



International
Association
of Oil & Gas
Producers

Standardization of equipment specifications for procurement

JIP33



Project Context, objective and vision



Context

Between 2010-2014, 75% of large E&P projects exceeded budget by 50% on average, and 50% of projects exceeded schedule by almost 40%.



Objective

The CPC initiative seeks to drive a structural reduction in upstream project costs and schedule improvement with a focus on industry-wide, non-competitive collaboration and standardization.



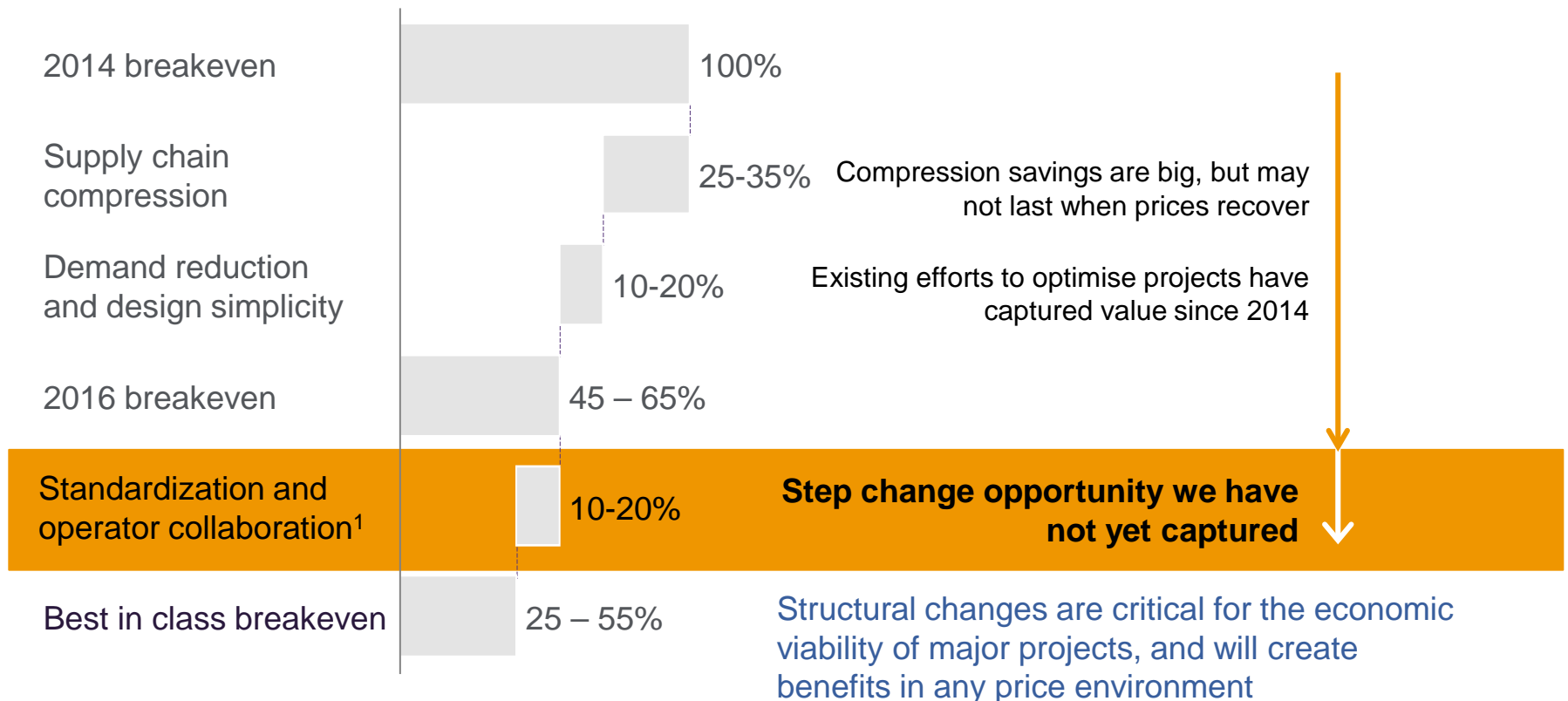
Vision

The vision for the industry is to standardize specifications for procurement for equipment and packages, facilitating improved standardization of major projects across the globe.

Standardization is a key lever we can pull as an industry to structurally reduce large capital project lifecycle costs




Average breakeven cost for an example major capital project

% of total



1. Includes a portion of cost of quality savings

Successful standardization initiatives in other sectors were launched in times of disruptive market environments

Industry	 Semiconductors	 Automotive	 Data servers
Disruptive market conditions	Rising costs and market share decline due to competition from Japanese OEMs	Rising costs from bespoke electronics solutions and declining profitability	Rising capex and opex on server facilities due to bespoke and antiquated designs
Impact of standardization	<ul style="list-style-type: none">▪ 14 U.S. companies created industry consortium, SEMATECH▪ Generated 60+ standard specifications, resulting in 50% cost reductions for certain components	<ul style="list-style-type: none">▪ 5 automakers create standards organisation, ASAM▪ Creates standardized software testing and interoperability methods▪ Industry-wide reduction in testing costs per vehicle	<ul style="list-style-type: none">▪ Facebook and four other companies create non-profit Open Compute▪ Shares and builds hardware specifications▪ \$2B savings for Facebook alone between 2011 and 2014

Mutual benefits

Standardization will create a mutually-beneficial outcome for industry by addressing safety, cost, schedule, quality, reliability



1. Estimated reduction from supplier based on Phase 1 LV switchgear specification and expert interviews for ball valves and subsea trees

JIP33 Benefits to the Supplier

Optimization through simplification and standardization

Benefits



Bids and proposals

Standard bid template and clarification process

- Fewer questions to answer
- Less deviation requests
- Increased focus
- Quicker response and decisions possible

Saved time, resources and costs



Engineering and manufacturing

Harmonized engineering / more certain information

- Streamlined design and approval process
- Fewer last-minute changes / interruptions
- Fewer inspection hold points / quicker release
- Repeatability enables continuous improvement

Enhanced efficiency and quality of supply



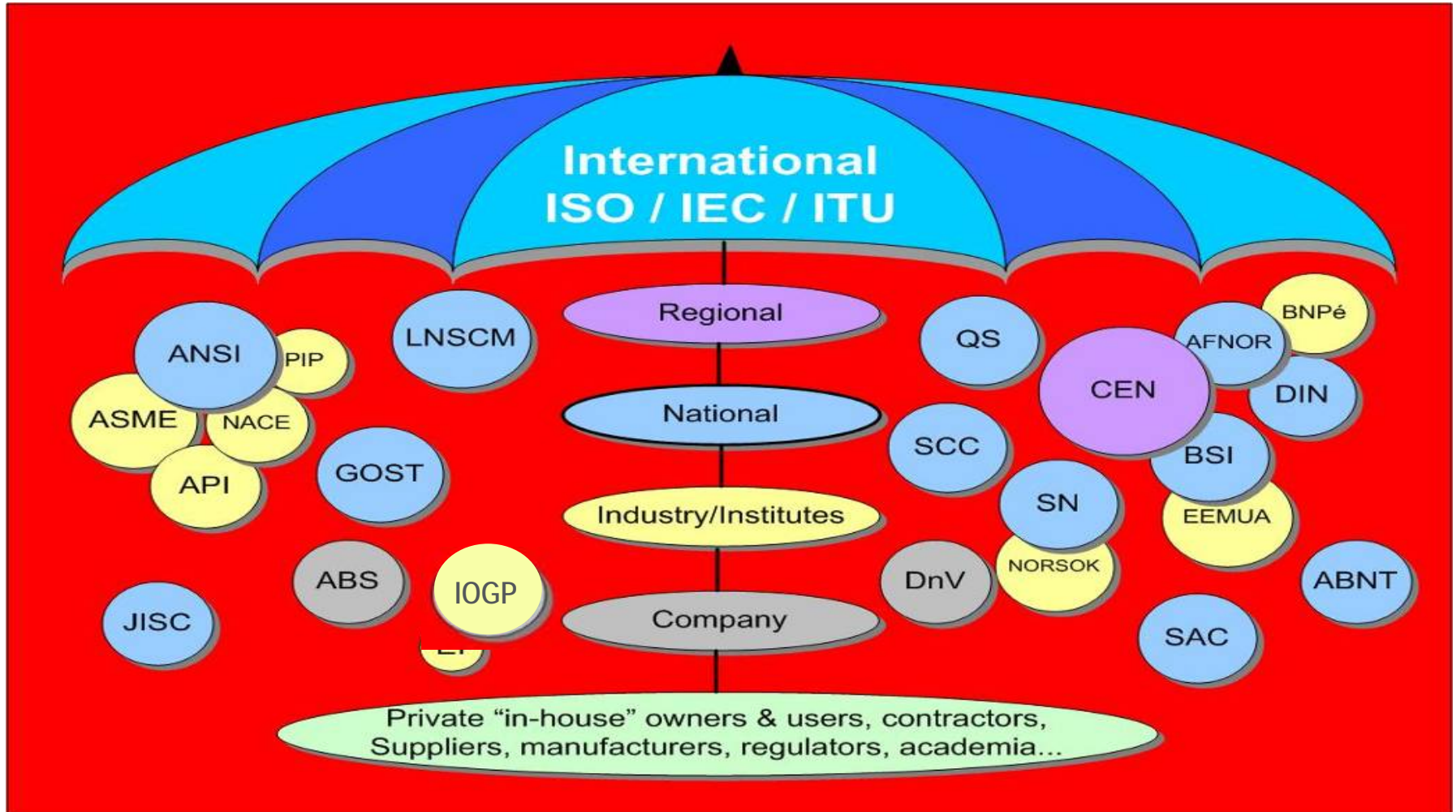
Installation and commissioning

Streamlined equipment simplifies fleet management

- **Reduced wiring / testing / tools / spare parts**
- Fewer items on secondary punch list
- Condensed commissioning time
- Reduced drawing updates required

Enhanced reliability and improved safety

Lots of different standards developing organizations and lots of different Operator Specifications!

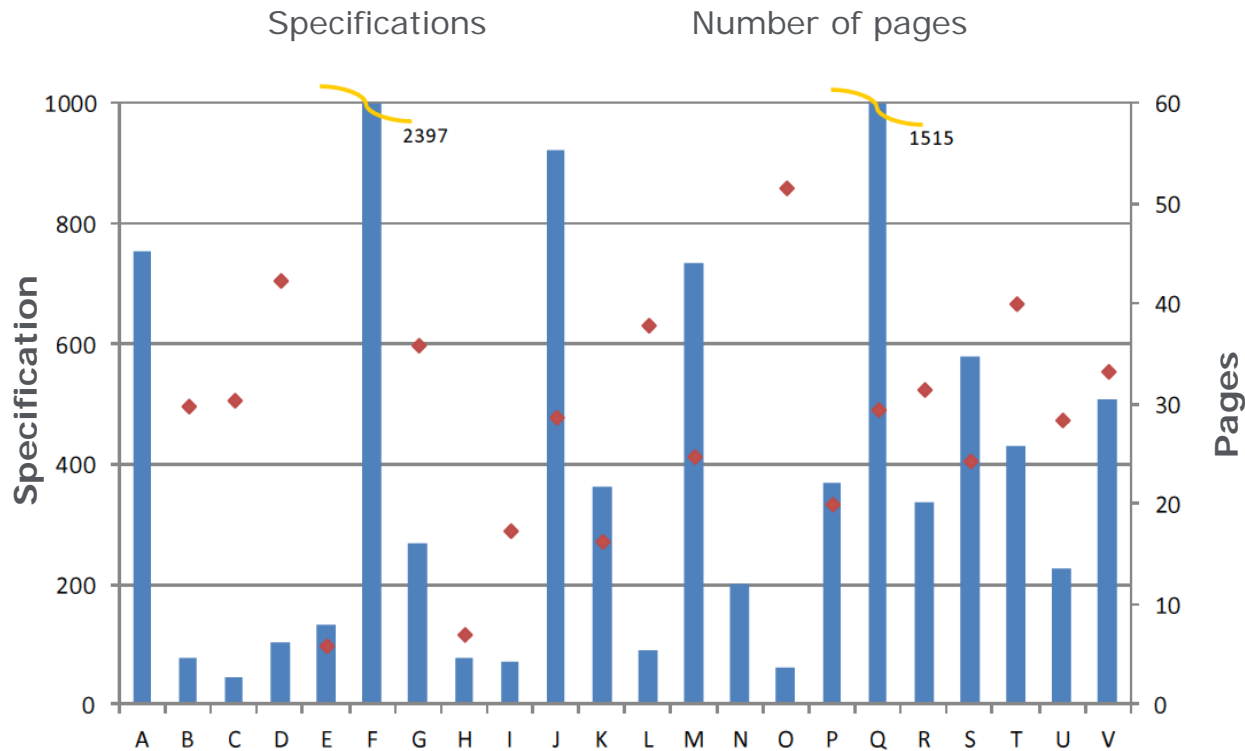


We need to focus!

Where it all started – IOGP Madrid workshop 2014

Evolution of Operator Company specifications - IOGP Reports 450, 500 & Madrid workshop 2014:

- Average number of specifications per company: 466;
- Average number of pages: 28



Change needed:

**Standardise
Operators specs
Establish
JIP33**

Where it all started



Future of Oil & Gas

Common Standardization Concept
Capital Project Complexity

- The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas
- The O&G Community at the WEF is composed of NOCs, IOCs and Independents representing approximately 40% of global oil supply as well as Services and Equipment companies

WORLD ECONOMIC FORUM

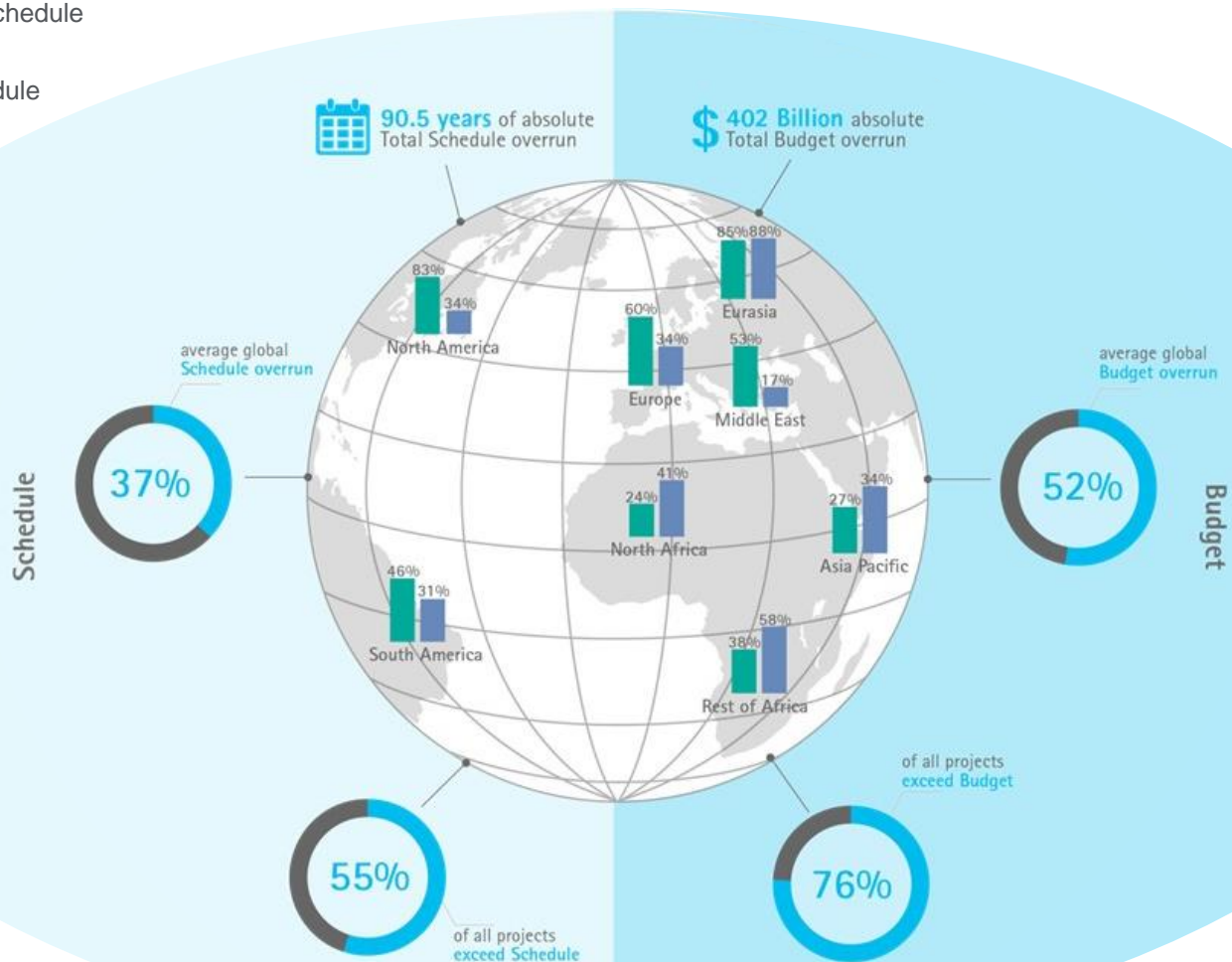
– Capital Project Complexity

World Economic Forum	<ul style="list-style-type: none">• The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas• The Annual Meeting in Davos convenes leaders from business, government and civil society to discuss the most pressing issues
Oil & Gas Community	<ul style="list-style-type: none">• The O&G Community at the WEF is composed of NOCs, IOCs and Independents representing approximately 40% of global oil supply as well as Services and Equipment companies
Capital Project Complexity	<ul style="list-style-type: none">• Since 2014, the O&G community has worked to address issues associated with budget and schedule overruns of large upstream projects• Over time, the focus has evolved towards revisiting standardization to improve the economics of hydrocarbon production.
Team	<p>The collaboration is shaped by:</p> <ul style="list-style-type: none">• A Steering Committee: Select group of CEOs from major producers. Committee meets around 4 times a year (2 physically/ 2 virtually).• The Working Group: Group of senior executives (e.g. Chief Engineer, Head of Projects etc.) who interact regularly in order to execute and further shape objectives and next steps• The Project Team: WEF staff who manage and support the project.

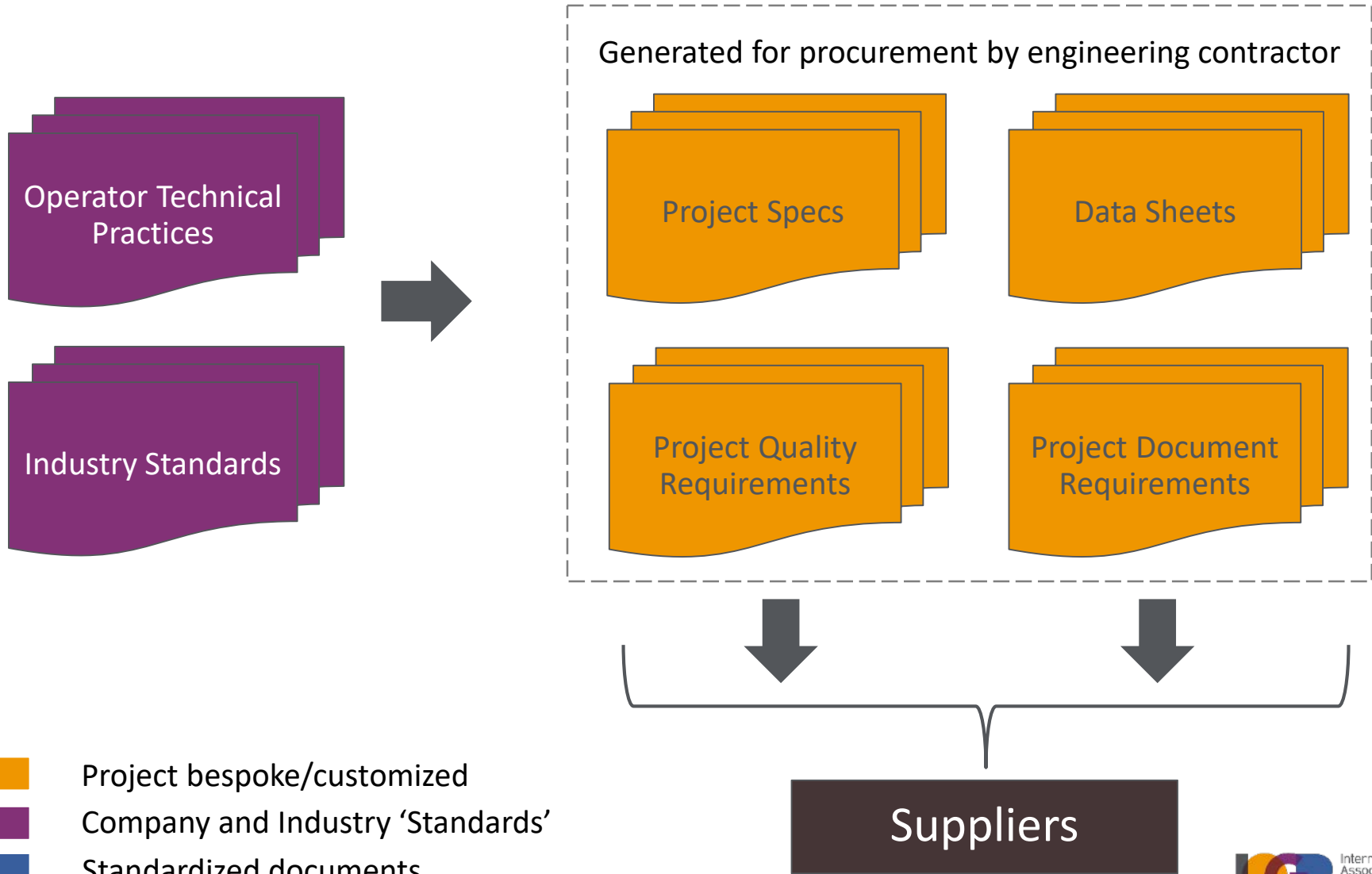
Large E&P projects budget and schedule overrun between 2010-2014




Average Budget and Schedule overrun' per region

■ Budget ■ Schedule

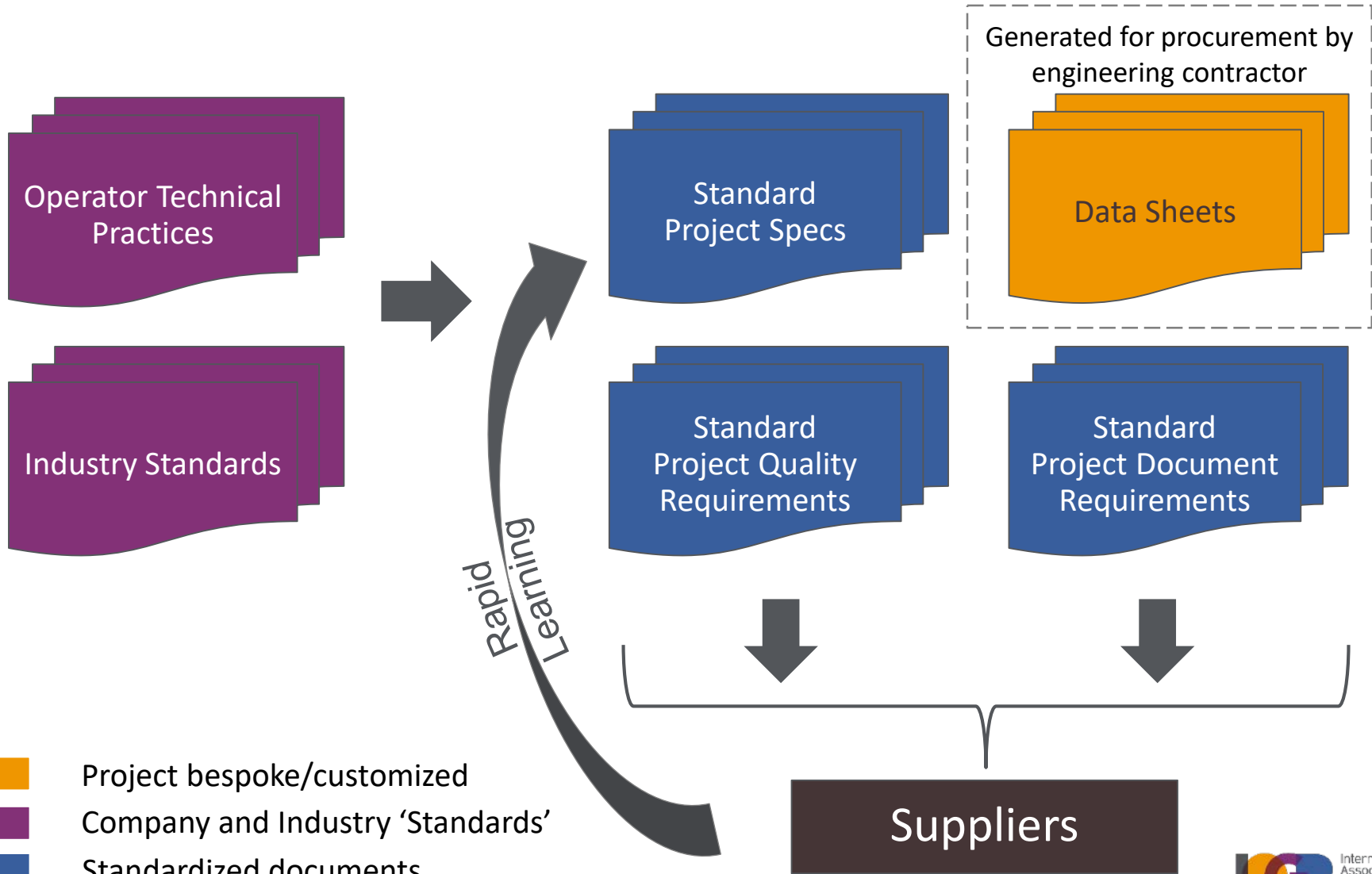


“The old way” of procuring equipment



-  Project bespoke/customized
-  Company and Industry 'Standards'
-  Standardized documents

“The new way” with standard specs



- Project bespoke/customized
- Company and Industry 'Standards'
- Standardized documents

About IOGP

IOGP's Members produce 40% of the world's oil and gas – safely, efficiently and reliably

IOGP works on behalf of the world's oil and gas companies and organizations to promote safe, responsible and sustainable exploration and production

The Association encompasses many of the world's leading publicly-traded, private and state-owned oil and gas companies, industry associations and major upstream service companies

- 78 Member Companies
- 3 offices – London, Brussels, Houston

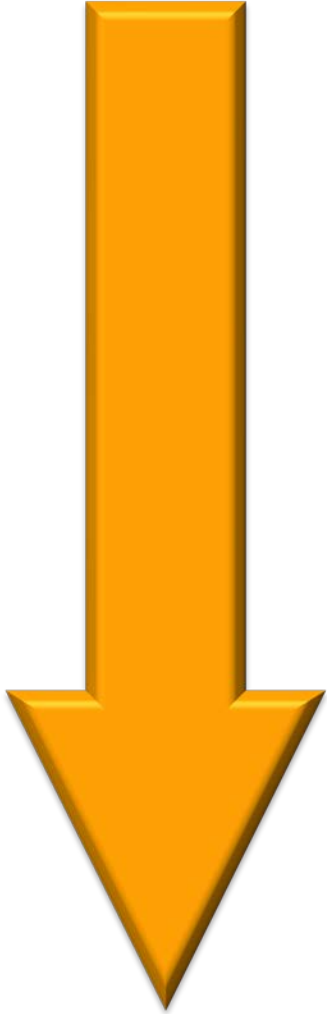




Standards Committee

- Supports development and promote value-added international standards that are recognized globally and used locally worldwide
- Maintains Standards Solution
- Aims to harmonize Operating company supplementary specifications
- Aiming to strengthen collaboration between IOGP, API, CEN, ISO and others
- Pushing for alignment on standards
- Actively engages and drives implementation

How do we drive costs down?



Simplification

- Design-to-cost – always minimum solution as starting point
- Drive for significant efficiency improvements in all cost

Standardization

- Standardize on cost effective design and limit variations
- Extensive effort to remove company specific requirements

Industrialization

- Maximize use of industry standards and supplier solutions
- Systematically strive for re-use of the Harmonised Industry Specification

JIP33 Mandate & process

Develop standardized equipment specifications for procurement

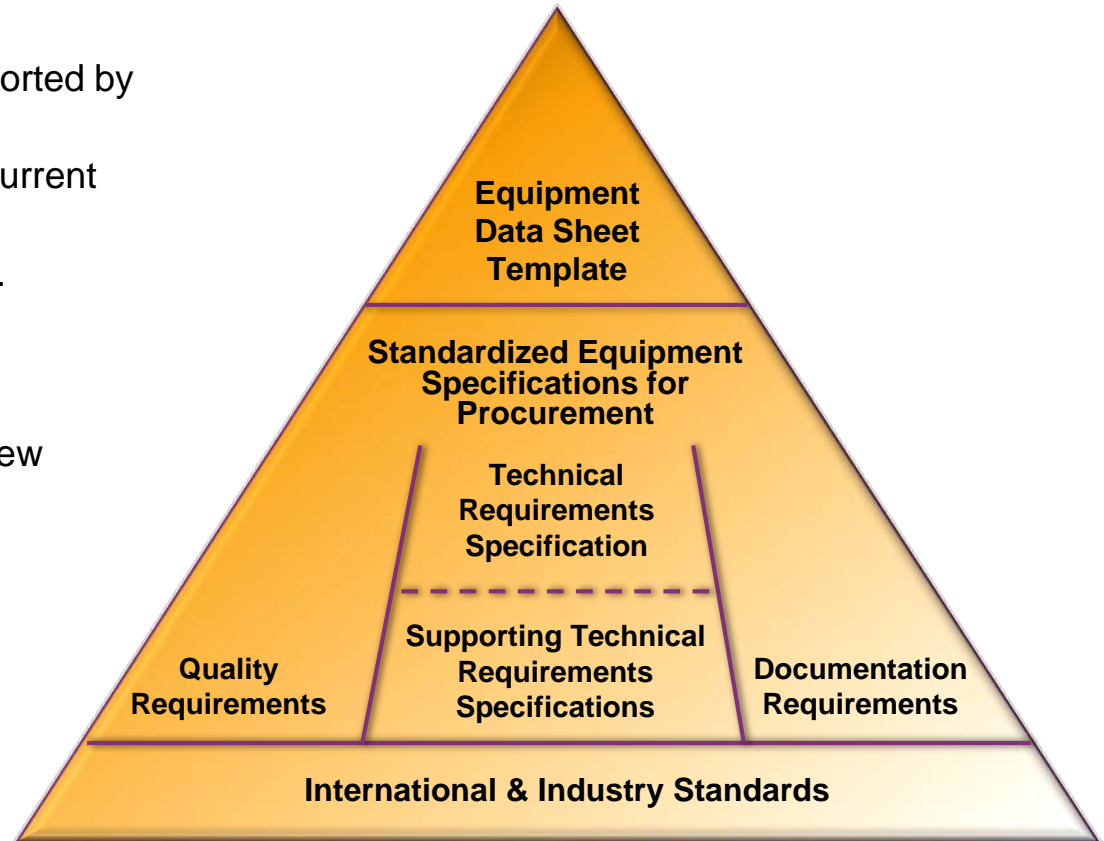
Sub teams must understand the cost and justify the safety or business value where proposed requirements exceed minimum proven industry practice.

Draft: Created by the JIP sub teams, supported by KBR technical experts, based on:

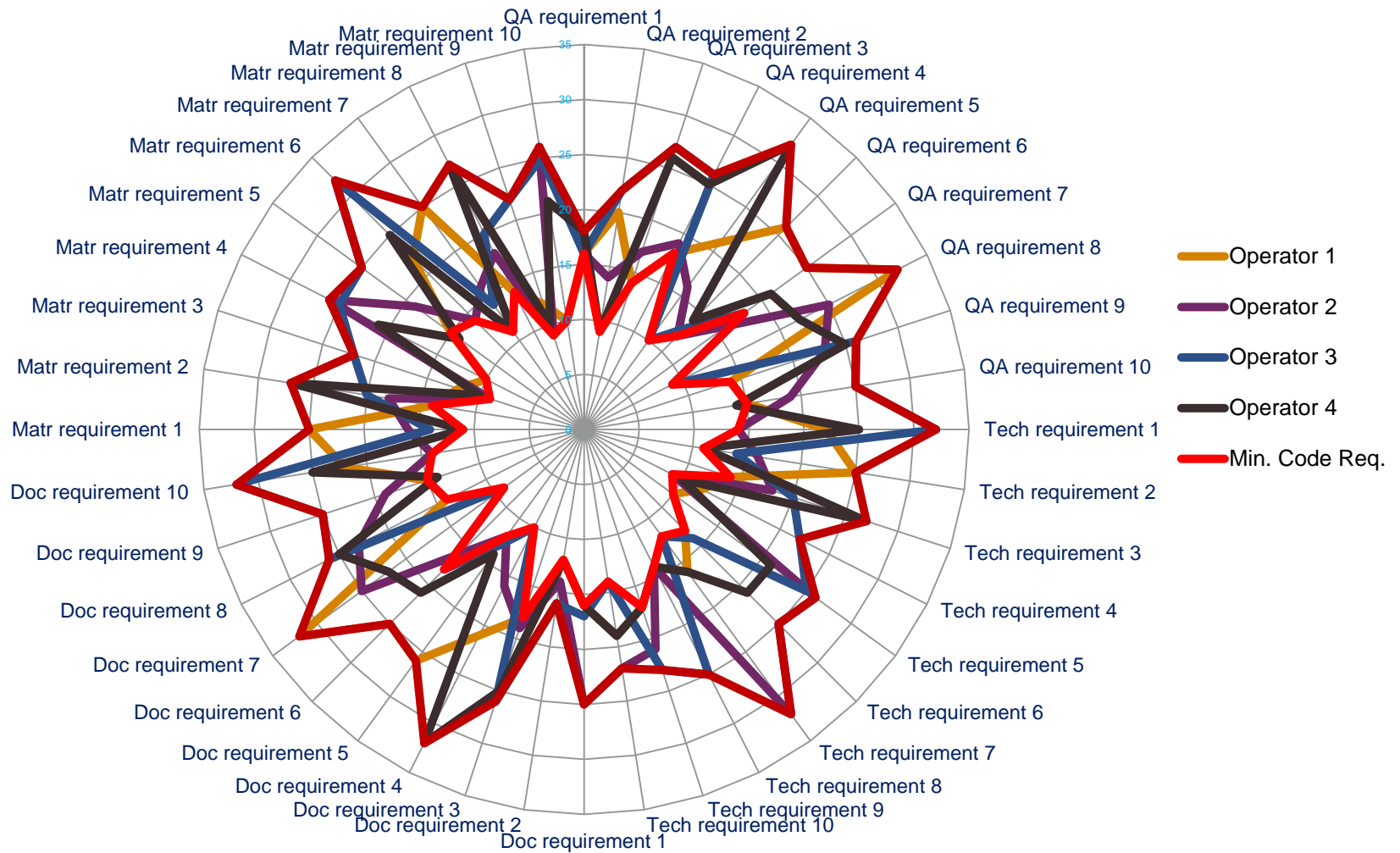
- The participating operating companies current design and procurement specifications.
- Supplement relevant industry standards.

Revision 1: Issued by IOGP following review and alignment amongst the JIP members' technical experts.

Revision 2: Issued by IOGP following review and feedback by suppliers.



Requirement Rose



JIP33 Vision & scale up

JIP33's vision for the industry is to unlock significant value and drive a permanent reduction in project costs through use of industry-level, global technical specifications for procurement of bulk materials, packages, modules and potentially, even projects

Phase 4 – Scale up

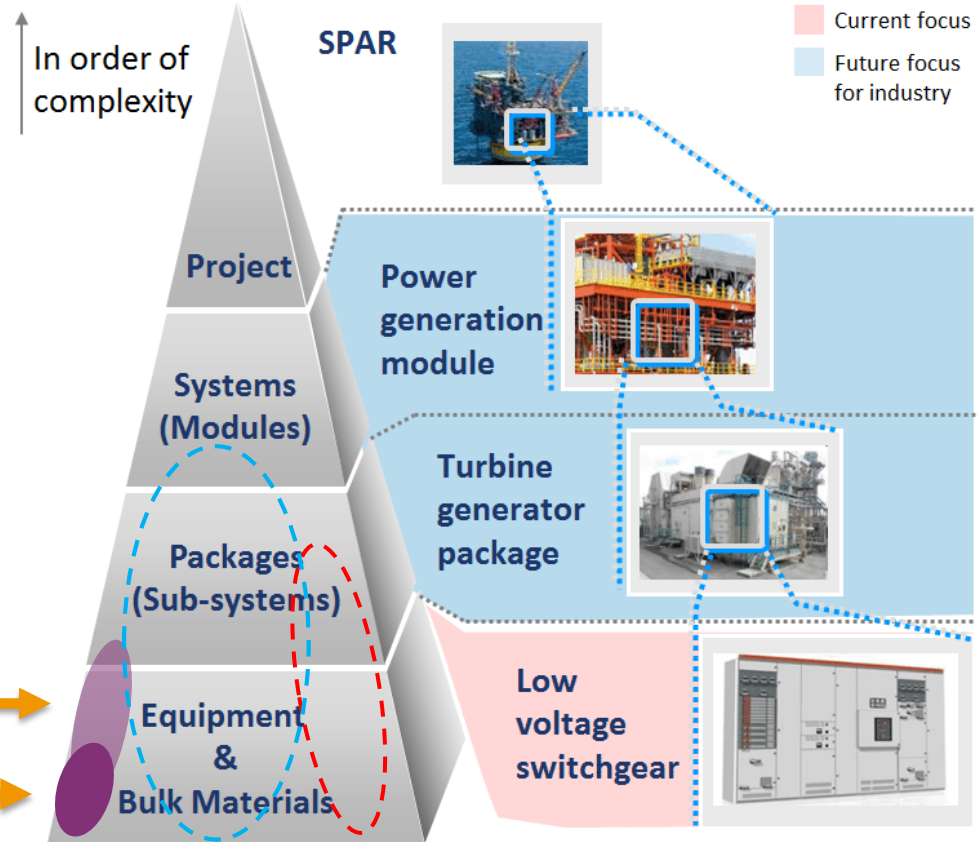
Phase 3 – Scale up

Scale Up – Number / Complexity

Proof of Concept

Phase 2

Phase 1 "Pilot"



ExxonMobil

BR PETROBRAS

أرامكو السعودية
saudi aramco

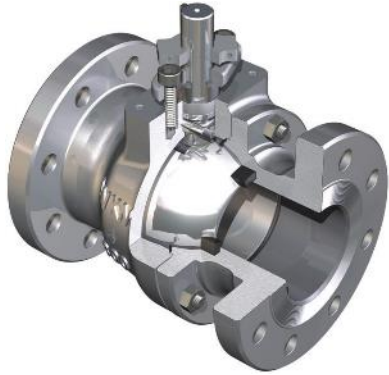


TOTAL



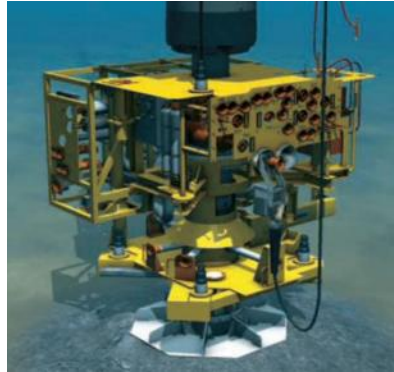
JIP33 Phase 1 equipment specifications for procurement

Ball valves



IOGP S-562 is based on API 6D 24th edition Specification for pipeline and piping valves.

Subsea xmas trees



IOGP S-561 is based on API Spec 17D subsea wellheads and XT requirements.

Low voltage switchgear



IOGP S-560 is based on the IEC 61439 low-voltage switchgear and controlgear assemblies.

Piping material



IOGP S-563 is based on NORSOK M-630 datasheets.

Specifications have been reviewed by suppliers:



JIP33 Phase 1 – proving the concept

Status as of January 2017

Achievements

Completed **proof-of-concept** by producing 4 standardized specifications for procurement.

Developed guidance document on supporting **cultural change**.

Documented learnings from proof-of-concept phase.

Established **Engineering Leadership Summit (ELS)** to drive second phase.

Phase 1 specifications

JIP33 members planning to implement

0% 100%



Ball valves



Subsea xmas trees



LV switchgear



Piping material



What are the savings on pilot specifications and what is the potential value from a scale up?

Industry-wide savings potential from pilot specifications

Current status and realized value

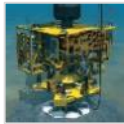
Ball valve



\$250-750M
(10-30%) annual savings potential

40%
schedule compression

Subsea Christmas tree



\$1,000M+
(25%+) annual savings potential

40%+
schedule compression

Low-voltage switchgear



\$200M+
(10%+) annual savings potential

25%+
schedule compression

- One operator mentioned adoption would save internal engineering to develop own company specification
- Operators have asked suppliers to evaluate bespoke design against standardized spec; received quotes with 20-25% savings
- Procured by Woodside for an FPSO refurb, with confirmed savings of 13%
- BP implemented on an active project; supplier cited reductions in cost, footprint and weight by at least 10% each, and lead-time by up to 25%

Switchboard example



When defining “requirements”

- ✓ Adopt global best practice (OPS)
- ✓ Supplement only where justified on the basis of:
 - ✓ Technical integrity/process safety
 - ✓ Lifecycle cost benefit



Woodside’s adoption of the JIP33 LVSG supplement to IEC ticks all the boxes !!!!!

Low Voltage Switchgear example

Feedback from supplier:

- 10% cost reduction
- 4 weeks schedule reduction
- Additional benefits:
 - Length – 13.5% reduction
 - Weight – 10.0% reduction
 - Delivery ex-works – 26.0% reduction
 - Starter component simplification – 50.0% reduction



Engineering Leadership Summit

Collaboration amongst major operators to identify, align and sponsor activities such as standardisation is key to our sector becoming competitive, whilst maintaining safety as our number one priority.

The engineering leadership summit brings together the heads of engineering from major operator companies who will lead and drive a collaborative engineering agenda across the industry. This is supported by the world economic forum capital value complexity work stream.



Activities agreed and aligned:

Standards

Alignment and progression of the industry and international standards.

Actions:

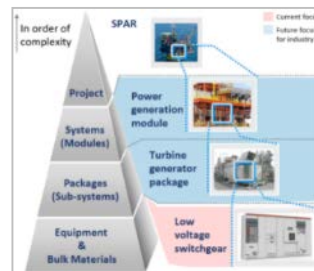
- Aligned operators' position and key messages on standards document to be created and agreed.
- Facilitate alignment of API and ISO.
- Create the 'Operators preferred standards' list.



Standardisation (JIP33)

Harmonisation of company requirements to develop standardised equipment specifications for procurement.

Next steps: Consolidate JIP33 proof-of-concept and increase the scale of the scope and visibility of the effort.



Other engineering areas where collaboration will drive value in the Oil & Gas sector

To be discussed at the periodic engineering leadership summit meetings.



Engineering Leadership Summit

Mission & aims

To promote the development of a harmonized listing of the standards recommended and supported by oil and gas sector operators through a dedicated “Operators Preferred Standards Task Force”.

The principle deliverables will include:

- ✓ Aligned definition of standard type, discipline and application categories
- ✓ Recommended list of preferred standards from:

Organisations making standards (>180)



- ✓ Prioritized listing of opportunities to improve the identified standards portfolio
- ✓ Management protocols

JANUARY 2017
DRAFT FOR DISCUSSION PURPOSES ONLY

Operators' position and key messages on standards



Introduction

Standardization is a top priority for the oil and gas industry to enable and enhance safety, reliability and integrity of operations globally. As economic conditions dramatically challenge the oil and gas industry, standardization also is a key business driver to tackle escalating project costs and schedule.

A key deliverable to standardization are standards. As operators, we need an aligned way forward to help set and steer the direction forward for the development of standards.

This paper addresses the way forward for oil and gas industry standards, i.e. standards developed for the industry by standards developing bodies (SDO) and other organizations, of which there are over 180 such as API, DNV GL, IEC, ISO, NACE and NORSOK. Starting with selected standards as the base, major operators typically codify their own learnings in their own suite of technical specifications and practices. Harmonization of these additional company requirements is being reviewed and addressed through JIP33.

As an independent, non-standard setting organization of global operators, IOGP can serve as a voice of the industry to influence international, global, regional and industry standards development and seek to agree to the preferred international standards.

Current status on the progress of standards development

With multiple standards-setting bodies across the global oil and gas industry, there continues to be duplicating, competing and inconsistent standards development in some areas.

As operators, through IOGP, we agreed to maintain a system where organizations developing standards work together to develop “international standards used locally worldwide” for the oil and gas industry. International standards are standards that have been agreed by countries (through balloting process) and ISO/IEC are the bodies that develops these.

While there has been significant cooperation between standards-setting organizations in the past years to progress international standards, the following challenges have recently arisen:

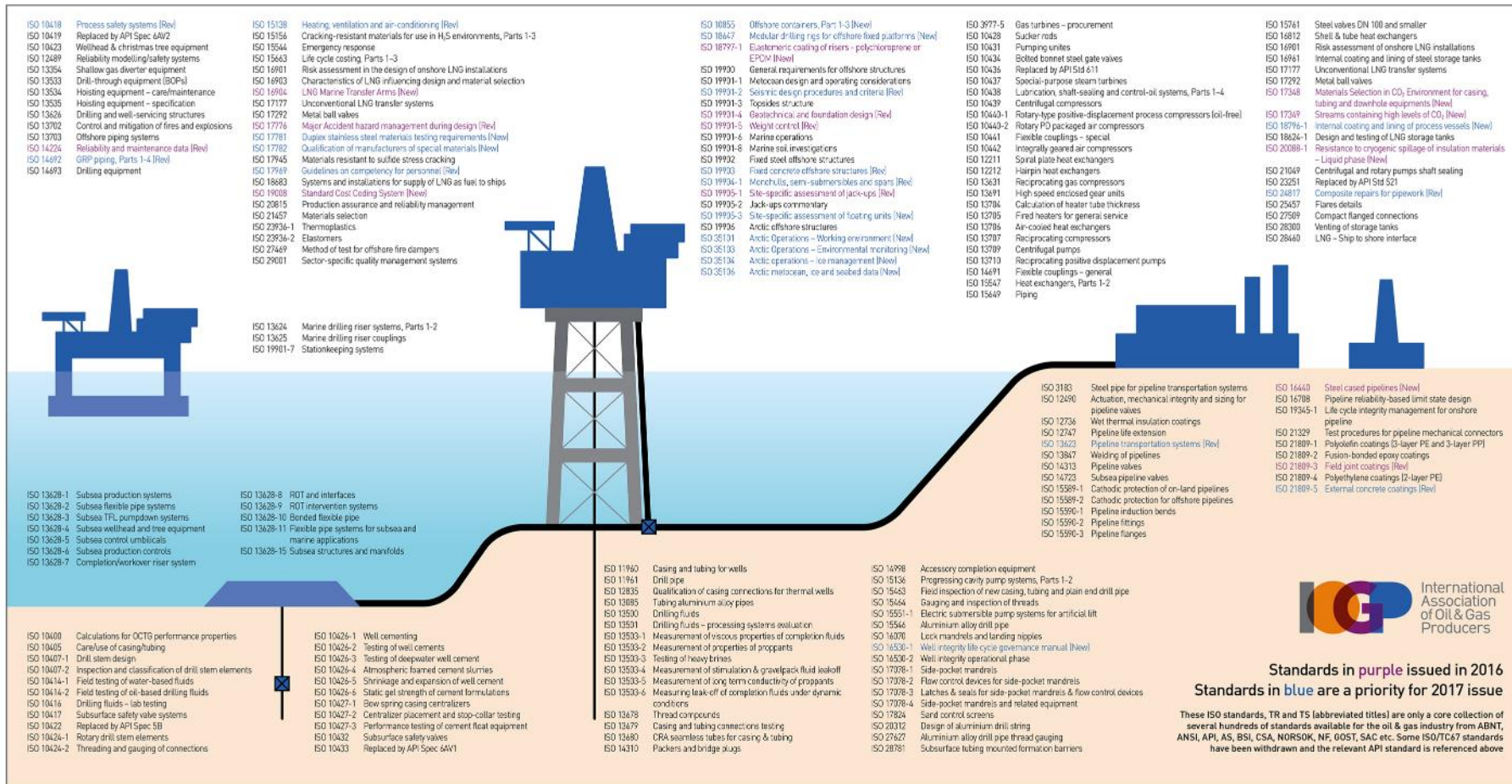
- API withdrew from the leadership of ISO standards development process in 2009.
- A number of companies withdrew from ISO standards development process due to EU/US sanction regulations in 2012.
- Concerns about intellectual property and copyrights have been raised.



See “Operators’ position and key messages on standards” document <http://www.iogp.org/>

Preferred standards used locally worldwide

Adopt best practice global standards
(ISO, API, NORSOK etc...)
Supplement only when justified for safety or life cycle cost benefit



Standards in purple issued in 2016
Standards in blue are a priority for 2017 issue

These ISO standards, TR and TS (abbreviated titles) are only a core collection of several hundreds of standards available for the oil & gas industry from ABNT, ANSI, API, AS, BSI, CSA, NORSOK, NF, OOST, SAE etc. Some ISO/TC67 standards have been withdrawn and the relevant API standard is referenced above

IOGP-ISO Poster to be superseded by "Operators Preferred Standards Poster"



IOGP JIP33 Phase 2



Workstreams

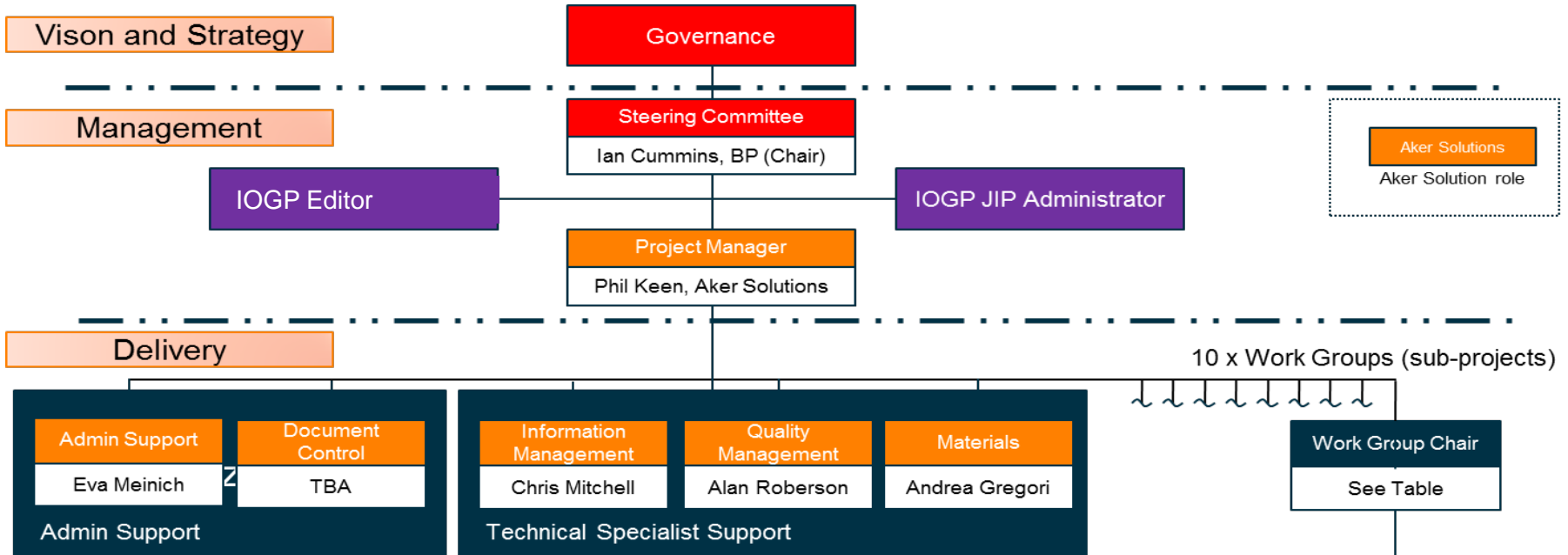
- Adopt specifications across the industry, embed the culture change and work the communications plan.
- Understand the value of standardization and implement KPIs for individual companies and industry as a whole.
- Improve the ball valve and subsea xmas trees specifications.
- Create further procurement specifications.

Specs to be delivered mid-2018

Air compressor packages
Ball valves (Revision of IOGP S-562)
Centrifugal pumps
Gate valves and globe/ check valves
HV switchgear
Line pipe for critical service
Offshore cranes/pedestal cranes
Pressure vessels
Shell and tube heat exchangers
Subsea trees (Revision of IOGP S-561)
Subsea tree configuration “top down”
Information and quality management

Project management by:  **Aker**Solutions

JIP33 Phase 2 - Structure



Aker Solutions
Aker Solution role

Work Group	Chair	LSME
1. Pressure Vessels	David Gudgeon, Eni	Martin Swinger (AKSO)
2. Centrifugal Pumps	Fabio Michelini, Eni	Peter Zakis (AKSO)
3. S&T Heat Exchangers	Tim Griffin, Eni	Martin Swinger (AKSO)
4. Air Compressor Package	Peter Clark, Shell	Arup Ray (AKSO)
5. Line Pipe	Lars Magne Haldorsen, Statoil	Ardian Fandika, Total
6. Offshore Cranes	Ben Finlay, Woodside	Julien Dunand-Chatellet (Total)
7. HV Switchgear	Justin Mason, BP	Martin Gillard, Shell
8 Gate / Check Vales	Loic Deneuve, Total	Tony Smart, Shell
9. Subsea tree "top down"	Gordon Budge, BP	Giorgio Pastore, Eni
10. Information & Quality	Ted Fletcher, Woodside	Chris Mitchell / Alan Roberson

Other sector standardization efforts provide lessons learned on what is critical for a successful scale up



Momentum can be created by just a few

- Critical mass needed for success requires leadership from a few “champions”



Change must be driven by executive leadership

- Executive leadership with “eyes on the prize” can break logjams and speed the process



Requires committed participation and time

- Engagement of subject matter experts with structured time is critical – ensures standards can be progressed efficiently



Decide clear rules to guide process

- Consensus can be the goal, but clear rules on voting procedures, organization roles and timelines are critical for success



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