



PRODUCTION SHARING CONTRACTS

ABOUT APTA CONSULTING

APTA provides Financial modelling, Petroleum Economics evaluation & analysis, and Excel training for business modelling and data analysis to range of clients. Our clients range from blue chip to small enterprises and individuals. Our clients have access to high quality, cost effective modelling support delivered by team of experts around the world.

APTA FINANCIAL MODELLING TEAM

APTA's dedicated Oil & Gas modeling team is led by Santosh Singh. Santosh has more than 12 years of industry experience. With a technical background in drilling engineering and further qualification in Finance and Economics, he has worked in a number of major technical and commercial functions and gained extensive experience in economics evaluation, business development and commercial agreements.

Santosh's commercial valuation and analysis experience covers Africa, Asia, and Eurasia to name a few. He has a proven ability in the fiscal regime modelling, investment analysis, and providing high quality support to management for the strategic investment decisions.



SANTOSH SINGH
PRINCIPAL CONSULTANT, OIL & GAS



PRODUCTION SHARING CONTRACTS

“ ”

Share cropping.

PRODUCTION SHARING CONTRACTS

A Production Sharing Contract (PSC or Production Sharing Agreement – PSA) is a system where by government does not transfer the ownership of the resources to the license holder, the contractor. The contractor is supposed to work for the government and recover its cost from the production. The government allows the contractor to share in the profit from the oil leftover after the cost recovery.

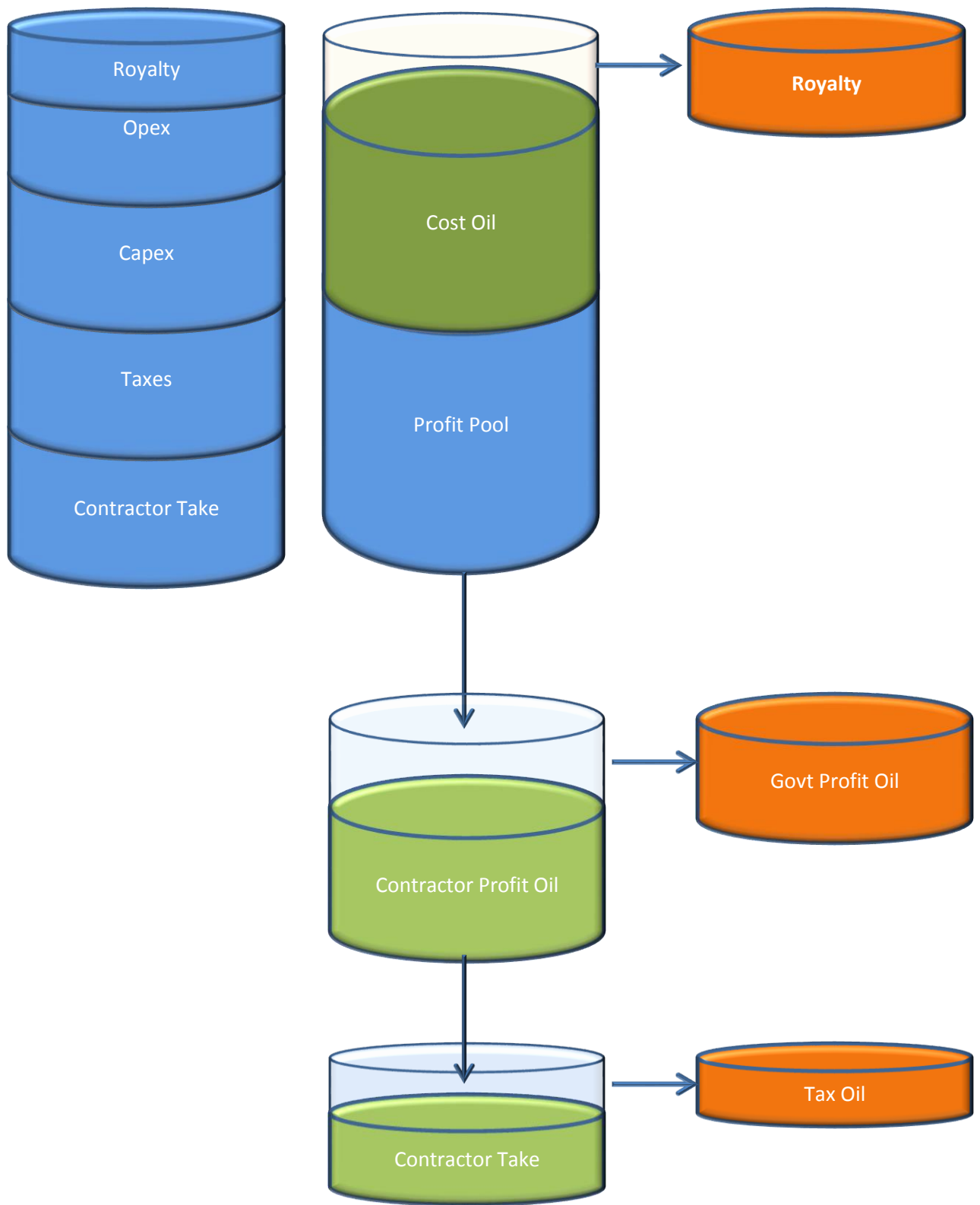
On the surface PSCs and Royalty/Tax system looks very different. But in reality, both are more or less the same (mathematically). The differences lie in the symbolism and the thought process behind the structure of the two regimes types. Legally in a PSC, the government has the ownership of the resources, in a Royalty/Tax, contractors gets the ownership on the well head of the entire crude. In a PSC, contractor is entitled only for the Cost Oil and Profit Oil (we will see in a minute what it means).

Be aware that a PSC can have royalty in its structure. Generally tax rate are less in a PSC than a Royalty/Tax regime. A disadvantage of a PSC is that its sensitivity to Oil prices is greater than a Royalty/Tax regime. The contractor may be handsomely compensated or penalized based on which way the Oil price has moved.

Company (designated as Contractor) gets a license from the government to carry out exploration, development and production. The contractor bears all cost. In lieu of that it receives compensation from the government from the crude sales/production.

Crude Oil production is allocated as Cost Oil and the remaining as Profit Oil. Cost Oil is used by the Contractor to recoup its costs. Sales proceeds from the Profit Oil are then shared between the contractor and the government. The sharing mechanism or basis is pre-defined. It can be based on level of production, cumulative production, R-factor, ROR or any metrics as defined in the PSC.

The flow diagram for a generic PSC is shown below. Sometime a tax is applied on the contractor's share of the Profit Oil.



The royalty comes right off the top just like in any Royalty/Tax regime. Before splitting the production, the contractor is allowed to recover costs out of revenues left after payment of royalties. Most often there will be a limit on the amount of net revenue that can be used against cost recovery. Assume a PSC has a limit of 70% for Cost Oil. It implies if recoverable costs are more than 70% of the net revenue then , the balance would be carried forward for future period cost recovery.

Cost recovery mechanism allows the contractor to recoup costs of exploration, development, and operations out of sales proceeds. Generally PSCs will limit the amount of revenues the contractor can claim for cost recovery but will allow unrecovered costs to be carried forward and recovered in later periods. Cost recovery limits are in the range from 30%-60%.

The purpose of the cost recovery limit is to allow the government to have at least minimum profit in every possible production scenario even when the project itself is not making any profit. If you think about it, mathematically, the cost recovery limit is the only true differentiating feature between PSC and a Royalty/Tax system.

The concept of 'cost Recovery' is nothing new. Those who put up the capital should at least be allowed to get their investment back. The cost recovery mechanism is one of the most common features of a PSC. It is not much different from the Royalty/Tax regimes.

Since there are several categories of cost, not all cost may be allowed to be recovered at same time. There may be a hierarchy cost items which has to be cost recovered in a particular order. This may make a difference in the cash flows if certain cost recovery items are taxable.

Net Revenues = Gross Revenues - Royalties

Profit Oil = Net Revenues – Cost Oil

Cost Oil = Opex
+ DD&A
+ Abandonment provisions
+ Investment Credits
+ Financing Charges
+ Any Unrecovered Cost Balance
+ Others

Revenues left after royalty and cost recovery is called Profit Oil or Profit Gas. This is analogous to pre-tax income of a Royalty/Tax regime. The contractor's share of the profit oil is subject to taxation. In a service contract, this will be termed as the service fee instead of profit oil. In a Royalty Tax system the government gets an income tax and or special other taxes.

Contractor Profit Oil = Profit Oil x Contractors Profit Oil share
Government Profit Oil = Profit Oil - Contractor's Profit Oil

Contractor's NCF = Gross Revenues
- Royalties
- Opex
- Capex
- Abandonment provisions
+ Investment Credits
- Bonuses
- Government Profit Oil
- Taxes

In a PSC cash flows can be computed in several ways. And it's always a good idea to check one's calculation by doing alternate calculations. A generic cash flow algorithm is given below.

Contractor's NCF = Cost Oil + Contractors Profit Oil
- Opex
- Capex
- Abandonment provisions
- Bonuses
- Taxes

$$\text{Government Take} = \text{Royalties} + \text{Government Profit Oil} + \text{Tax on Contractor's Profit Oil} + \text{Bonuses}$$

We will discuss a little bit about the concept of “Contractor Take”, “State Take”, and “Government Take”.

In normal parlance the State and the Government signifies one and the same entity. But in case of Oil and Gas fiscal regime context, they refer to two different entities. National Oil Company represents “State”. A National Oil Company (NOC) usually can participate in the upstream project as one of the partner company within the Contractor group. Government on the other hand represents the federal government of the host country.

Let’s show you an example case with just one company in the contractor group. Assume Oil price of \$100/bbl. and 10 barrels of productions. All figures are in \$. Other assumptions are as shown below:

<i>Royalty Rate</i>	10.0%
<i>Cost Recovery Max</i>	50.0%
<i>Excess Oil Contractor Share</i>	50.0%
<i>Profit Split Contractor Share</i>	40.0%
<i>Tax Rate</i>	30.0%
<i>Revenue</i>	1000
<i>Signature Bonus</i>	10
<i>Opex</i>	100
<i>Capex</i>	100

We need to explain you the meaning of Excess Cost Oil as shown in the terms above. Usually there is limit on the Revenue that can be used for recovering the costs in a PSC. If the recoverable cost is less than the maximum revenue allowed for cost recovery, then the extra revenue left unused after cost recovery is called Excess Cost Oil. This excess cost Oil may be split in any proportion between the government and the contractor. The distribution of the cash flow for the above example is shown below:

	<i>Contractor</i>	<i>Project</i>	<i>Government</i>
<i>Gross Revenue</i>		1000	
<i>Royalty</i>		-100	100
<i>Revenue bf Cost Recovery</i>		900	
<i>Max Revenue Available for Cost Recovery</i>		450	
<i>Cost Recovered</i>	200	-200	
<i>Excess Cost Oil</i>	125	250	125
<i>Profit Oil</i>	180	450	270
<i>Signature Bonus</i>	-10		10
<i>Opex</i>	-100		
<i>Capex</i>	-100		
<i>BT Cash Flow</i>	295		
<i>Tax</i>	-89		89
<i>AT Cash Flow</i>	206.5		594

Contractor Take	206.5	25.81%
Government Take	593.5	74.19%
Capex + Opex	200.0	
Total	1000.0	
Total Revenue	1000.0	

To explain the calculation above we have used the following formula:

Revenue before Cost Recovery = Gross Revenue – Royalty

Maximum Revenue Available for Cost Recovery = Revenue before Cost Recovery
X
Cost Oil Limit

Cost Recovered = Minimum of Capex + Opex or Max Revenue Available for Cost Recovery

Excess Cost Oil = Max Revenue Available for Cost Recovery – Cost Recovered

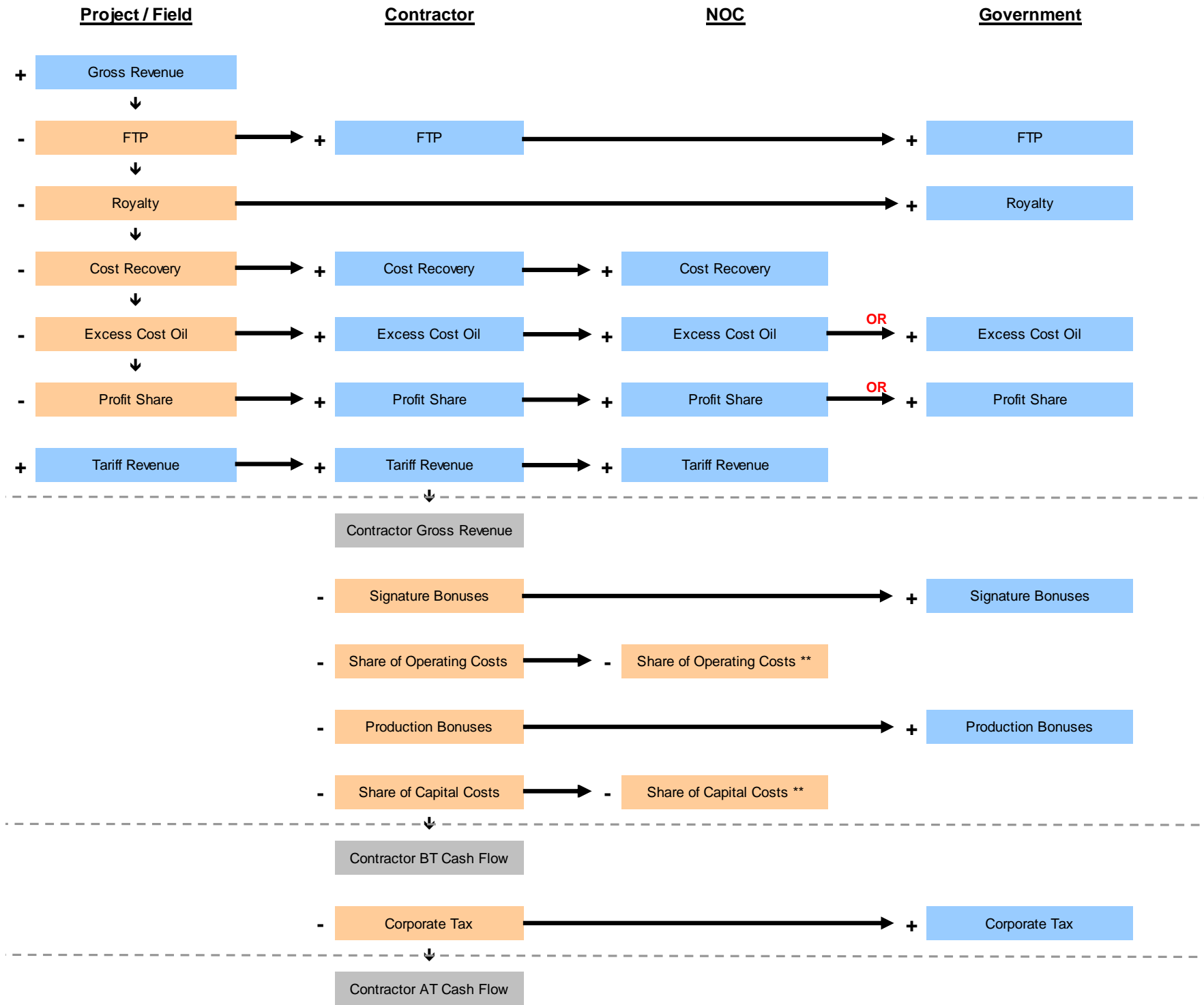
Contractor's Excess Cost Oil = Excess Cost Oil X Contractor's share in Excess Cost Oil

Govt. Excess Cost Oil = Excess Cost Oil X (1- Contractor's share in Excess Cost Oil)

Profit Oil = Revenue – Royalty – Cost Oil – Excess Cost Oil

Contractor's Profit Oil = Profit Oil x Contractor's share in Profit Oil

Govt. Profit Oil = Profit Oil x Govt. share in Profit Oil



BASIC ELEMENTS IN A PSC

Bonus: Cash bonuses may be required to be paid to the government upon signing the contracts terms (license agreement). It's called Signature Bonus. Bonus may be paid in kind instead of cash such as tools and technology. Then there are Production Bonuses which are tied to the production. The basis of this bonus payment is based on certain rules linked to production rate or volume or some other measure of production.

Royalties: Like concessionary regimes many PSCs have the provision of royalties. It's based on gross revenue of the field or license area. Sometime certain costs are allowed to be deducted for royalty calculation such as transportation cost of the crude. This occurs when the point of valuation of the crude is different from the point of crude sales. Royalty rate can be linked to production rate, volume, cumulative volume etc.

Here we must explain the use of Sliding Scales (Incremental Scale). A common methodology many fiscal regimes follow is the use of sliding scale for royalties, profit oil split, taxes, and other items. The most common approach is an incremental sliding scale based on average production rate. The following example should clarify.

Say in sliding scale royalty that steps up from 10% to 15% on 10,000 BOPD tranches of production. This means for any production less than 10,000 BOPD royalty rate will be 10%. For production rate greater than 10,000 BOPD to royalty rate will be 15%, but only on production above 10,000 BOPD. Now assume the average daily production is 15,000 BOPD, the effective royalty paid by the contractor is 11.67% (10,000 BOPD at 10% + 5,000 BOPD at 15%).

	Average Production	ROYALTY
First Tranche	Up to 20,000 BOPD	8%
Second Tranche	20,001-50,000	10%
Second Tranche	Above 50,000 BOPD	15%

A general confusion arises when analysts assumed that once the production exceeds a particular threshold all production is subjected to the higher rate. Sliding scales are incremental in nature. It is generally used so that it does not penalize the contractor just because production moved from one tranche to another they have to pay higher rates on all volumes.

Cost Recovery: We have discussed this earlier as well. Cost recovery is similar to deductions of a Royalty/Tax regime. The share in profit oil by the government is actually just a tax to the contractor. Viewed this way PSC becomes a Royalty/Tax regime! However due to ownership issue, instead of calling it tax, govt. pretend that its sharing its profit with the contractor in lieu of the service provided to produce its own oil. Since the contractor under a PSC does not own the production, government reimburses the contractor for costs through the cost recovery mechanism and then shares a portion of the remaining production or revenues with the contractor. There may or may not be a

limit on the cost recovery amount depending on the PSC. While some PSCs have no limit on cost recovery some may not have cost recovery at all! For e.g. older Peruvian regimes made no allowance for cost recovery before the profit oil split. The government simply granted the contractor a share of production.

Generally most PSC allows for the following to be cost recoverable:

- ✓ Unrecovered costs carried over from previous years
- ✓ Opex
- ✓ Expensed capital costs
- ✓ Current year DD&A
- ✓ Financing charges with certain cap
- ✓ Investment credit (uplift)
- ✓ Abandonment cost recovery fund

Sometime no distinction may be made between tangible/intangible Capex. And all Capex may be allowed to be recovered in the period incurred instead of allowing on depreciated portion in the period concerned.

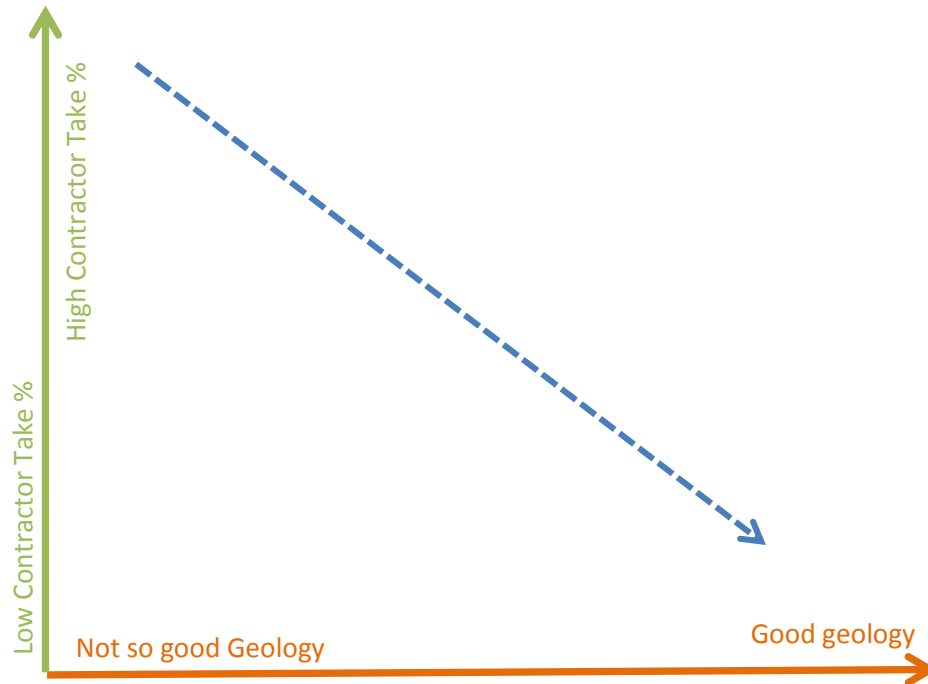
Generally unrecovered costs are carried forward indefinitely and are available for recovery in future periods. But there may be instances that carry forward is not allowed (especially for Sunk Costs) or there is limit to the number of years or the amount of carry forwards in future periods.

Some fiscal regimes may have incentives, such as investment credits (or uplifts). Uplift allows the contractor to recover an extra percentage of capital costs through cost recovery. For example, an uplift of 25% on Capex of \$100 would allow the contractor to recover \$125 (\$100 + \$25).

Under most PSCs the contractor gives up ownership rights to the government for equipment platforms, pipelines, and facilities on start of the project. Therefore it's the government as owner who should be held responsible for the abandonment expenditure. But normally the onus is on the contractor for the field abandonment provision. What government does then in turn is to allow this abandonment provision to be cost recoverable. Projected abandonment cost is accumulated through a reserve fund that matures at the time of abandonment. The costs are recovered prior to the actual abandonment.

Profit Oil & Taxation: Profit oil is split between the contractor and the government, based on pre-defined terms as per the signed PSC. These terms may or may not be negotiable. The contractor's share of profit oil may or may not be subjected to further taxation. Sometime the contractor doesn't have to pay the tax to government themselves. The NOC participating with the contractor is deemed to have paid the tax to government on behalf of the contractor. This is called Deemed or Imputed Tax.

Whether a PSC is good or not so good from the contractors view point can be based on “Take” statistics. The common benchmark to use for comparing a PSC is contractor take (contractor’s cash flow as a percentage of project operating profit). Generally if the geology and supporting infrastructure are good, the terms of PSC become tough and vice versa.



DMO (Domestic Market Obligations): Some time a PSC may require the contractor to fulfil certain domestic market needs of the host country at discounted price. These they require that a certain percentage of the contractor's profit oil be sold to the government at discount to market price. Sometime the exchange rate of the currency in which the government pays back the contractor for fulfilling this obligation may be predetermined and not market based.

Ring-fencing: The issue of recovery or deductibility of costs, profit oil and taxation is dependent on the revenue base from which costs can be deducted. Normally all costs associated with a given block or license must be recovered from the revenues generated within that block. In fiscal regime terms we call that the block is ring-fenced. This prohibits cost or profits to from consolidation with another block or license operated by same company. Some countries will allow certain classes of costs associated with a given field or license to be recovered from revenues from another field or license.

Ring-fencing may have impact on tax base and tax payment and carry forward of losses (and same with cost recovery). Say a company has two blocks and both are ring-fenced for cost recovery and tax purpose. This means if one of the blocks generates a loss of \$50 while the other generates a profit of \$100, the total profit of the company operating these two blocks will be \$50 (\$100 profit of one block - \$50 loss of another block). Let’s say the tax rate is 30%. If there was no ring-fence for the purpose of the tax

computation, total tax liability for the period would be \$15 (\$50 x 30%). If the two blocks on the other hand are ring-fenced, the tax liability of the company will be \$30

Tax & Royalty Holidays: Sometime in certain fiscal regimes there is provision of tax holidays or royalty holidays. These allow the contractor not to pay any taxes or royalty (in case of royalty holiday) to the government during those holiday years. These holidays are designed to attract additional investment in the field of exploration and development.

Let's show you a worked out example for a simple PSC now. The inputs for the case is shown below:

Inputs						
Production	Oil price	Opex	Exploration Capital	Development Capital	Abandonment Capital	
Bbl/day	USD/barrel	M USD	M USD	M USD	M USD	
		1,080,000	324,000	1,205,000	375,000	
2013	0	100	0	174,000	0	0
2014	0	100	0	150,000	15,000	0
2015	0	100	0	0	465,000	0
2016	0	100	0	0	525,000	0
2017	5,000	100	60,000	0	0	0
2018	15,000	100	60,000	0	0	0
2019	30,000	100	60,000	0	50,000	0
2020	30,000	100	60,000	0	0	0
2021	25,500	100	60,000	0	0	0
2022	21,675	100	60,000	0	50,000	0
2023	18,424	100	60,000	0	0	0
2024	15,660	100	60,000	0	0	0
2025	13,311	100	60,000	0	50,000	0
2026	11,314	100	60,000	0	0	0
2027	9,617	100	60,000	0	0	0
2028	8,175	100	60,000	0	50,000	0
2029	6,949	100	60,000	0	0	0
2030	5,906	100	60,000	0	0	0
2031	5,020	100	60,000	0	0	0
2032	4,267	100	60,000	0	0	0
2033	3,627	100	60,000	0	0	0
2034	3,083	100	60,000	0	0	0
2035	0	100	0	0	0	375,000

Other assumptions that we assumed in this case is royalty rate of flat 10% on any level of production. Cost recovery limit of 80%. Government share of the profit Oil is assumed to be flat 40%. For simplicity we assumed Deemed Tax scenario, i.e. tax is assumed to be paid by NOC to the government on behalf of the contractor.

Revenue		Royalty			Cost Recovery						
Oil Volume	Gross Revenue	Royalty Rate	Royalty Base	Royalty	Cost Recovery Limit	Costs	Total Revenue	Cost Recovery Deductions	Max Revenue Available For Cost Recovery	Cost Recovered	Balance
M Bbl	M USD	%	M USD	M USD	%	M USD	M USD	M USD	M USD	M USD	M USD
84,873	8,487,272		8,487,272	848,727		2,984,000	8,487,272	848,727	6,110,836	2,609,000	
		10%			80%						
2013	0	10%	0	0	80%	174,000	0	0	0	0	174,000
2014	0	10%	0	0	80%	165,000	0	0	0	0	339,000
2015	0	10%	0	0	80%	465,000	0	0	0	0	804,000
2016	0	10%	0	0	80%	525,000	0	0	0	0	1,329,000
2017	1,825	10%	182,500	18,250	80%	60,000	182,500	18,250	131,400	131,400	1,257,600
2018	5,475	10%	547,500	54,750	80%	60,000	547,500	54,750	394,200	394,200	923,400
2019	10,950	10%	1,095,000	109,500	80%	110,000	1,095,000	109,500	788,400	788,400	245,000
2020	10,950	10%	1,095,000	109,500	80%	60,000	1,095,000	109,500	788,400	305,000	0
2021	9,308	10%	930,750	93,075	80%	60,000	930,750	93,075	670,140	60,000	0
2022	7,911	10%	791,138	79,114	80%	110,000	791,138	79,114	569,619	110,000	0
2023	6,725	10%	672,476	67,248	80%	60,000	672,476	67,248	484,183	60,000	0
2024	5,716	10%	571,590	57,159	80%	60,000	571,590	57,159	411,545	60,000	0
2025	4,859	10%	485,852	48,585	80%	110,000	485,852	48,585	349,813	110,000	0
2026	4,130	10%	412,961	41,296	80%	60,000	412,961	41,296	297,332	60,000	0
2027	3,510	10%	351,021	35,102	80%	60,000	351,021	35,102	252,735	60,000	0
2028	2,984	10%	298,388	29,839	80%	110,000	298,388	29,839	214,839	110,000	0
2029	2,536	10%	253,639	25,364	80%	60,000	253,639	25,364	182,620	60,000	0
2030	2,156	10%	215,569	21,557	80%	60,000	215,569	21,557	155,210	60,000	0
2031	1,832	10%	183,230	18,323	80%	60,000	183,230	18,323	131,926	60,000	0
2032	1,557	10%	155,746	15,575	80%	60,000	155,746	15,575	112,137	60,000	0
2033	1,324	10%	132,386	13,239	80%	60,000	132,386	13,239	95,318	60,000	0
2034	1,125	10%	112,530	11,253	80%	60,000	112,530	11,253	81,021	60,000	0
2035	0	10%	0	0	80%	375,000	0	0	0	0	375,000

	Profit Oil				Profit Split				Net Cash Flow			
	Total Revenue	Royalty	Cost Recovery	Profit Oil	Contractor Share in Profit Oil	Government Share in Profit Oil	Profit Oil Contractor	Profit Oil Government	Contractor Net Cash Flow	Contractor Take	Government Net Cash flow	Government Take
	M USD	M USD	M USD	M USD	%	%	M USD	M USD	M USD	%	M USD	%
	8,487,272	848,727	2,609,000	5,029,545			3,017,727	2,011,818	2,642,727	48%	2,860,545	52%
2013	0	0	0	0	60%	40%	0	0	-174,000		0	
2014	0	0	0	0	60%	40%	0	0	-165,000		0	
2015	0	0	0	0	60%	40%	0	0	-465,000		0	
2016	0	0	0	0	60%	40%	0	0	-525,000		0	
2017	182,500	18,250	131,400	32,850	60%	40%	19,710	13,140	91,110		31,390	
2018	547,500	54,750	394,200	98,550	60%	40%	59,130	39,420	393,330		94,170	
2019	1,095,000	109,500	788,400	197,100	60%	40%	118,260	78,840	796,660		188,340	
2020	1,095,000	109,500	305,000	680,500	60%	40%	408,300	272,200	653,300		381,700	
2021	930,750	93,075	60,000	777,675	60%	40%	466,605	311,070	466,605		404,145	
2022	791,138	79,114	110,000	602,024	60%	40%	361,214	240,810	361,214		319,923	
2023	672,476	67,248	60,000	545,228	60%	40%	327,137	218,091	327,137		285,339	
2024	571,590	57,159	60,000	454,431	60%	40%	272,659	181,772	272,659		238,931	
2025	485,852	48,585	110,000	327,266	60%	40%	196,360	130,907	196,360		179,492	
2026	412,961	41,296	60,000	311,665	60%	40%	186,999	124,666	186,999		165,962	
2027	351,021	35,102	60,000	255,918	60%	40%	153,551	102,367	153,551		137,469	
2028	298,388	29,839	110,000	158,549	60%	40%	95,129	63,420	95,129		93,258	
2029	253,639	25,364	60,000	168,275	60%	40%	100,965	67,310	100,965		92,674	
2030	215,569	21,557	60,000	134,012	60%	40%	80,407	53,605	80,407		75,162	
2031	183,230	18,323	60,000	104,907	60%	40%	62,944	41,963	62,944		60,286	
2032	155,746	15,575	60,000	80,171	60%	40%	48,103	32,068	48,103		47,643	
2033	132,386	13,239	60,000	59,147	60%	40%	35,488	23,659	35,488		36,897	
2034	112,530	11,253	60,000	41,277	60%	40%	24,766	16,511	24,766		27,764	
2035	0	0	0	0	60%	40%	0	0	-375,000		0	

