

INTRODUCTION





OIL & GAS 101

This training class was designed to give a high-level introduction to the oil and gas industry. The key concepts will be generally explained with an end goal of giving a preview of the challenges governments have in putting together laws, regulations and revenue sharing for hydrocarbon development.

EXPECTATIONS FOR THE WEEK

FISCAL DESIGN 101

- Provide the legislature with:
 - an overview of key aspects of the petroleum industry that impact fiscal design
 - an appreciation for the constant degree of change and how fiscal design can withstand this change
 - The global competition by governments for petroleum company capital and human resources
- Provide external sources for learning
- Solicit and answer as many questions as possible and document those we can't for later discussion
- Provide time for individuals or groups to schedule private sessions to answer questions, provide additional detail or explore possible legislative changes
- We will not be discussing specific bills or regulations during training courses





UNDERSTANDING PETROLEUM INDUSTRY TERMS

- The oil and gas industry is full of exclusive terms, numerous acronyms, and common terms which within the industry may have specialist meanings
- One key to understanding input provided by articles, books or consultants is to make sure you have an understanding of the terms used and their meaning
- Often there are multiple terms that have the same general meaning, and we will cover some of these today
 - Example: "state"
 - Often used to refer to the government at the highest level
 - Can also be used to define an area within a country like the State of Alaska or the State of Texas
- Additionally, it's important to understand units of measurement and that they can vary globally



If we use a term you do not know, please ask us to explain and clarify ואסונ

UNDERSTANDING PETROLEUM INDUSTRY TERMS



- A good reference for oilfield terms, acronyms and concepts is the Schlumberger Oilfield Glossary
 - <u>https://www.glossary.oilfield.slb.com</u>
 - Google search "Schlumberger oilfield glossary"



SOME TERMS ARE USED INTERCHANGEABLY

GOVERNMENT ENTITY

- Government
- State
- Sovereign
- Regulator

GOVERNMENT GUIDELINES

- Fiscal regime
- Fiscal policy
- Oil and gas taxation
- Petroleum Taxation

GOVERNMENT SHARE OF VALUE

- Government take
- Government share
- State take
- State share

PRIVATE COMPANY

- Producer
- Oil company
- Oil and gas company
- Petroleum company
- Contractor
- Operator



COMMONLY USED TERMS

COMPANY TYPES

- Independent,
- Midsize, or
- Major producer
- "IOC" or international oil company
- "NOC" or national oil company (government owned)

CONTRACT TYPES

- JV joint venture
- License
- Service agreements
- Unit agreement
- Processing
- Transportation
- Banking

ECONOMIC TERMS

- IRR internal rate of return
- NPV net present value
- EMV expected monetary value
- ROI return on investment

PRODUCTION AMOUNTS

- bbl barrel (oil)
- bopd barrels of oil per day
- cf cubic foot (gas)
- Mcf/d thousands of cubic feet per day (gas)
- MMBTU/cf millions of BTUs per cubic foot



RESOURCES OR RESERVES?

THE MOST IMPROPERLY USED TERMS

- Petroleum RESOURCES and petroleum RESERVES are often incorrectly used interchangeably in discussions
- RESOURCES represents the quantity of hydrocarbons that based on available data can reasonably be said to likely exist within a set of geographical boundaries
- RESERVES represent a subset of resources being the quantity of discovered hydrocarbons that are commercially recoverable with proven technology based on defined conditions (i.e. costs and prices)
 - Oil companies are bound by very detailed rules for defining RESERVES with those rules mainly being set by various stock exchange regulators such as the SEC in the US
 - Reserves are used to value a company, and as an asset for loan and financing



HYDROCARBONS BACKGROUND



WHAT IS A HYDROCARBON?

THE FUNDAMENTAL STRUCTURE

- Hydrocarbon: an organic compound containing only carbon and hydrogen. Types of hydrocarbons (sometimes referred to as fossil fuels) include:
 - Petroleum/crude oil
 - Natural gas
 - Coal
 - Bitumen
- They are classified by the number of carbon atoms in the molecule
 - 1 Carbon Methane
 - 2 Carbons Ethane
 - 3 Carbons Propane
 - 4 Carbons Butane
 - 5+ Carbons numerous products from LPGs and Natural Gas Liquids, all the way to asphalt



Source: Marriam-Webster, Britannica

MILLIONS OF YEARS TO CREATE

NON-RENEWABLE RESOURCE

- Organic material dies and decomposes
- After 300-400 million years of heat and compression, nonrenewable sources are created and 'mined'
- Governments must consider that its resources are finite when designing fiscal policy



This picture is taken from timmeko's photostream



Source: Offshoreengineering.com

HYDROCARBONS ARE IN EVERYTHING

MODERN SOCIETY HIGHLY DEPENDENT ON FOSSIL FUELS

• Despite efforts towards the total elimination of fossil fuels, hydrocarbons are present in almost every aspect of our daily lives





Source: International Association of Oil and Gas Producers

HYDROCARBONS ARE NOT CREATED EQUAL

HOW MANY KINDS OF CRUDE OIL ARE THERE?

- Produced crude oil can vary quite significantly from one field to another
- The value of a barrel of crude oil, and the costs to produce that barrel, are dependent on the quality and specifications of the crude
- Crude types are classified from Light to Heavy (API Gravity)
 - Lighter crudes are similar to water in their density and ease of flowing
 - Heavier crudes can be quite dense and flow like peanut butter
- Crude quality can also be Sweet or Sour (**Sulfur** content)
 - Oil with sulfur content greater than 0.5% is considered sour
 - Sour crudes require more expensive specialty materials for transport and refining due to their corrosion capabilities and high potential for environmental damage



HOW IS CRUDE OIL PRICED?

FOR ALASKA IT IS ANS WEST COAST

- Globally there are a number of marker crudes defined by their physical characteristics (light, heavy, sweet, sour) and location
- Other crude oils are priced relative to one of these marker crudes with adjustments made for quality and location differentials





HYDROCARBONS ARE NOT CREATED EQUAL

DIFFERENT MAKEUP OF MAIN MARKER CRUDES



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CRUDE OIL PRODUCTS

IT IS NOT ALL GASOLINE

Petroleum products made from a barrel of crude oil, 2018

gallons



 The figures to the left are averages.
Different crudes and different refineries will have slightly different product yields.

Note: A 42-gallon (U.S.) barrel of crude oil yields about 45 gallons of petroleum products because of refinery processing gain. The sum of the product amounts in the image may not equal 45 because of independent rounding.

Source: U.S. Energy Information Administration, *Petroleum Supply Monthly*, April 2019, preliminary data.



HYDROCARBONS ARE NOT CREATED EQUAL

HOW MANY KINDS OF NATURAL GAS ARE THERE?

- Produced gas can vary quite significantly from one field to another
- Natural gas is primarily made up of methane (dry gas), but can also include amounts of heavier hydrocarbons such as ethane and propane (wet gas)
- Dry gas tends to be produced from reservoirs with little crude oil (non-associated gas) and wet gas tends to be produced from predominately crude reservoirs (associated gas)
- Like crude, natural gas can be sweet or sour (contains H₂S or CO₂)
- End use markets require natural gas in a narrow range of heating content, otherwise known as BTUs/cubic foot



HOW IS NATURAL GAS PRICED?

MORE REGIONAL VERSUS GLOBAL

- Within a given region natural gas trading hubs have developed
- Like with crude, produced natural gas is priced relative to a pricing hub with adjustments for heating content, quality and location
- Unlike crude which trades in a defined range globally, natural gas prices can vary quite significantly from region to region





HYDROCARBONS RESERVOIRS VARY

CONVENTIONAL AND UNCONVENTIONAL

Conventional Drilling Basic Vertical Penetration Limited Formation Contact



Unconventional Drilling More Sophisticated Horizontal Penetration Extensive Formation Contact





HYDROCARBONS RESERVOIRS VARY

CONVENTIONAL AND UNCONVENTIONAL

- Evolving oil field technology has opened up new sources of both oil and gas
- New unconventional resources, such as shale formations, bring different unit cost structures as well as very different production profiles





MAKING HYDROCARBONS EQUAL

COMBINING OIL AND NATURAL GAS

- Oil is usually discussed in terms of barrels such as **bopd** or barrels of oil per day
- Natural gas is usually discussed in terms of cubic feet such as MMcfd or million of cubic feet per day
- When the two are combined they are discussed in terms of **boe** or barrels of oil equivalent
- On an energy equivalent basis 6000 cf of gas = 1 barrel of oil
 - AKLNG design of 3.6 bcf/d would be 600,000 boepd
- On price parity basis \$1 MMBtu = \$6/barrel



PRODUCTION CURVES VARY

SHAPE OF PRODUCTION IMPACTS FISCAL POLICY

- Conventional oil, unconventional oil and natural gas are produced very differently based on a number of drivers
- Fiscal regimes must be responsive across a wide range of operations





GLOBAL COMPETITION



OIL & GAS INDUSTRY

HOW IT IS ORGANIZED



INSIGHT. INQUIRY. INGENUITY.

THE OIL AND GAS VALUE CHAIN

FROM A PROSPECT TO END USER

- The oil and gas industry is broadly categorized into 3 sectors: **Upstream, Midstream,** and **Downstream**
- Petroleum fiscal systems usually only address the upstream



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THE VALUE CHAIN

FROM A PROSPECT TO END USER

- The value of oil and gas is determined by market prices (i.e. the downstream) less the costs to get from the wellhead to the market
- Upstream fiscal policies need to ensure that midstream and downstream costs are kept to a reasonable minimum

	UPSTREAM	MIDSTREAM	DOWNSTREAM
	OIL & GAS EXPLORATION / PRODUCTION	TRANSPORT & STORAGE	PRODUCT PREPARATION & USAGE
	Petroleum Fiscal Policy Laws and Regulations	Tightly Regulated Business	Highly competitive
			Lower Risk
	High Risk	Lower Risk	Lower Return
	High Reward	Lower Return	
			Volume Driven
	Full of Unknowns	Well Defined	Well Defined
INSNERGY	/		INSIGHT. INQUIRY. INGENUITY.

OIL AND GAS VALUE CHAIN

OWNERSHIP OF MAIN SEGMENTS

 Minerals in the ground are primarily controlled by governments, while midstream and downstream infrastructure is primarily controlled by private companies





WHO ARE THE MAIN INDUSTRY PLAYERS?

STURDY THREE-LEGGED STOOL

- Three Principal Players
 - Governments or resource owners
 - Energy companies
 - Service companies
- Governments grant the right to others to develop and monetize their oil and gas (and other mineral resources)
 - Like Alaska, many governments are just the regulatory authority and are not directly involved in operations. Their role is to enforce applicable laws and regulations and to ensure the resource is optimally developed
 - At the other end of the spectrum, besides being the regulatory authority other governments participate in operations through their NOC or national oil company
 - A few countries further divide the regulatory function into one agency as the regulator and another agency as the commercial participant



WHO ARE THE MAIN INDUSTRY PLAYERS

STURDY THREE-LEGGED STOOL

- Energy companies fulfill many roles while providing necessary capital, people and technology resources
 - Upstream exploration, appraisal and development
 - Midstream transportation and infrastructure
 - Downstream petrochemicals, refining and retail marketing
 - Most importantly they bring experience, especially for large project management
- Service companies provide the tools, technology and manpower resources to:
 - Explore for hydrocarbons
 - Drill and produce hydrocarbons
 - Responsibly abandon operations



THE NEED FOR OIL COMPANIES

GOVERNMENTS AND THE PRIVATE SECTOR

- Governments, who control the vast majority of mineral resources, generally lack the requisite financial and technical resources to effectively and efficiently exploit their mineral riches
- The necessary investment capital, trained personnel, technology and market access are largely held by the private sector
- Additionally, as "easy" oil declines and technologically challenged oil becomes the focus, the large project management skills of the oil companies becomes all the more important



WORLD OF OPPORTUNITY

COMPETING FOR CAPITAL



ANALYSIS IS STATIC, INDUSTRY IS NOT

CHANGE IS CONSTANT

- The Petroleum industry is continually changing and evolving, thus it's important to balance preparing for the future while addressing the present....
- ... in a global market, where no single region, player, or component is isolated from another, and...
-Where governments like Alaska need to set petroleum fiscal policy that is responsive to a complex and sophisticated business environment in a global

competition for oil company investment dollars



OIL PRICES ARE ANYTHING BUT STATIC

FISCAL SYSTEMS MUST WORK ACROSS WIDE RANGE OF PRICE



BP Statistical Review of World Energy 2019



OIL RESERVES CONTINUE TO GROW

ALASKA SIGNIFICANT BUT A VERY SMALL PART OF THE WORLD



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OIL LONG OR OIL SHORT?

FISCAL POLICIES DEPENDENT ON VIEW OF NEAR FUTURE



MAJOR OIL TRADE MOVEMENTS

CHINA, INDIA NOW BIGGEST IMPORTERS

IN3NERGY



WORLDWIDE PROVED GAS RESERVES

20 YEARS OF PRODUCTION AND RESERVES INCREASED 50%



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GAS LONG OR GAS SHORT?

IN3NERGY

HOW MANY YEARS WILL THE COUNTRY'S GAS LAST?



MAJOR GAS TRADE MOVEMENTS 2018

TRADE FLOWS WORLDWIDE (BILLION CUBIC METRES)



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FISCAL SYSTEMS



THE ROLE OF A FISCAL SYSTEM

STEWARDSHIP OF MINERAL RESOURCES

IN3NERGY

- A petroleum fiscal system is a framework of laws, regulations and contracts designed to define a government's economic status in the development of hydrocarbon resources
- The intent is to provide economic and other terms that will attract sufficient capital for the prudent development and production of a country's mineral wealth while returning a fair share of the value to the government
- Governments hope that whatever system they put in place will be robust enough to last many years before needing alteration
- However, as we showed earlier petroleum fiscal systems around the globe are regularly changing
- As such, governments need to frequently evaluate the competitiveness of their fiscal policy against the global market and potential impacts on the status of resource development within their country

THERE IS NO SINGLE IDEAL STRUCTURE

COUNTRIES ARE UNIQUE, FISCAL SYSTEMS ARE UNIQUE

- After a century of varying methods and terms, and the development of new and improved fiscal tools, there is still no single ideal or optimum petroleum fiscal structure
- Why is that? Every situation is unique
 - Oil companies are developing unique petroleum resources in partnership with governments that create fiscal structures fit to their specific goals, circumstances, needs and drivers
- Each government tries to use the best practices and tools modified to meet their stewardship obligations. Some typical drivers of policy design include:
 - Short term revenue needs vs building multi-generational wealth
 - Short on reserves (need to drill) or long on reserves (need to produce)
 - Providing affordable/discounted domestic energy supply
 - Growing associated industries (e.g. Petrochemical, Power)
 - Creating long term jobs for the country
 - Creating a national oil company



In making decisions where and when to invest, producers will assess the risk of doing business based on the whole package INSIGHT. INQUIRY. INGENUITY.

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ACHIEVING COMPETITIVE RETURNS

EACH PROJECT, REGION COMPETE GLOBALLY FOR CAPITAL

- IOCs are encouraged to invest in a given country or project through the opportunity to earn competitive returns via the:
 - Method of sharing benefits
 - Degree of sharing benefits
 - Timing of sharing benefits
 - Risk / Benefit balance
- Regimes and fiscal systems that share benefits that align with IOC investment decision-making metrics, timing and processes can be expected to be most robust, and to attract the most investment dollars
- Determining the right amount of government take is not and never has been an easy task- part science, part art
- Systems viewed most favorably have built-in flexibility, or self-correcting terms in order to adjust to the ever-changing conditions of the real world



SHARING BENEFITS

TYPICAL METHODS IN USE TODAY





Economically, each can be designed to deliver near similar results

FISCAL SYSTEMS

GETTING TO FAIR SHARES



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SHARING BENEFITS

TYPICAL METHODS IN USE TODAY

• At a very high level, oil and gas projects follow general project economics

Revenue - Costs = Profit

- Fiscal policy plays a role in all three parts, but the determination and division of profit are where petroleum fiscal frameworks play a large role
- Division of profit between the government and the companies is where the following terms are used:
 - Severance Tax
 - Petroleum Tax
 - Profit Oil
 - Government Take
 - Domestic Market Obligation



TOTAL REVENUES OVER THE LIFE OF THE PROJECT





INDUSTRY JARGON





ECONOMIC JARGON





DETERMINING THE VALUE OF THE VARIOUS PIECES



 Gross Revenues appears to be very simple calculation, just take production and multiply by the price

But

- Price:
 - Where is the pricing point?
 - How does it relate to published indices?
 - Is the sale third party / arm's length or affiliate sale / non arm's length?
 - What quality adjustments are needed?
- Production:
 - Where is it measured?
 - Who suffers losses?
 - Is lease use (for fuel) free or chargeable
- Net back Costs
 - What are allowable processing costs?
 - What are allowable transportation costs?
 - What are allowable shipping costs?
 - What are allowable marketing costs?



DETERMINING ALLOWABLE COSTS



IN3NERGY

- Oil company decision making economics and project expected returns will include ALL the associated costs incurred. However....
- Most fiscal systems disallow deduction or recovery of some types of costs for a variety of reasons. Examples include:
 - Bonuses, Annual Rentals
 - Overhead, Outside Country
 - Spill, Abandonment
- Other fiscal systems provide incentives to compensate for extended periods between investment and recovery:
 - Credits
 - Uplift
- These costs can be substantial and not including them in the fiscal system creates an expectation of a higher return for costs that are allowed

SUFFICIENT INCENTIVE TO CAUSE INVESTMENT



- One of the more contentious items is the "fair" rate of return to the oil company for their invested capital
- Producer overall returns on capital expectations can vary significantly depending on their drivers:
 - Actual cost of capital
 - Long run returns
 - Alternatives available at the time
- Oil Companies tend to target achieving 'a little extra' on successful projects to pay for expensive and at times unsuccessful exploration costs



GROSS ASPECTS OF GOVERNMENT TAKE



- Certain aspects of the non producer take, which constitute part of the "rent" are actually collected based on gross revenues
- These items present themselves as a hurdle that must be overcome before the producer realizes any value or to start recovering costs and earn a profit
- Known as 'regressive" elements, i.e. they get more burdensome as prices fall, they are payable even if the producer is not making a profit. The magnitude of their impact depends on the price and cost structure



FISCAL SYSTEMS

DESIGN IN PRACTICE



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COMPONENTS OF A FISCAL REGIME

MORE THAN MEETS THE EYE



www.accuweather.com

 Oil and Gas taxation, and the competitiveness of one regime versus another, is based on numerous items that are not always well understood, discussed, or even made 'visible' in typical competitive analyses and discussions



There is much more to petroleum fiscal policy than the headline level of government take

SHARING BENEFITS

LEVEL OF GOVERNMENT TAKE



- Determining the right amount of government take is not an easy task
- Chart shows government take (or non-producer share)
 - Lower government take is to the top & to the right of the chart
 - Higher government take is to the bottom & to the left of the chart
- A rational assumption would be that the bulk of the petroleum investment dollars would be spent in countries in the top half of the table
- But actual industry spending favors the bottom half of the table
- This tells us there is more to energy investment decision making than government rates of take

FISCAL SYSTEM DESIGN CONSIDERATIONS

THE "FIXED" VERSUS "VARIABLE" DEBATE

- With so many options and so many moving parts, a flexible, selfcorrecting structure is now the globally preferred way forward as it is a much more stable structure as change occurs
 - The industry is in a constant state of change
 - As world-wide and local fiscal conditions fluctuate, the profit available for sharing will change
 - Fiscal structures must be flexible to accommodate this
- Good fiscal design without complementary institutional structures may still not achieve the desired goals
- Fiscal design needs to be within the administrative and audit capacity of the relevant governing institutions



A simpler system usually proves out to be more viable than a theoretically ideal but complex system

FISCAL SYSTEM DESIGN

HOW TO APPROACH

- The structures, and tools that can be used under each structure, are very widely known and understood
- Competitive reviews are mainly about the past or present, and rarely address the inevitable change to come
- Make sure you have established agreed short-term and long-term goals, e.g. :
 - Multi-generational wealth creation
 - Fill TAPS
 - Cheap fuel and power across the state
- Review multiple options modelled against different future scenarios to improve chances of realizing goals
- Draw conclusions of competitiveness from a review of all aspects of your multifaceted system and all aspects of competing systems



FISCAL SYSTEM DESIGN

HOW TO APPROACH

- Ask for and expect to be shown something other than a single comparative table to explain differences between Alaska and other fiscal systems competing for company capital
- The 'obvious' aspects usually don't drive investment decisions
- Understand the true differentiators that drive investment
- Ask companies why they are spending billions on countries with a 'higher government take'



ALASKA PETROLEUM TAX

THINGS TO CONSIDER



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THE ALASKA PETROLEUM FISCAL SYSTEM

BACKGROUND

- Alaska has a royalty (gross tax) and net tax combined structure
 - Royalty rates based on who owns the onshore or offshore minerals, the type of lease and the lease vintage
 - Most leases pay between 1/8th and 1/6th royalty
 - Current production tax rate of 35% was set in 2013 by SB21
 - After deductions and credits, at current prices the average effective tax rate actually paid has been much lower
- Compared to other fiscal systems, Alaska's fiscal system is complex, making it hard for companies to work within and for the State to administer, e.g.:
 - Multiple tax credits
 - 7 tax ring fences
 - Allowed and disallowed costs
 - Carry forward NOLs

THE ALASKA TAX CALCULATION

MANY STEPS TO THE PROCESS

- Market
 - Less marketing fees
 - Less shipping
 - Less TAPS

- Netback

- [Less inter-field lines]
- Gross Value at the Point of Production GVPP
 - Less Royalty
 - Less [GVR or gross value reduction]
 - Less Capital Expenditures Capex
 - Less Operating Expenditures Opex
 - Less Carry forward losses NOLs
 - Less property tax
- Taxable Value



THE ALASKA TAX CALCULATION

MANY STEPS TO THE PROCESS

- Taxable Value
 - Calculate preliminary "net" tax
 - Less carry forward credits
 - Less per barrel credits
 - [Less GVR credits]
 - "Net" petroleum tax owed
 - Calculate "Gross" Minimum Tax
 - [Less GVR credits]
 - "Gross" petroleum tax owed
 - Less applicable tax which is the greater of Gross & Net
- Gross profit
 - Less State Corporate Income Tax calculation
 - Less Federal Corporate Income Tax calculation
- Producer Share



THE ALASKA TAX CALCULATION

MANY STEPS TO THE PROCESS

- Government Total Share is comprised of:
 - Royalty
 - Property Tax
 - Applicable petroleum tax
 - Alaska Corporate Income Tax
- Because of how the overall calculus works an extra \$1 more or less to the State of Alaska is something smaller than \$1 less or more in the producer's pocket



SUMMARY



INTRO TO PETROLEUM FISCAL SYSTEMS

SUMMARY

- Oil and gas terms and jargon are extensive but important to building an understanding
- Hydrocarbons are a non-renewable resource
- Hydrocarbons are not created or valued equally
- Oil companies and governments work together in countries across the globe to produce and market hydrocarbons
- Alaska is a small part of a growing global market
- There is no ideal fiscal structure
- Alaska has a complex gross and net tax system

