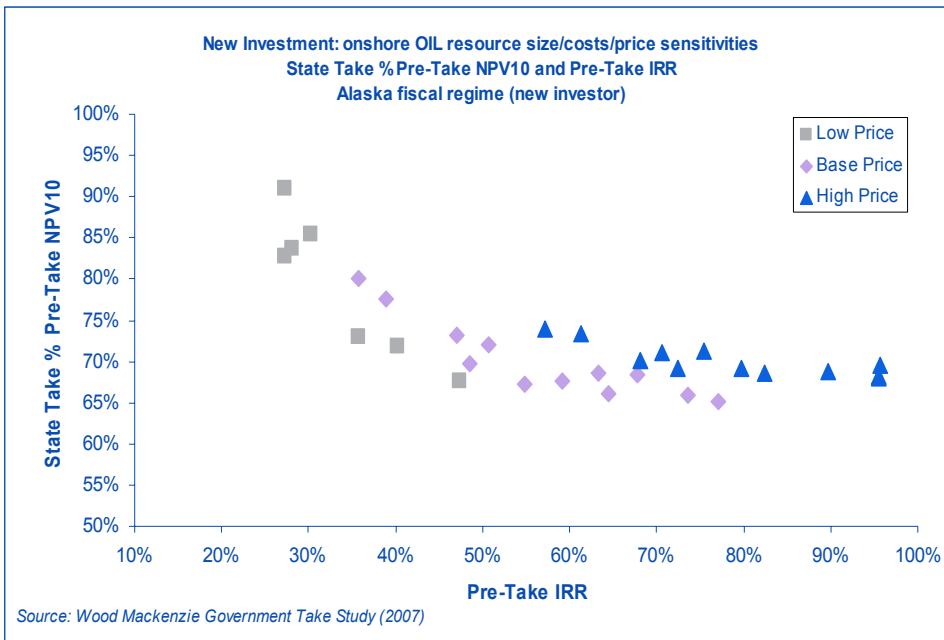
# Government Take Study

## New investment: Alaska State Take



- › On a full cycle basis:
- › State Take from economic fields = between 65% and 70%
- › Regressive royalty generates higher Government Take under low prices

- › State Take from gas fields similar to oil
- › Lower economic value of gas fields, in general, accentuates regressive nature of regime



# Government Take Study

## New investment: global State Take

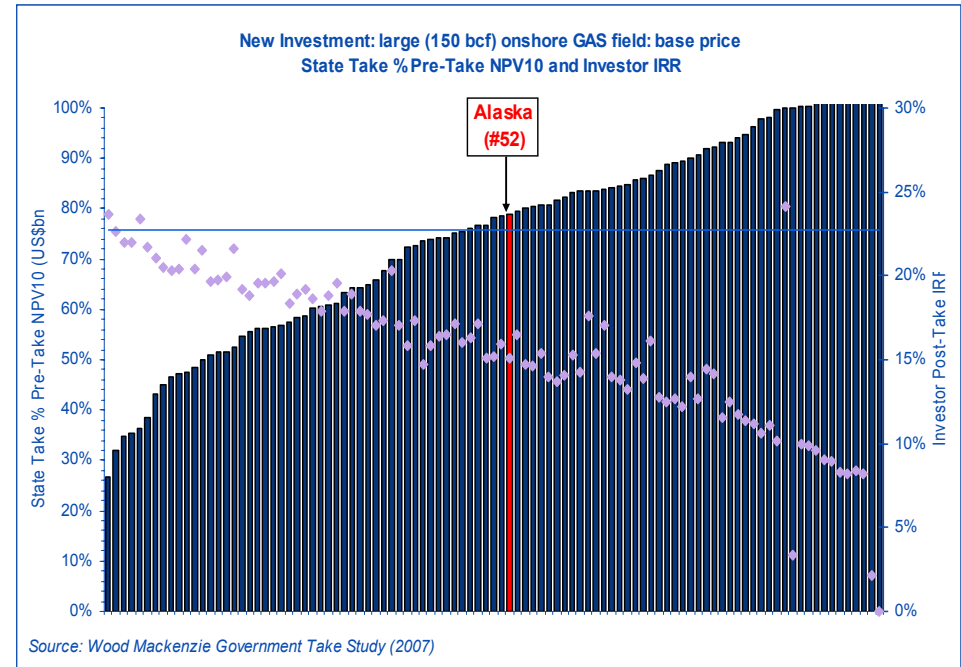
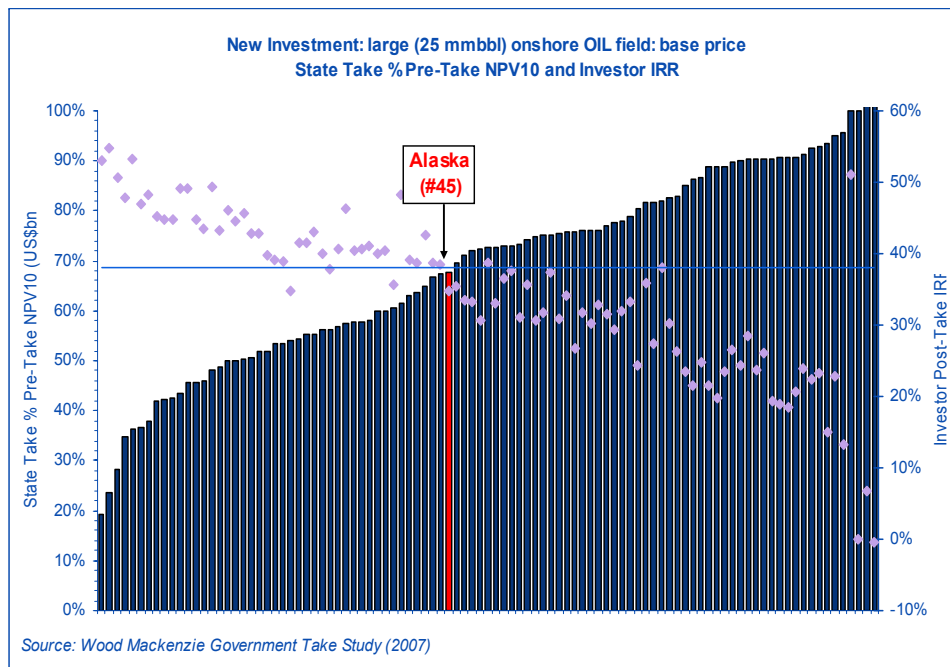


### “Large” oil field (25 mmbbl)

- › Global Average: 69% (base price); 67% (high)
- › Alaska: 68% (base price); 69% (high)
- › Alaska ranks (of 99): 45 (base price); 47 (high)

### “Large” gas field (150 bcf)

- › Global Average: 76% (base price); 69% (high)
- › Alaska: 79% (base price); 70% (high)
- › Alaska ranks (of 99): 52 (base price); 48 (high)





1

Study Overview

2

Existing assets

3

New Investment

**4****Fiscal Terms Index**

5

Appendix: Government Take vs. Previous Studies

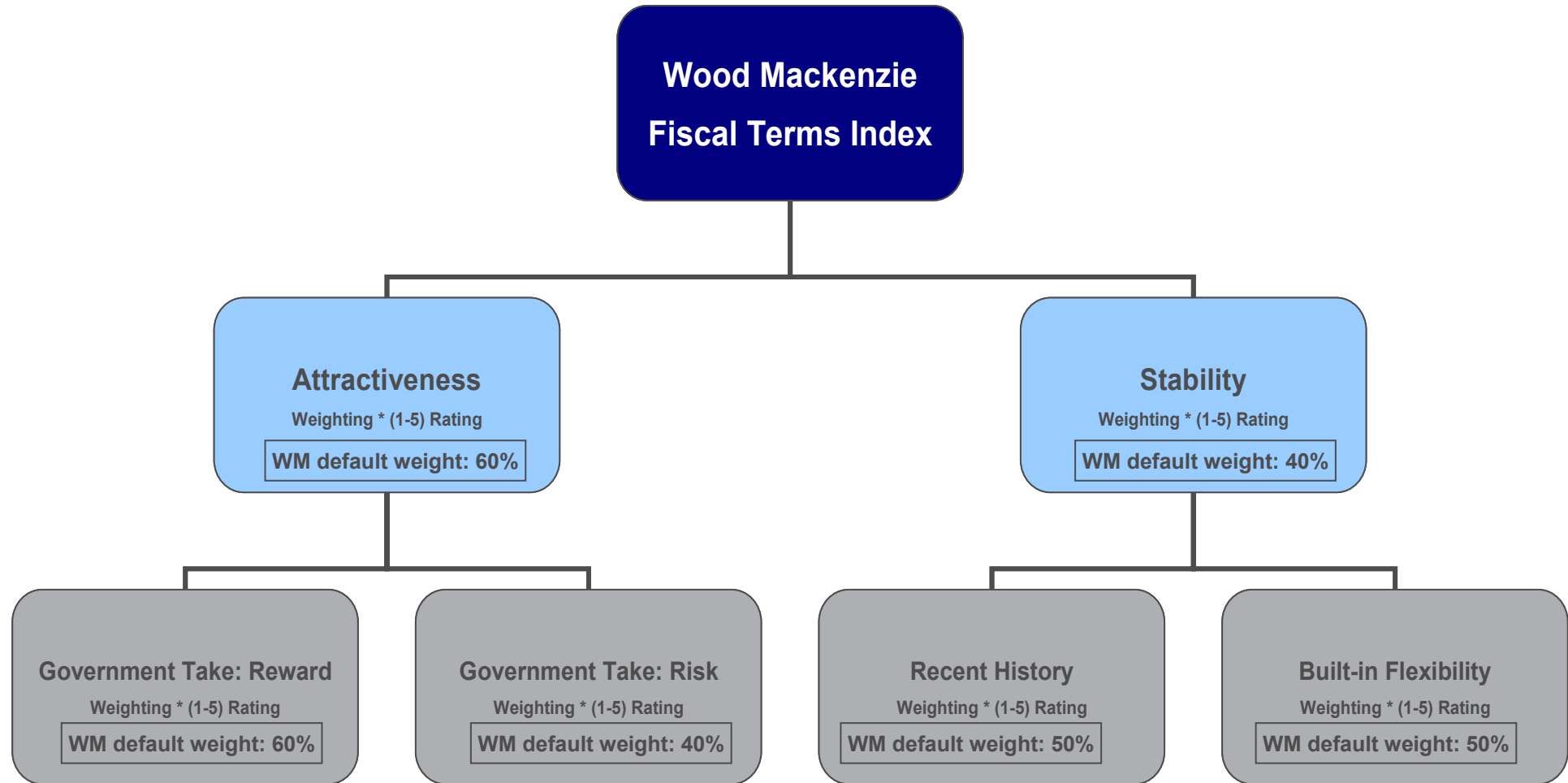
## Government Take Study Fiscal Stability



- › ***“...It’s also vital that there [is] fiscal stability to boost investment”*** , Jeroen van der Veer, CEO, Shell (2007)
- › ***“...And the final thing we need is a secure and stable fiscal environment in which to make long-term investment decisions”*** Tony Hayward, CEO, BP (2006)
- › ***“Governments should provide predictable, secure fiscal and regulatory regimes...”***, David O'Reilly, CEO, Chevron (2006)
- › ***“We’re willing to take geologic risk. We’re willing to take cost risk and we’re even willing to take price risk. But we can’t take fiscal terms changing on us risk. Because then I can’t calculate the basis on whether this is a good investment decision or not”***, Rex Tillerson, CEO, ExxonMobil (2007)
- › ***“Fiscal risk needs to be taken out of the equation if we are to achieve our goal of maximising the ultimate recovery from the UK offshore”***, Malcolm Webb, CEO, UK Offshore Operators Association (UKOOA) (2006)
- › ***“The oil and gas industry needs a predictable and stable investment climate with long term regulatory certainty and fiscal stability“***, Canadian Association of Petroleum Producers (CAPP) (2006)

# Government Take Study

## Fiscal Terms Index: methodology



## Government Take Study

### Fiscal Terms Index: fiscal attractiveness



#### Government Take (reward)

- › 5 = State Take < 50%
- › 4 = State Take 50-60%
- › 3 = State Take 60-70%
- › 2 = State Take 70-80%
- › 1 = State Take > 80%

Scores based on median results from new investment, weighted for current activity (on/offshore, oil/gas); discounted and undiscounted results considered

- › **Alaska score = 2.5**

#### Government Take (risk)

**50% \* signature bonuses payable**

- › 5 = none
- › 4 = minimal
- › 3 = generally small
- › 2 = generally high
- › 1 = very high
- › **Alaska score = 3**

#### Government Take (risk)

**50% \* NOC equity**

- › 5 = none
- › 4 = < 20%, paying from day one
- › 3 = < 20%, carried
- › 2 = > 20%, paying from day one
- › 1 = > 20%, carried
- › **Alaska score = 5**

#### Government Take (risk)

- › **Alaska score = (50% \* 3) + (50% \* 5) = 4**

#### Fiscal Attractiveness

- › **Alaska score = (60% \* 2.5) + (40% \* 4.0) = 3.1**
- › **Alaska ranks (of 103): #60**



## Government Take Study

### Fiscal Terms Index: fiscal stability



#### Fiscal Stability

##### Recent History

Scores based on fiscal changes made since 2001

- › 5 = No change / reduced take
- › 4 = Small increase in take for new investment OR increased take as a result of industry bidding
- › 3 = Significant increase in take for new investment
- › 2 = Small increase in take for existing assets
- › 1 = Significant increase in take for existing assets
- › **Alaska score = 1**

#### Fiscal Stability

Alaska score =

$$(50\% * 1.0) + (50\% * 2.4) = 1.7$$

**Alaska ranks (of 103): #99**

#### Fiscal Stability

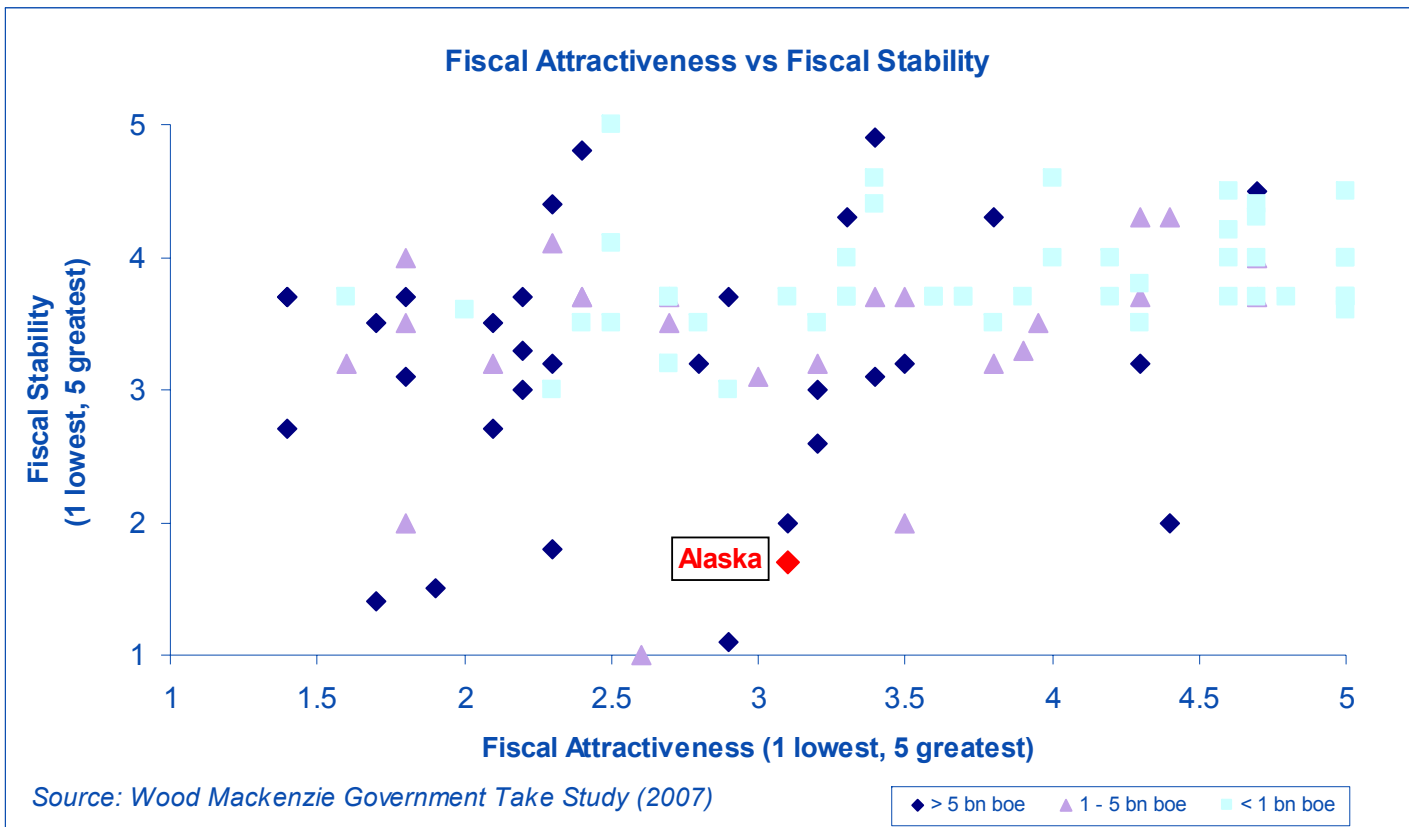
##### Built-in flexibility

Scores based on level of progressivity in results from new investment under different costs / prices / resource sizes, weighted for current activity (on/offshore, oil/gas)

- › 5 = progressive (both downside and upside)
- › 4 = progressive (either downside or upside, neutral on other)
- › 3 = neutral
- › 2 = regressive (either downside or upside, neutral on other)
- › 1 = regressive (both downside and upside)
- › **Alaska score = 2.4**

# Government Take Study

## Fiscal Terms Index: fiscal attractiveness vs. fiscal stability



**Based on Wood Mackenzie's default weightings:**

### Fiscal Attractiveness

Alaska score =  
 $(60\% * 2.5) + (40\% * 4.0) = 3.1$   
**Alaska ranks (of 103): #60**

### Fiscal Stability

Alaska score =  
 $(50\% * 1.0) + (50\% * 2.4) = 1.7$   
**Alaska ranks (of 103): #99**

### Fiscal Terms Index

Alaska score =  
 $(60\% * 3.1) + (40\% * 1.7) = 2.54$   
**Alaska ranks (of 103): #87**



1

Study Overview

2

Existing assets

3

New Investment

4

Fiscal Terms Index

**5****Appendix: Government Take vs. Previous Studies**

## Government Take Study

### Appendix: Government Take vs previous studies



- › **Global Oil and Gas Risks and Rewards (GOGRR) 1 (2002)**
- › Wood Mackenzie's original *GOGRR 1* study was compiled during 4Q 2001 and published in February 2002. The data used and fiscal terms assumed were based on understanding and estimates at the end of 2001.
- › created Expected Monetary Values (EMVs) for 60 areas, based on exploration success rates (1991-2000) and re-modelling all commercial discoveries made in the period as future discoveries
- › calculated remaining value of existing assets to compare pre-take and post-take values and influence of Government Take on rankings
- › all economics run under Wood Mackenzie base price assumption (US\$19.5/bbl, 2002, constant real)
  
- › **Global Oil and Gas Risks and Rewards (GOGRR) 2 (2004)**
- › Wood Mackenzie's *GOGRR 2* study was compiled during 3Q 2004 and published in November 2004. The data used and fiscal terms assumed were based on understanding and estimates at the end of 2Q 2004.
- › focus changed to generating full cycle economics, based on exploration activity from 1994-2003 – comparing E&A spend with pre-take and post-take field development values on an “as developed” basis for 66 areas
- › economics run under 3 price assumptions: base price assumption = US\$22/bbl, 2007, constant real
  - ~ low price = (US\$16/bbl, 2007, constant real); high price = (US\$35/bbl, 2007, constant real)
- › included fiscal comparisons based on a limited number of standard hypothetical field economics

# Government Take Study

## Appendix: Government Take vs previous studies



### Comparison of GOGRR and Government Take studies

- › principal difference is the exclusion of exploration performance metrics in the current study. This analysis is being compiled for a much more detailed, basin-by-basin review to be published later this year as part of the new **Exploration Service**.
- › current study introduces analysis and criteria designed to measure fiscal stability to compare with fiscal “attractiveness”
- › current study significantly increases the number and range of hypothetical new field investments modelled, and assumptions checked with industry steering group for current relevance
- › current study re-introduces analysis of Government Take from existing assets (previously in GOGRR 1)
- › coverage increased to 100+ regimes

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