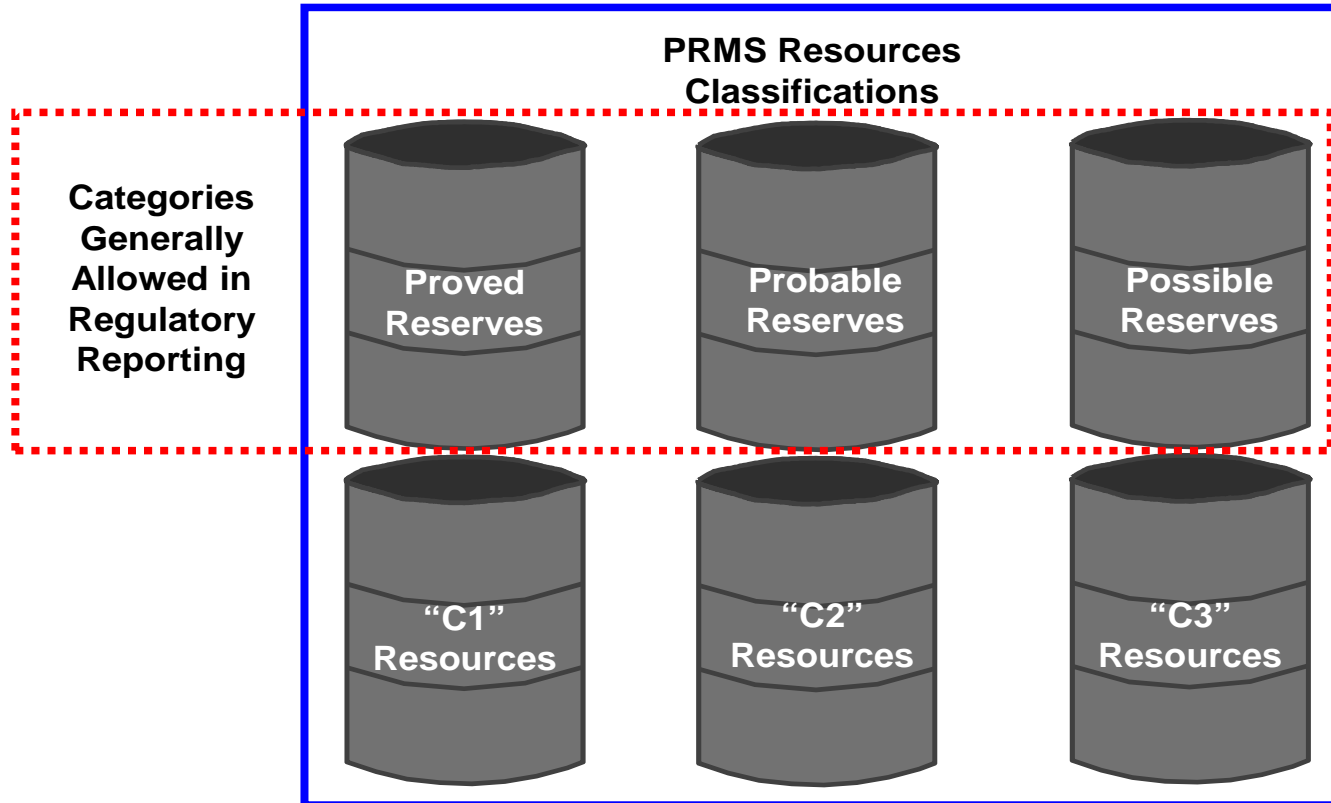




# Reserves Entitlement and Reporting

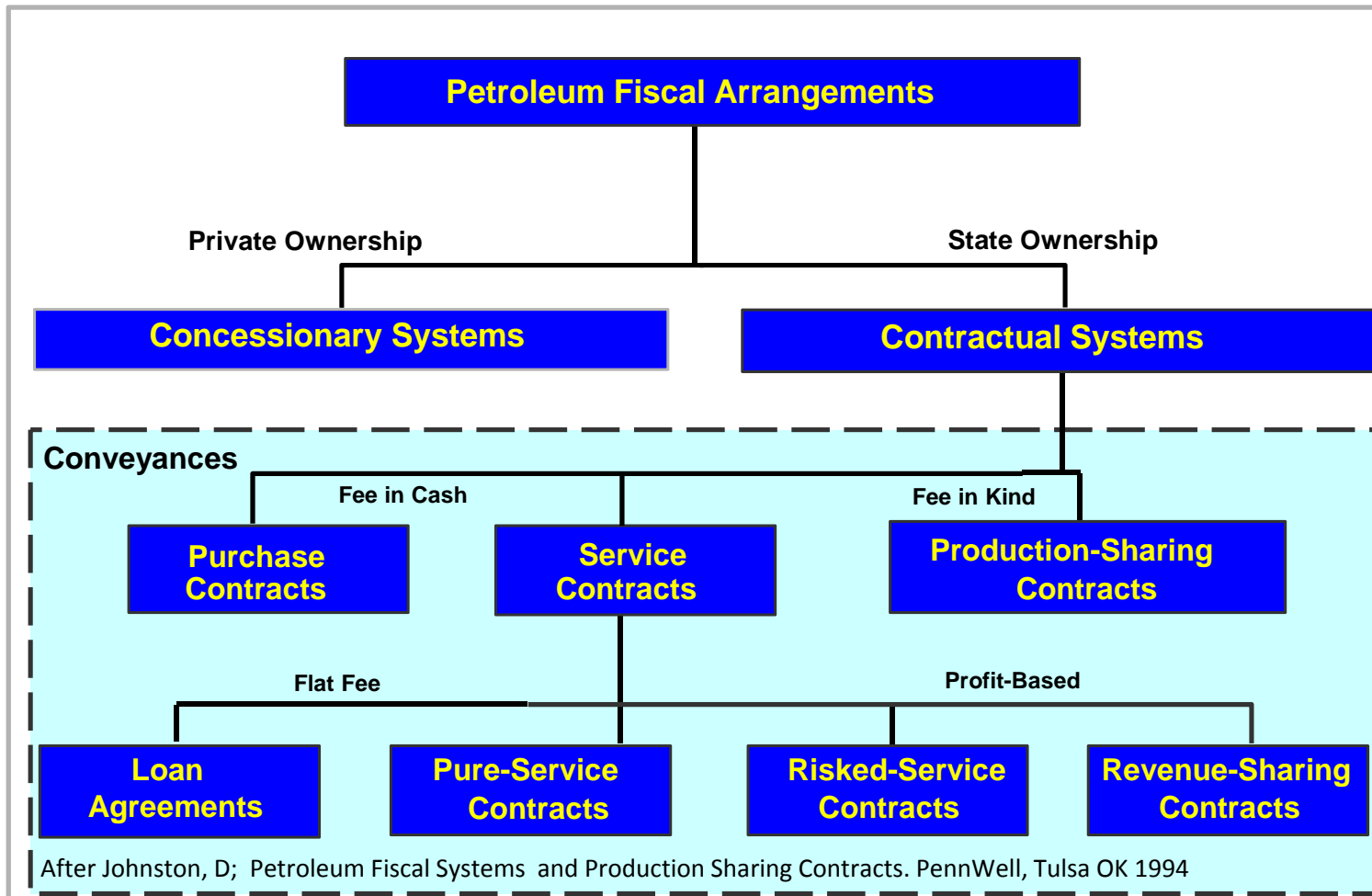
Elliott Young, Author - PRMS Application Guidelines Chapter 10

# Reporting Reserves



"C1" (*Technically Proven*) Contingent Resources = PRMS 1C  
"C2" (*Technically Probable*) Contingent Resources = PRMS 2C – 1C  
"C3" (*Technically Possible*) Contingent Resources = PRMS 3C - 2C

# Classification of Petroleum Fiscal Systems



# Entitlement - Interests in Reserves & Resources

**PRMS – Economic Interest** in hydrocarbons

**SEC – Revenue Interest** in production or legal right to produce

## **Financial Accounting Standards Board - ASC 932**

### **Properties**

Mineral Interests in properties, [...] which include the following:

- a. Fee Ownership or a lease
- b. Concession
- c. Other interest representing the legal right to produce or a revenue interest in production of oil or gas subject to such terms as may be imposed by the conveyance of that interest.

Properties also include:

- a. Royalty interests
- b. Production payments payable in oil or gas
- c. Other nonoperating interests in properties operated by others.

Properties include those agreements with foreign governments or authorities under which an entity participates in the operation of the related properties or otherwise serves as the producer of the underlying reserves [...] properties do not include other supply agreements or contracts that represent the right to purchase [...] oil and gas

# Reporting Reserves - Key Agreement Elements

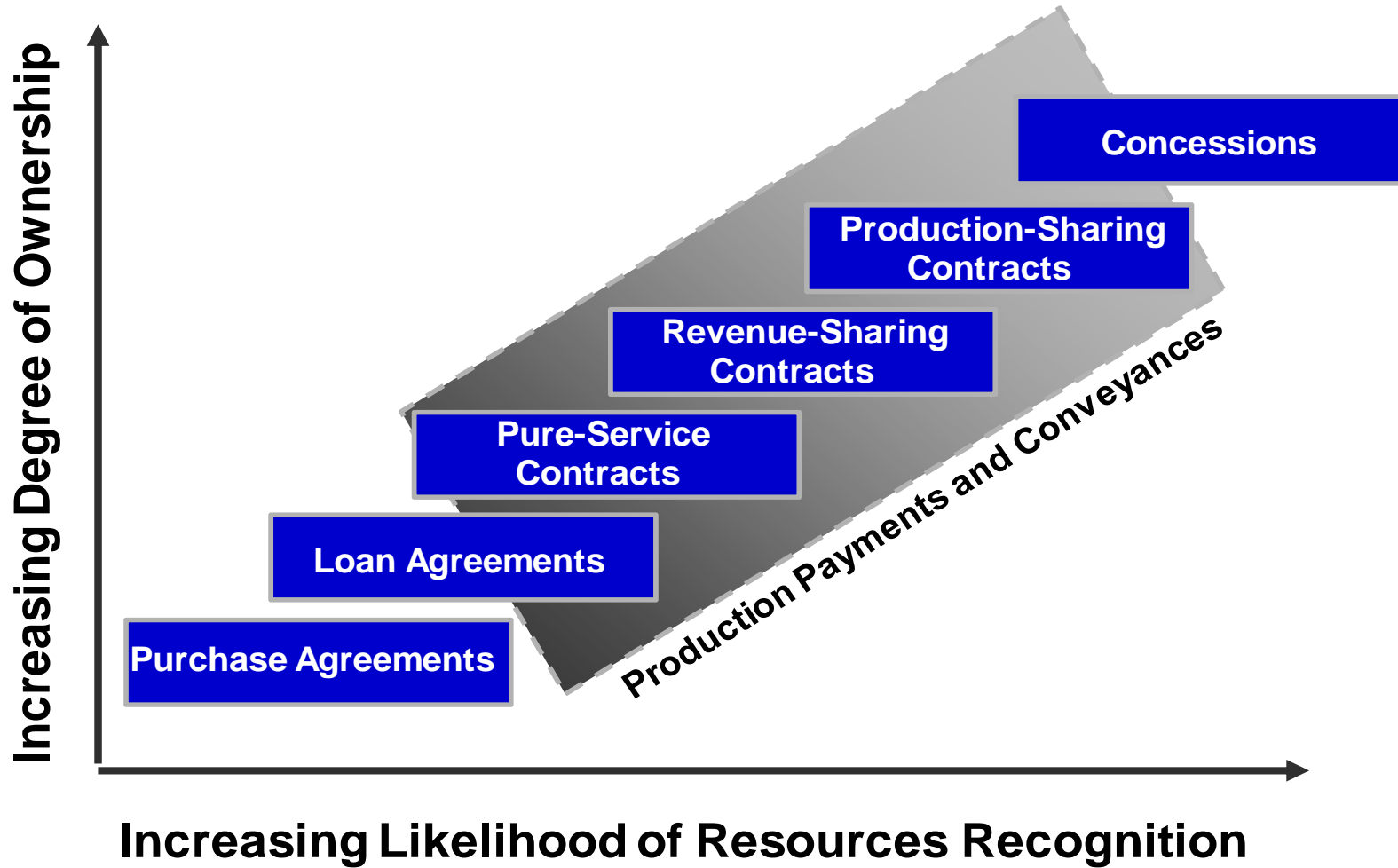
## Elements Supporting Reserve Reporting

- The right to extract oil or gas
- The right to take produced volumes in kind or share in the proceeds from their sale
- Exposure to market risk and technical risk
- The opportunity for reward through participation in producing activities

## Elements not Supporting Reserves Reporting

- Participation that is limited only to the right to purchase volumes
- Supply or brokerage arrangements
- Agreements for services or funding that do not contain aspects of risk and reward or convey an interest in the minerals

# Spectrum of Petroleum Fiscal Systems



# Summary of Agreement Types

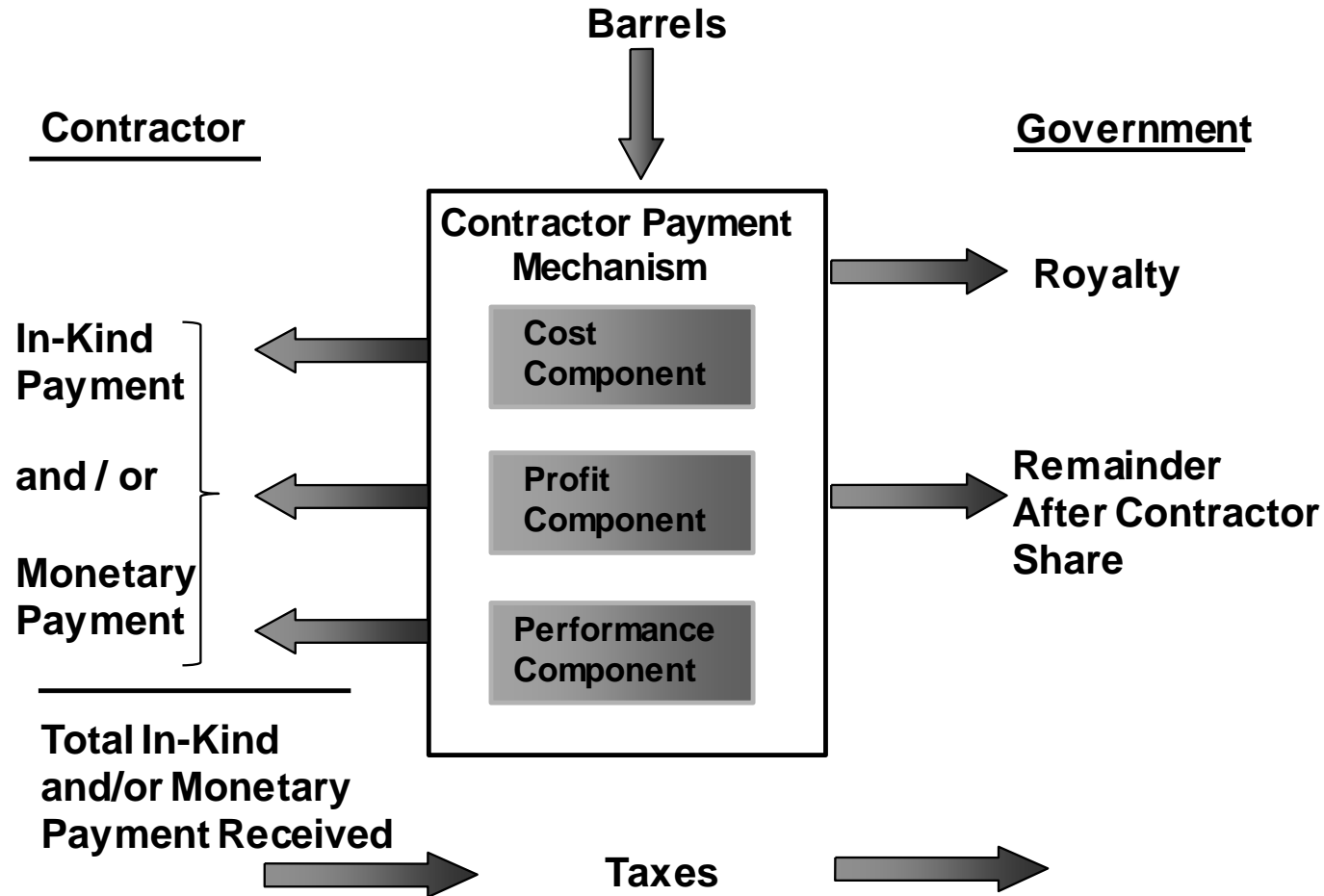
<b>Contract Type</b>	<b>Ownership</b>	<b>Payment</b>	<b>Reserves</b>
<b>Concession</b>	<b>Contractor</b>	<b>In-Kind</b>	<b>Yes</b>
<b>Production Share</b>	<b>Contractor (When Produced)</b>	<b>In-Kind</b>	<b>Yes</b>
<b>Revenue Share</b>	<b>Government</b>	<b>Share of Revenue</b>	<b>Yes</b>
<b>Risked Service</b>	<b>Government</b>	<b>Fee-Based</b>	<b>Likely</b>
<b>Pure Service</b>	<b>Government</b>	<b>Fee-Based</b>	<b>No</b>
<b>Purchase</b>	<b>Government</b>	<b>Product Cost</b>	<b>No</b>
<b>Loan</b>	<b>Government</b>	<b>Interest</b>	<b>No</b>
<b>Conveyance</b>	<b>Government</b>	<b>Production Pmnt</b>	<b>Likely</b>

# Utilizing PRMS Classification Categories

- ❑ Project investment decisions are typically evaluated on the anticipated cumulative recovery:
  - Most Likely Estimate or Best Estimate (2P)
  - Expected Value (or a risk weighted 3P basis)
  
- ❑ Entitlements are typically determined on a discrete category basis when fiscal terms are not directly dependent on prices, investments (fixed interest & constant royalty):
  - e.g.: Proved, Probable, Possible Reserves
  
- ❑ Where fiscal terms are more complex, entitlements are normally determined on a cumulative category basis, and discrete categories are calculated by difference:
  - Proved Undeveloped = 1P – Proved Developed
  - Probable Reserves = 2P – 1P



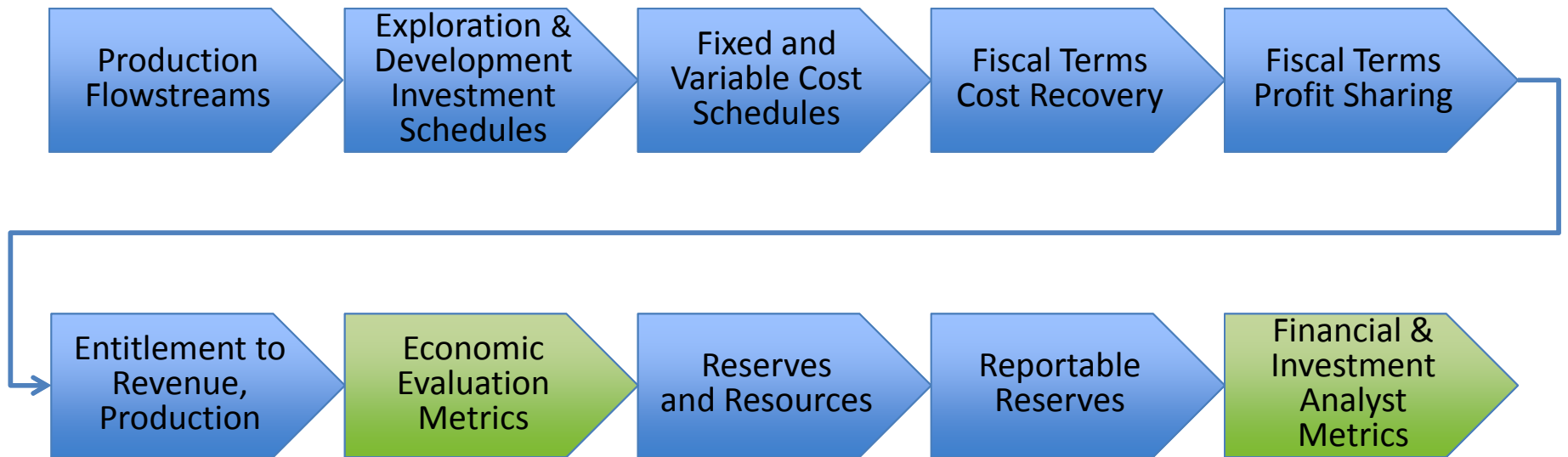
# PSC, Revenue Sharing or Risked-Service Contract Entitlement Example



# PSC Entitlement Example Field

Field Information Summary		
Field Size	500 million barrels	
Production During PSC Term	400 million barrels	
Exploration Costs	USD 600 million	
Drilling Costs	USD 1000 million	
Development Costs	USD 800 million	
Fixed Operation Costs	USD 2000 million (USD 100 million/yr)	
Variable Operating Costs	USD 10/bbl	

# Generalized Modeling Approach



# Field Production and Cost Profile

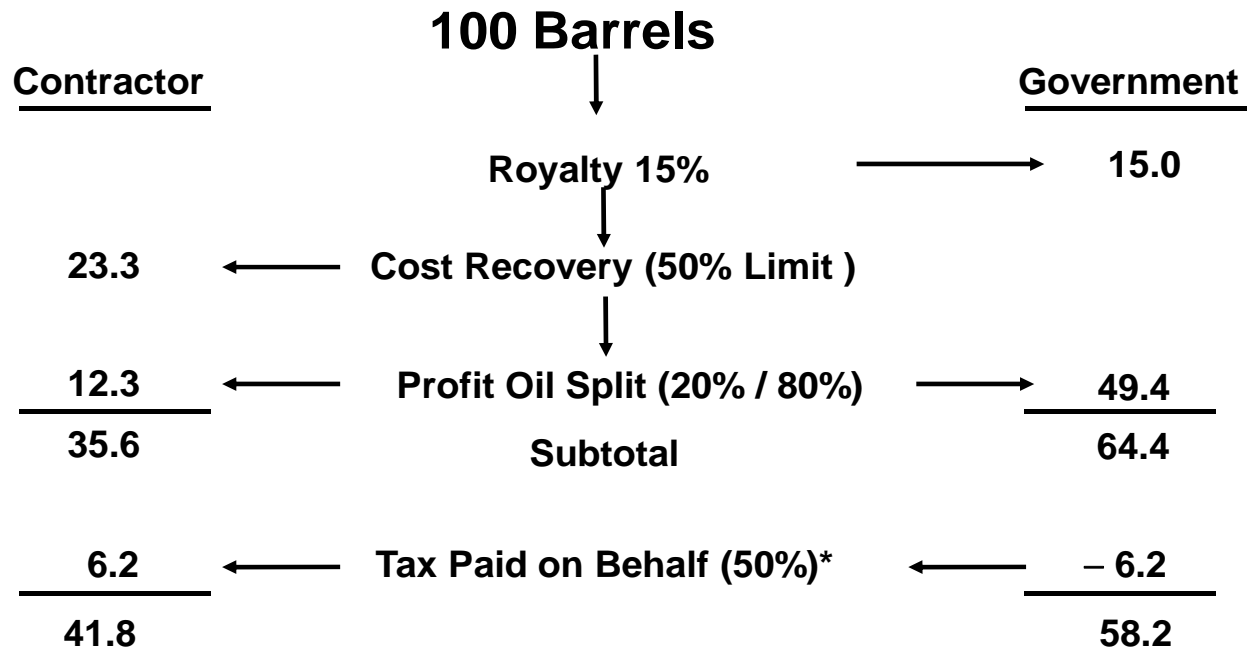
PSC Project Production and Cost Schedule							
Year	Annual Oil Production	Exploration	Development	Drilling	Fixed Operating Cost	Variable Operating Cost	Total Cost
	million barrels	million USD	million USD	million USD	million USD	million USD	million USD
1	0	300	0	0	0	0	300
2	2.7	300	200	200	100	27	827
3	11.5	0	400	400	100	115	1015
4	19.9	0	200	400	100	199	899
5	30.4	0	0	0	100	304	404
6	33.3	0	0	0	100	333	433
7	34.5	0	0	0	100	345	445
8	34.6	0	0	0	100	347	447
9	31.3	0	0	0	100	313	413
10	28.1	0	0	0	100	281	381
11	25.3	0	0	0	100	253	353
12	22.8	0	0	0	100	228	328
13	20.5	0	0	0	100	205	305
14	18.5	0	0	0	100	185	285
15	16.6	0	0	0	100	166	266
16	14.9	0	0	0	100	149	249
17	13.5	0	0	0	100	135	235
18	12.1	0	0	0	100	121	221
19	10.9	0	0	0	100	109	209
20	9.8	0	0	0	100	98	198
21	8.8	0	0	0	100	88	188
<b>Total</b>	<b>400</b>	<b>600</b>	<b>800</b>	<b>1000</b>	<b>2000</b>	<b>4000</b>	<b>8400</b>

# Annual Cost Recovery and Profit Share

PSC Project Cost Recovery and Profit Share Schedule (USD 90/bbl, Normal Income Tax)									
Year	Gross Revenue	Net Revenue after Royalty	Recoverable Costs	Costs Carried Forward	Contractor Recovered Costs	Revenue Available for Profit Sharing	Contractor Profit Share	Contractor Cost + Profit Share	Contractor Entitlement (USD 90/bbl)
	million USD	million USD	million USD	million USD	million USD	million USD	million USD	million USD	million barrels
1	0	0	300	300	0	0	0	0	0
2	242	206	827	1,024	103	103	21	123	1
3	1,031	876	1,015	1,600	438	438	88	526	6
4	1,788	1,520	899	1,739	760	760	152	912	10
5	2,736	2,325	404	980	1,163	1,163	233	1395	16
6	2,998	2,548	433	139	1,274	1,274	255	1529	17
7	3,104	2,638	445	0	584	2,055	411	995	11
8	3,125	2,656	447	0	447	2,209	442	889	10
9	2,813	2,391	413	0	413	1,978	396	808	9
10	2,531	2,152	381	0	381	1,770	354	735	8
11	2,278	1,936	353	0	353	1,583	317	670	7
12	2,050	1,743	328	0	328	1,415	283	611	7
13	1,845	1,568	305	0	305	1,263	253	558	6
14	1,661	1,412	285	0	285	1,127	225	510	6
15	1,495	1,270	266	0	266	1,004	201	467	5
16	1,345	1,143	249	0	249	894	179	428	5
17	1,211	1,029	235	0	235	795	159	393	4
18	1,090	926	221	0	221	705	141	362	4
19	981	834	209	0	209	625	125	334	4
20	883	750	198	0	198	552	110	308	3
21	794	675	188	0	188	487	97	286	3
<b>Total</b>	<b>36,000</b>	<b>30,600</b>	<b>8,400</b>	<b>n/a</b>	<b>8,400</b>	<b>22,200</b>	<b>4,440</b>	<b>12,840</b>	<b>143</b>

# Production-Sharing Contract Base Case, Average Entitlement over PSC Life

Crude Price \$90 /bbl

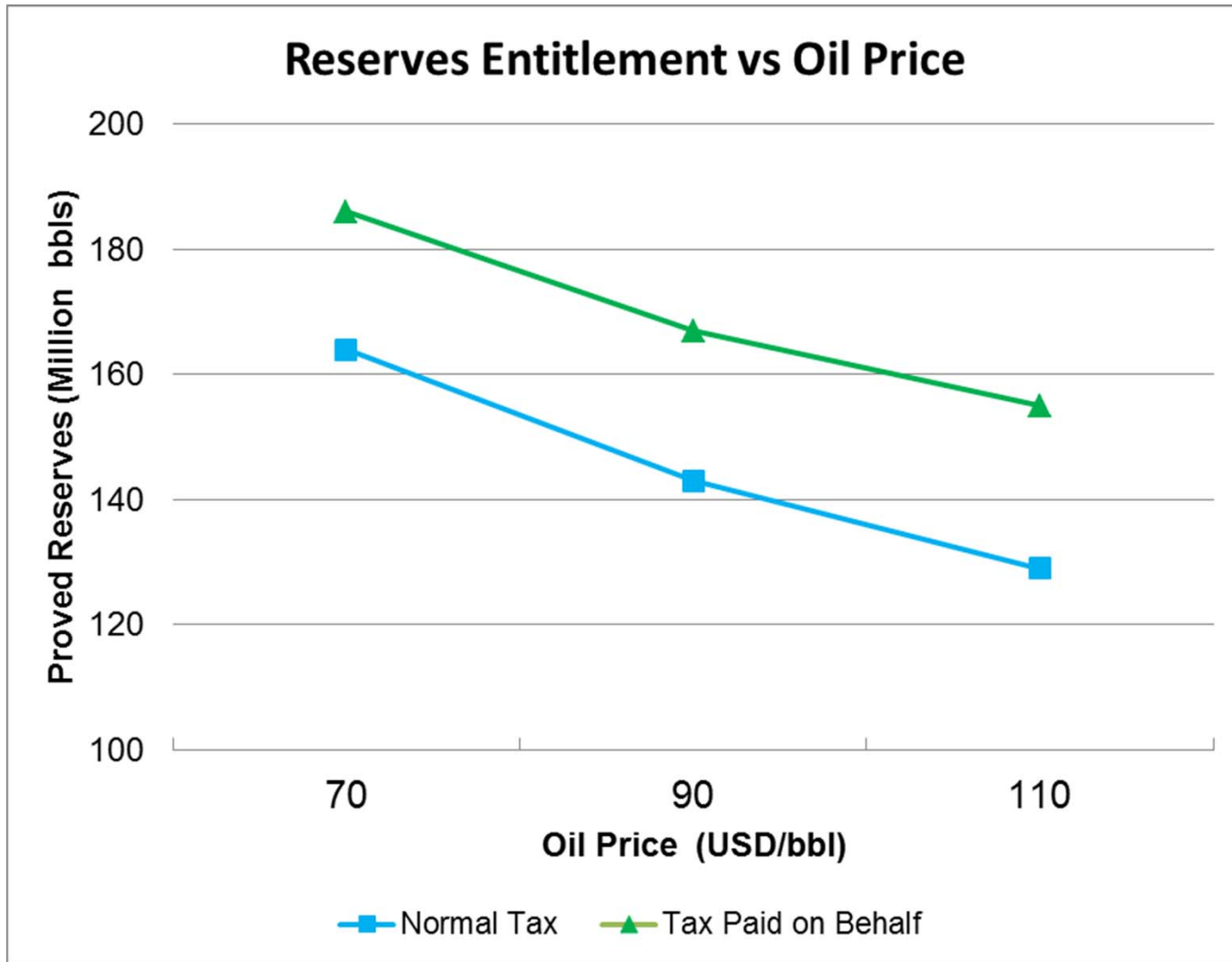


\* Taxes may be paid by Government on behalf of Contractor in some PSCs. Depending on specific terms, the payments may be treated as a tax credit or a revenue gross-up. In this example : Taxable income = (Profit Share)

# Price Sensitivity Cases

Oil Price USD/bbl	70		90		110	
	Normal Tax	Tax Paid on Behalf	Normal Tax	Tax Paid on Behalf	Normal Tax	Tax Paid on Behalf
<b>Reserves Millions of barrels</b>	<b>164</b>	<b>186</b>	<b>143</b>	<b>167</b>	<b>129</b>	<b>155</b>
COFD USD/bbl	14.63	12.90	16.82	14.34	15.59	15.44
Production Costs USD/bbl	36.59	32.26	42.06	35.86	46.48	38.60
Net Production Income Before Tax USD/bbl	18.78	24.84	31.12	39.80	44.93	55.97
Net Production Income After Tax USD/bbl	9.39	16.56	15.56	26.53	22.47	37.31
NPV @ 10% (SMOG) Million USD	86	628	437	1220	743	1774
SMOG USD/bbl	0.53	3.38	3.06	7.29	5.76	11.41
Contractor IRR %	11	18	17	26	23	34

# Price Sensitivity Cases





# Conclusions

- ❑ PSCs and other non-traditional agreements provide an effective framework for balancing Contractor entitlement and Host take
  - Ability to recovery of costs, investments & earn an agreed profit
  - Contract terms can become more regressive through their life reducing incentives to the contractor, 'R' factor resets could make incremental developments more attractive
- ❑ Reporting reserves (resources) does not imply ownership
  - Reporting is required by stock market regulators and financial standards
  - Stock analyst performance statistics (IRR, COFD, ROCE ...) may be different than those for traditional concessions and lease agreements
- ❑ Entitlement is based on a revenue/economic interest in production, participation in operation rather than a fixed working interest
  - Exposure to elements of risk and opportunity for reward
  - Entitlement may include other elements including Taxes Paid on Behalf, Royalty holidays etc.
- ❑ Economic modeling of production flow streams, costs and product prices is required to determine production entitlement and reportable amounts.



## **Acknowledgements / Thank You / Questions**

The author would like to thank BHP Billiton for their support for the presentation of this material.