Energy Sector Report

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Energy Sector Report

Agenda

- Historical Background
- Current Conditions
- Takeaways - Impacts on Gear Manufacturers
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Historical Background

- 1845 - Methane first liquefied by Michael Faraday
- 1859 - Colonel Edwin Drake, Northwestern Pennsylvania
- 1882 - John D. Rockefeller Standard Oil Trust
- 1901 – Spindletop
- 1930’s - East Texas
- 1938 - Freestanding drilling platform in the Gulf of Mexico
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Historical Background

- 1947 - First oil rig out of sight of land
- 1947 - Hydraulic fracturing invented
- 1959 - Vessel Methane Pioneer transports first methane cargo from Lake Charles, LA, USA to Canvey Island, UK
- 1967 - Oil discovery at Alaska’s Prudhoe Bay
- 1969 - Undersea oil well off Santa Barbara, CA
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Historical Background

- 1973 - Arab oil embargo
- 1989 - Exxon Valdez Alaska's Prince William Sound
- 2004 - Shell reserves overestimate
- 2004 - Hurricane Ivan underwater mudslides in GOM
- 2000’s – U.S. oil & gas boom
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Historical Background

- 2010 - Deepwater Horizon oil rig oil spill offshore Louisiana
- 2012 - Kulluk rig grounded offshore Alaska – leased by Shell
Hubbert’s “Peak Oil” Theory

- Dr. M. King Hubbert – Shell Research Scientist
- 1956 model which predicted US crude production would “peak” between 1965 & 1971
- Terminal decline would occur after 1971
- Studied past discoveries, production rates and, predicted future discoveries
- Proposed that production from any field, etc., would represent a “bell curve” over time
- Forecasted that world oil would “peak” in 1995
Historical Background
Hubbert vs. Actual

U.S. Crude Oil Production versus Hubbert Curve

Data source: US Energy Information Administration
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Historical Background

- Hubbert’s “Peak” Theory
  - US crude oil production did have “a peak” in 1971.
- Issues
  - Better geological tools
  - Better drilling techniques
  - Enhanced recovery techniques
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Current Conditions
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Current Conditions

- Current state of the energy sector
- Regulatory policies
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Current State of the Energy Sector

Source: https://www.eia.gov/todayinenergy/detail.php?id=30972

![U.S. total energy production (2000-2016)](image)
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Current State of the Energy Sector

- Crude Oil
- Natural gas
- Electricity, coal, renewables, and emissions
North Sea Brent crude oil spot prices averaged $52 per barrel (b) in April, $1/b higher than the March average and the fifth consecutive month that Brent crude oil spot prices averaged between $50/b and $55/b.

EIA forecasts Brent prices to average $53/b in 2017 and $57/b in 2018. West Texas Intermediate (WTI) crude oil prices are forecast to average $2/b less than Brent prices in both 2017 and 2018.

NYMEX contract values for August 2017 delivery traded during the five-day period ending May 4 suggest that a range of $37/b to $63/b encompasses the market expectation for WTI prices in August 2017 at the 95% confidence level.

Source: https://www.eia.gov/outlooks/steo/
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Crude Oil – Prices

https://www.eia.gov/outlooks/steo/marketreview/crude.cfm

Figure 1. Crude oil front-month futures prices

$/b

WTI crude oil  Brent crude oil

Bloomberg L.P.
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Crude Oil – Prices

https://www.eia.gov/todayinenergy/detail.php?id=29092

Monthly West Texas Intermediate and Brent spot crude oil prices

- Brent
- West Texas Intermediate

Forecast
U.S. crude oil production averaged an estimated 8.9 million b/d in 2016.

U.S crude oil production is forecast to average 9.3 million b/d in 2017 and almost 10.0 million b/d in 2018.

EIA estimates that crude oil production for April 2017 averaged 9.1 million b/d, which is 0.2 million b/d above the April 2016 level and 0.6 million b/d above the recent monthly average low reached in September 2016.

Source: https://www.eia.gov/outlooks/steo/
Production in the GOM is less sensitive to short-term price movements than onshore production in the Lower 48 states because of the time needed to complete large offshore projects.

The GOM projects that started producing in the second half of 2016 collectively produced more than 100,000 b/d in November and contributed to overall production increases (e.g. Shell Stones Project est. 50,000 b/d)

Source: https://www.eia.gov/outlooks/steo/
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Crude Oil – Production

https://www.eia.gov/todayinenergy/detail.php?id=30032

Monthly U.S. crude oil production (January 2013-November 2016)

million barrels per day

Alaska
Federal Offshore
Gulf of Mexico

Lower 48 states

2013 2014 2015 2016
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Crude Oil – Production

https://www.eia.gov/todayinenergy/detail.php?id=30032
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Crude Oil – Production

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Natural gas - Prices

- In April, the average Henry Hub natural gas spot price was $3.10 per million British thermal units (MMBtu), 22 cents/MMBtu above the March level.

- NYMEX contract values for August 2017 delivery traded during the five-day period ending May 4 suggest that a range of $2.47/MMBtu to $4.49/MMBtu encompasses the market expectation for Henry Hub natural gas prices in August 2017 at the 95% confidence level.

- Source: https://www.eia.gov/outlooks/steo/
U.S. dry natural gas production is forecast to average 74.1 billion cubic feet per day (Bcf/d) in 2017, a 1.8 Bcf/d increase from the 2016 level. This increase reverses a 2016 production decline, which was the first annual decline since 2005. Natural gas production in 2018 is forecast to be 3.2 Bcf/d more than the 2017 level.

New natural gas export capabilities and growing domestic natural gas consumption contribute to the forecast Henry Hub natural gas spot price rising from an average of $3.17/MMBtu in 2017 to $3.43/MMBtu in 2018.

Source: [https://www.eia.gov/outlooks/steo/](https://www.eia.gov/outlooks/steo/)
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Natural Gas – Exports

https://www.eia.gov/todayinenergy/detail.php?id=30052
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Natural Gas – Exports

https://www.eia.gov/todayinenergy/detail.php?id=30052
Total U.S. electricity generation from utility-scale power plants averaged 11,150 gigawatthours per day in 2016.

Forecast generation declines by 1.2% in 2017 and then grows by 1.9% in 2018. EIA expects the annual average U.S. residential electricity price to increase by 2.4% in 2017 and by 2.3% in 2018.

Source: https://www.eia.gov/outlooks/steo/
ELA expects growth in demand for U.S. coal exports to contribute to a 5% increase in coal production in 2017.

Forecast growth in coal-fired electricity generation leads to an additional 1% increase in coal production in 2018.

ELA estimates the delivered coal price averaged $2.11/MMBtu in 2016, a 5% decline from the 2015 price. Coal prices are forecast to increase in 2017 and 2018 to $2.16/MMBtu and $2.22/MMBtu, respectively.

Source: https://www.eia.gov/outlooks/steo/
Forecast generation declines by 1.2% in Wind energy capacity at the end of 2016 was 81 gigawatts (GW).

ELA expects wind capacity additions in the forecast will bring total wind capacity to 102 GW by the end of 2018.

Source: [https://www.eia.gov/outlooks/steo/](https://www.eia.gov/outlooks/steo/)
Total utility-scale solar generation capacity is forecast to increase by 48% from 21 GW at the end of 2016 to 32 GW at the end of 2018.

Utility-scale solar electricity generation is forecast to account for more than 1% of total utility-scale electricity generation in 2018.

Source: https://www.eia.gov/outlooks/steo/
After declining by 1.7% in 2016, energy-related carbon dioxide (CO2) emissions are projected to decrease by 0.7% in 2017 and then increase by 2.3% in 2018.

Energy-related CO2 emissions are sensitive to changes in weather, economic growth, and energy prices.

Source: https://www.eia.gov/outlooks/steo/
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Electricity, Coal, Renewables, and Emissions

Source: https://www.eia.gov/todayinenergy/detail.php?id=30972
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Regulatory Policies

- Environmental Regulations
- Financial Assurance Requirements
- Permitting Timelines
- Tax Reform
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Environmental Regulations

- Clean Air Act - Clean Power Plan
- Clean Water Act – *Waters of the United States*
- National Environmental Policy Act
August 3, 2015, President Obama announced the finalization of the *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units* (i.e. Clean Power Plan (CPP)) in preparation for the 2015 Paris Climate Conference.

CPP was promulgated under Section 111 of the Clean Air Act. 42 U.S.C. 7411 in 80 FR 64662 (October 23, 2015) codified at 40 C.F.R. pt. 60
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Clean Air Act - Clean Power Plan

- February 9, 2016 - U.S. Supreme Court granted an order staying the CPP
- March 28, 2017 - Trump to sign executive order to under the CPP

The final rule became effective on August 28, 2015

Clean Water Rule: Definition of “Waters of the United States” at 40 CFR 230.3

October 9, 2015, the U.S. Court of Appeals for the Sixth Circuit stayed the Clean Water Rule nationwide pending further action of the court
NEPA requires Federal Agencies to assess the environmental effects of their proposed actions prior to making decisions.

Termed "Magna Carta" of Federal environmental laws.

NEPA process" or "the environmental impact assessment process" provides public officials with relevant information and allow a "hard look" at the potential environmental consequences of each proposed project.
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**Financial Assurance Requirements**

- Well Abandonment and Decommissioning
- Federal Authorities Concerns:
  - “Routine” oil and gas facility decommissioning liability in Gulf of Mexico currently totals $40 billion.
  - An accident or hurricane event can result in a tenfold (or more) increase in “routine” decommissioning cost.
  - Existing Pacific & Gulf of Mexico oil and infrastructure is aging.
  - BSEE records indicate 245 GOM platforms currently fit idle iron criteria.
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Financial Assurance Requirements

- NTL 2016-N01 Requiring Additional Security - issued July 14, 2016 and effective September 12, 2016 superseding and replacing NTL No. 2008 –N07
- BOEM Withdraws Sole Liability Orders February 17, 2017- Pending Review of Complex Financial Assurance Issues
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Permitting Timelines

- Dakota Access Pipeline
- Keystone Pipeline
- Executive Memos Signed January 24, 2017
  - Review Timelines
  - Local Content
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Potential Tax Reforms

- Move to a territorial tax system – permit companies to repatriate foreign business income with little or no residual home-country tax

- Immediate write-off for business investment in PP&E.

- Border Adjustment Tax – Adopt a destination-based tax approach used by trading partners. Would eliminate self-imposed penalty for exports, subsidies for imports, and encourage companies to relocate supply sources and manufacturing facilities to the U.S.
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Takeaways - Impacts on Gear Manufacturers
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Takeaways - Impacts on Gear Manufacturers

- Broad scope of potential customers in all areas of the energy sector with an *all of the above* approach to energy

- Administration’s push beyond energy independence to energy dominance

- Key factors – Innovation – Social License
  - Technology
  - Business
  - Regulatory
Thank You!

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Questions?