



Energy Scenarios and Market Dynamics

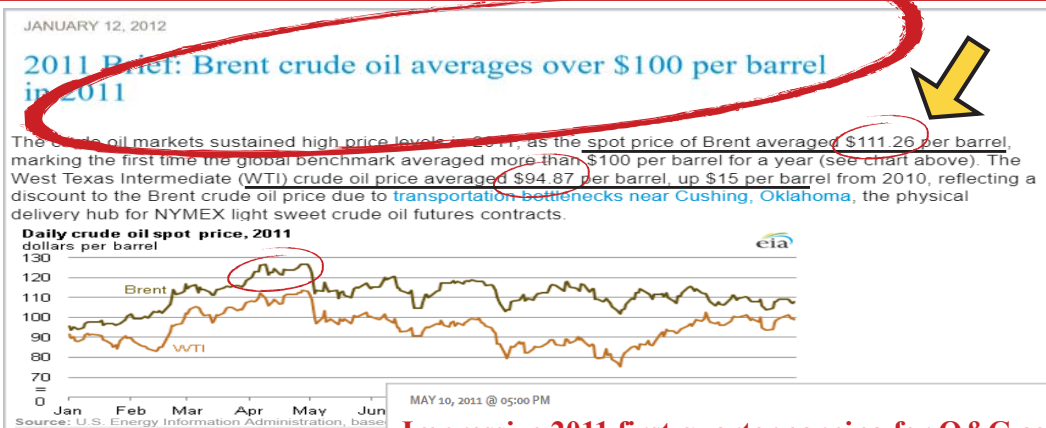
Roberto Nava, Bain & Company

Milan, 9 February 2018

DRAFT

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2011: Brent price reached the highest peak with an yearly average price of 100\$, leading to high OilCos' earnings



Unfortunately,
we are
In 2018

2011

Impressive 2011 first quarter earning for O&G companies, driven by high Oil price

America's largest oil and gas companies recently announced their earnings reports for the first quarter of 2011. The figures were eye-popping: Exxon Mobil alone posted \$10.7 billion in profits. Chevron and ConocoPhillips --the next two biggest U.S. firms in the industry--posted smaller but still impressive numbers of \$6.2 billion and \$3 billion, respectively.

All these results reflected large increases from last year's numbers.



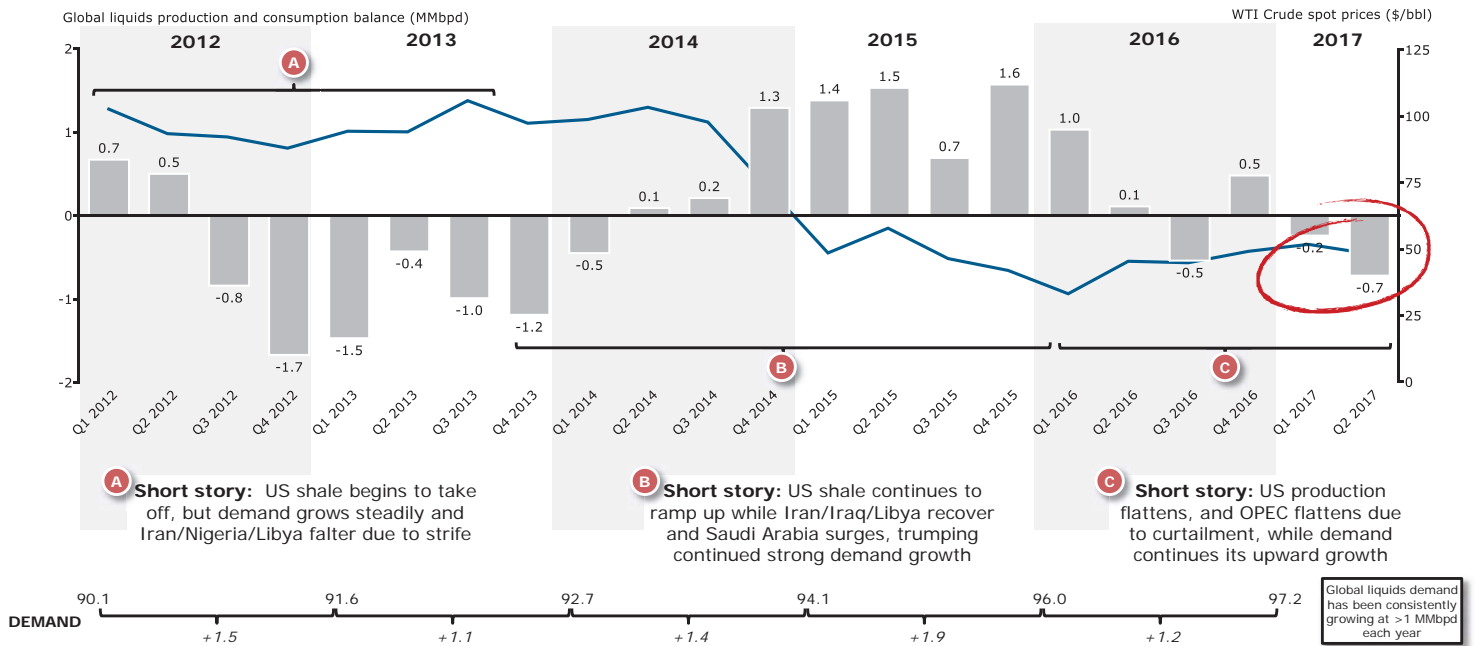
Truth is, recent earnings aren't the result of international conspiracy or corporate malfeasance or unbridled avarice--they spring from the basic fact that crude oil costs, and thus gasoline prices, have risen dramatically in recent months.

Source: Eia news, Forbes news



Since 2012, the global crude oil / liquids market has seen periods of both significant undersupply and substantial oversupply

Fundamentals



Source: EIA

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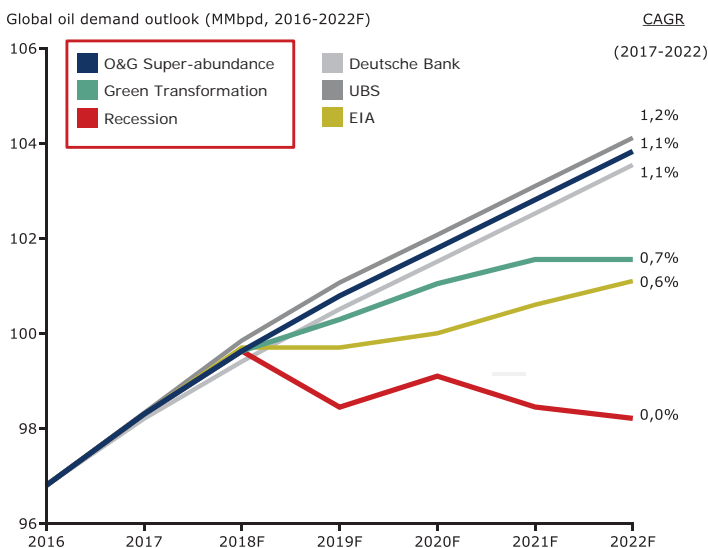
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Bain's demand forecast (O&G Super-abundance) is in line with 3rd party expectations – though we see two paths to a more bearish case

Demand

OIL DEMAND OUTLOOK RANGES FROM ~98 – 104 MMBPD IN 2022

KEY ASSUMPTIONS ON BAIN OUTLOOKS



- O&G Super-abundance** (Selected scenario)
 - Demand outlook bolstered by abundance of low cost supply from OPEC and US Tight Oil
 - Relatively slow evolution of vehicle efficiency gains, and minimal penetration of alternative fuel and electric vehicles
- Green Transformation**
 - No difference in global GDP assumptions vs. Super-abundance
 - Demand through 2022 reflects beginnings of impact of stronger green policies, increased fuel efficiency gains, and faster penetration of breakthrough technologies
- Recession**
 - Recession GDP assumptions beginning in 2019 are applied to the "base case" demand from O&G Super-abundance scenario
 - US recovers from 2019 recession, but Europe remains in protracted decline, as China continues its long-term slow-down

Source: IHS Market forecast, analyst reports, EIA, Bain IP, Bain analysis

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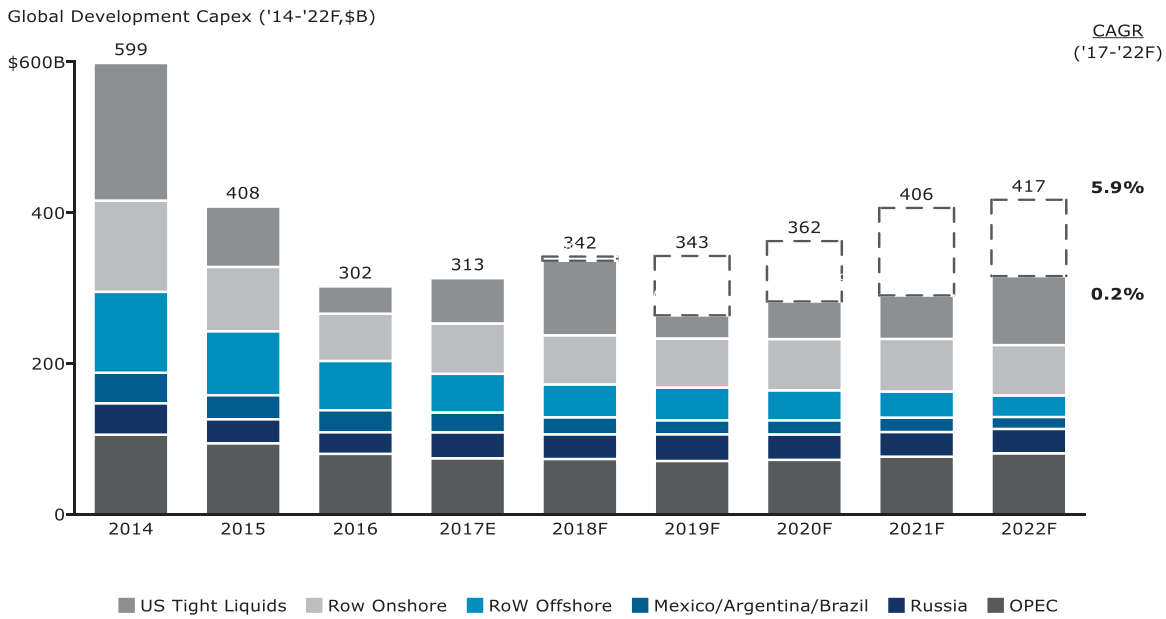
Based on Bain modeled scenarios, Global Development Capex to grow by ~0-6% p.a. from 2017-2022

Capex

1 OIL & GAS SUPER-ABUNDANCE

Selected scenario

GLOBAL PAST AND FORECASTED DEVELOPMENT CAPEX



Note: Development Capex includes Facility and Well Capex as defined by Rystad;
Source: Rystad; Bain analysis

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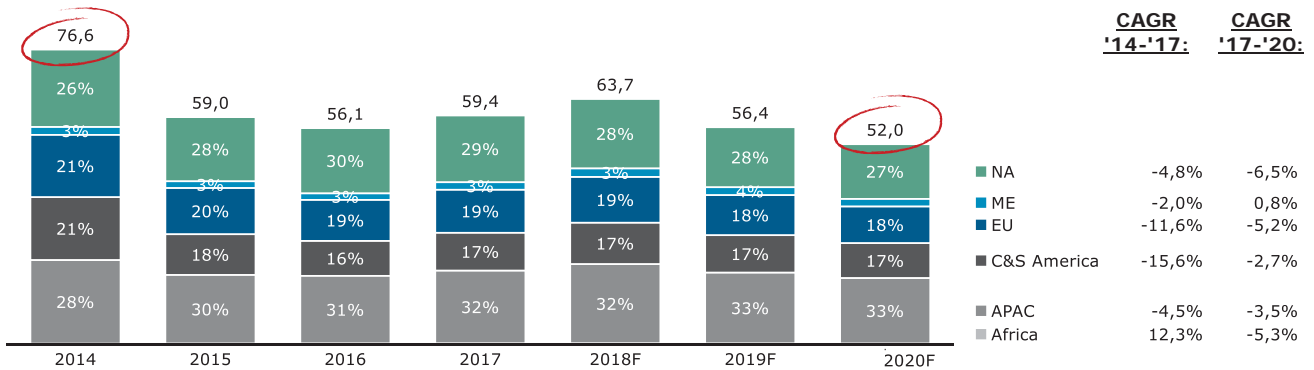
After '14-'16 CAPEX breakdown, a consolidation trend is forecasted in refinery plants investments

Capex

1 OIL & GAS SUPER-ABUNDANCE

Selected scenario

GLOBAL PAST AND FORECASTED CAPEX IN REFINERY PLANTS (B\$)



**Slight growth in investments in 2018, followed by a new decline:
CAPEX forecasted to reach ~52 B\$ in 2020**

Source: HIS, Bain Analysis

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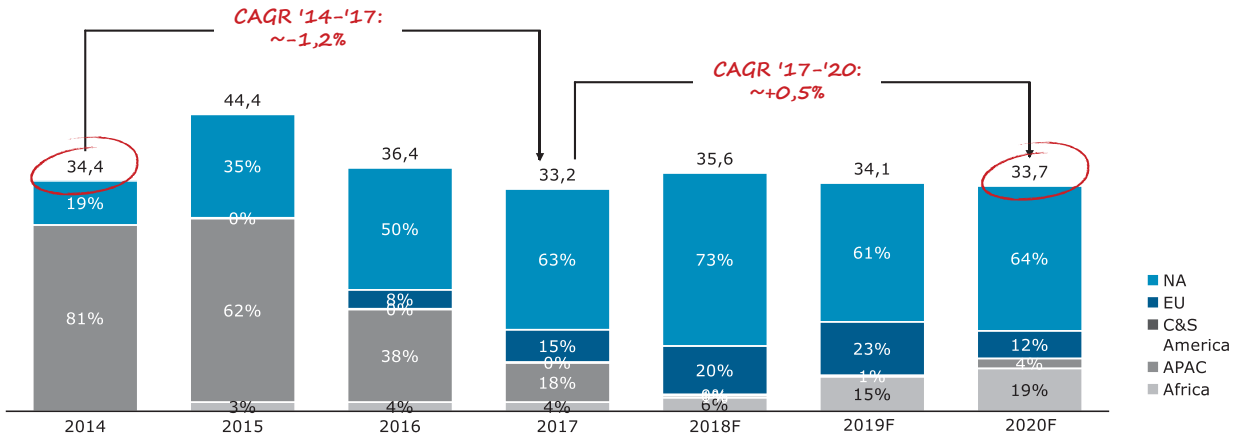
NLG Liquefaction capex are forecasted to be at a steady level between 2017 and 2020, with APAC dismissing CAPEX

Capex

1 OIL & GAS SUPER-ABUNDANCE

Selected scenario

GLOBAL PAST AND FORECASTED LNG LIQUEFACTION CAPEX (B\$)



NA accounting for the highest share of LNG liquefaction CAPEX from 2016, on due to APAC that is considerably losing share, while EU presence is increasing

Source: HIS, Bain Analysis

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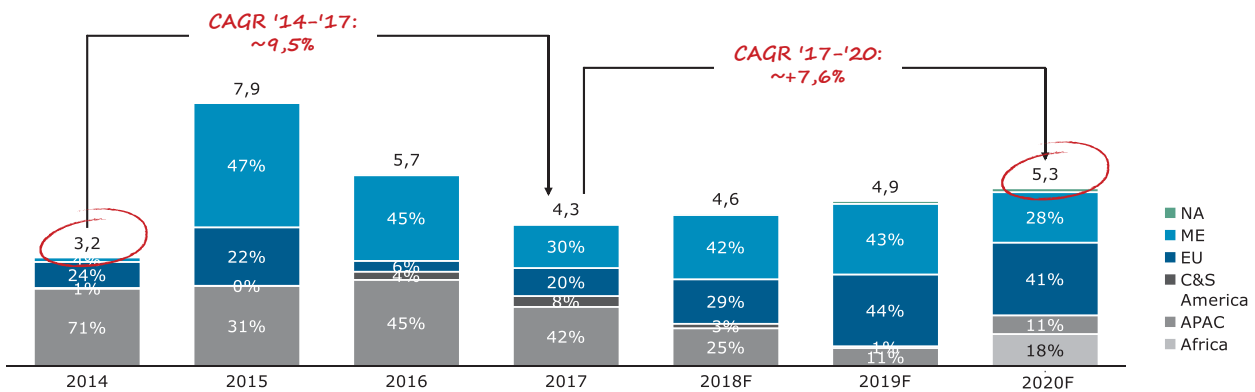
ME and EU accounting for the highest share of LNG Regasification CAPEX Level in 2020, while APAC is losing share

Capex

1 OIL & GAS SUPER-ABUNDANCE

Selected scenario

GLOBAL PAST AND FORECASTED LNG REGASIFICATION CAPEX (B\$)



ME, APAC and EU principal markets for Regasification CAPEX in 2017, even though APAC is losing share among years and will represent just 11% in 2020

Source: HIS, Bain Analysis

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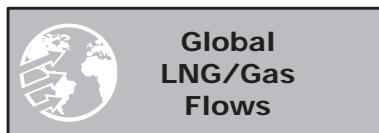
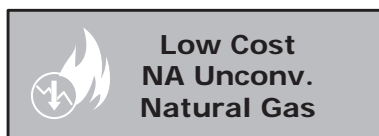
Looking out to 2030, a number of trends have the potential to disrupt the global energy landscape

Focus in next slides

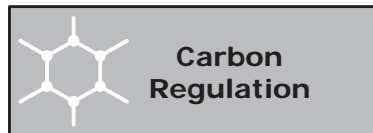
Disruptors

SOURCES OF DISRUPTION

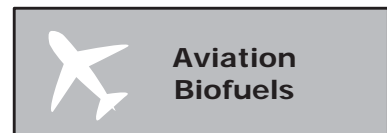
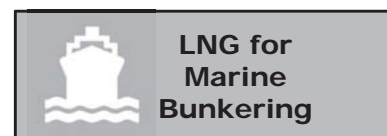
PETROLEUM LIQUIDS & NATURAL GAS



POWER



TRANSPORTATION



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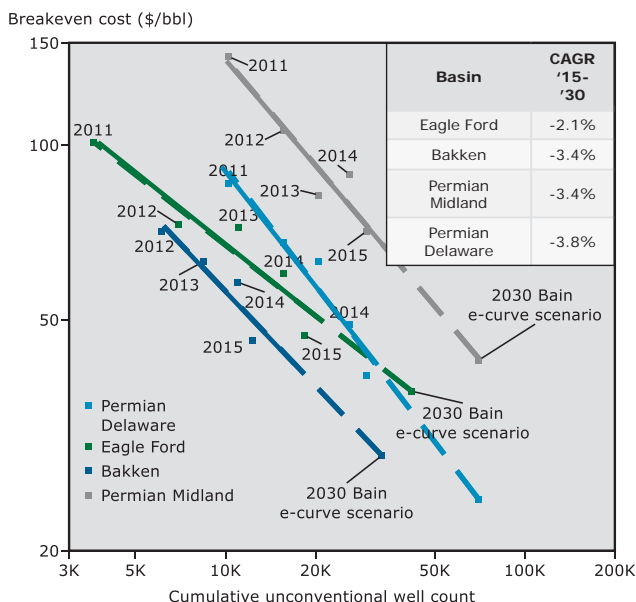
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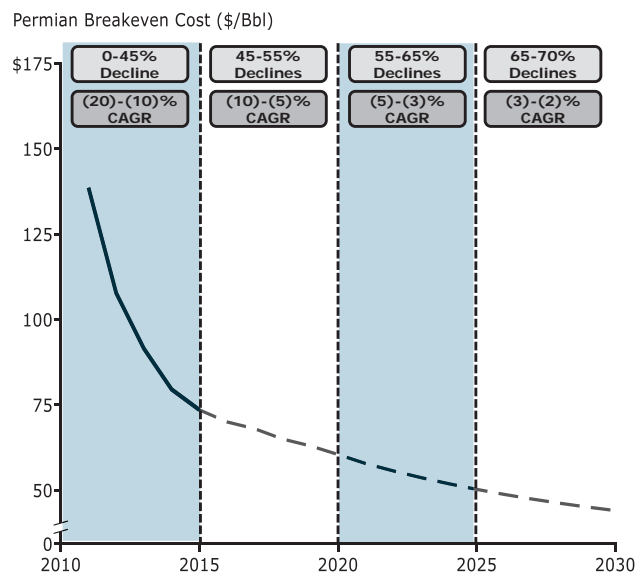
If NA Tight Oil experience curve continues, more low-cost supply available

Disruptors

APPLYING E-CURVE RESULTS IN NA TIGHT OIL BREAKEVEN DECLINE...



...ALTHOUGH DECLINE RANGES FROM (20)%-(2)% P.A. DUE TO LOGARITHMIC NATURE OF BREAKEVEN E-CURVE



Source: Rystad, EIA, Lit search, company presentations

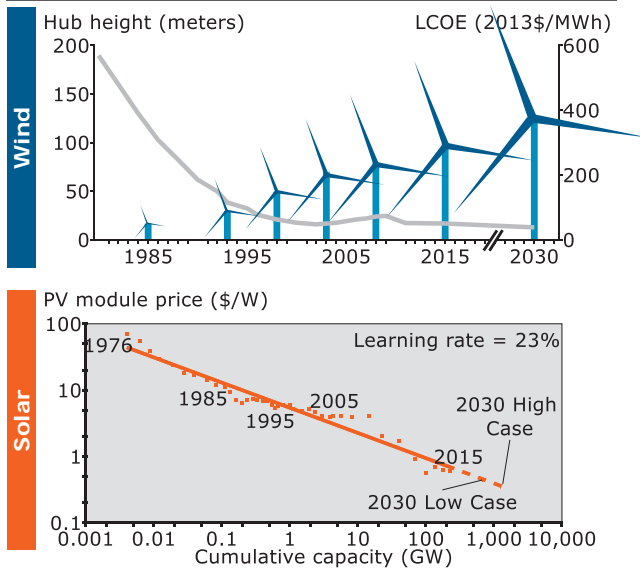
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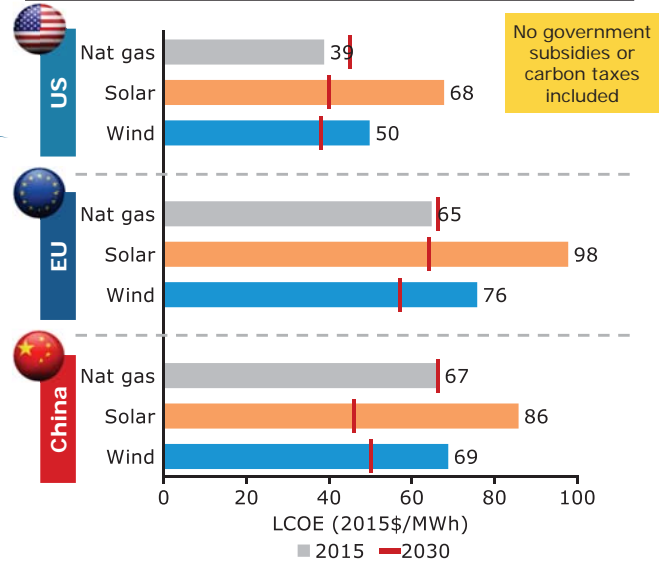
Declining capital costs are making renewables economically competitive even without subsidies

Disruptors

WIND COST DECLINES SLOW AS TURBINE SIZE GROWS; SOLAR FOLLOWS E-CURVE



RENEWABLES COMPETITIVE WITH FOSSIL FUELS BY 2030 ON LEVELIZED BASIS



Note: Wind 2030 High Case LCOE is \$5/MWh lower than the 2030 Low Case; 2030 LCOEs for different resources and regions use Bain mid-case
Source: BNEF; IRENA; IEA; Greentech Media; Bain Utility Power Model

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Battery storage will advance to replace peaking turbines for short-term load balancing

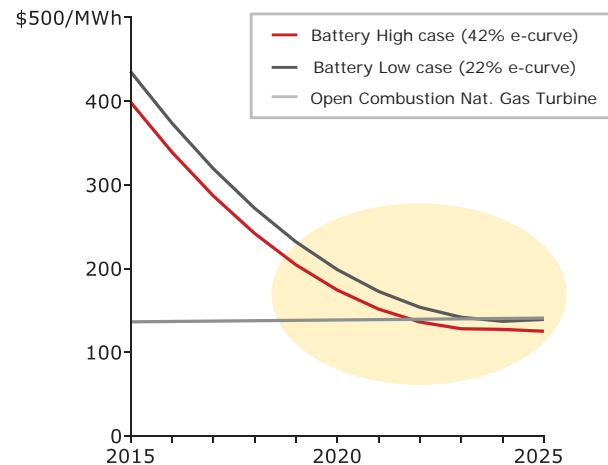
Disruptors

VARIOUS FORMS OF BATTERY STORAGE NECESSARY THROUGHOUT THE GRID

Ultra-short duration (1 min – 1 hour)	Short duration balancing	Electricity stored to meet frequent short-term spikes in load demand
	Renewable integration	Optimizes output from unpredictable renewable sources, providing backup generation time to ramp up
Intra-day (1 – 10 hours)	Distribution level	Used for everyday load balancing; sits between transmission-level storage and consumers; "distributed storage"
	Transmission level	High capacity bulk storage close to source of electricity used for everyday load balancing
	Peaking capacity	"Load leveling"; Arbitrages price of electricity by charging during oversupply, discharging in peak demand
Ultra-long duration (Multi-day)		Theoretical only, no current application

STORAGE ECONOMICAL TO REPLACE PEAKERS IN EARLY 2020'S

Levelized cost of electricity for each technology



Note: Nat. gas turbine LCOE fairly insensitive to natural gas prices or carbon pricing due to high capital costs and low generation; LCOEs assume 10% capacity factor and 7% WACC
Source: BNEF; EIA; NREL; Bain analysis

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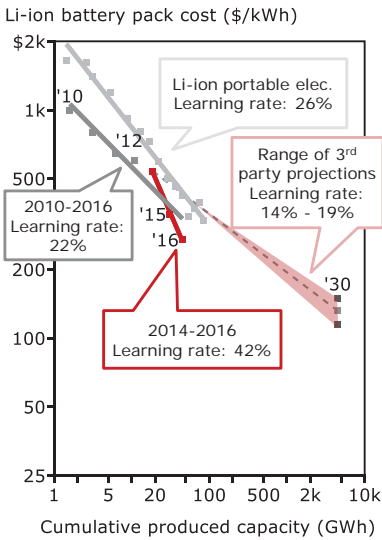
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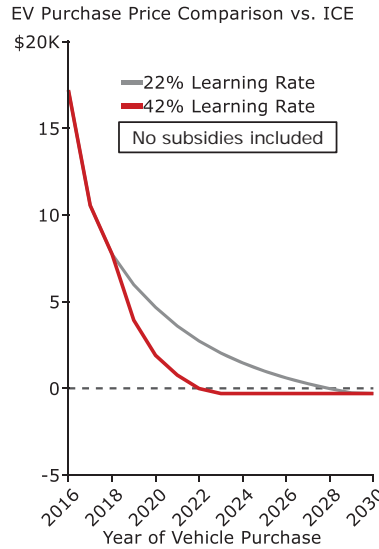
EVs could reach purchase price parity in early-2020's, accelerating transition

Disruptors

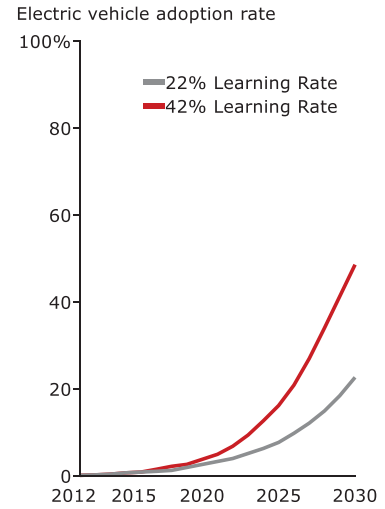
LI-ION COSTS DECLINED RAPIDLY IN LAST 5 YEARS



EVS COULD MATCH ICE PURCHASE PRICE BETWEEN 2022 AND 2027



REACHING PURCHASE PRICE PARITY ACCELERATES EV PENETRATION



Note: Minimum Li-ion battery price assumed to be \$40/kWh- no further EV cost decline modeled past this point
Source: IHS; BNEF; EIA; Morgan Stanley; Bain Transportation Demand Model

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E&Ps focus on value, a return to core competencies, and rapid payback (as opposed to simply production and reserves additions)

OilCos & OFSE

Anadarko
Successfully Navigating a Volatile Environment
• Focus on Enhancing Cash Generating Value
• Reduce Capital Program -50% YOY
• Reduce Dividends
• Achieve Additional Cost Savings and Efficiency Gains
• Continue Active Monetization Program
• Reduce Net Debt

ENI
2016 E&P INVESTMENTS (billions)
• 1 YEAR: \$1.5
• 1-2 YEARS: \$0.5
• 3+ YEARS: \$0.5

ConocoPhillips
Not That Long Ago We Were in 28 Places
Now We Are in About Half the Places
-50% REDUCTION IN CAPITAL EXPENDITURE
-35% IN PROCEEDS FROM OIL SALES

Shell
Integrate Gas from growth priority to cash engine - Global LNG
• CC technology position
• Global footprint
• Integrated gas in city
• Global production of Shell
• Value from operability

BP
Clear priorities for a changing world
1. Shift to gas and advantaged oil in the Upstream
2. Market led growth in the Downstream
3. Venturing and low carbon across multiple fronts
4. Modernising the whole Group

Chevron
Shorter-cycle, higher return investments
Total capital & exploratory
Percentage of capital program
40% 45% 60% 65%
Spend profile
• Increase in shale and tight
• More brownfield opportunities
• Fewer major capital projects
Reduced execution risk

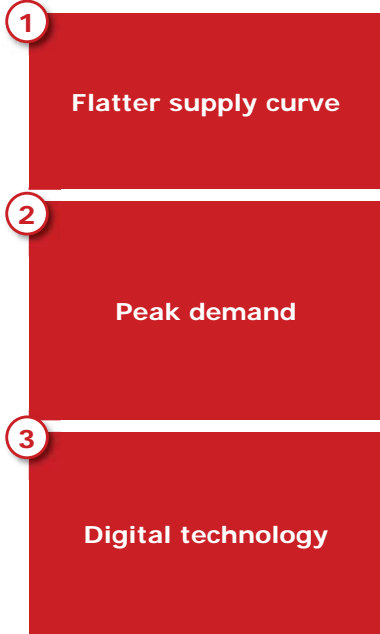
Source: 2016 and 2017 investor presentations from APC, RDS, ENI, COP, BP, CVX

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Upstream business models are diverging in order to enable each company to best cope with industry and energy market disruptions

EVOLVING UPSTREAM STRATEGIC MODES

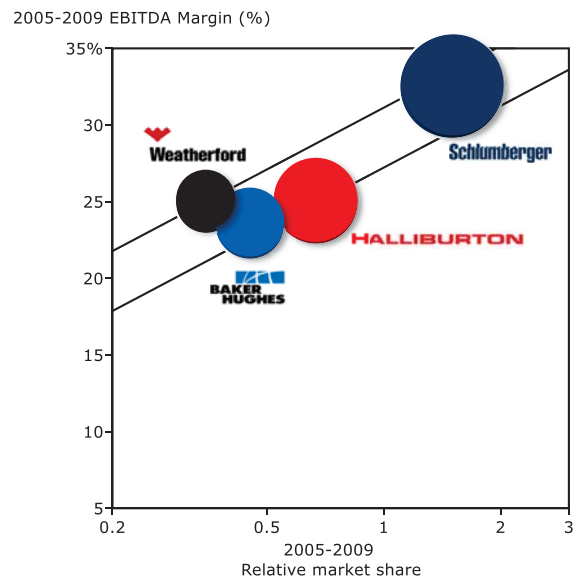
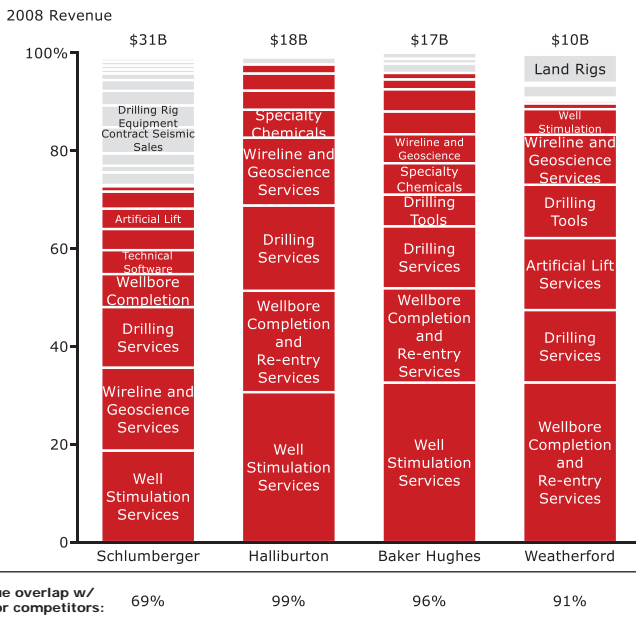


- Integrated energy providers**
 - Global suppliers who are **primary fuel agnostic**, connecting large scale energy sources (including renewables) with demand centers – trading in BTUs
 - Success will require **capital discipline**, effective **contractor management**, and large in-house **trading operations**
- Focused global E&Ps**
 - Larger Upstream players or IOCs **refocusing** activity around **core capabilities** – doubling down on certain product streams, regions, or technical skill sets
 - Portfolios optimized** to achieve shorter-cycle returns
- Efficient mature field producers**
 - Retained focus on hydrocarbons with massively **scaled back exploration capex**
 - Success will require **ruthless cost and capital efficiency** (a '3G' approach)
- Nimble onshore developers**
 - Leading unconventional operators who will continue to **drive down breakevens**
 - Success requires **rapid innovation, manufacturing approach** to continuous improvement and **growing scale** as winners consolidate the marketplace

Going back more than a decade, the big four global OFSEs have followed broadly similar strategies

PRODUCT PORTFOLIOS OF GLOBAL OFSES SHOWED ~85% OVERLAP...

...WITH RETURNS DRIVEN PREDOMINANTLY BY RELATIVE MARKET SHARE



Diverging Upstream customer requirements may accelerate shifting of historic OFSE business definitions

GLOBAL OFSES ARE RESPONDING IN NEW AND DIFFERENT WAYS

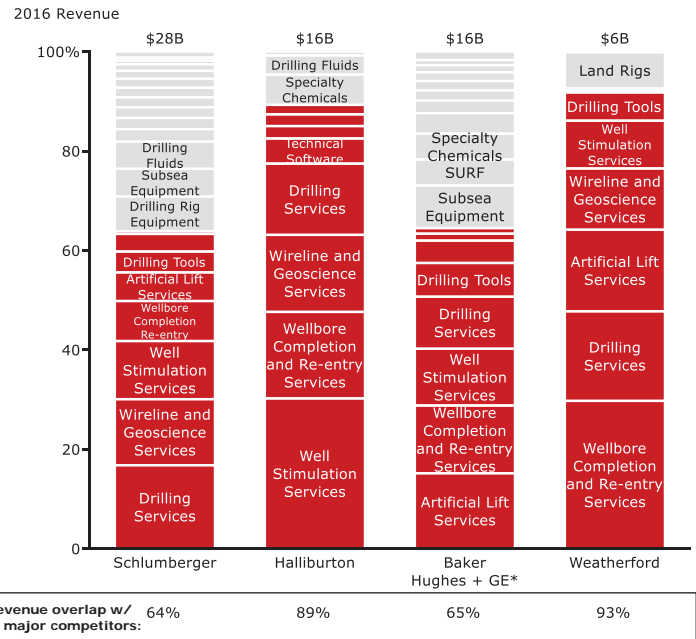
SLB

- **Increasing exposure to asset-intensive businesses**
 - Stake in Borr Drilling (offshore rig contractor)
 - FLNG joint venture with Golar
 - Weatherford pressure pumping JV
- **Renewed focus on production management**
 - Expansion of SPM
- **Continued push into equipment space**
 - Cameron acquisition
- **Emphasis on integrated solutions**
 - 'HEAL' artificial lift-based production solution
 - Smith, MI-SWACO, and Geoservices transactions extended downhole drilling offering
- **Sustained focus on innovation**
 - Renewable power generation: "Kite Power", Waste Energy
 - Recently opened a Silicon Valley office & multiple investments in disruptive technology startups (e.g., Energy Recovery Inc.)

GE/BHI

- **GE/BHI merger increases equipment portfolio**
- **Asset-lite approach**
 - BJ Services pressure pumping JV
- **Aggressively marketing digital offering**
 - GE sees the oil and gas sector saving \$220 billion by 2035 from technology-driven productivity
 - GE Predix platform a major component of merger
 - Integrating BHI sub-surface technology (Performix)

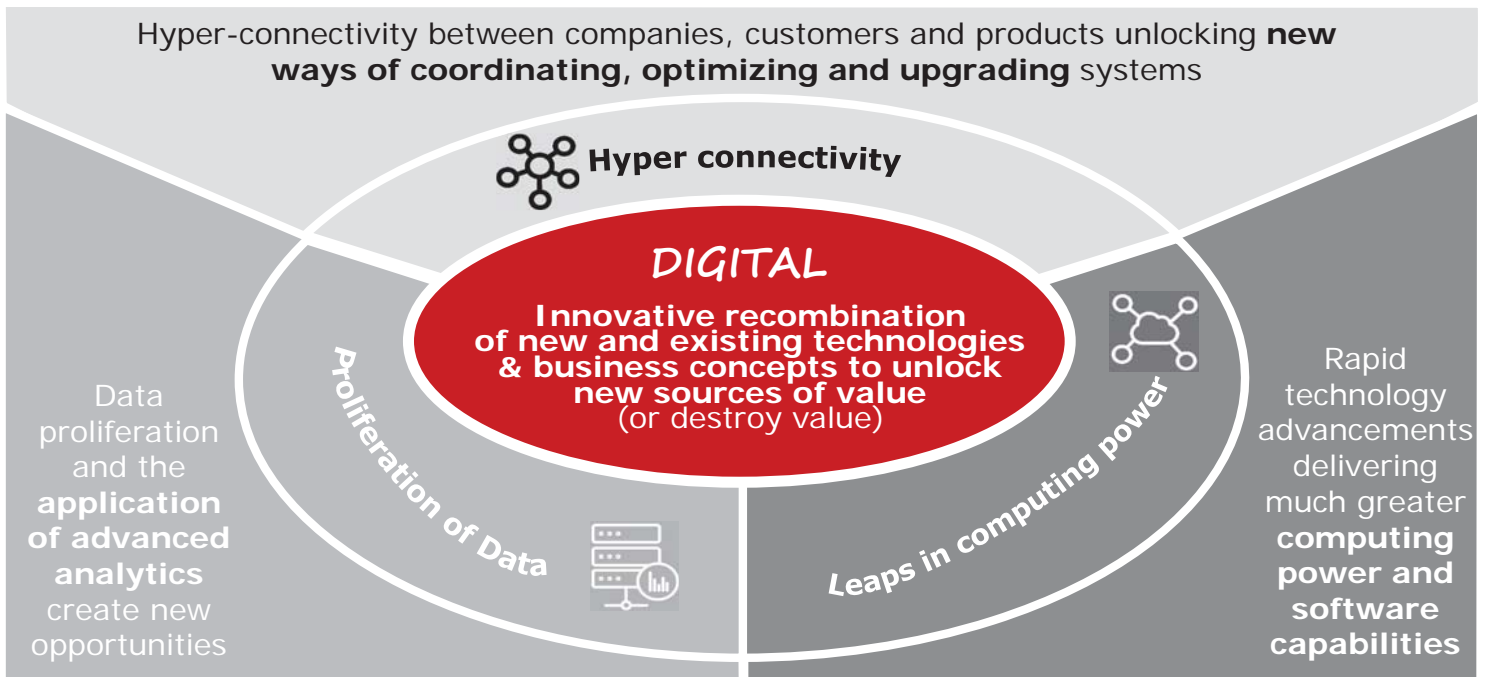
REFLECTED IN DIVERGING PRODUCT PORTFOLIOS (~70% OVERLAP)



Source: Rystad Energy; Bain analysis
*Combined BHI and GE O&G 2016 revenues

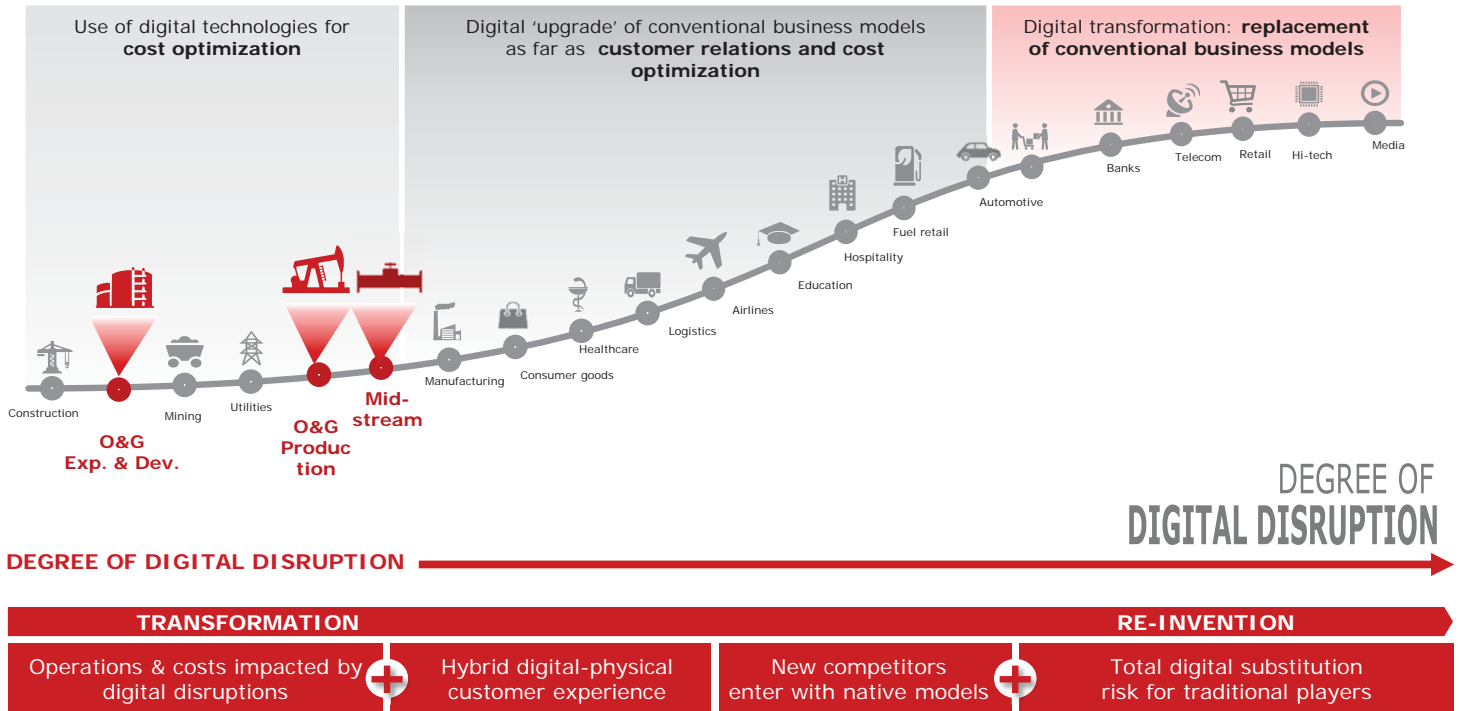
Digital is about how trends are merging to drive change

Hyper-connectivity between companies, customers and products unlocking **new ways of coordinating, optimizing and upgrading systems**



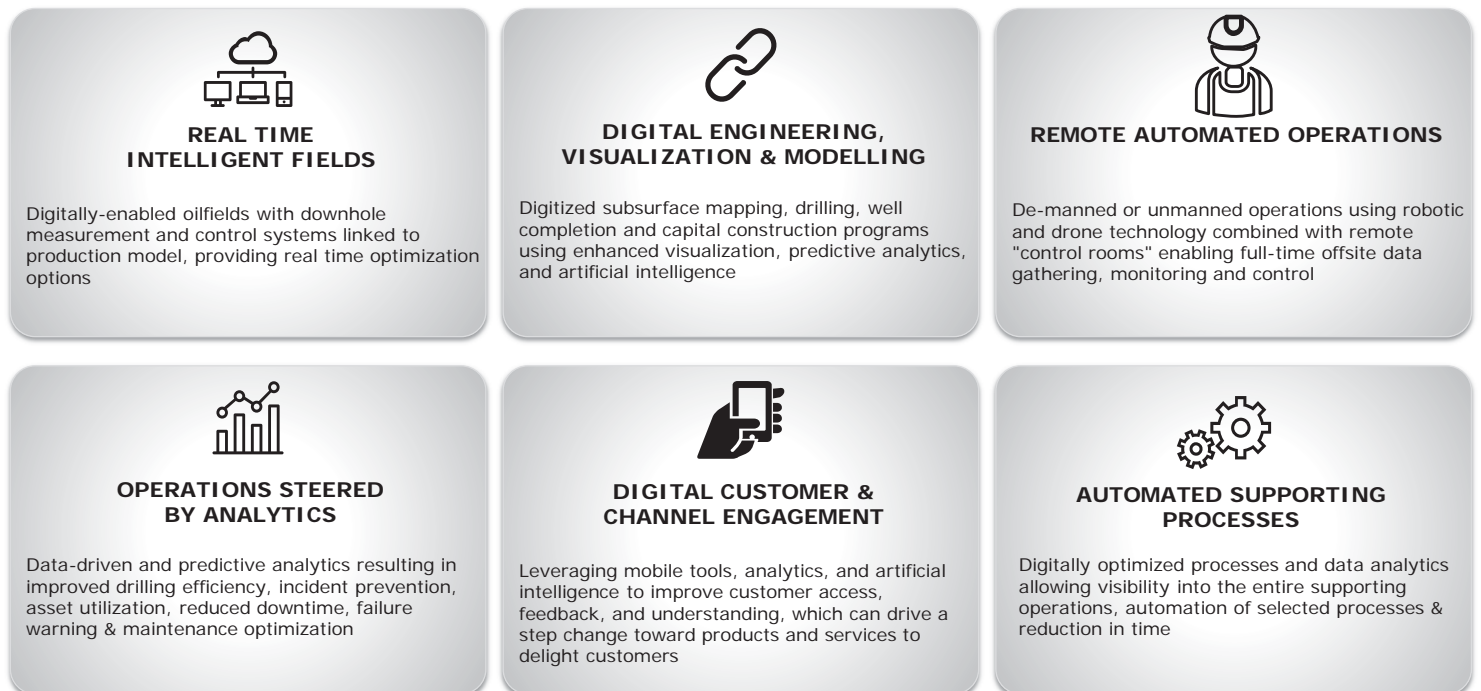
Digital is affecting all industries; Oil & Gas lags behind other sectors

Digital



Six digital themes are leading the charge today in Oil & Gas

Digital



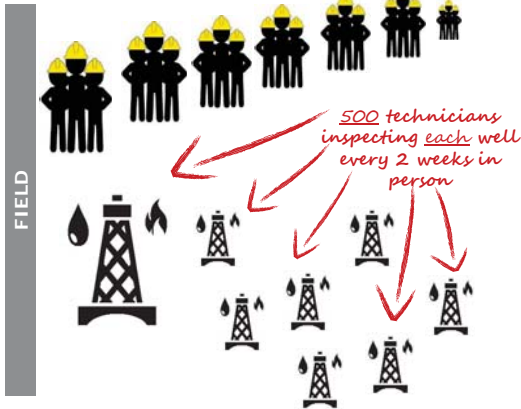
Asset base and operating model inhibitors

Digital

EXAMPLE: ONSHORE FIELD PRODUCTION MANAGEMENT

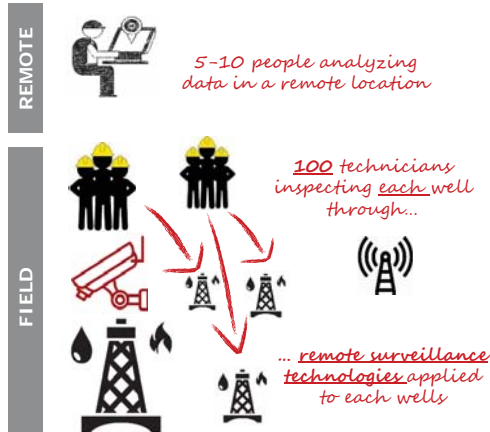
TRADITIONAL WORKFLOW

HIGHLY MANUAL
PRODUCTION MANAGEMENT



DIGITAL WORKFLOW

REMOTE SURVEILLANCE AND
MANAGEMENT BY EXCEPTION



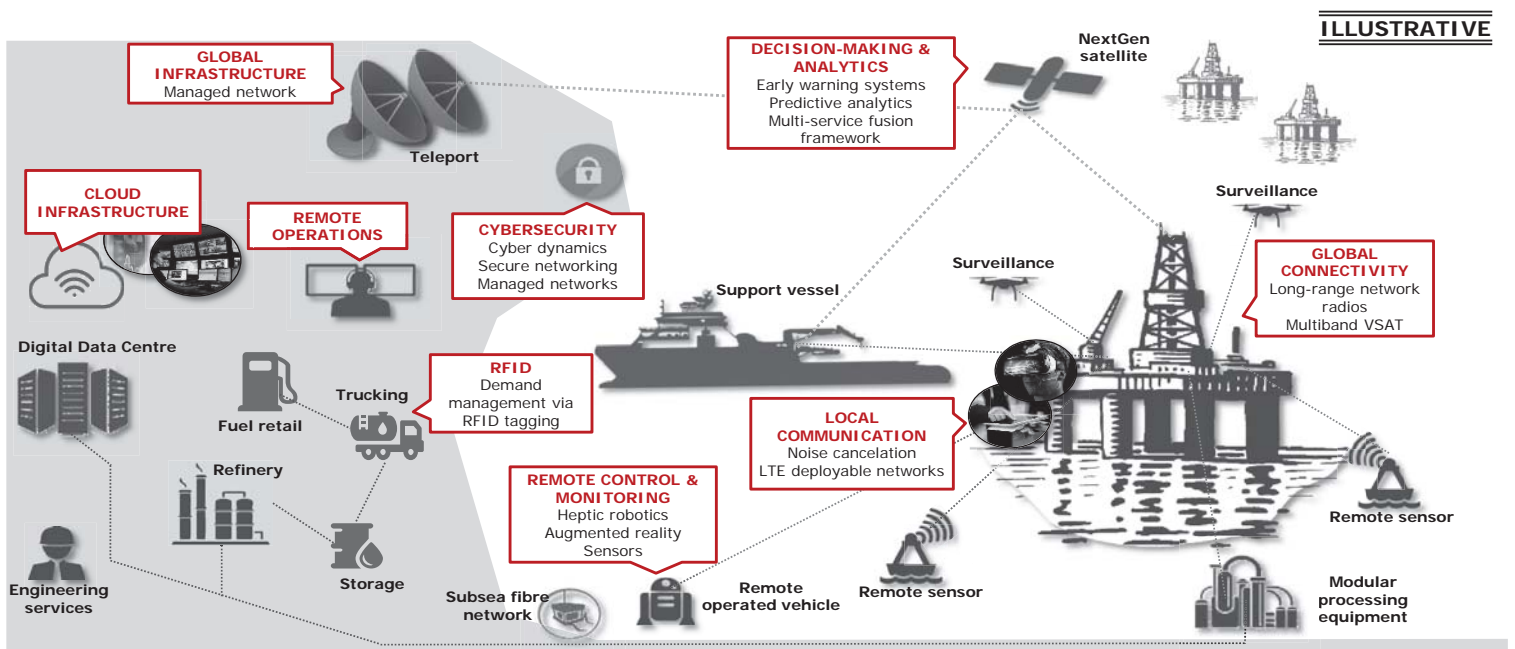
ASSETS MUST BE DIGITIZED,
STANDARDIZED, CONNECTED

NEW PROCESS MUST BE
TESTED, NEW TALENT
REQUIRED, OLD PROCESSES
MUST BE INTEGRATED

EXISTING PHYSICAL AND
OPERATING MODEL
INFRASTRUCTURE
SIGNIFICANT BARRIERS

The ecosystem will set the pace of change...

Digital



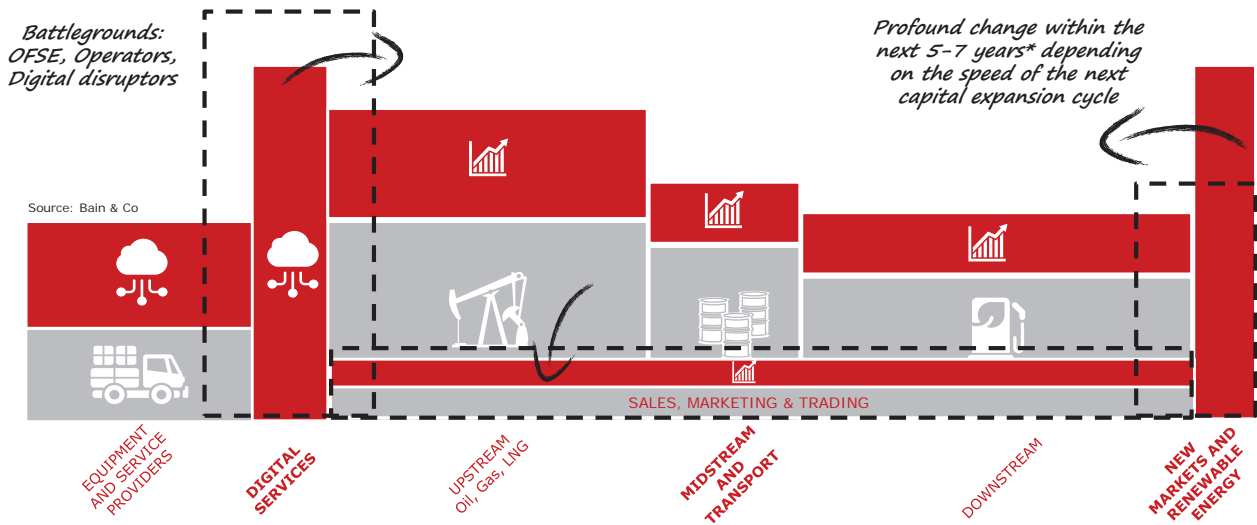
What about you?

Profit pools are being disrupted, challenging traditional models, creating opportunity for new profits

Digital

ILLUSTRATIVE

PROFIT POOLS OVERVIEW



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