Introduction
Westwood Global Energy Group ("WGE" or "Westwood") was formed in January 2015 by Energy Ventures, an energy specialist private equity firm with a vision to build a leading player in the business intelligence and data analytics space.

Westwood today comprises of the complementary expertise, products and services of six industry leading brands: Hannon Westwood, Douglas Westwood, Richmond Energy Partners, Novas Consulting, JSI Services and Energent Group.

We help clients make informed commercial and strategic decisions through a combination of proprietary data, insights and knowledge.

Our core business lines are:

**Research**
- Our research analysts provide insightful and timely independent research, underpinned by proprietary databases and analytical tools.

**Consultancy**
- Our consulting professionals excel in the provision of unbiased commercial advisory services, underpinned by focused independent research.

“At Westwood we commit to deliver industry research that is insightful, reliable, credible and relevant, and above all, independent. It is our intention that Westwood Global Energy becomes recognised as a highly valued provider of research and insight across both the E&P and Oilfield Services sectors. With a distinctive brand we will offer more while maintaining the depth and quality that our legacy stands for. We look forward to this next industry cycle with anticipation.”

- *Gavin Prise, Executive Chairman*
WGE Online Tools Sectors

Sectors empowers the global oilfield services industry to capture new opportunities for growth and investment by providing clarity through real-time access to intelligence, data, and insight.

- Global database of oil and gas production, field developments and drilling activity
- Commercial insight for sales and business development, strategy support and investment opportunity support
- Instant access to research reports, trends and insights for the global oilfield industry
- Interrogate, screen and visualise complex data
- Filter by a range of field attributes to build profiles
- Forecast accurately, mitigate risk, and make well-informed strategic decisions based on the latest data and insight
- Benchmark in-house research and analysis

- 2,523 fields across 1,463 projects
- Historic data back to 2005
- ~150bn barrels of future production, 110bn barrels of historic production filterable on a field-level
- 42 field attributes - includes country, region, offshore details, production increments, cumulative produced volumes
- Forecasting from 2017-2023
- 65 countries in the coverage. Expansion planned for the next 12 months

Access to 65 pre-built drilling and production PDF report quarter updates
WGE Research Products

**WGE Online Tools Energent**

Energent tracks and benchmarks oil & gas trends in top US shale plays, with research, apps and data updated daily. Helps sales and marketing teams commercialise new products, work with up to date operator data and track well completions.

- Focused on well life-cycle and frac market intelligence.
- Enables the user to create data driven market forecasts and assess well, frac sand and OCTG market potential by operator for a defined area.
- View nationwide frac sand and proppant trends across all basins.
- Review fluid system and volumes per well.
- Analyse combination of proppants used per well across plays.
- Determine pressure pumper and operator relationships by basin.
- Compare well cohorts on maps, list, table and charts.
- Customized analysis with well details alongside your proprietary data.
- Identify near term opportunities by understanding operator forecasts.

Tracks 1,700,000 US Wells

Historic data back to 2005

Benchmark wells using key efficiency, completion and production metrics

Comprehensive well and frac data includes state, basin, counties, well orientation, operator, spud date, fluid type and more

Weekly US rig counts includes operator, driller, basins, counties, well API, draw works, horsepower and more

Review and analyse data from 3,500+ E&P operators, 100+ Drilling Contractors & 150+ Oilfield service companies
Westwood offers a dynamic and constantly updated range of in-depth special reports, forecasts and market briefing services covering the global oilfield services and exploration markets.

The coverage within these 60+ report services is designed specifically to help our global energy customers make better, well-informed commercial and strategic decisions.

Behind every report is a team of dedicated professionals at your disposal working to gather and deliver information to you as it happens.

Sample of the 60+ report titles covers across the Westwood Group
Our experienced consulting teams work with blue-chips across the energy chain; supported by world-class, in-house research.

<table>
<thead>
<tr>
<th>Service Line</th>
<th>Core Competencies – OFS</th>
<th>Core Competencies – E&amp;P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Analytics</td>
<td>- Independent analysis and provision of insights on key macroeconomic, asset, market, commercial, regulatory and technological trends in conjunction with detailed forecasting.</td>
<td>- Activity trends and deal flows</td>
</tr>
<tr>
<td></td>
<td>- Macroeconomic scenario analysis</td>
<td>- E&amp;P asset evaluation</td>
</tr>
<tr>
<td></td>
<td>- Competitive landscaping</td>
<td>- Basin entry &amp; growth strategy</td>
</tr>
<tr>
<td></td>
<td>- Market sizing and projections</td>
<td>- Business as usual (BAU) diagnosis</td>
</tr>
<tr>
<td></td>
<td>- Supply &amp; Demand analysis</td>
<td>- Corporate performance review</td>
</tr>
<tr>
<td></td>
<td>- Supply chain analysis</td>
<td>- Competitor benchmarking</td>
</tr>
<tr>
<td></td>
<td>- Technology and regulatory risk assessment</td>
<td>- Exploration strategy and portfolio management</td>
</tr>
<tr>
<td></td>
<td>- Regional and portfolio screening</td>
<td>- Growth initiatives, organic and inorganic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Farm-in / farm-out screening &amp; strategy</td>
</tr>
<tr>
<td>Corporate Strategic Advisory</td>
<td>- Business as usual (BAU) diagnosis</td>
<td>- DNA assessment</td>
</tr>
<tr>
<td></td>
<td>- Business Planning</td>
<td>- Implementation strategy</td>
</tr>
<tr>
<td></td>
<td>- Corporate performance review</td>
<td>- Strategic intervention</td>
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<tr>
<td></td>
<td>- Competitor benchmarking</td>
<td></td>
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<tr>
<td></td>
<td>- DNA assessment</td>
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<td></td>
<td>- Growth initiatives, organic and inorganic</td>
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</tr>
<tr>
<td></td>
<td>- Strategic intervention</td>
<td></td>
</tr>
</tbody>
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### Service Line

**Transaction Support**

- Independent analysis of assets, businesses, underlying markets and drivers to help develop and support investment / financing decisions

**Government Services**

- Independent analysis and provision of insights and recommendations to government agencies and industry bodies to help shape energy industry-specific policies

### Core Competencies – OFS

- Debt financing and refinancing support
- Financial restructuring support
- Indicative asset valuations
- IPO and secondary equity financing support
- M&A commercial due-diligence
- Project financing support

### Core Competencies – E&P

- **UPSTREAM**
  - Acquisition Scouting
  - Corporate and Asset Acquisition support
  - Indicative E&P asset valuations
  - Resources and Reserves Assessment
  - Technical and commercial due diligence

- **MIDSTREAM**
  - Data room management
  - Future volume projections / evaluation
  - Infrastructure & Hub Analysis, capacity, throughput & longevity
  - Surface facility Engineering (DNV-GL)

- **Industry roadmap**
- **Long term energy scenario planning**
- **Market workshops**
- **Project finance**
- **Regional hub benchmarking**
- **SME stimulation**
It’s all about OPEC!

• Current recovery hinges entirely on OPEC... for now

• Huge supply-side uncertainties & wildcards remain
• Oil touches $70/bbl after a long downturn and slow recovery
• OPEC intervention now well-disciplined – but for how long?
• Demand growth is accelerating – EIA forecasting 1.6m bpd in 2018 vs 1.4m bpd in 2017.
OPEC members display increasing discipline through 2017

- 1.2 mmbbl/d cut agreed between ten OPEC members 12 months ago
- Saudi Arabia with largest share of the cut (-486 kbbl/d)
- -558 kbbl/d from 11 non-OPEC nations
- Saudi Arabia have gone beyond agreed adjustment to compensate for non-compliance of OPEC and non-OPEC nations
- Cuts extended in May to March 2018, again in November to end of 2018
- Libya and Nigeria now restricted to 2017 levels, previously exempt
OPEC members display increasing discipline through 2017

- Saudi Arabia, Venezuela and Mexico have driven OPEC cuts compliance to 125%
- Saudi Aramco reportedly continuing to progress IPO plans to float 5% in 2018
- Russia reportedly mulling OPEC deal exit?
• Recovery driven by North America – short lead-times & lower risk
• Expectations are that spend levels will not recover to pre-downturn levels this decade
Major E&P cos continue to focus on capital discipline – overall Capex and cost/bbl extracted remain important performance indicators.

Over 40% reduction in average cost/bbl extracted for developments sanctioned 2014 vs 2016 onshore US.
US production is rapidly increasing & expected to hit 11mbpd by 2019....
• ...driven by an increase in shale production & associated technology
• Shale supply-chain now in overdrive & inventory of uncompleted wells hits new highs as frac utilisation and sand consumption soar
IPO
Will reserves be disclosed?
Cashing in?
Resigned to < $75/bbl
Landscape?

Trump
Tax reliefs for fossil fuels
Acceleration of oil/gas exports
Conflict?

China
Can demand be sustained
Production cuts
Import gains

Middle East
Yemen Conflict
Qatar & GCC
Kurdistan
• Oil industry forecasting continued growth in demand which, along with production decline from existing fields paints a positive view for the need for offshore field development.

• However, other views exist and could have material impact on future oil development in difficult-to-access (i.e. high cost) areas.
Global Offshore Prospects

WGE Offshore Sector Forecasts & Leading Indicators

Total spend of c.$1.3tn expected over 2018-2022.

- **ROVs**: 1%
- **SSV**: 2%
- **SSH**: 7%
- **Offshore Wind**: 17%
- **DWS**: 22%
- **OFE**: 19%
- **Opex**: 32%

2018-2022: $1.3tn
Flat outlook for offshore wells drilled

- 27% decline over 2014-2017
- Asia 45% of forecast well spuds
- Western Europe to peak in 2020
- More positive 2018 & 2019
- Long-term issues of lack of sanctioning
Surface drilling will remain dominant

- Surface wells 85% of forecast
- 1,449 visible subsea tree installations to 2022
- Subsea drilling to peak in 2021
Drilling & Well Services driven by drilling activity. Day rate deflation to remain.

- $280bn market over the forecast
- Uplift in 2018 due to rise in drilling
- Return to decline in 2019 and beyond
- Rig utilisation will remain low
WGE Offshore Drilling & Wells Services

Rig & Crew is the largest offshore Drilling & Well Services market. Will total $156bn over 2018-2022.

- Rig & crew accounts for 56% of total
- 37% decline since 2014
- Jackups largest portion of spend
- Drillships have been hardest hit
- Struggles likely to continue

Offshore Rig & Crew Expenditure by Rig Type
Offshore Oilfield Equipment market shows one of the poorest growth prospects in WGE market coverage.

- $235bn market over next 5 years
- Expenditure phased from order to delivery year
- Fixed platforms and MODUs have worst outlook
- FPS flat near-term; gaining long-term

Offshore Oilfield Equipment Expenditure by Equipment Category
Global Offshore Prospects

WGE Offshore Oilfield Equipment

Fixed and Floating Production product line to total $108bn over 2018-2022

- 46% of total OFE spend
- Fixed platform improved, but long-term issues
- FPS more stable, delayed projects boosting long-term prospects

Offshore Fixed & Floating Production Expenditure by Asset Type

Floating Production (inc LNG FPSOs) vs Fixed Platforms

$billions

Rig build boom in 2011-2013 has caused dramatic oversupply. Very few orders expected over next 5 years.

- Very few orders since 2014
- Shipbuilding backlogs vastly reduced
- Minimal orders over forecast
- Aftermarket has been more buoyant
Significant offshore Opex market. Operators have looked to make cutbacks where possible.

- $432bn market over 2018-2022
- Platform maintenance accounts for vast majority of this
- All Opex markets have seen cutbacks through the downturn
- Positive outlook from here
Fixed and floating platform maintenance modifications and operations spend the largest portion of global Opex.

- Fixed platform population is mature
- Total market over 2018-2022:
  - Fixed: $366bn
  - Floating: $30bn
- Delayed modifications spend boosting forecast
Subsea inspection, repair and maintenance market is a much smaller market, but no less significant.

- $20bn market over next 5 years
- Asia is the largest subsea IRM market
- Middle East to see strongest growth
- Western Europe to be flat
WGE Subsea Hardware

Subsea hardware market is improving. $89bn total market over 2018-2022.

- Driven by deepwater activity
- Line Pipe a key market, but “lumpy”
- Western Europe one of the biggest markets
- Tree installations key driver of SSH market
$32bn market over next 5 years

Templates and manifolds 43% of spend

Subsea trees 22% of total

UK & Norway to see 276 subsea tree installations
Subsea umbilicals, risers and flowlines market is 29% of future subsea hardware market.

- 41% decline through downturn
- More ‘lumpy’ than TMFJ and xmas tree market
- 2017-2018 boosted by 1,410km in North Africa
- 2019 by India, Norway
- 2021-2022 by Australasia
Line pipe very dependent on a handful of high profile/Capex projects. Tends to be 'lumpy'.

- 35% of total SSH market
- EE&FSU 29% of forecast
- Turkstream & Nord Stream II
- 1,300km SAGE pipeline included in forecast but a risk
- ~250km for Bonga SW and Zabazaba
Reduction of E&P spend and an oversupplied vessel market put large pressure on the vessel market in recent years.

- Brazil biggest Capex spender, high number of tree installations.
- Oversupplied vessel market has suppressed day rates. Modest growth through to 2022.
- Project sanctioning picking up but pressure on prices remains.
Expenditure for WROV support will reach over $10bn as demand begins to improve.

- Drilling support will account for over half of both volume and expenditure.
- After a decline due to delayed maintenance, IMR activity will see consistent growth.
- Asia to account for largest volume of activity and spend due to a large installed base and a number of new projects.
Offshore wind sector to benefit from the increased scale of project in both project capacity and turbine capacity.

- Global capacity to increase 431% between now and 2026 – additional 57 GW.
- €420bn to be spent globally.
- UK, Germany and China are largest markets. The US, France and Poland are key emerging markets.
- Wind farms moving further from shore and in deeper waters.
- 42,200km of Cable to be installed.
04 Countries in Focus
Global Offshore Prospects
Westwood Global Energy Group Countries in Focus

Conclusions...
- Sector opened up following local content change
- Six FPS orders expected this year
- 23% of all FPS orders destined for Brazil
- One fifth of tree installations to occur in Brazil

**Brazil Subsea Oil & Gas Production**

**Brazil Expected FPS Orders**

**Brazil Orders 2018-2024**

**Other Orders 2018-2024**
• Pre-down contract awards supports near-term production

• Region at start of relative barren spell

• Nigerian PIB delays + oil price crash responsible

• No long-term recovery for Angola

• Nigerian recovery towards end of forecast but high risk area
• Oil in steep decline, gas to show sharp growth
• FLNG opportunity due to lack of existing subsea infrastructure
• Mozambique to dominate spend
• Subsea to grow from 31% of total gas production 2020 to 80% by 2024.
• 2018 subsea production 104% higher than 2014, projects sanctioned pre-downturn

• Focus on near-field exploration could yield tiebacks

• Penguins redevelopment sanctioning shows continued IOC interest
• Many offshore sectors now focused on renewables

• Tyra redevelopment highlights key projects still sanctioned

• Norway to continue traditional subsea dominance

• Subsea cable installation driven by offshore wind will support investment activities in Europe
• Immature gas plays in eastern Mediterranean to change fortunes of several countries

• Network of fields in Cyprus, Israel and Egypt to require extensive subsea infrastructure

• Egypt is expected to re-start gas export in 2019
- Backlog of pre-downturn developments still being worked through in US
- Mexico to benefit from foreign investment in medium-term
- Limited FPS orders over the forecast, however, subsea tiebacks provide potential upsides for investments
• Liza one of the largest new producers in forecast period

• A super size FPSO is expected to be ordered in 2019

• Exxon’s success continuing, 5 discoveries – potential for more FPS orders & higher production
- China and India both seeing increased subsea investment – 4 FPS orders in 2018
- Gas to increase 123% 2018-2024 driven by Australian LNG projects
- 12 FPS units to be ordered in Asia and 7 in Australia
Conclusions
• Oil price recovery is positive for the industry particularly when combined with lower costs for equipment, engineering and services

• The recovery is fragile, however and everything hinges on OPEC

• Subsea and FPS market has improved markedly in 2017 with a resumption in project sanction.

• E&Ps remain focused on capital discipline and supply chain pressures will remain with substantial excess capacity throughout the offshore supply chain.

• Deepwater activity continues and returns in some fields are more attractive than onshore shale.

• Costs continue to tumble in offshore wind and many O&G supply chain firms are participating.

• Positive outlook for 2018 albeit all eyes on OPEC for continued discipline
Questions?