

Companies under low oil prices: Case study – Iraq



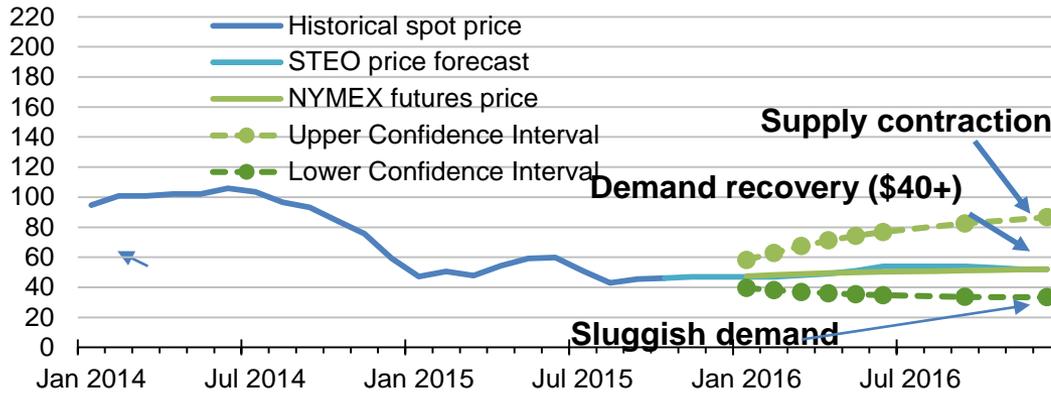
How are companies adjusting their operations to lower oil prices in Iraq?

- **Streamlining E&P investments & expectations**
- **Improving operational risk management**
- **Deepening involvement in petroleum value chain - midstream**
- **Developing infrastructure**

Is Iraq pioneering production in a warzone or just delaying inevitable bottlenecks?

Market environment: Price & Capitalization

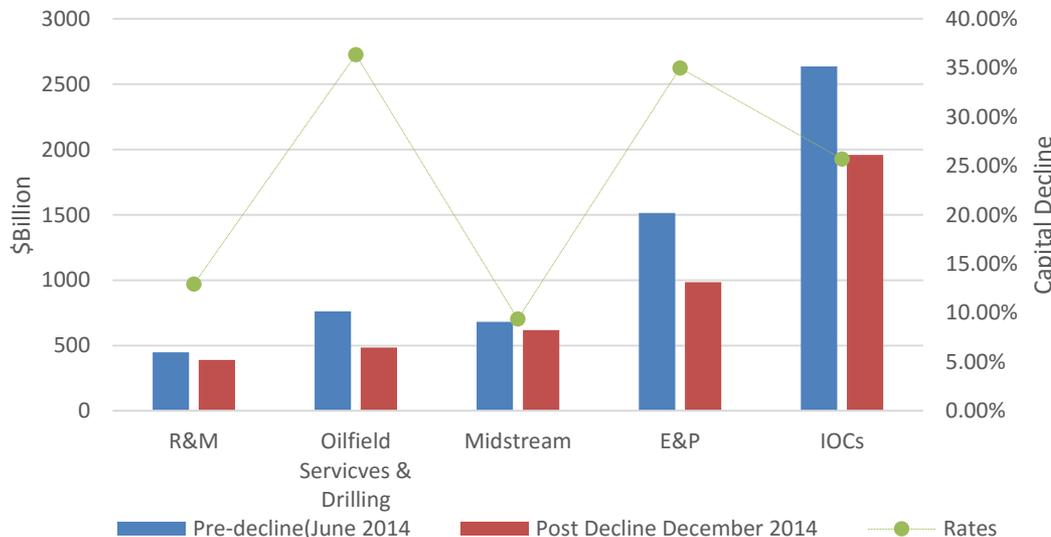
EIA forecast 2016 (\$/bl)



Assumptions:

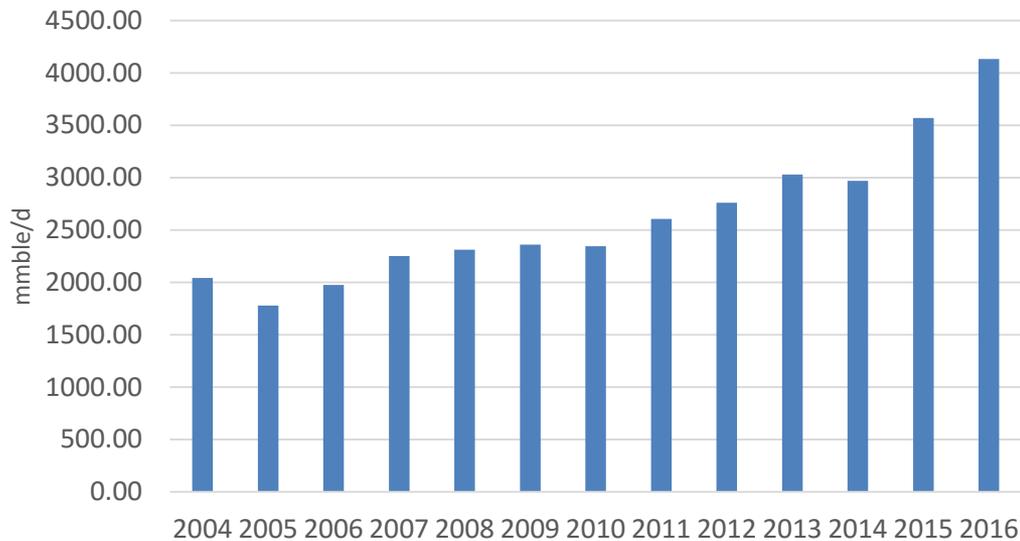
- Iraq Operators assuming demand recovery (\$40+ in Q316), but contingency plans for -\$30
- IOC operators responding to trends in global market capitalization after 2014
- Hardest hit are IOCs (25% down), E&P (35% down)
- Midstream most minimally impacted
- Midstream business opportunities likely to be hedge against upstream operating risk in Iraq
- Momentum on integrated projects like Nassriyah NIP likely to gain traction under current price levels

Market capitalization before and after price crash (2014 - 2016)



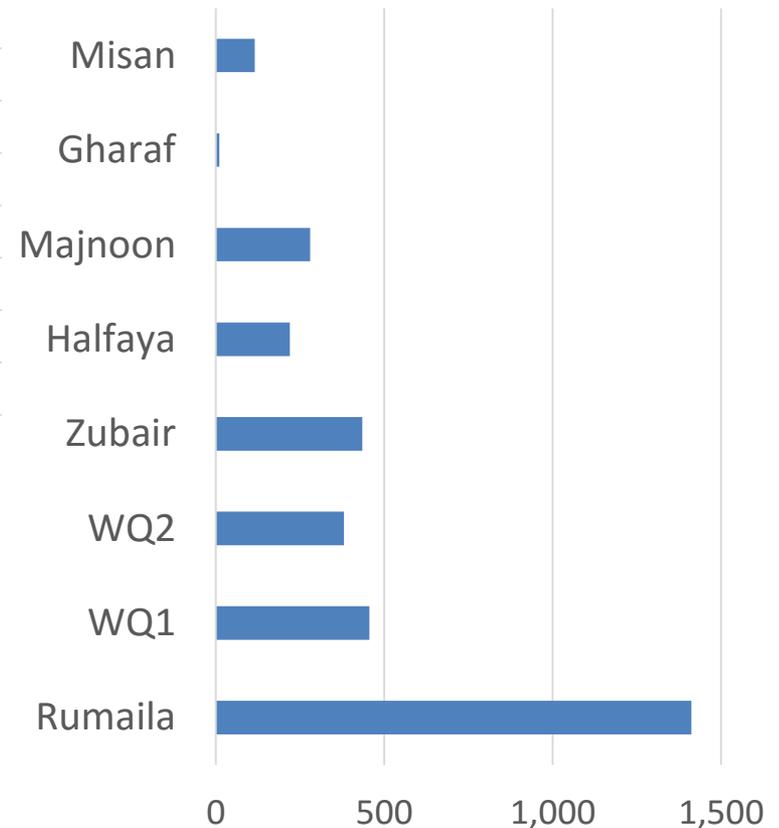
Market environment: Iraqi fundamentals

Iraqi liquids production 2016

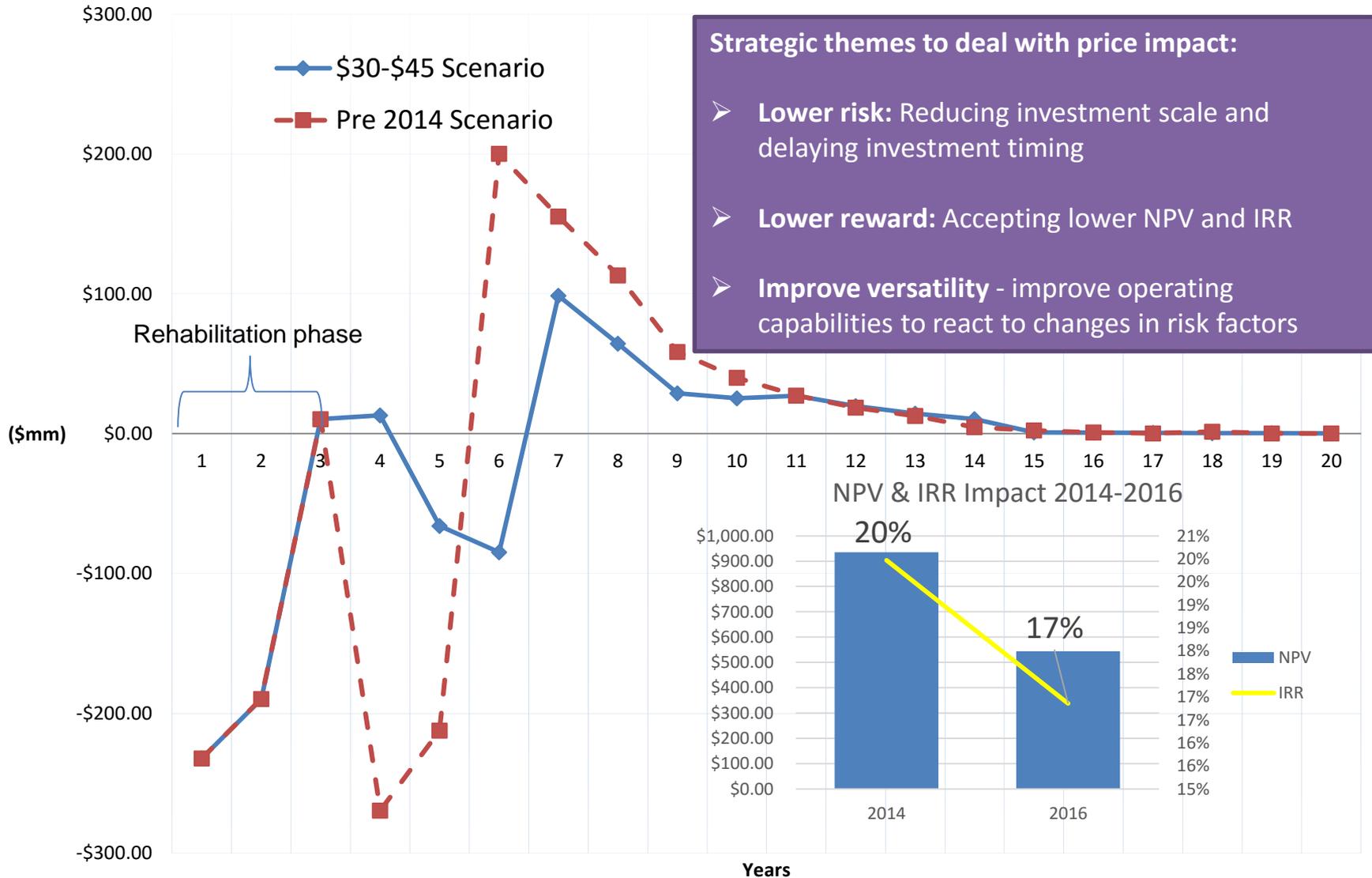


- Iraq crude oil production approximately 4.30 mmbbls/d in March 2016
- Rumaila is about 35% of national production (currently @ +1.35 mmbbls/d)
- Has sustained about y-o-y 30% growth 2010-2014
- Post 2014 prices heighten production risk, influence negative or flat growth possibilities (5-10% best case)

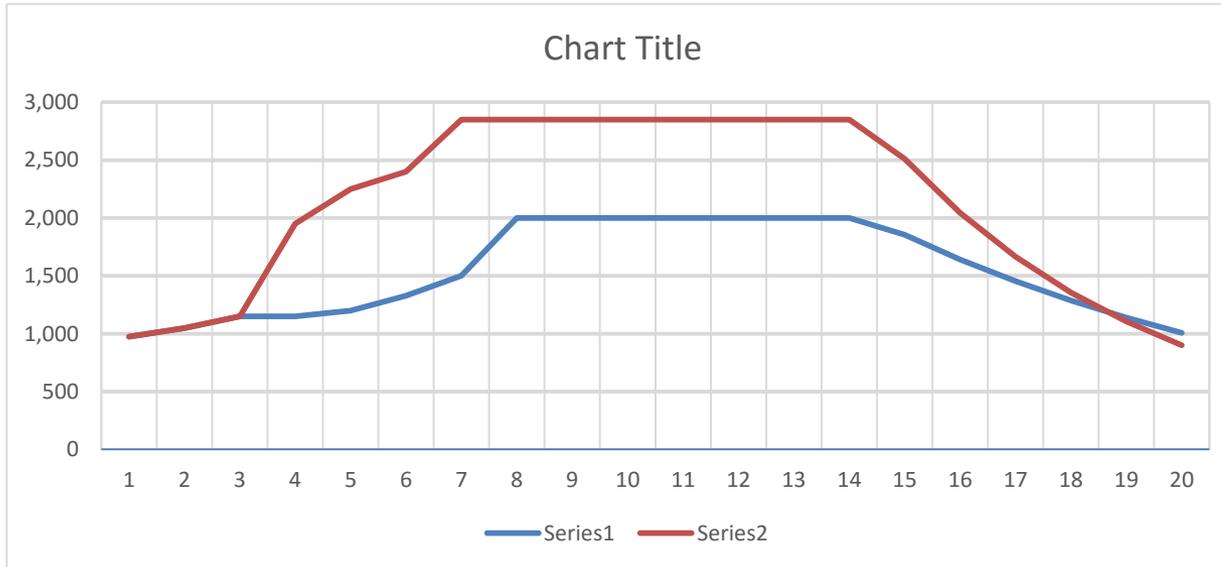
80% southern production 2016



Streamlining E&P Investments & Expectations: Rumaila



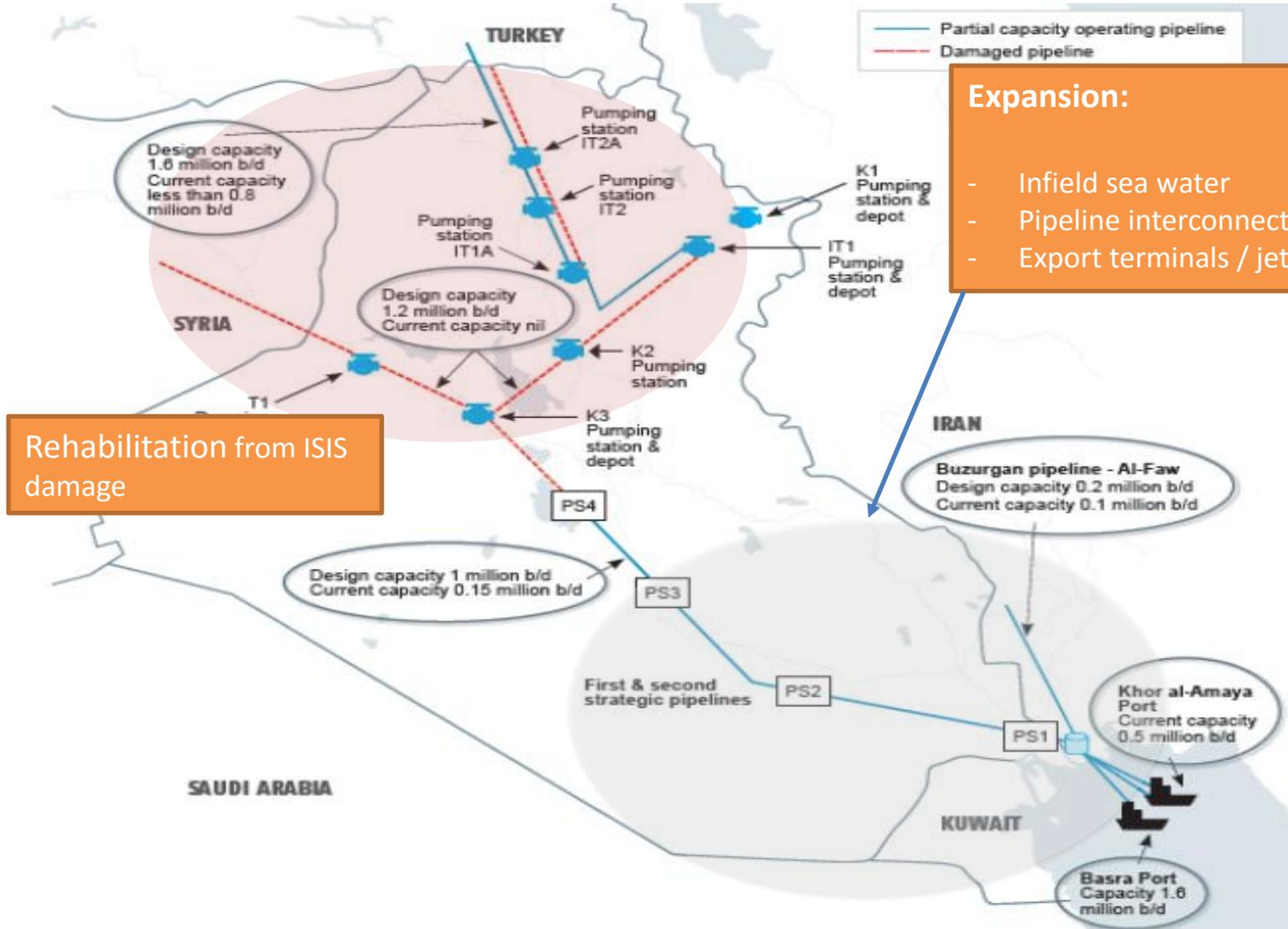
Streamlining E&P Investments & Expectations: Rumaila



- Rumaila likely to see reduction of PPT from 2.85 to 2 MMbbls/d
- Implies less intensive reservoir activity / gradual ramp up and declines
- Translates to estimates of 30-40% drop in field CAPEX, -3%, -45% NPV in 2016

- Development of Rumaila is benchmark for Iraqi production for the next 3 years
- Key drivers of production decisions are oil price, MoO policy, domestic politics, OPEC/ Geopolitics
- Almost certain prospect of declining PPT and incremental production of at least 30% for 2016
- Other fields WQ1+2, Zubair, Majnoon, Gharaf, Halfaya, Al Ahdhab likely to follow similar revisions
- Declining incremental production does not offset flat or 5% y-o-y growth of Iraqi output beyond 2016
- **IOCs can sustainably operate under lower prices, but Iraqi production operations remain vulnerable**

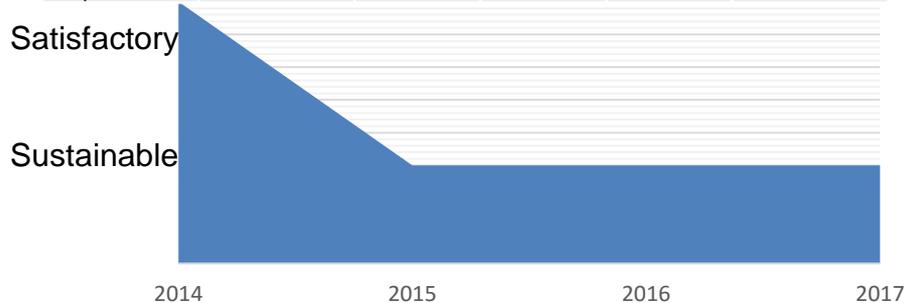
Infrastructure: key crude oil pipelines and export facilities



Operational risk management – key perceptions & challenges

IOC perceptions of operational viability in Iraq

FACTOR	WEIGHT	STATUS			
		2014	2015	2016	2017
Security	Decisive	Fair	Good	Fair	Fair
Bureaucracy	Significant	Poor	Fair	Fair	Fair
Profitability	Significant	Good	Poor	Poor	Poor
Oil price	Preferred	Fair	Poor	Poor	Poor



- Despite strong potentials, risks are becoming higher

Several contingencies being considered by the main IOCs:

- ❑ Deeper expansion in Iraq's petroleum value chain (midstream & gas) as hedge against upstream risk
- ❑ **Regional expansion into Iran, with emphasis on joint oilfield projects to capitalize on Iraqi presence**
- ❑ Fast track farm out and exit plans in the event of deterioration in operating risks

Key challenges in upstream operations

Challenge	Initiative	Degree of success
Rationalizing Security costs	Broader community involvement in infield security	High
Expatriate labor	Local content training and capacity development	Moderate
Government relations	Negotiating decision processes / engaging multi levels in government	Moderate
Infrastructure	Makeshift infrastructure and collective development programs	Moderate
Stakeholder relations	Sustainable community involvement in supply chain processes and business projects	Poor
Understanding local market & politics	Limited investment towards deep understand of operational drivers	Poor

Key challenges for IOCs are to have a deep operational understanding of Iraq and to integrate the right stakeholders in operations and services supply chain

CONCLUSIONS

- Iraqis operate well under pressure – competitive market helping streamline/ de-politicize industry, but limiting investment capabilities
- Cash flow and production adjustments will allow Iraq and IOC to maintain sustainable but lower production growth, despite continued operating risks
- Risks expose serious flaws in Iraq's operational environment and foundations such as functional politics, infrastructure, decision making
- Only several IOCs have a deep enough understanding of Iraq to know how to utilize its potentials towards a sustainable production
- BOTH the government and IOCs must succeed in their challenges to prevent declining Iraqi production (possibly from 5% y-o-y) starting in 2017
- Production beyond 4.5 mmbbls involves more complex technical and operational talent to produce the 'harder barrels', deeper into the value chain

Is Iraq becoming a more efficient producer or will production decline under mounting pressure?

Iraq's gas value chain

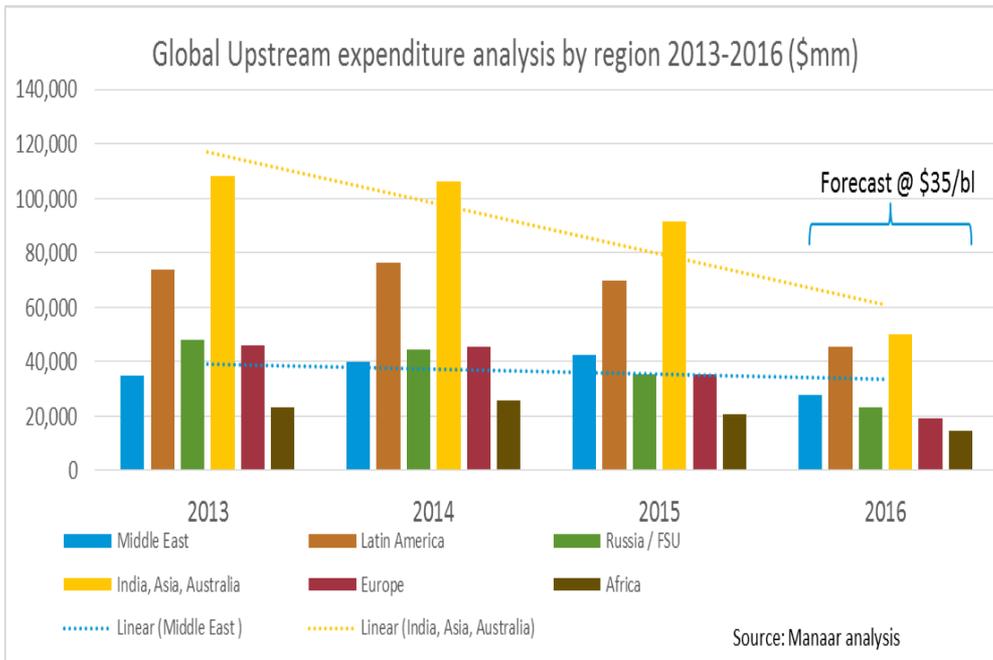
- Iraq embarking on initiatives to restructure and optimize its gas value chain
- Recently announced program by Iraqi Government, World Bank and selected Energy Companies
- Contains number of short, medium, long term targets aimed at restructuring Iraq's value chain, creating
- Economic and social opportunities in Iraq's natural gas sector

		Challenges		
Business model	Physical value chain	Operational decision making	Financial value chain	Regulatory issues
Upstream E&P / Iraqi National Gas Company (INGC)	Production asset	<p>Long Term: Permanent legislation governing INGC</p> <p>Medium Term: Interim legislation for INGC E&P pilot</p> <p>Medium Term: Federal approval of INGC fiscal terms</p> <p>Short term: Pilot program operations plan</p>	<p>Long term: Self-sustaining E&P financial model,</p> <p>Medium term: Government ratification of pilot</p> <p>Short term: Asset-specific financial model</p>	<p>Long term: National independent gas regulator</p> <p>Medium term: Ratification of required license</p> <p>Short term: Flaring regulations, disincentive</p>
	Production facilities	<p>Long term: Fully owned and operated facilities</p> <p>Medium term: EPC contract provisions for pilot</p> <p>Short Term: Facilities EPC management plan</p>	<p>Long term: Autonomous investment capabilities</p> <p>Medium term: Secured project CAPEX for pilot</p> <p>Short term: Facilities EPC financial plan</p>	<p>Long term: Mature incentives driven fiscal contracts</p> <p>Medium term: contract hurdle rates and incentives</p> <p>Short term: Production incentives plan</p>

Iraqi gas value chain: Midstream

Midstream partnerships (transmission, storage, distribution)	Pipelines / transmission infrastructure	Long term: Viable transmission infrastructure	Long Term: Mature tariff revenue model	Long term: Established bandwidth-driven tariff
		Medium term: EPC contract provisions for facilities	Medium term: Sustainable income from tariffs	Medium term: introduction of Bandwidth tariff
		Short Term: Pipeline construction IRR/discount model	Short term: transmission cash flow analysis	Short term: Optimal tariff modelling
	Storage / linepack	Long term: Viable storage infrastructure	Long Term: Mature tariff revenue model	Long term: Established bandwidth tariff regulation
		Medium term: Storage construction agreements	Medium term: Sustainable income from tariffs	Medium term: introduction of Bandwidth tariff
		Short Term: Storage construction IRR model	Short term: Storage cash flow analysis	Short term: Optimal tariff modelling
	Distribution pipeline	Long term: Pipeline network expansion	Long term: Competitive take or pay system	Long term: Bandwidth adjusted pricing system
		Medium Term: Pipeline construction agreements	Medium term: Initial take-or-pay commitment/s	Medium term: Introduction of pricing formula
		Short term: Reliable end user demand forecasts	Short term: Distributor financial model	Short-term: Price data research & analysis
Downstream	End users	Long term: Industrial and residential buyer market	Long term: Sustainable demand/supply balance	Long term: wholesales & retail price regulation
		Medium term: Focus on gas-to-power market	Medium term: Negotiated gas purchase contract/s	Medium-term: gas-to-power price regulation
		Short term: Gas-to-power market model	Short-term: Analysis of viable contract terms	Short-term: Price data research & analysis

Spending cuts

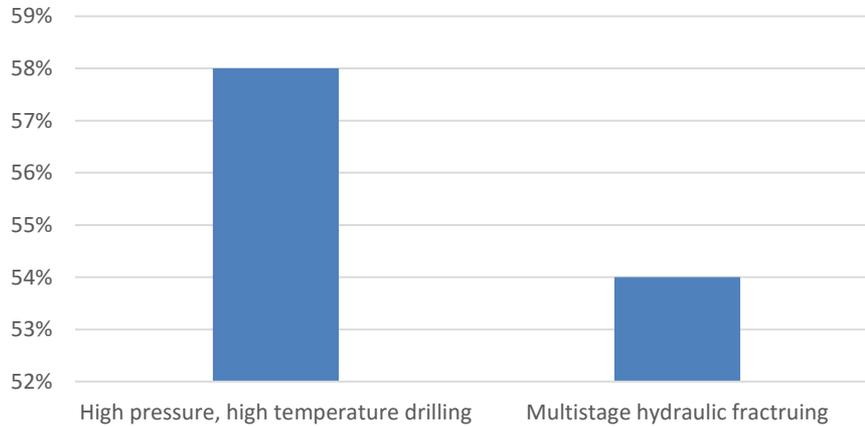


- Upstream expenditure defined as E&P operations, drilling, seismic reservoir, development
- Current forecast is minimum 20% decline in average global upstream spend for 2016

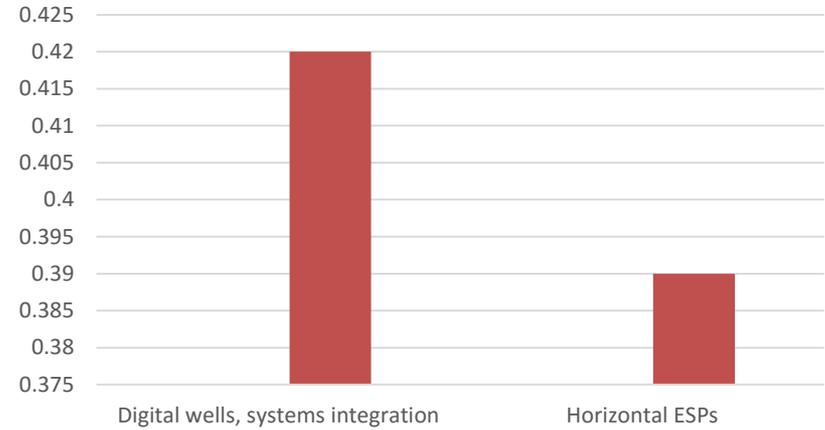
- Uncertainty over exact scale and timing of upstream expenditure cuts for most NOCs
- GCC sticking to average ball park reduction in costs around 25% for Aramco, ADNOC, KOC
- Iraq showing largest decline of around 40% in OPEX
- **GCC NOCs arguably have higher overheads than Iraq, which can sustain lower costs due to favorable geology?**
- **Geopolitical risks are the biggest unknowns hindering spending and investment planning for Middle East NOCs**

Key Operational technologies & impacts

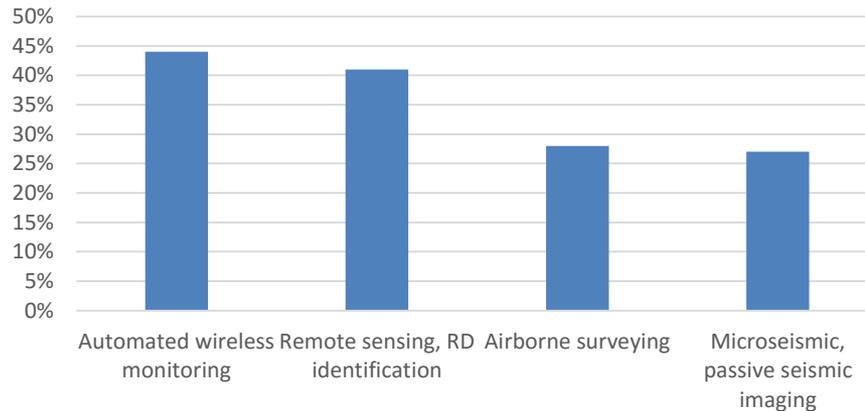
Reserve Replacement



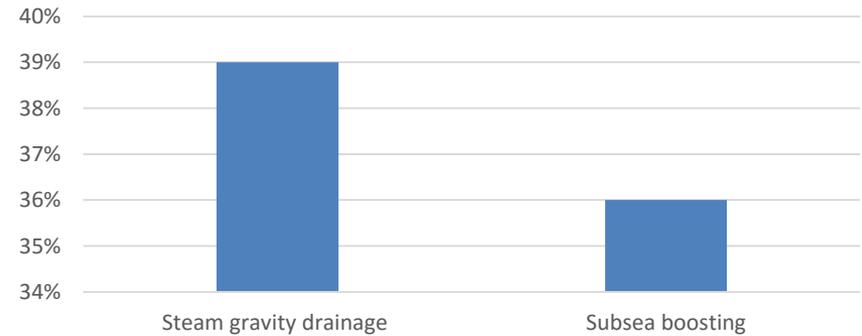
Smart Supply Chain



Risk Management



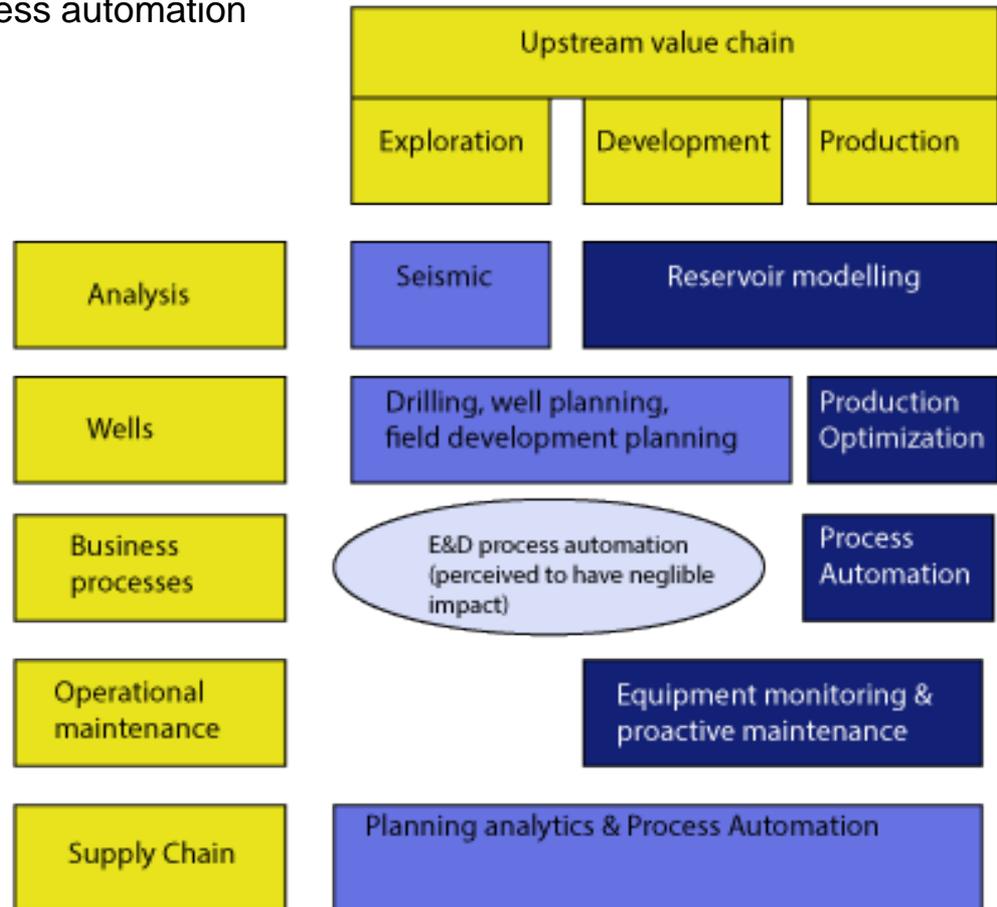
Life extension



Upstream operations automation snapshot

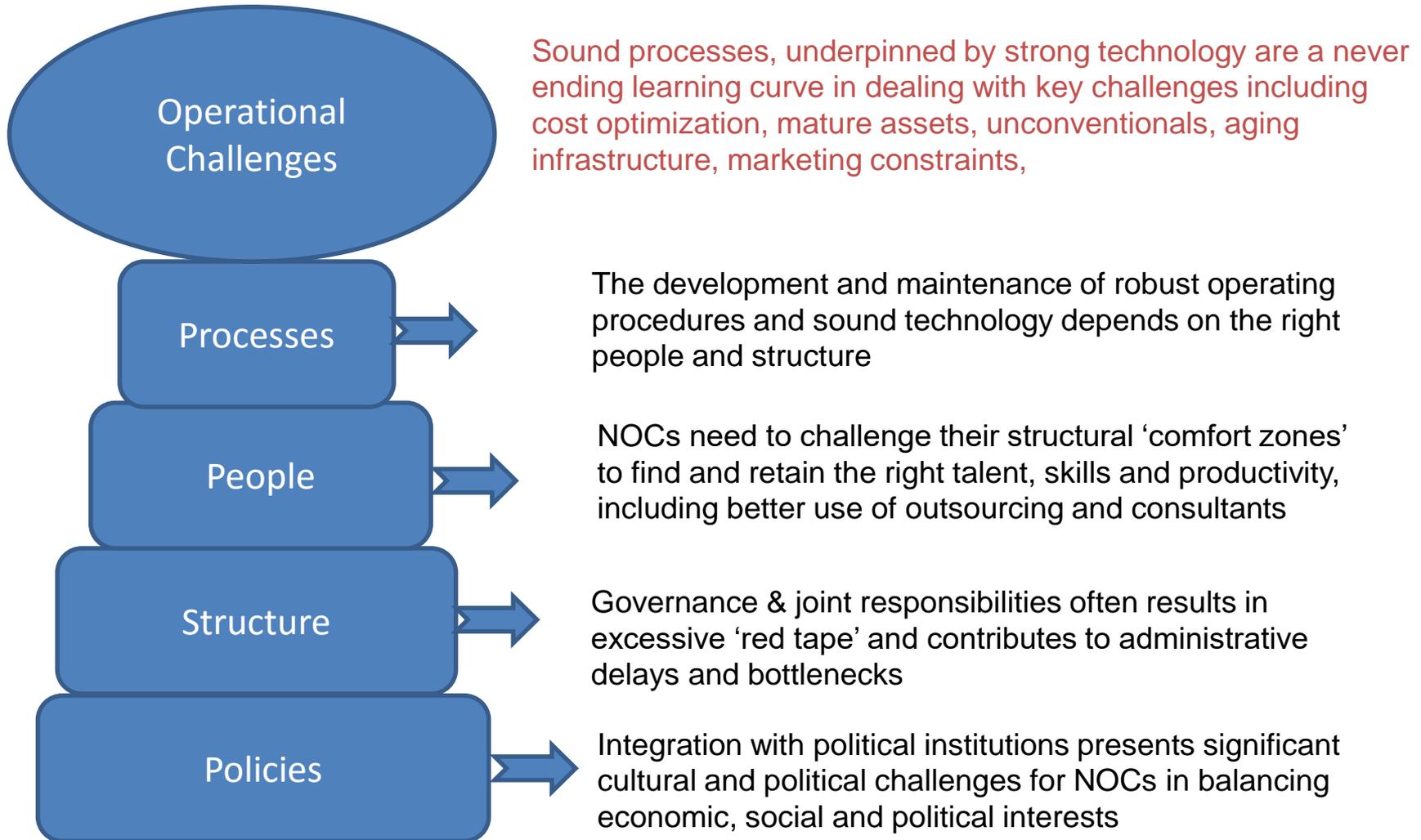
What do operators really think about process automation in the upstream space?

-  : Automation of production operations is the priority
-  : Automation of exploration operations likely to be relegated by market conditions
-  : Automation of E&D business processes still being debated in terms of proven operational impact



- Lower oil prices environment heightens the risk but also the imperative for NOCs to make much faster gains in the areas of operational automation

NOC operating model & structure



Organizational maturity

Common NOC performance metrics

PSPP: People, Structure, Processes, Policies

SMART: Specific, Measurable, Achievable, Realistic, Time-driven

SHE: Safety, Health, Environment

Proactive:
PSPP, SHE,
SMART well
established

Best in class:
PSPP, SHE,
SMART way of
life

