Introduction to Oil & Gas Industry, Accounting & Financial Statement Analysis
A number of distinct yet interconnected sectors

- There are a number of sectors that make up the O&G industry – each focused on a specific process in the value chain.

Companies focus on one sector

- Given the complexities of this extractive industry, most companies focus on one particular sector.
Mission – to find and extract
• The Exploration & Production sector involves all operations associated with finding and extracting oil and gas.
• E&P sector can be broken out into the exploration and production components.
• Timing between the two components can take years (and usually does!).

Crude terms
• Exploration & Production is typically referred by its acronym: E&P.
• Companies focused only on this sector are referred to as E&P companies.
• E&P is also known as the upstream sector, to indicate the upward extraction of the commodities.
Oil & gas industry sectors and players

- Pre-license prospecting
- Property/land rights acquisition
- Exploration drilling
- Evaluation and appraisal
- Development

- Primary recovery method
- Secondary recovery method
- Tertiary (enhanced) recovery method
Oil & gas industry sectors and players

**Prospcting**
- Involves performing a number of geological evaluations/surveys to determine hydrocarbon presence.

**Property acquisitions**
- Involves activities relating to securing the rights from the property owner to explore for and produce oil & gas in that field/area.
- Fiscal terms surrounding property acquisitions (what is owned by the oil companies versus original land owners/government) are complex; we will examine them in the later section.

**Exploration (drilling)**
- Involves drilling exploration wells to determine if commercial hydrocarbon quantities exist.

**Evaluation and appraisal**
- Involves confirming the initial exploration results through appraisal wells drilled to gain further insight into the property, including the size of the reservoir.

**Development**
- Involves activities relating to developing the discovered O&G reserves for production.

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**Exploration costs (part 1)**
- Geological and geophysical (G&G) costs

**Acquisition costs**
- Related to acquiring the rights to explore and develop

**Exploration costs (part 2)**
- Exploratory drilling

**Exploration costs (part 3)**
- Often include appraisal-related costs

**Development costs**
- Drilling costs
- Storage costs
Oil & gas industry sectors and players

**Production – the beginning of the end**
- Involves extracting, storing, and getting O&G ready for shipping.
- Companies typically follow a number of recovery methods to prolong the production life of the property (typically 5-10 years).

**Primary recovery**
- Relies on the underground pressure, which if sufficient, will force O&G to the surface.
- Less than 40% of O&G in the U.S. can usually be extracted using this method.

**Secondary recovery**
- Implemented when natural pressure is insufficient to sustain commercial O&G production.
- Utilizes a number of various methods – pumps, water injection, natural gas re-injection and gas lift – to sustain production.
- Accounting for about 50% of extracted O&G in the U.S.

**Tertiary (Enhanced) recovery**
- Various enhanced recovery methods focused on increasing the O&G's flow characteristics.
- Accounts for about 10% of extracted O&G in the U.S.

Crude terms
Costs associated with the production phase are interchangeably known as:
- Production costs
- Lifting costs
- Operating costs
- Lease operating (LOE costs)
Reserves – the lifeline of the E&P industry

- Can be classified differently depending, among several other things, on the certainty with which they can be recovered:
Proved reserves – we’re fishing and the fish is most certainly in our net

• Commercially recoverable under current economic conditions (both in terms of prices and costs) and currently available technology.
• Highly certain to be recovered – must be a 90% chance that actual reserves will be larger than this estimate.

Proved Developed

• Reserves that are expected to be produced from existing wells.
• Can be producing – proved developed producing (PDP).
• Not yet producing – proved developed non-producing (PDNP).

Proved Undeveloped (PUD)

• Reserves that are expected to be produced from new wells.

Reserve talk

• Under U.S. GAAP rules, only proved reserves are allowed to be booked (shown in companies’ financials)
• Under international GAAP (IFRS) rules, companies are allowed to book both proved and probable reserves.
Probable reserves – we’re fishing and we see fish in the water
• Unproved reserves that are likely to be recoverable.
• Should be at least 50% chance of being technically and economically producible.

Possible reserves – we’re fishing and we think there is fish in the water
• Estimated to have a significant, but less than 50 percent chance of being technically and economically producible.

More reserve talk
• 1P or P = proved reserves
• 2P = Proved + probable reserves
• 3P = Proved + probable + possible reserves
Oil & gas industry sectors and players

Transportation – store and transport

• Involves all operations associated with storing O&G and transporting it from fields to refineries and processing plants.
• O&G can be transported by pipelines, trucks, and oil tankers.
• The sector is typically referred to as midstream, to indicate its role as a connection between E&P and refining and marketing operations.

Major midstream players
• Enterprise Products Partners
• Kinder Morgan
• Northern Border Partners
• Plain All-American Pipeline
• TEPPCO Partners

Source: EIA
Refining and Marketing – refine and get ready for end-users

- Includes refining crude oil into petroleum products (gasoline, jet fuel, heating oil, diesel, fuel oil, asphalt, etc.) and marketing them to end-users (i.e. through gasoline stations).
- As with its E&P counterpart, the downstream sector can be examined by looking at refining separately from marketing.

Refining terms

- Refining & Marketing is typically referred by its acronym: R&M
- R&M is also known as the downstream sector, to indicate the delivery of petroleum products to end-users
Oil & gas industry sectors and players

Refining – from crude oil to petroleum products

- Since crude oil cannot be used in its natural unrefined form, it must first be converted (refined) into petroleum products – this is accomplished in processing plants known as refineries.
How are refining profits calculated?

- Refining margins refer to the difference between the price of a petroleum product (output) and raw material costs (feedstocks/input) expressed on a per barrel basis.
- Often based on “benchmark” feedstocks such as WTI.
- Refining margins exist for each petroleum product:
  - Gasoline crack = 1 bbl gasoline – 1 bbl crude oil
  - Heat crack = 1 bbl heating oil – 1 bbl crude oil

Refining terms
Refining profits are interchangeably referred to:
- Indicator margin
- (Margin) differential
- Crack / spread / crack spread
More complex refineries = higher refining margins

- More complex refineries are able to refine cheaper (heavy and/or sour) heavy oil into petroleum products, increasing their profits.
- More complex refineries can change the proportion of petroleum product mix to take advantage of feedstock costs and petroleum product prices.

<table>
<thead>
<tr>
<th>Feedstock / Product Mix</th>
<th>Volume</th>
<th>Unit Price ($/bbl)</th>
<th>Revenue / (Cost)</th>
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</thead>
<tbody>
<tr>
<td>WTI</td>
<td>100%</td>
<td>$71.00</td>
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<tr>
<td>Gasoline</td>
<td>33%</td>
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<td><strong>Revenue</strong></td>
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<td><strong>Costs</strong></td>
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<td><strong>($71.00)</strong></td>
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<td><strong>Gross Margin</strong></td>
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Oil & gas accounting

Complex topic made more challenging by competing accounting methods

- The challenge stems from treatment of unsuccessful exploration costs

![Diagram showing O&G costs breakdown]

- Acquisition Costs: Capitalized (B/S), Amortized (I/S)
- Exploration Costs: Depends
- Development Costs: Capitalized (B/S), Amortized (I/S)
- Production Costs: Expensed (I/S)
Different treatments of unsuccessful exploration methods:

**Full costs (FC) method**
- Allows all exploration results (dry holes and discoveries) to be capitalized (on the balance sheet) and amortized (on the income statement) over the estimated lives of the properties.

**Successful efforts (SE) method**
- Requires unsuccessful exploration results (dry holes) to be expensed as incurred.
- Only successful exploration wells are capitalized (on the balance) and amortized (on the income statement) over the estimated lives of the properties.

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<th>Successful Efforts</th>
<th>Full Cost</th>
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<td>Acquisition costs</td>
<td>CAPITALIZED</td>
<td>Cap</td>
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<tr>
<td>Geological &amp; geophysical</td>
<td>Exp</td>
<td>Cap</td>
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<td>Exploratory dry hole</td>
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<td>Cap</td>
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<td>Successful exploratory well</td>
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<td>Development dry hole</td>
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<td>Successful development well</td>
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<td>Operating costs</td>
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<tr>
<td>Size of cost center</td>
<td>Small</td>
<td>Large</td>
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<tr>
<td>Amortization Cost Center</td>
<td>Single well / field</td>
<td>Company / country</td>
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Oil & gas accounting

**Depreciation**
- A method by which the cost of long-term fixed assets (over 1 year) is spread over a future period (number of years), when these assets are expected to be in service and help generate revenue for a company.
- An allocation of the costs of an original purchase of fixed assets over the estimated useful lives of those fixed assets.

**Depletion**
- O&G industry specific
- Same concept as depreciation that is applied to mineral resources.

**Amortization**
- Amortization is the systematic allocation of the cost of acquired intangible assets over a period of time that these assets are expected to be in service and help generate revenue for a company.

**All 3 appear on the income statement**
- Combined into 1 line item: Depreciation, Depletion, and Amortization (or DD&A).

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**What’s depreciated?**
Fixed assets:
- Plants
- Machinery
- Drilling equipment
- Pipelines

**What’s depleted?**
- O&G reserves

**What’s amortized?**
Acquired intangible assets:
- Brand
- Franchise
- Trademarks
- Patents
Full costs (FC) method
• Requires companies to perform a ceiling test limitation (impairment test) comparing the book value of O&G assets against the SEC value of reserves (market value proxy) that all O&G producing companies must disclose in their footnotes (more on this in the later section).
• If SEC value is lower than the capitalized costs, a write-down is required.
• This is why companies using the FC method utilize large cost centers.

Successful efforts (SE) method
• Companies are not required to perform a ceiling test limitation.
• Write-downs are less frequent than under the SE method, since unsuccessful exploration costs are expensed.

A ceiling test limitation example
- If a company has book value of proved O&G reserves of $200 million and the SEC value of these reserves is $150 million, there would be a $50 million write-down.
- If the SEC value of these reserves is $275 million, there wouldn’t be any write-down (a company would have a cost ceiling cushion of $75 million).