



# Information for candidates in the 2014 elections

AUGUST 2014



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## Presentation

### Brazilian shipbuilding promotes socio-economic development

#### A new category

With a strong generation of employment and income, the Brazilian shipbuilding reaches 2014 recognized as a basic industry that expands the country's socio-economic development possibilities.

A new category of qualified workers and technicians is created. Jobs are generated in the various regions of the country where there are shipbuilding centers.

#### Number of people employed in associated shipyards (excluding the nautical segment)

UF	2004	2005	2006	2007 <sup>1</sup>	2008	2009	2010	2011	2012	2013	2014 <sup>2</sup>
RJ	10.636	12.385	17.052	24.003	20.403	23.654	25.987	25.020	29.967	30.506	35.458
ES	—	—	—	—	—	—	—	—	—	410	508
SP	661	781	795	1.578	1.065	1.414	781	721	1.604	1.782	1.838
SC	1.046	766	1.208	2.207	2.395	2.518	1.958	2.397	3.039	4.247	5.172
RS	—	—	—	—	—	820	5.500	5.500	6.174	19.954	9.454
PA	175	190	225	225	341	420	411	371	316	580	810
AM	—	—	—	—	2.500	2.637	9.244	11.987	13.372	11.902	12.110
CE	133	320	320	632	960	1.500	1.300	903	202	702	703
SE	—	—	—	—	—	—	350	345	38	38	58
BA	—	—	—	—	—	523	—	2.125	1.628	92	100
PE	—	—	—	480	5.613	7.014	10.581	9.798	5.696	7.923	15.680
<b>TOTAL</b>	<b>12.651</b>	<b>14.442</b>	<b>19.600</b>	<b>29.125</b>	<b>33.277</b>	<b>40.500</b>	<b>56.112</b>	<b>59.167</b>	<b>62.036</b>	<b>78.136</b>	<b>81.891</b>

<sup>1</sup> 2007 up to August <sup>2</sup> 2014 up to July

Source: SINAVAL

#### Increasingly important

In international studies the shipbuilding industry is considered essential for attracting investments, generating jobs and increasing a country's insertion in the world, as well as producing innovation and technology.

Given the forecast increase in maritime transportation, which is set to grow from the current level of 10 billions tons per year to 19 billion tons in 2030, countries throughout the world are strengthening their shipbuilding industries.

According to the International Energy Agency (IEA), the demand for oil and its products will remain strong until 2040. Renewable energy is forecast to increase its share of the energy mix from 1% to 7%, while oil's share will decline from 81% to 75%.

The analysis confirms that oil and natural gas will continue to dominate the energy supply mix during the next 30 years. Considering the maturity and natural production decline of fields, investments will be needed to maintain and expand current production.

In Brazil, maritime transportation along the Brazilian coast and river transportation are both expected to increase, with the latter being used especially to ship grain to seaports. The demand for equipment for deepwater (offshore) oil exploration and production will continue for at least another 20 years.

## Shipyard order book

Type of construction	Number	Shipyards
Oil tankers	34	EAS (PE), Mauá (RJ)
Gas tankers	8	Vard Promar (PE)
Drilling rigs	29	ERG (RS), BrasFELS (RJ), EJA (ES), Enseada (BA), EAS (PE)
Platform productions	16	BrasFELS (RJ), ERG (RS), Brasa (RJ)
Offshore Support Vessels	61	Aliança (RJ), Vard Niterói (RJ), Eisa (RJ), São Miguel (RJ), ETP (RJ), Wilson, Sons (SP), Navship (SC), Detroit (SC), Keppel Singmarine (SC), ERIN (AM), Intecnial (RS)
Container ships and bulk carriers	4	Eisa (RJ)
River navigation	220	Rio Maguari (PA), Rio Tietê (SP), ERIN (AM), EASA (AM), Intecnial (RS)
Patrol ships	4	Eisa (RJ), Inace (CE)
Submarines	5	Estaleiro de Submarinos (RJ)
<b>TOTAL</b>	<b>381</b>	

Observation: port tugs not included.

The Brazilian shipbuilding industry is producing oil tankers, container ships, offshore support vessels (PSV, PLSV, AHTS and others), drilling rigs, production platforms and river convoys (barges and pusher craft) to meet demand.

The countries that are currently leaders in the shipbuilding and offshore industry took decades to reach their present position. Our industry took a decade to emerge from stagnation. Today we are recognized as being an important shipbuilding industry.

**The positive scenario for shipbuilding shows the need for continued political support of the legal and fiscal system that incentivizes the sector in Brazil.**

## Ariovaldo Rocha

SINAVAL President

## Brazilian shipbuilding industry results

### The Brazilian shipbuilding industry has achieved its target of becoming a local alternative for the supply of oil tankers, drilling rigs and production platforms

A total of 357 vessels and 6 shipyard construction or expansion projects financed by the Merchant Navy Fund (FMM) have been concluded since 2007. There are currently 157 vessels under construction and 8 shipyard works being undertaken using FMM funding.

The FMM, managed by the Ministry of Transportation, has made total disbursements of R\$ 22.7 billion since 2001, as can be seen in the adjoining table.

#### FMM Funds

Disbursements in 2013:  
R\$ 4.9 billion

Disbursements since 2001:  
R\$ 22.7 billion

YEAR	R\$ BILLION
2001	0.3
2002	0.3
2003	0.6
2004	0.7
2005	0.5
2006	0.6
2007	1.1
2008	1.3
2009	2.3
2010	2.6
2011	2.7
2012	4.8
2013	4.9
<b>TOTAL</b>	<b>22.7</b>

Source: FMM – CGU

### The shipbuilding sector has grown 19.5% a year since 2004

The Applied Economic Research Institute (Ipea) prepared the book “The Re-emergence of the Shipbuilding Industry In Brazil – 2000-2013”. Investments in the sector amount to R\$ 149.5 billion. During a period of ten years, since 2004, the Brazilian shipbuilding industry has recorded average annual growth of 19.5%. This recovery can be attributed basically to the development of Petrobras orders and offshore production.

### The Libra field is boosting oil investments says the BNDES

The Brazilian National Economic and Social Development Bank (BNDES) has mapped the investments forecast in various sectors of the Brazilian economy and concluded that these investments will amount to R\$ 4.07 trillion during the 2014-2017 period.

The largest sums will be invested in oil and gas.

In the case of the Libra field – granted at the end of last year to Petrobras, Shell, Total and the Chinese state companies CNPC and CNOOC – estimated investments of R\$ 488 billion will be required between 2014 and 2017.

### 23 of the 50 biggest offshore projects are in Brazil, informs OPEC

According to the annual report of the Organization of Petroleum Exporting Countries (OPEC), published in November 2013, 23 of the 50 biggest offshore projects forecast for the next five years are in Brazil.

### Additional areas for Petrobras

Petrobras will spend US\$ 1 billion to drill wells and delimit the reserves recently contracted by the Federal Government, informed the company's Exploration and Production Director, José Formigli, during a presentation to the press in July 2014.

The aim is to obtain more detailed knowledge of the the four pre-salt areas of the Santos – Búzios, Entorno de Iara, Florim and Nordeste de Tupi Basin.

Potential reserves are estimated at 9.8 billion to 15.2 billion barrels of oil equivalent.

## Oil and product tankers

### The increase in Brazil's production of oil poses the challenge of increasing the oil and product tanker fleet

The Promef, Transpetro's fleet modernization program, represents orders for 49 oil tankers, seven of which already delivered and in service.

The *suezmax* tanker *João Cândido*, second ship of the Transpetro Fleet Modernization and Expansion Program (Promef) to enter service, made its first international trip in July 2014, carrying 1 million barrels of oil from the Lula Field in the pre-salt area of the Santos Basin to oil terminals in Chile.

The *João Cândido* was the first oil tanker to be built in the Northeast. It has been in service since May 2012. It is 274 meters long, with a deadweight capacity of 157.7 tons, and can carry up to 1 million barrels of oil – nearly a half of Brazil's daily production.

#### Essential mission of oil and product tankers

The construction of oil and product tankers is essential for the transportation of crude oil from platforms to terminals on land and the transportation of oil products such as gasoline, kerosene, fuel oil and lubricants along the Brazilian coast, reaching Manaus through the Amazon River.

#### Promef – Transpetro Fleet Modernization and Expansion Program

Seven ships had already been delivered to Transpetro by April 2014

Date	Tanker	Shipyard	Type of tanker
November 2011	<i>Celso Furtado</i>	Mauá	Product tanker
May 2012	<i>João Cândido</i>	EAS	Oil tanker
July 2012	<i>Sérgio Buarque de Holanda</i>	Mauá	Product tanker
January 2013	<i>Rômulo Almeida</i>	Mauá	Product tanker
May 2013	<i>Zumbi dos Palmares</i>	EAS	Oil tanker
January 2014	<i>José Alencar</i>	Mauá	Product tanker
April 2014	<i>Dragão do Mar</i>	EAS	Oil tanker

**Promef must continue in order to meet Transpetro's future demand for tankers.**

### Promef – forecast deliveries of tankers until the end of the program

Shipyards / Tankers	2014	2015	2016	2017	2018	2019	2020
<b>EAS (PE)</b>							
7 Suezmax tankers (+3 delivered)	3	2	2				
4 DP Suezmax tankers						3	1
5 Aframax tankers				2	2	1	
3 DP Aframax tankers							3
<b>MAUÁ (RJ)</b>							
8 product tankers (+4 already delivered)		2	3	3			
4 Panamax tankers	3	1					
<b>VARD PROMAR (PE)</b>							
8 gas tankers	2	3	3				
<b>SHIPYARDS TO BE DEFINED</b>							
3 bunker tankers						1	2
<b>TOTAL</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>5</b>	<b>2</b>	<b>5</b>	<b>6</b>

Source: Petrobras (dates subject to alteration)

### Promef waterway

Construction under way at the Estaleiro Rio Tietê (SP) of 20 pusher craft and 80 barges to carry up to 4 billion liters of ethanol annually.



Photo: Office of the President

## Offshore Support Vessels (OSV)

### Offshore support vessels are fundamental for deep water oil exploration

The term “offshore support vessels” encompasses the following main activities:

**PSV – Platform Supply Vessel** Supplies oil platforms, carrying water, food, fuel, spare parts and various consummables for personnel on board and for operations.

**AHTS – Anchor Handling Tug Supply** Tows platforms and handles anchors for correct positioning. Also undertake supply activities.

**RSV – ROV Support Vessel** Supports subsea operations using remotely operated vessel (ROV).

**OSRV – Oil Spill Recovery Vessel** Performs oil spill containment and response operations and other support operations.

**MPSV – Multi Purpose Support Vessel** Multi purpose vessel; performs various operations, such as launching flexible lines at low depth, fire fighting, rescue, combating pollution and others.

**PLSV – Pipe Layer Support Vessel** Lays flexible pipes which link the various production wells of a subsea system on the seabed to the risers systems to the production platforms.

**LH – Line Handlers** Handle lines, cables and hoses, supporting towing operations and supplies and transfers of crude oil from platforms to offloading vessels.

**Crew** The ships that transport crews between platforms and between platforms and terminals on land and platforms and other vessels at sea.



Foto: Divulgação Vard/Siem

### Current composition of the fleet

Main types of maritime support vessels: vessels registered abroad lead in the segments with higher daily rates: PSV, AHTS, PLSV and RSV.

Type	Registered abroad	Registered in Brazil	Total
PSV	93	87	180
AHTS	80	19	99
PLSV	8	2	10
DSV / RSV	11	3	14
OSRV	23	15	38
MPSV	6	2	8
<b>TOTAL</b>	<b>221</b>	<b>128</b>	<b>349</b>

Does not include LH (line handling) and Crew (passenger) type vessels.

### Fleet in service in Brazil

Estimate of the Brazilian Maritime Support Vessel Association (Abeam)

Total number of vessels	Registered in Brazil	Registered Abroad
<b>CURRENTLY IN SERVICE</b>		
450	211	239
<b>EXPANSION UNTIL 2020: 236 more vessels, total fleet in Brazil would increase to</b>		
686	300	386



## Ordered

In the first five rounds of the Offshore Support Vessels Fleet Renewal Program (Prorefam), 87 vessels were ordered.

Round	Year	AHTS	PSV	OSRV
1 <sup>st</sup>	2009	-	8	5
2 <sup>nd</sup>	2010	6	20	1
3 <sup>rd</sup>	2011	-	8	8
4 <sup>th</sup>	2013	-	9	14
5 <sup>th</sup>	2013	5	3	-
<b>TOTAL</b>	<b>11</b>	<b>48</b>	<b>28</b>	

Source: Petrobras

## OSVs ordered

According to Petrobras, 61 of the 87 vessels ordered are being built (until March 2014) and 26 are in service. Vessels ordered are distributed as follows:

Operator	Shipyard	Local	Number of vessels
Astromarítima	Eisa	RJ	8
Bram	Navship	SC	14
Brasil Supply	Eisa	RJ	4
CBO	Aliança	RJ	4
CBO	Oceana	SC	2
Consub	ETP	RJ	2
Galaxia	Erin	AM	10
Geonavegação	Wilson, Sons	SP	3
Norskan	Vard Niterói	RJ	5
Oceanpact	Intecnia	RS	4
São Miguel	São Miguel	RJ	10
Saveiros	Wilson, Sons	SP	2
Senior	Eisa	RJ	4
Starnav	Detroit	SC	11
Wilson, Sons	Wilson, Sons	SP	4

Source: Petrobras and SINAVAL

## Orders of the 6<sup>th</sup> Prorefam Round

In May 2014, the Petrobras board approved the order of 23 maritime support vessels under the Offshore Support Vessel Fleet Renewal Program (Prorefam).

Operator	Vessel	Number
Asgaard	PSV	6
Starnav	PSV	6
Bram	PSV	3
Wilson, Sons	PSV	2
CBO	PSV	2
CBO	AHTS	4

**It is essential to guarantee funds for the Merchant Navy Fund (FMM) in order to finance the local construction of maritime support vessels, a segment in which Brazilian shipyards have more than 10 years of experience.**

## Production platforms

An offshore production platform which may be a FPSO (built using an oil tanker hull) or semi-submersible, is the floating structure which permits the first treatment of the crude oil extracted from underneath the seabed.

It operates in an integrated fashion with the subsea production system and is built to last 20 to 30 years, the average life of a producing field.

Brazilian shipyards have one of the world's biggest production platform order books.

In 2013, six of the nine platforms received by Petrobras were totally or partially built in Brazil.

16 platforms are currently being built in Brazil. Four of them are module construction and integration on hulls converted in Asian shipyards.

Petrobras forecasts that 56 new platforms will be needed to ensure continuity of platform order book in Brazilian shipyards.

Platforms	Shipyards
<b>2013 (DELIVERED)</b>	
P-55 – SS	EAS (PE) – Hull. QGI (RS) – Modules. Entirely built in Brazil.
P-58 – FPSO	QGI (RS) – Module integration.
P-61 – TLWP	BrasFELS (RJ) – First TLWP platform (Tension Leg Wellhead Platform) built in Brazil.
P-62 – FPSO	EAS (PE) – Module integration.
P-63 – FPSO	QUIP (RS) – Module integration.
Cidade de Paraty – FPSO	BrasFELS (RJ) – Module integration.
<b>FORECAST DELIVERIES</b>	
Cidade de Mangaratiba – FPSO – 2014	BrasFELS (RJ) – Module integration.
Cidade de Ilhabela – FPSO – 2014	
Cidade de Maricá – FPSO – 2015	Estaleiro Brasa (RJ) – Module integration.
Cidade de Saquarema – FPSO – 2016	
<b>FPSO HULLS UNDER CONSTRUCTION</b>	
Eight hulls: P-66; P-67; P-68; P-69; P-70; P-71; P-72; P-73	Estaleiro Rio Grande – ERG (RS)
Four hulls: P-74; P-75; P-76; P-77	Estaleiro Inhauma (RJ)

## Module integration for FPSOs

The so-called production modules include power generators, steam generators, pumping systems, crude oil treatment systems and living quarters for crews of nearly 100 people who operate platforms on a 24-hour basis in six-hour shifts.

The platform modules will be constructed by the following firms:

**Tomé – Ferrostaal (RS):** modules for six replicant FPSO platforms under construction at ERG in Rio Grande (RS).

**EBR – Toyo (RS):** modules for FPSO P-74 (hull at Estaleiro Inhauma – RJ).

**Technip – Techint (PR):** modules for FPSO P-76 (hull undergoing conversion at Estaleiro Inhauma – RJ).

**Estaleiro Brasa (RJ):** modules for two FPSOs built in Asia for SBM-Queiroz Galvão Óleo e Gás.

**Mendes Júnior – OSX (RJ):** construction and integration of eight FPSO modules for the Petrobras, BG Group, and Petrolgal consortium for production in the pre-salt fields.

## New platforms forecast

The presentation on 7/1/2014 by Petrobras diretor, José Formigli, regarding the production of 500 thousand barrels from the pre-salt reserves, forecast the need for 72 platforms, including the new areas of the onerous cession.

### 31 more platforms are forecast until 2020, with 16 already under construction

Under construction:

Eight platforms at Estaleiro Rio Grande (ERG-Ecovix), in Rio Grande (RS).

Three platforms at Estaleiro Brasa, in Niterói (RJ) (module integration).

One platform at Estaleiro BrasFEL S, Angra dos Reis (RJ) (module integration).

Four platforms at Estaleiro Inhauma, in Rio de Janeiro (RJ).

### 41 more platforms are forecast until 2030

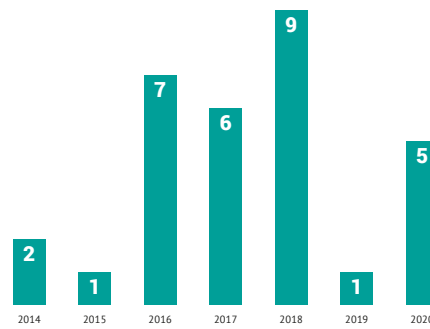
Part of the demand will be met by local shipyards and the remainder by international shipyards, through leasing contracts with offshore asset management companies and system integrators that already do business with Petrobras.

### Main offshore asset management companies

Petrobras is one of the companies that most hires oil production platforms from international offshore asset management companies.

## Production platforms until 2020

FORECAST ORDERS: 31



## Production platforms until 2030

FORECAST ORDERS: 41

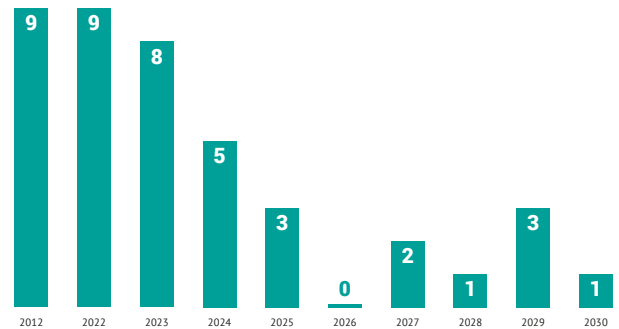


Photo: Agência Petrobras

Companies	Leased platforms
SBM Offshore	15
BW Offshore	14
Modec	11
Teekay Offshore	10
Bluwater	5
Bumi Armada	5

Source: Cited companies

**The outlook for demand shows the need to maintain the current legislation that permits the leasing of platforms, built in international shipyards, and the export to Petrobras's subsidiary in Holland, in the case of platforms built in local shipyards.**

## Drilling rigs

The Sete Brasil order book contains 29 oil drilling rigs.

The BNDES will be one of Sete Brasil's main sources of financing. The rigs will be leased to Petrobras under longterm contracts.

Sete Brasil's contract with Petrobras has enabled Brazil to join the exclusive group of countries capable of building oil rigs.

The contract led to investments in the development of two new shipyards: Jurong Aracruz (ES) and Enseada Indústria Naval (BA). It also guaranteed work for three big shipyards that already exist: Estaleiro Atlântico Sul (PE), Rio Grande Estaleiros (RS) and BrasFELS (RJ).

### Forecast deliveries

Shipyards	2016	2017	2018	2019	2020
<b>ERG (RS)</b>					
3 drillships	<i>Cassino</i>	<i>Curumim</i>	<i>Salinas</i>		
<b>BRASFELS (RJ)</b>					
6 semisub	<i>Urca</i>	<i>Frade and Bracuhi</i>	<i>Portogalo</i>	<i>Mangaratiba and Botinas</i>	
<b>EAS (PE)</b>					
7 drillships	<i>Copacabana and Grumari</i>	<i>Ipanema</i>	<i>Leblon and Leme</i>	<i>Marambaia</i>	<i>Joatinga</i>
<b>ENSEADA (BA)</b>					
6 drillships	<i>Ondina</i>	<i>Pituba</i>	<i>Boipeba and Interlagos</i>	<i>Itapema</i>	<i>Comandatuba</i>
<b>JURONG ARACRUZ (ES)</b>					
7 drillships	<i>Arpoador and Guarapari</i>	<i>Camburi and Itaoca</i>		<i>Itaúnas and Siri</i>	<i>Sahy</i>

Source: Petrobras and Sete Brasil

## Maritime and river transportation

### The challenge of maritime transportation in Brazil

The world fleet is composed of an estimated 87 thousand ships with a carrying capacity of 1.6 billion tons per trip, according to the report *RMT – Review of Maritime Transport 2013*, produced by UNCTAD.

Brazil has a fleet of 310 ships, with 82% of cargo capacity, out of a total of 16 million tons, in leased ships registered abroad.

This information is confirmed by Antaq (National Agency for Waterway Transportation) statistics. The political challenge is to increase the fleet of ships registered in Brazil and expand Brazil's participation in navigation along our own coast.

### Maritime transportation attained 10 billion tons in 2014

According to Clarksons Shipping Intelligence, world maritime transportation attained 10 billion tons carried by ships on the planet's oceans.



### The main cargoes carried worldwide

According to the RMT document, around 72% of worldwide cargo is composed of ore, grain, coal and oil.

Type of ship	Millions of tons	Share (%)
Bulk carriers – grain and ore	665	41,40
Oil tankers	491	30,57
Container ships	207	12,80
Others	166	10,33
General cargo	80	4,90
<b>TOTAL</b>	<b>1.606</b>	<b>100</b>

The fleet, with a total (shipboard ) capacity of 1 billion 606 million tons, needs 6.2 trips a year to reach the estimated 10 billion tons of total maritime cargo.

World maritime transportation is expected to grow at an annual rate of 4% and attain 15 billion tons in 2024. It is forecast to reach 20 billions tons by 2031.

### The transportation mix

Highway transportation predominates in Brazil's transportation mix. Other modes have been increasing their share, but this predominance is one of the country's main logistics problems.

The table below compares Brazil with China and the USA.

Country	Highway transportation	Railroad transportation	Air/waterway/pipeline transportation
Brazil	52%	30%	18%
China	37%	50%	13%
USA	43%	32%	25%

Source: ANTF, Antaq and CIA

Railroad transportation predominates in China due to its inland country feature.

The USA has two sea coasts and makes great use of its river network.

Brazil has a long coastline and a large river network and a great expansion of waterway transportation is needed.

### Situation of maritime transportation

The 2013 RMT report, produced by UNCTAD, shows that world trade is growing faster than world GDP, thus confirming the increasing importance of maritime transportation.

The International Transportation Forum (ITF), an intergovernmental body that congregates 54 countries, predicts that China's and the other Asian countries' predominance in world trade will accelerate the change in the flow of merchandise using the oceans, with corresponding economic and political implications.



This means that a gradual change will occur in the flow of maritime cargoes from the Atlantic to the Pacific and Indian Oceans, thus increasing Brazil's isolation in the South Atlantic, and demonstrating the country's strategic need to create its own fleet of ships.

In Latin America, only Chile is an important world transporter with the company CSAV, recently associated with Hapag-Lloyd.

**To change this reality, it is necessary to strengthen coastal navigation. The Syndarma, Brazilian Shipowners Association, defends the project to support navigation between domestic ports, known as the “Pro-Cabotagem”.**

**It is composed of a series of measures designed to encourage navigation and eliminate distortions, such as the fact that the Internal Revenue Service, in Recife, inspects a cargo sent from Santos with the same rigor applied to cargo arriving from Asia.**

**Coastal shipping also needs special areas in ports and less bureaucracy. The most obvious distortion is that ICMS (Tax on Circulation of Goods and Services) is levied on fuel for ships involved in coastal navigation and not in the case of ships used in foreign trade.**

Coastal shipping has recorded average double-digit growth over the past five years. The greatest source of potential growth lies in the conversion of highway transportation cargoes to coastal shipping, a solution that would reduce the “Brazil cost” (a term used to describe the various costs associated with Brazil’s bureaucratic and logistics inefficiencies) in logistics operations linking the South-Southeast and North-Northeast regions of the country.

### Main world operators of the containership fleet

Position	Company	Country	Number of ships	Number of containers TEUs	Share of (%) of world container transportation
1	Maersk	Denmark	453	2.149.524	13,4
2	MSC	Switzerland	398	2.064.118	12,9
3	CMA CGM	France	288	1.153.088	7,2
4	Cosco	China	155	715.219	4,5
5	Evergreen	Taiwan	187	709.702	4,4
6	Hapag-Lloyd	Germany	141	639.148	4,0
7	APL	Singapore	127	570.497	3,6
8	CSC	China	124	564.151	3,5
9	Hanjin	South Korea	107	555.279	3,5
10	MOL	Japan	111	507.894	3,2
11	OOCL	Hong Kong China	102	453.044	2,8
12	NYK	Japan	93	403.030	2,5
13	Hamburg Sud	Germany	93	384.293	2,4
14	HMM	South Korea	67	364.373	2,3
15	Yang Ming	Taiwan	86	363.057	2,3
16	K Line	Japan	75	341.848	2,1
17	ZIM	Israel	71	282.411	1,8
18	UASC	Kuwait	41	260.818	1,6
19	CSAV	Chile	55	259.391	1,6
20	PL	Singapore	98	237.776	1,5
<b>TOTAL</b>			<b>2.872</b>	<b>12.978.661</b>	<b>80,8</b>

Source: UNCTAD

**Increasing the construction of ships for maritime transportation along the Brazilian coast is one of the priorities to be considered.**

## River transportation

Brazil has 12 hydrographic regions and 41.635 kilometers of waterways, of which only 20.956 km (50.3%) are operational.

Six waterway corridors are used for cargo transportation. The main one is the Solimões-Amazonas, with 16.797 kilometers of waterways, accounting for 80% of the whole operational waterway system.

The others are the: Paraná-Tietê (1.495 km), Tocantins (982 km), Paraguai (592 km), São Francisco (576 km) and Sul (514 km) waterway corridors.

In 2012, according to the National Agency for Waterway Transportation (Antaq), 80.9 million tons of cargoes were carried using waterways.

## Exports of grain from the North using river transportation

April 2014 saw the inauguration of a new grain export route through the Miritituba-Barcarena port complex, involving the Transshipment Station, in Miritituba, and the Fronteira Norte Port Terminal (Terfron), located in Barcarena, both in the state of Pará.

Brazilian agribusiness and logistics firms invested R\$ 700 million in the port and logistics infrastructure.

The increase in world demand for food makes it necessary to expand the use of river transport. Just one convoy of 20 barges carries 40 thousand tons of grain, the equivalent of 1,000 trucks or 4.5 freight trains per trip.

## Map of Brazilian waterways



Source: Transportation Ministry

## Regulatory, legislative and fiscal system

### The SINAVAL proposes the continuation and improvement of the public policies that have made the sector regain its importance in the Brazilian economy

- Maintain and improve the shipbuilding industry's regulatory, legislative and fiscal system.
- Maintain and improve the public policy of local preference in the supply of ships and oil production platforms and drilling rigs.
- Guarantee funds for the Merchant Navy Fund (FMM) to increase the local construction of ships.
- Improve the Navigation Law to increase the local construction of ships by coastal and long-haul maritime transportation operators.
- Maintain and improve state and federal tax incentives for shipbuilding.
- Improve and expand the reach of the Shipbuilding Guarantee Fund (FGCN).
- Encourage production financing initiatives using receivables funding, as already adopted by Petrobras.
- Enhance the strategic view of the role of the shipbuilding industry in ensuring the supply, in Brazil, of ships and equipment for maritime transportation and production of oil in Brazilian territorial waters.
- Strengthen technical and university education in specialties that are essential for the shipbuilding industry.
- Increase funding for the scientific and technological development of the shipbuilding industry through partnerships between this industry and universities.

#### Maintain tax relief on inputs for the shipbuilding industry

Decree no 6.704, of 12/19/2008, provides for IPI (Industrial Products Tax) exemption for materials supplied to the shipbuilding industry, and Law no 11.774, of 9/17/2008, which eliminates the PIS/Pasep and Cofins taxes on equipment used in the shipbuilding industry.

#### Maintenance of the Shipbuilding Guarantee Fund

The fund was created by Law no 11.786, of 9/25/2008, complemented by Law no 12.058, of 10/13/2009, with allocation of R\$ 5 billion for the formation of its assets, and providing for exemption from Income Tax on investments made for its maintenance.

#### Repetro

Maintenance and improvement of the special customs regime which permits the importing of specific equipment to be used directly in exploratory activities in oil and gas reserves, and which are exempt from Federal II, IPI, PIS and Cofins taxes.

#### Payroll tax exemption

Maintenance and improvement of the payroll tax exemption legislation that benefits 56 different sectors, including Brazilian shipbuilding. The legislation encourages firms to hire more by replacing the social security contribution on payroll with a contribution on billing, excluding export revenues.



## Shipyards and shipbuilding centers



### The SINAVAL has 50 members, including the main Brazilian shipyards

The shipyards are distributed throughout various Brazilian states, creating shipbuilding centers at different stages of development.

Among the main ones, 9 are large-scale shipyards, 23 medium-scale shipyards and five new shipyards that are currently being set up.

Two shipyards that specialize in the construction of yachts and launches for leisure purposes are also SINAVAL members (Vellroy and Beneteau). Shipyards that build sports and leisure vessels are also covered by the legislation that encourages shipbuilding.

### Construction segments

Brazilian shipyards produce for eight different market segments:

**Offshore equipment** This is the segment with the highest level of demand, involving production platforms, drilling rigs and maritime support vessels.

**Oil and product tankers** Oil and product tankers for use off the Brazilian coast.

**Container ships** Ships for transportation of cargo in containers along the Brazilian coast, a segment dominated by ships registered abroad.

**Bulk carriers** Ships for transportation of ore and grain along the Brazilian coast.

**Barges and pusher craft** Vessels for the river transportation of grain, fuel and ore.

**Port tugs** Port support vessels to support mooring operations in Brazilian ports.

**Military vessels** Patrol ships and submarines.

### Shipyards in operation – Large-scale

Shipyard	State	Order book
ATLÂNTICO SUL	PE	Large oil tankers, production platforms and drilling rigs
BrasFELS	RJ	Production platforms and drilling rigs
RG	RS	Production platforms and drilling rigs
EISA	RJ	Bulk carriers, container ships, maritime support vessels and patrol ships for the Navy
MAUÁ	RJ	Oil and product tankers for Transpetro
VARD PROMAR	PE	Gas tankers for Transpetro
QGI	RS	Platform module Integration
RENAVE	RJ	Ship repairs
BRASA	RJ	Platform module integration

## Shipyards in operation – medium-scale

Shipyard	State	Order book
ALIANÇA	RJ	Offshore support vessels
VARD NITERÓI	RJ	Offshore support vessels
WILSON, SONS	SP	Offshore support vessels and port tugs
SÃO MIGUEL	RJ	Offshore support vessels
ARPOADOR	RJ and SP	Offshore support vessels
DETROIT	SC	Offshore support vessels and port tugs
DSN EQUIPEMAR	RJ	Offshore support vessels
ENAVAL	RJ	Offshore support vessels and construction of platform modules
NAVSHIP	SC	Offshore support vessels
OCEANA	SC	Offshore support vessels
ETP	RJ	Offshore support vessels
INTECNIAL	RS and SC	Offshore support vessels, pusher craft and river barges
KEPPEL SINGMARINE	SC	Offshore support vessels
NAPROSERVICE	RJ	Ship and offshore equipment maintenance and repairs
RIO NAVE	RJ	Product and gas tankers
SERMETAL	RJ	Repairs and maintenance
UTC	RJ	Integration of modules for platforms
INACE	CE	Patrol ships for the Navy and offshore support vessels
EASA	PA	River barges and pusher craft
BIBI	AM	River barges and pusher craft
RIO MAGUARI	PA	River barges and pusher craft
RIO TIETÊ	SP	River barges and pusher craft

## Shipyards under construction

Shipyard	State	Order book
EJA – Estaleiro JURONG Aracruz	ES	Drilling rigs
ENSEADA Indústria Naval	BA	Drilling rigs
Estaleiros do Brasil – EBR	RS	Integration of modules for platforms
OSX	RJ	Integration of modules for platforms
CMO Offshore	PE	Integration of modules for platforms

## Military shipyards

Shipyard	State	Order book
Arsenal da Marinha	RJ	Maintenance and construction of military vessels
ITAGUAÍ Construções Navais	RJ	Under construction to build five submarines, one of which will be nuclear propelled

## Shipbuilding centers

A shipbuilding center is characterized by the existence of shipyards that stimulate the installation of a structure of services and suppliers that operates on a continuous basis, generating jobs and income. Its activities require municipal and state authorities to provide power, transportation, sewage and housing infrastructure.

Universities and research institutes have recently created centers to develop technology to meet the demands of shipyards, mainly in the sphere of oil production systems.

The challenge facing lawmakers is to guarantee automatically-granted tax benefits in shipbuilding centers for shipyards' networks of suppliers.

### Pará and Amazonas shipbuilding center

Encompasses hundreds of shipyards that build wooden, steel and aluminium vessels to transport cargo and passengers and big river barges and pusher craft to carry grain, ore and fuel. The big shipyards are located in the vicinity of Manaus (AM) and Belém (PA).

### Pernambuco shipbuilding center

The Pernambuco shipbuilding center is located in the industrial area of Suape and has two shipyards: Estaleiro Atlântico Sul and Vard Promar.

### **Bahia shipbuilding center**

With a tradition in repairs and medium-scale shipbuilding, the center is located around the large yard Enseada Indústria Naval in the region of the Paraguaçu River estuary, with an impact on various local municipalities.

### **Espírito Santo shipbuilding center**

The Espírito Santo shipbuilding center is emerging around the Estaleiro Jurong Aracruz (EJA). The construction of drilling rigs will mobilize a network of suppliers and service providers.

### **Rio de Janeiro shipbuilding center**

It is the country's biggest shipbuilding center and accounts for 37.5% of total employment generated in the sector. It has the largest number of shipyards with the most highly diversified production: oil tankers, offshore support vessels, production platforms, drilling rigs, submarines and military vessels.

### **Santa Catarina shipbuilding center**

With a great tradition in the construction of fishing vessels, the Santa Catarina shipbuilding center specializes in the construction of offshore support vessels and port tugs. It benefits from the state's tradition in metallurgy and mechanical engineering industries and the excellence of the region's research centers and universities.

### **Rio Grande do Sul shipbuilding center**

Rio Grande do Sul shipbuilding center is structured around two big shipyards: ERG in Rio Grande, which specializes in the construction of oil platforms, and QGI, which specializes in the platform module integration. The shipyard Estaleiros do Brasil – EBR, is currently being set up in São José do Norte. A network of suppliers and technology centers demonstrates the center's dynamism.

## **Human resources**



The challenge facing Brazilian shipyards is to increase productivity and improve their competitiveness in the world market, year by year. The shipbuilding industry currently employs around 80 thousand people in the country. If one considers the indirect jobs in the network of suppliers, this figure rises to nearly 400 thousand jobs.

In the human resources area, the replacement of older technicians – who are retiring – by younger ones, implies a relative loss of experience in the labor force. This makes it necessary for shipyards to expand continuous training programs for their professionals, representing an increase in their costs.

The possibility of subsidizing shipyards' investments in HR training is one of the themes that should be the object of specific legislation.

In the sphere of public investments, there has been an increase in the number of places available in technical courses. Ministry of Education figures show an increase in the demand for technical courses over the past three years. 263 thousand students were enrolled in technical courses in 2010, rising to 553 thousand in 2013.

### **International cooperation in HR training**

International cooperation in human resources training is effectively taking place.

In November 2013, an agreement was signed between the government of Japan and the Ministry of Development, Industry and Foreign Trade (MDIC), resulting in an agreement between the National Industrial Apprenticeship Service (SENAI) and the Japan International Cooperation Agency (Jica) for the formation of instructors..

During the next four years, the Jica will invest R\$ 10 million in training specialized workers, technicians and teachers in the areas of shipbuilding mechanics, shipbuilding production management and composite material welding.

The training centers will be located in four Senai units in Rio Grande do Sul, Rio de Janeiro, Bahia and Pernambuco, and will train personnel for three large Japanese firms that have invested a total of R\$1.6 billion in Brazilian shipyards over the past three years.

Large Japanese firms that have invested in Brazilian shipyards:

- Japan Maritime United (JMU) acquired 25% of Estaleiro Atlântico Sul, in the Suape Port Complex, in Pernambuco, for R\$ 207 million.
- Kawasaki acquired 30% of Enseada Indústria Naval, in the Recôncavo Baiano, for R\$ 300 million.
- The consortium led by Mitsubishi acquired 30% of Estaleiro Ecovix-Engenvix, in Rio Grande, in Rio Grande do Sul, for R\$ 300 million.
- The Japanese firm Toyo is a partner of EBR (Estaleiros Brasil) which is under construction in São José do Norte (RS).

The size of these investments and the lack of skilled labor were determining factors in the Japanese's decision to transfer technology to Brazil.

## NR-34 was developed by workers, the government and shipyards

Norm NR-34, approved in 2011, created a specific rule in Brazil to govern worker health and safety conditions in shipbuilding. The World Labor Organization (WLO) considers that the norm is an example to be followed internationally.

The norm was the result of the work of the Tripartite Commission of the Shipbuilding Industry, created by Ministerial Order MTE no 64, of 1/31/2008. The technical group set up by the SINAVAL was composed of labor auditors of the Regional Labor Offices and representatives of the labor unions and shipyards.

Norm NR-34 is undergoing constant improvement and is being further developed.

### Distribution of professional categories in shipyards:

- Engineers: 5%
- Technicians: 8%
- Skilled workers: 70%
- Management: 7%
- Support: 10%

Source: SINAVAL – preliminary sample survey

## Technology and innovation

The SINAVAL takes part in the Innovation for the Competitiveness of the Shipbuilding and Off-shore Industry Network together with the Brazilian Naval Engineering Society (Sobena), Syndarma (Shipowners Association) and the CENO – Center of Excellence in Naval and Ocean Engineering (Coppe/UFRJ, IPT, USP and Transpetro).

Programs with funds from the Ministry of Science and Technology finance the development of local projects. The most important technology centers for the shipbuilding and offshore industry are UFRJ (Federal University of Rio de Janeiro), USP (University of São Paulo) and Cenpes, Petrobras's research center.

The universities of Pernambuco, Santa Catarina and Rio Grande do Sul are also developing skilled manpower and technology centers for the shipbuilding industry.

### Current situation of the Brazilian shipbuilding industry

A similar reality is found in countries that lead the shipbuilding industry - South Korea, Singapore, China, Japan, Germany, Italy, USA and Brazil.

The great technological advances being made is in embedded technology, mainly in engines, command systems, steering systems, dynamic positioning and satellite communication.



Productivity factors	Elements	Impact	Benchmarks
Shipyard equipment	Lifting capacity. Dry dock. Automation.	Fewer blocks. Building time. Utting and welding time.	68% automation of the welding process in the Samsung shipyard, South Korea.
Qualified personnel	Building time. Less work over.	Deadline and budget.	In South Korea and Europe the State ensures a supply of qualified personnel.
Managment systems	Production. Projects. Supply chain.	Identify deviations. Improve planning. Schedule and budget conformity.	Continuous improvement in European and Asian shipyards.
Design and detailing	Designs in sync with modifications.	Production flow. Dimensional control.	One of the difficulties in Brazil.
Supply chain	Arrival of equipment in sync with production.	Maintenance of production flow. Schedule and budget conformity.	Challenge of local content.

Source: SINAVAL / Ivens Consult

In shipyards up to 68% of construction processes are automated, as in the case of South Korea's Samsung shipyard.

In Brazil plate cutting and welding systems are usually automated, especially on panelization production lines.

Building a ship's hull continues to be a highly artisanal activity in which the quality of human resources training is a determining productivity and competitiveness factor.

The repetitive production of ships and floating platforms with the same design is recognized worldwide as a productivity factor. Any modification in the original design increases construction time and costs and thus error and rework risks.

## Local content

**A public policy to develop local construction capacity, create a new industrial sector and enhance personnel skills.**

### Factors inducing local content development

**ANP (Brazilian National Agency of Petroleum, Natural Gas and Biofuels)** It is mandatory to declare local content levels used in the exploration and development phases. These indices are part of the scores used to win concessions.

**Prominp** The National Oil and Gas Mobilization Program has been preparing studies to develop local suppliers since 2003.

**BNDES (Brazilian National Development Bank)** Uses local content as one of the indicators to define interest rates on loans.

**MDIC – Ministry of Development, Industry and Foreign Trade** With the PDP II – Development of Production Policy, the ministry created the ship parts catalogue jointly with the ABDI (Brazilian Agency for Industrial Development), containing more than 300 certified firms.

**SINAVAL and ONIP (National Organization of the Petroleum Industry)** Develop spreadsheets with the shipyards to assess local content in ships and platforms.

## Local Suppliers

The local content policy has encouraged the setting up and expansion of industrial units of large international suppliers in Brazil. These firms bring technology and develop personnel skills in segments that are essential for the future of local shipbuilding.

## Main shipyard suppliers

Materials and equipment	Supplier	Local industrial unit
Ship steel / thick plate	Usiminas – Cosipa	Yes Sole supplier
Paint and coatings	Akzo Nobel, Jotun, WEG	Yes
Pipe systems	V&M Tubes, Tenaris, Tuper Tubes, Apolo	Yes
Electrical systems – cables, networks panels	Prysmian e Nexans, WEG, ABB	Yes
Auxiliary generators and engines	WEG, Caterpillar, GE, Voith, Scania	Yes
Pumping systems	Sulzer	Yes
Automation systems	ABB	Yes
HVAC – refrigeration and heating	Heinen & Hopman	No
Elastomers and rubbers	Lanxess	Yes
Main engine	MAN, Daihatsu, Kawasaki, Mitsubishi, Wärtsillä, MTU, MAN, ABB, Rolls-Royce, GE, Caterpillar	No
Comand, control, steering, navigation systems	Kongsberg, Northrop Grumman, ABB, Vision Marine (representant)	No
Maritime communication by radio and satellite	Astrium / EADS, Harris CapRock	No

## Shipbuilding for the Brazilian Navy

Similarly to other countries, shipbuilding for military purposes favors the development of local technologies, best building practices and the development of qualified personnel.

### Military orders

Project	Situation	Importance	Impacts
<b>Prosub</b> Submarine Development Program	Estimated value R\$ 23 billion. Submarine shipyard under construction in Itaguaí (RJ). Construction of five submarines, one of which will be nuclear propelled.	Absorption of technology from the French firm DCNS. Only five countries have the capacity to build nuclear submarines.	Development of a network of suppliers. New materials technologies. Management and production control processes.
<b>PRM</b> Navy Reequipment Program	Being executed by the Ministry of Defense. Structured for two decades: 2006 to 2015 and 2016 to 2020.	Building of ocean patrol ships to patrol the coast.	Hiring of local shipyards: Eisa e Inace. Improving construction systems with military quality.

## International insertion

World exports total around US\$ 19 trillion, with US\$ 5 trillion corresponding to the value added and US\$ 14 trillion to the value of goods commercialized. The value of countries' annual production is estimated at US\$ 145 trillion, according to the United Nations Conference on Trade and Development (UNCTAD).

The amount of cargo transported is forecast to increase from the current level of 10 billion tons a year to 19 billion tons by 2030. For this reason countries are making great efforts to expand their shipbuilding industries.

Europe is implementing systematic actions to strengthen its shipyards and network of suppliers of systems, equipment, products and services. Governments are putting public policies in place to develop technology and human resource skills.

Countries with strong shipbuilding industries, such as Denmark, Finland and Norway, allocate more than US\$ 100 million a year, in non-repayable loans, for the development of technology. The return is constituted by the maintenance of the jobs of around 100 thousand people in shipyards and supplier industries that export ships and equipment to various countries.

In 2014, the US Congress passed legislation that strengthens waterway transportation to increase competitiveness and prosperity. The bill was approved by a large majority (412 to 4), reducing Federal bureaucracy and simplifying the approval of infrastructure projects.

### World shipbuilding scenario

The current order books of domestic shipbuilders places Brazil among the 10 largest builders of ships and platforms.

Demand for maritime support vessels, drilling rigs and oil production platforms is expected to increase for the next 30 years, in view of the growing demand for energy. In March this year, 451 international shipyards had a total of 5,000 ships on their order books.

Chinese shipyards dominate the large-scale bulk carrier market and account for 65% of orders. South Korea, on the other hand, is leader in the construction of oil tankers, meeting 48% of all orders. South Korea also occupies first place in the construction of container ships, jointly with Japan. China is also becoming a strong competitor in this segment..

In the case of gas tankers South Korea also tops the ranking, followed by the Japanese shipyards.

All countries that occupy the leading positions in world shipbuilding have wide-ranging support systems for shipyards, reimbursement of expenditures on personnel training and non-repayable loans for development of technologies.

### Table of international competitors

Company	Country	Local presence	Segment
Keppel Offshore Marine	Singapore	Yes – BrasFELS	Rigs, platforms, module integration
Sembcorp Marine	Singapore	Yes – Estaleiro Jurong Aracruz	Rigs, platforms, modules
VARD-Fincantieri	Italy	Yes – VARD Promar e VARD Niterói	Specilaized OSVs and gas tankers
Japan Marine United	Japan	Yes – Stake in Estaleiro Atlântico Sul	Oil tankers, rigs, platforms
Hyundai	South Korea	No	Oil tankers, platforms, rigs, gas tankers
Samsung Heavy	South Korea	No	Oil tankers, rigs, platforms
Daewoo (DSME)	South Korea	No	Oil tankers, platforms, gas tankers
Cosco	China	No	Oil tankers, platforms
China State Shipbuilding	China	No	Oil tankers, specialized vessels, platforms
Mitsui Shipbuilding	Japan	Yes – Stake in Estaleiros Rio Grande - ERG	Oil tankers, specialized vessels, platforms
STX Offshore Shipbuilding	South Korea	No	Oil tankers, gas tankers, platforms
Toyo Engineering	Japan	Yes – Stake in EBR	Designs, modules, platforms

### World protectionist policy

A strong protectionist policy defends countries' capacity to have fleets under their control (including flag of convenience ships) ) in order to exercise a strategic control over the transportation of domestic and international cargoes.

The USA has the recently strengthened the hundred-year-old Jones Act, which assures transportation along its own coast by ships built locally and manned solely by US citizens.

China recently denied the right of the P3 consortium - formed by the world's biggest container shippers (Maersk, CMA-CGM and MSC) - to operate in its ports. The consortium dominates more than 40% of the market and is monitored by the Global Shippers Forum, based in London, to verify practices that restrict free competition in the freight market.

## SINAVAL Member Shipyards

### AMAZONAS

ERIN – Estaleiro Rio Negro Ltda.  
Estaleiro BIBI Ltda.

### BAHIA

ENSEADA Indústria Naval S. A.

### ESPÍRITO SANTO

EJA – Estaleiro JURONG Aracruz Ltda.

### PARÁ

EASA – Estaleiros Amazônia S. A.  
Estaleiro RIO MAGUARI S. A.

### PERNAMBUCO

Estaleiro ATLÂNTICO SUL S. A.  
CMO Construção e Montagem Offshore S. A.  
VARD PROMAR S. A.

### RIO DE JANEIRO

ALIANÇA S. A. – Indústria Naval e Empresa de Navegação  
ARPOADOR Engenharia Ltda.  
BENETEAU Brasil Construções de Embarcações S. A.  
BR OFFSHORE S. A.  
BrasFELS S. A.  
BRAVANTE – Brasbunker Participações S. A.  
(Estaleiro SÃO MIGUEL)  
CAMARGO CORRÊA Naval Participações Ltda.  
Construtora QUEIROZ GALVÃO S. A.  
DOCK BRASIL Engenharia e Serviços S. A.  
DOCKSHORE Navegação e Serviços Ltda.  
DSN EQUIPEMAR Engenharia e Indústria Naval Ltda.  
EISA – Estaleiro Ilha S. A.  
Empresa Brasileira de Reparos Navais S. A. – RENAVE  
ENAVAL – Engenharia Naval e Offshore Ltda.  
Estaleiro BRASA Ltda.  
Estaleiro MAUÁ S. A.  
Estaleiro SÃO JACINTO Ltda. (Grupo Muliceiro)  
ETP Engenharia Ltda.  
ICN – Itaguaí Construções Navais S. A.  
NAPROSERVICE Offshore Estaleiros do Brasil Ltda.  
OSX Construção Naval S. A.  
RIO NAVE Serviços Navais Ltda.

SERMETAL Estaleiros S. A.  
TRIUNFO Operadora Portuária Ltda.  
UTC Engenharia S. A.  
VARD ELECTRO Brazil Instalações Elétricas Ltda.  
VARD NITERÓI S. A.

### RIO GRANDE DO SUL

Estaleiros do Brasil S. A. – EBR  
INTECNIAL S. A.  
QGI Brasil S. A.  
RG Estaleiros S. A. / ECOVIX – Engevix  
Construções Oceânicas S. A.

### SANTA CATARINA

DETROIT Brasil S. A.  
Estaleiro NAVSHIP Ltda.  
Estaleiro OCEANA S. A.  
KEPPEL SINGMARINE Brasil Ltda.

### SÃO PAULO

Estaleiro RIO TIETÊ Ltda.  
VELLROY Estaleiros do Brasil Ltda.  
WILSON, SONS – Comércio, Indústria  
e Agência de Navegação Ltda.

