

# ***Opportunities for Suppliers in the Off-shore and Naval Brazilian Industry***

*Rio Oil & Gas 2012*

*Rio de Janeiro, September 18<sup>th</sup> 2012*



# Agenda

Major National Shipyards – Technical File

Offshore and Naval Equipment Demand



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Major National Shipyards – Technical File

Offshore and Naval Equipment Demand

# Capacity and Occupancy of Major Shipyards and Construction Sites

Mauá

## Occupancy



- 8 Panamax



- 10 Light Products



- 2 Dark Products



- 1 Building Modules and Integration (FPSO Cidade Ilha Bela)

## Current Situation

In Operation

## State

Rio de Janeiro

## Municipality

Niterói

## Available Area

334.000 m2

## Steel Processing

36.000 tons per year

## Dry Docks

1

## Quays

4

## Careers

1

Source: SINAVAL

Labor Peak:  
3.950 people in Set/2014

## Occupancy



- 6 Semi-submersible Drilling Rigs



- 1 Hull Construction and Integration (P-61)



- 2 Building Modules and Integration (Replicantes 1 e 4)



- 2 Integrations (Cidade São Paulo and Cidade Paraty)

## Current Situation

In Operation

## State

Rio de Janeiro

## Municipality

Angra dos Reis

## Available Area

410.000 m2

## Steel Processing

50.000 tons per year

## Dry Docks

1

## Quays

2

## Careers

3

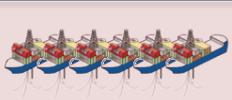
Source: SINAVAL

Labor Peak:  
7.900 people in Ago/2014

# Capacity and Occupancy of Major Shipyards and Construction Sites

OSX

## Occupancy

- 
  - 11 Products and 1 PLSV
- 
  - 7 Fixed Platforms
- 
  - 4 Hull Constructions
- 
  - 6 Building Modules and Integration
- 
  - 3 Building Modules and Integration  
*(FPSO Cidade Mangaratiba and Replicantes 2 e 5)*
- 
  - 5 Drilling Vessels

## Current Situation

**Under construction**

## State

Rio de Janeiro

## Municipality

São João da Barra

## Available Area

2.500.000 m<sup>2</sup>

## Steel Processing

180.000 tons per year

## Dry Docks

1

## Quays

1

## Careers

8

Source: SINAVAL

**Labor Peak(\*):**  
11.500 in Jul/2016

 Intended to own OSX

(\*)The peak considers only Petrobras projects

# Capacity and Occupancy of Major Shipyards and Construction Sites

ERG 1 and ERG 2

## Occupancy



- 8 Hull Constructions (Replicantes 1 - 8)



- 3 Drilling Vessels



- 1 Building Modules, Topside and Integration (P-55)

## State

Rio Grande do Sul

## Municipality

Rio Grande

## Available Area

834.300 m2

## Steel Processing

120.000 tons per year

## Dry Docks

1

## Quays

2

## Careers

0

Source: ENGENHARIA

## Current Situation

In Operation (ERG 1) / Under construction (ERG 2)

Labor Peak:  
7.750 people in Set/2015

# Capacity and Occupancy of Major Shipyards and Construction Sites

Atlântico Sul (EAS)

## Occupancy



- 14 Suezmax



- 8 Aframax



- 1 Building Modules, Conversion and Integration (P-62)



- 7 Drilling Vessels

## Current Situation

In Operation

## State

Pernambuco

## Municipality

Ipojuca

## Available Area

1.500.000 m<sup>2</sup>

## Steel Processing

160.000 tons per year

## Dry Docks

1

## Quays

2

## Careers

2

Source: SINAVAL

Labor Peak:  
8.000 people in Ago/2016



# Capacity and Occupancy of Major Shipyards and Construction Sites

Enseada do Paraguaçu (EEP)

## Occupancy



- 6 Drilling Vessels

## State

Bahia

## Municipality

Maragogipe

## Available Area

1.600.000 m<sup>2</sup>

## Steel Processing

36.000 tons per year

## Dry Docks

1

## Quays

1

## Careers

0

Source: SINAVAL

## Current Situation

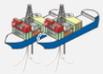
Under Construction

Labor Peak:  
4.200 people in Abr/2016

## Occupancy



- 6 Drilling Vessels



- 2 Building Modules and Integration (*Replicantes 3 and 6*)

## State

Espírito Santo

## Municipality

Aracruz

## Available Area

825.000 m<sup>2</sup>

## Steel Processing

48.000 tons per year

## Dry Docks

1

## Quays

1

## Careers

0

Source: SINAVAL

## Current Situation

**Under Construction**

**Labor Peak:  
4.850 people in Out/2016**

# Capacity and Occupancy of Major Shipyards and Construction Sites

*Inhaúma*

## Occupancy



- 4 Hull Conversion – Transfer of Rights (P-74, P-75, P-76 e P-77)

## State

Rio de Janeiro

## Municipality

Rio de Janeiro

## Available Area

320.000 m2

## Steel Processing

42.000 tons per year

## Dry Docks

2

## Quays

2

## Careers

0

Source: ENGENHARIA

**Labor Peak:  
4.800 people in Nov/2012**

## Current Situation

**In Modernization**

# Capacity and Occupancy of Major Shipyards and Construction Sites

## Occupancy



- 3 Bunker Ships



- 2 Dark Products

## State

Rio de Janeiro

## Municipality

Niterói

## Available Area

200.000 m<sup>2</sup>

## Steel Processing

40.000 tons per year

## Dry Docks

4

## Quays

1

## Careers

0

Source: SINAVAL

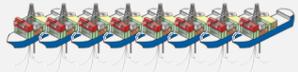
## Current Situation

In Operation

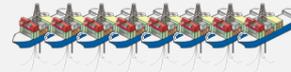
# Capacity and Occupancy of Major Shipyards and Construction Sites

## Shipyards - 8 FPSO Replicantes Modules

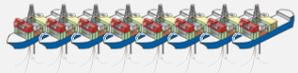
DM-TKK Consortium – Itajaí (SC) – Total Area of 98.300m<sup>2</sup> – **In Planning**



- 8 Building Fuel Gas and Dehydration Modules

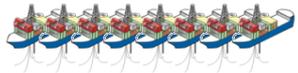


- 8 Building Generation 2 Modules



- 8 Building Generation 1 Modules

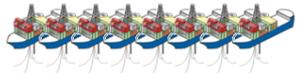
IESA – Charqueada (RS) – Total Area of 359.300m<sup>2</sup> – **Under Construction**



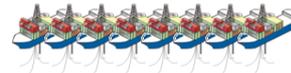
- 8 Building CO<sup>2</sup> Compression Modules



- 8 Building Main Compression and Vapor Recovery Modules

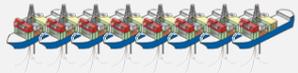


- 8 Building Gas Compression Exportation Modules



- 8 Building Injection Gas Compression Modules

Tomé/Ferrostal – Maceió (AL) – Total Area of 77.000m<sup>2</sup> – **Under Construction**



- 8 Building Oil Processing Modules



- 8 Building Oil Processing and Production Water Treatment Modules



- 8 Building Launchers, Receivers and Manifolds Modules

### Occupancy



- 7 Gas Tankers – Itajaí (SC) Shipyard



- 4 Panamax – EISA (RJ)



- 3 Bunkers – SUPERPESA (RJ)



- 3 Bunkers – São Miguel (RJ)



- 8 GLPs – STX Promar (PE)



- 2 Building Modules (*P-58 and P-62*) – UTC (RJ)



- 2 Building Modules (*P-58 and P-62*) – NUCLEP (RJ)



- 1 Building Modules (*Cidade Paraty*) – EBSE (RJ)

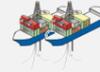
### Occupancy



- 1 Building and Integration Modules (*Cidade Ilha Bela* – SBM/Brasa (RJ)



- 2 Building Probe (*Jack-up P-59 e P-60*) – CRP (BA)



- 2 Building Modules (*P-55 e P-63*) – Porto Rio Grande (RS)



- 1 Building Modules and Integration (*P-58*) – Porto Rio Grande (RS)



- 7 Light Products – Rio Nave (RJ)



- 3 Dark Products – Rio Nave (RJ)



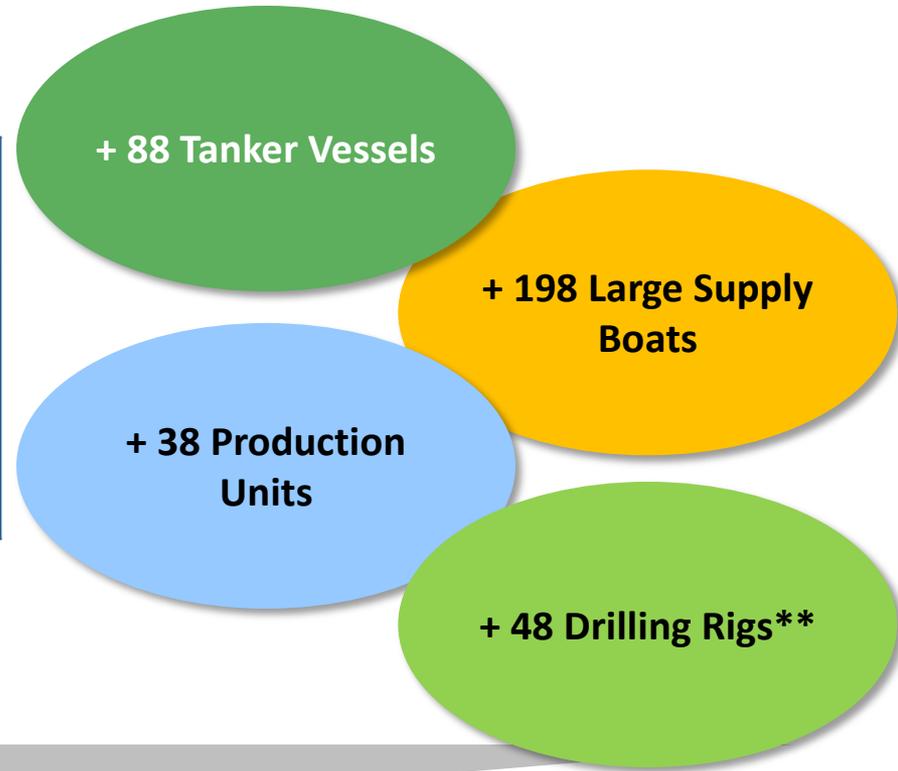
# Agenda

Major National Shipyards – Technical File

Offshore and Naval Equipment Demand

## 2020 Strategic Planning

### Future Demand



Critical Resources	Jan/12 Situation	Future Situation Accumulated Values <sup>(1)</sup>	
		Until 2016	Until 2020
Tanker Vessels (DWT x 1000t)	16.000	19.000	24.500
Large Supply Boats*	216	313	358
Production Units (SS e FPSO)	45	56	81
Drilling Rigs (SWD > 2.000 m)	26	42	65

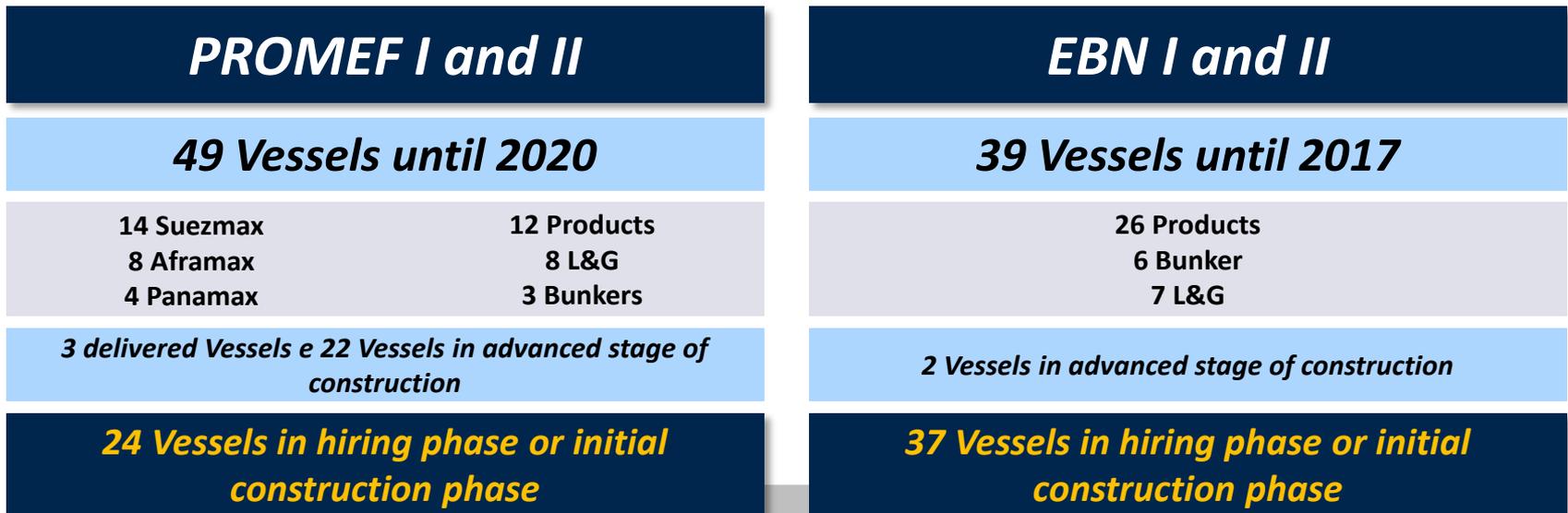
(1) The future situation of 2020 does not reflect the sum of the current situation with future demand, as there are vessels whose contracts expire by 2020. This demand may be revised as necessary.  
 (2) Future Demand includes hired demand, demands in hiring phase and yet to be hired demand.

### Significant equipment demand mapping:

- ✓ *Historically imported equipment with potential to attract foreign suppliers*
- ✓ *Equipment produced nationally but with potential bottlenecks in production capacity*

\* AHTS, ORSV, PSV  
 \*\* 33 will be constructed in Brazil

## ***Petrobras Fleet Growth Program with Brazilian Vessels***



***Equipment demand not yet addressed for 61 Vessels (until 2020)***

**Example of equipment with potential for national development**

- ✓ *61 Vacuum Sewage Systems*
- ✓ *53 Inert Gas Generation Unit*
- ✓ *72 Life Boats + Davit*
- ✓ *1.830 Accomodation Cabines*

### *Demand for the 61 Vessels to be delivered between 2013 and 2020*

Equipament	Demand
MAIN ENGINE (UN)	61
AUXILIARY ENGINE (UN)	177
PROPELLERS (FPP & VPP) (UN)	61
AZIMUTAL & TUNNEL THRUSTERS (UN)	12
AUXILIARY BOILERS(UP TO 35 TONS PER HOUR) (UN)	66
EXHAUSTED GAS ECONOMIZER/COMPOSED BOILER (UN)	51
THERMAL OIL HEATER (UN)	12
START AIR COMPRESSORS (30 BAR) (UN)	111
AIR COMPRESSOR (UN)	170
PLATE HEAT EXCHANGER (UN)	333
FRESH WATER GENERATOR (UN)	55
VALVES (UN)	75.270
ELETRIC(MAIN/AUX) SWITCHBOARDS (UN)	120
WINDLASS / WINCH (UN)	346
CHAINS (KM)	39
CRANES (3 TO 20 TONS) (UN)	214
ANCHORS (UN)	144

Equipament	Demand
LIFEBOAT (UN)	72
INFLATABLE BOATS (UN)	355
TOILET UNITS (UN)	1.849
PURIFIERS (UN)	293
INTEGRATED BRIDGE (UN)	61
CARGO PUMPS(FUEL OIL,DIESEL OIL, LUB. OIL) (UN)	67
CARGO PUMP (DEEP WELL) (UN)	384
MOORING LINES (UN X 200 METRES)	840
CHOCK, BOLLARD (UN)	7.271
ACCESS HATCH (UN)	1.220
VACUUM SEWAGE SYSTEMS (UN)	61
INERT GAS GENERATION UNIT (UN)	53
LIFE BOATS + DAVIT (UN)	72
ARCHITECTURE MATERIALS (ACCOMODATION PACKAGE)	61
MANUAL OPERATED VALVES (TON)	58.500
PIPES (TON)	9.800
FITTINGS (TON)	7.900

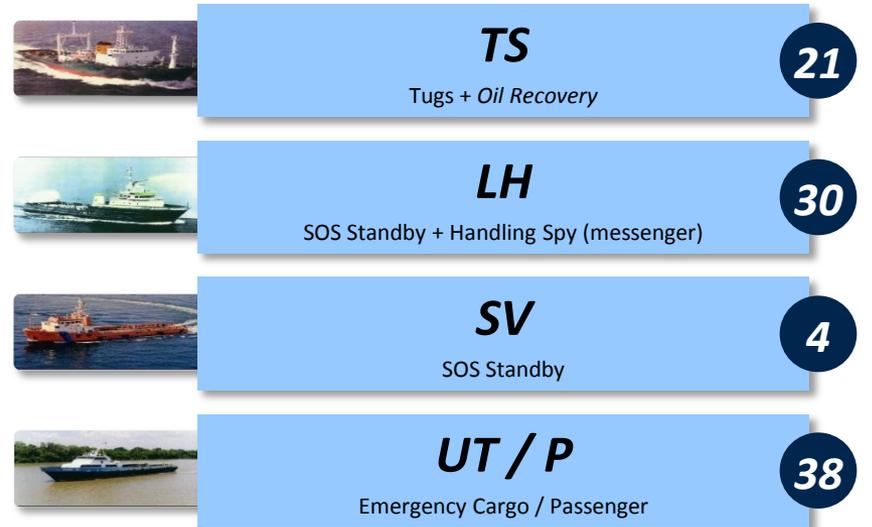
# Large Supply Vessels

## Fleet increase by 2020

### Current Petrobras Fleet

### Quantity

### Future Demand



**+ 198 Large Supply Vessels**  
**until 2020**  
*(almost the same quantity as the current  
fleet – 216)*

#### Example of equipment with potential for national development

- ✓ 198 Offshore Cranes
- ✓ 198 Vacuum Sewage Systems
- ✓ 396 Life Boats
- ✓ 55.700 Manual Operated Valves
- ✓ 44.550 ton of Pipin
- ✓ 4.800 ton of Fitting

# Large Supply Vessels

## Main demands for equipment (1/2)

### *Demand for 198 vessels to be delivered until 2020*

Equipment	Demand
Classified profiles (ton)	<b>59.400</b>
Shock fast (UN 300L)	<b>1.584</b>
Directional propulsion system (UN)	<b>396</b>
Transverse thrusters (UN)	<b>396</b>
Generator set (UN)	<b>792</b>
Emergency generator - port (UN)	<b>198</b>
Compressors (UN)	<b>594</b>
Oil Purifier (UN)	<b>396</b>
Oil water separator (UN)	<b>198</b>
Heat exchanger (UN)	<b>792</b>
Fans and blowers (UN)	<b>7.326</b>
Vacuum sewage system (system)	<b>198</b>
Air-conditioning system (system)	<b>198</b>
Fresh water heater (UN)	<b>198</b>
Domestic refrigeration (system)	<b>198</b>
Laundry equipment (set)	<b>396</b>
Trailer/mooring winch (UN)	<b>396</b>

Equipment	Demand
Provisions crane (UN)	<b>198</b>
Compressors for bulk (UN)	<b>198</b>
Cargo pump (UN)	<b>1.188</b>
Control systems and supervising machines (system)	<b>198</b>
Metal pipes (yards) (meters)	<b>1.584.000</b>
Valves (estimated) (pieces)	<b>74.250</b>
Manual Operated Valves (estimated) (pieces)	<b>55.700</b>
Fittings (estimated) (ton)	<b>4.800</b>
Parts passage (UN)	<b>19.800</b>
Main switchboard (set)	<b>198</b>
Distribution Panels (UN)	<b>3.960</b>
Starters (UN)	<b>1.980</b>
Spotlights and reflectors (UN)	<b>3.960</b>
Navigation lights (set)	<b>198</b>
Aldis lamp (UN)	<b>198</b>
Battery charger (UN)	<b>198</b>
Static Inverter/Frequency Converter (UN)	<b>792</b>
Rotary guard and cleaner (UN)	<b>4.950</b>

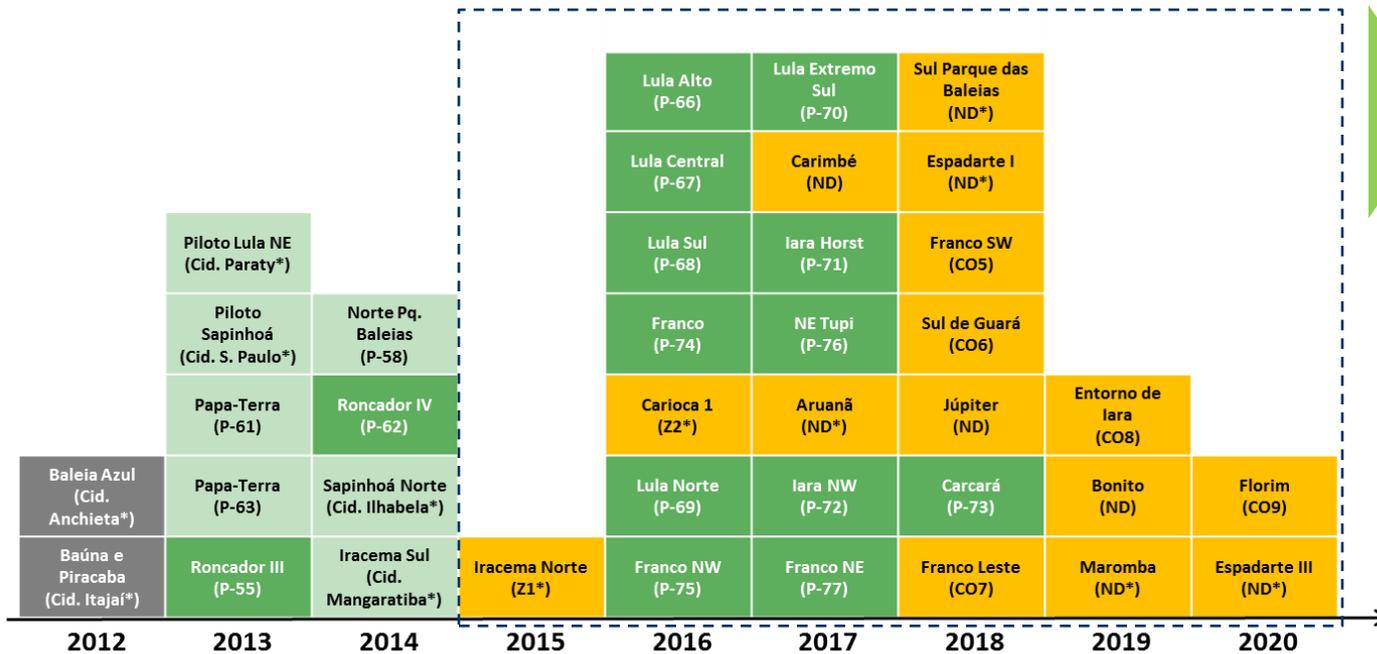
### *Demand for 198 vessels to be delivered until 2020*

Equipment	Demand
Self excited phone (UN)	792
Fonoclama and TV and sound system (system)	198
Transformers and Rectifiers (UN)	396
Radar (UN)	396
Navigation, communication and signaling equipments (set)	198
Eco-probe and echobathymeter (UN)	198
VHF Radio (UN)	792
SSB Radio (UN)	396
Odometer (UN)	198
Automatic Pilot (UN)	198
Satellite navigator+ Ploter (UN)	396
Automation System/Micro Full (system)	198
Dynamic Positioning System(system) (system)	198
Steel doors (UN)	5.940
Ducts of natural and forced ventilation (UN)	594
Windows (UN)	7.524
Guards and wide eyes (UN)	5.940

Equipment	Demand
Fixed firefighting system (system)	198
Smoke and heat detectors (set)	198
General alarm (system)	198
Whistle (UN)	198
Magnetic needle (UN)	198
General bulkheads (m 2)	396.000
Ceiling and bulkhead liners (m 2)	396.000
Paving (m 2)	178.200
Doors class B (UN)	9.900
Anchors (UN)	396
Mooring lines (UN)	396
Cables mooring and trailer (UN)	1.782
Rubber Fenders (UN)	3.960
Motorized service boats (UN)	198
Small Lifeboat (UN)	1.188
Buoys and life jackets (UN)	1.584
Boats transceivers (UN)	1.188

### Operation Startup Timeline for Petrobras Production Units

Production Units considered for the equipment demand analysis



Equipment demand not yet addressed for 27 Production Units to be delivery until 2020

Example of potential equipment for national development

- ✓ 81 Chemical Injection Units
- ✓ 81 Offshore Cranes
- ✓ 27 Vacuum Sewage System
- ✓ 81 Offloading System
- ✓ 108 Life Boats + Davit
- ✓ 189.000 Manual Operated Valves
- ✓ 54.000 ton of Piping
- ✓ 43.200 ton of Fittings



#### Construction Site

- Abroad
- Abroad/Brazil \*\*
- Brazil
- To be defined

ND: Not defined

\* Chartered Production Unit

\*\* Integrated in Brazil with imported Hull or Modules

# Production Units

## Main demands for equipment – Topside

### *Demand for the 27 Production Units to be delivered between 2015 and 2020*

Package/Skid	Demand (units)
ELETRO CHLORINATION UNIT	31
VAPOR RECOVERY UNIT	54
GAS DEHYDRATION UNIT	27
VACUUM DEAERATOR UNIT	27
CHEMICAL INJECTION UNIT	81
H2S REMOVAL UNIT	27
NITROGEN GENERATOR UNIT	27
SULPHATE REMOVAL UNIT	27
ELECTROSTATIC TREATERS PACKAGE	27
PRODUCED WATER TREATMENT	27
FLARE GAS RECOVERY COMPRESSION UNIT	27
FLARE	27
FRESH WATER MAKER	27
SHELL&TUBES HEAT EXCHANGE PACKAGE	27
PLATE HEAT EXCHANGERS PACKAGE	27
PRESSURE VESSELS / SEPARATORS PACKAGES	27
CENTRIFUGAL PUMPS PACKAGE	27
SEA WATER LIFT PUMPS PACKAGE	27

Package/Skid	Demand (units)
WATER INJECTION PUMPS PACKAGE	27
WELL SERVICE PUMP PACKAGE	27
RECIPROCATING PUMPS PACKAGE	27
POSITIVE DISPLACEMENT PUMPS PACKAGE	27
FILTERS PACKAGE	27
PIG LAUNCHERS & RECEIVERS PACKAGE	27
MECHANICAL HANDLING EQUIPMENT PACKAGE	27
ICSS – INTEGRATED CONTROL & SAFETY SYSTEM	27
HYDRAULIC POWER UNIT - HPU	27
FISCAL METERING SKID	27
ELECTRICAL AND AUTOMATION MODULE	27
HVAC SYSTEM	27
EXPORTATION GAS COMPRESSION UNIT	27
CO2 COMPRESSION UNIT	27
MAIN GAS COMPRESSOR	27
INJECTION GAS COMPRESSION UNIT	27
MAIN TURBOGENERATOR UNIT	27

# Production Units

## Main demands for equipment – Loose Equipment

### *Demand for the 27 Production Units to be delivered between 2015 and 2020*

Equipment	Demand
COMPRESSOR	567
PRESSURE VESSEL (Scrubber/Separator/K.O.Drum)	1.674
TANK	729
CONTROL PANEL (Distribution panel)	2.241
PUMPS	2.808
HYDROCYCLONES / GAS FLOTATION	189
FILTER	594
SHELL&TUBES HEAT EXCHANGER	1.269
PLATE HEAT EXCHANGER	486
MECHANICAL HANDLING EQUIPMENT	2.862
OIL DEHYDRATOR / PRE-OIL DEHYDRATOR	54
OIL DEHYDRATOR DEGASSER / PRE-OIL DEHYDRATOR DEGASSER	54
PIG LAUNCHERS & RECEIVERS	648
CONTROL, SHUTDOWN, CHOKE, PRESSURE SAFETY, DELUGE VALVES	21.600
MANUAL VALVES (un)	189.000
PIPING (ton)	54.000
FITTING (ton)	43.200
CABLE (Electrical/Instrumentation/Telecom) (km)	13.500
INSTRUMENTATION (Transmitter/Gauge/Indicator) (un)	54.000

# Production Units

*Main equipment demand – Hull*

## *Demand for the 27 Production Units to be delivered between 2015 and 2020*

Equipment	Demand (units)
OFFSHORE CRANE API-2C (50T)	81
ALUMINIUM HELIDECK	27
LIFEBOAT & DAVIT	108
RESCUE BOAT & DAVIT	108
FOAM FIREFIGHTING SYSTEM	27
CO2 FIREFIGHTING SYSTEM	27
OFFLOADING SYSTEM	54
INERT GAS SYSTEM	27
SEWAGE TREATMENT & VACUUM UNIT	27
AUXILIARY & EMERGENCY DIESEL GENERATOR	54
DIESEL FIRE WATER PUMP	54
BALLAST PUMPS	108
COOLING WATER PUMPS	54
FRESH WATER GENERATOR	54
PORTABLE WATER GENERATOR	54

Equipment	Demand (units)
FIRE DETECTION SYSTEM	27
ENVIRONMENTAL & POSITIONING SYSTEM	27
NAVIGATION AID SYSTEM	27
OFFLOADING SYSTEM	27
MOORING SYSTEM	108
PULL-IN / PULL-OUT SYSTEM	27
SUBMERGED CARGO PUMPS	378
SUBMERGED DEBALLAST PUMPS	162
CONTROL VALVES SYSTEM (un)	5.400
HELICOPTER REFUELING SYSTEM	27
DIESEL PURIFIER	27
VAC SYSTEM	27
ACCOMODATION PACKAGE	27
AUTOMATION & ELECTRIC PACKAGE	27



### ***Demand for the 33 Drilling Rigs to be delivered between 2016 and 2020***

Equipment	Demand
ELECTRICAL & INSTRUMENTS AUTOMATION SYSTEM (ESD, fire/gas detection, Ship Sever ,electrical power (transformers/switch borders) (System, UPS system)	33
HEAVE COMPENSATION SET	33
TOPDRIVES & ASSOCIATED EQUIPMENT(907 mt x 2x857 KW)	33
VERTICAL PIPEHANDLING - STANBUILDING	33
TRAVELING EQUIPMENT - GENERAL	33
DRAWWORKS AND MACHINERY(8508 KN /10056 KN)	33
ROTARY TABLE & ASSOCIATED EQUIPMENT(47,5 KN, 40 rpm)	33
HYDRAULIC ROUGHNECKS FOR WELL CENTRE & STADBUILDING	33
RISER & PIPE RACK HANDLING SYSTEM	33
HYDRAULIC POWER UNIT(4x 150 KW + 1x 9 KW)	165
MUD SYSTEM (Pumps, accessories, mixer)7500 psi x 4 un.	33
CHOKE & KILL MANIFOLD	33
DRILLERS CONTROL CABIN & CONTROL SYSTEM	33
BOP / XMAS TREE TRANSPORTATIO / HANDLING SYSTEM	33
RISER TENSIONING SYSTEM	33
BULK MUD & CEMENT SYSTEM	33
SUBSEA PACKAGE	33

### ***Demand for the 33 Drilling Rigs to be delivered between 2016 and 2020***

Equipament	Demand
ELECTRICAL & INSTRUMENTS AUTOMATION SYSTEM (ESD,fire/gas detection, Ship Sever ,electrical power (transformers/swith borders) (System,UPS system)	33
MAIN DIESEL GENERATORS SETS(7680 KW X720 RPMX11000v)	198
EMERGENCY GENERATOR SET (1180 KW x1800 rpmX600V)	33
DECK CRANE-Lattice boom 25tx42m	99
DECK CRANES-KNUCKLE BOOM -25TX45M + 1X85T X19M	66
AZIMUTH THRUSTERS(4500 kwX4,50M Dia)	198
ANCHORING & MORING EQUIPMENTS(electrichal hyd. Driven)	33
PUMPS( centrifugal,Pneumatics,Positive displac.)	3.201
HVAC SYSTEM (Main machines) (un)	99
HVAC SYSTEM (Self-container) (un)	990
ACCOMODATION MODULE (Persons)	33
PIPING ( ton)	20.000
FITTINGS (ton)	13.000
CABLE (Electrical / Instrumentation / Telecom) (km)	26.400
VALVES (ton)	24.450

