

Green Ports: Concepts and Certification for Projects and Operation in Brazil

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Agenda

- Ports in Brazil – Environment situation
- AQUA – Certification process – High Environmental Quality
- Port Certification Development
- Case Study: Itaoca Offshore Port
- Results
- Conclusions

Why do Brazilians ports need to be green?

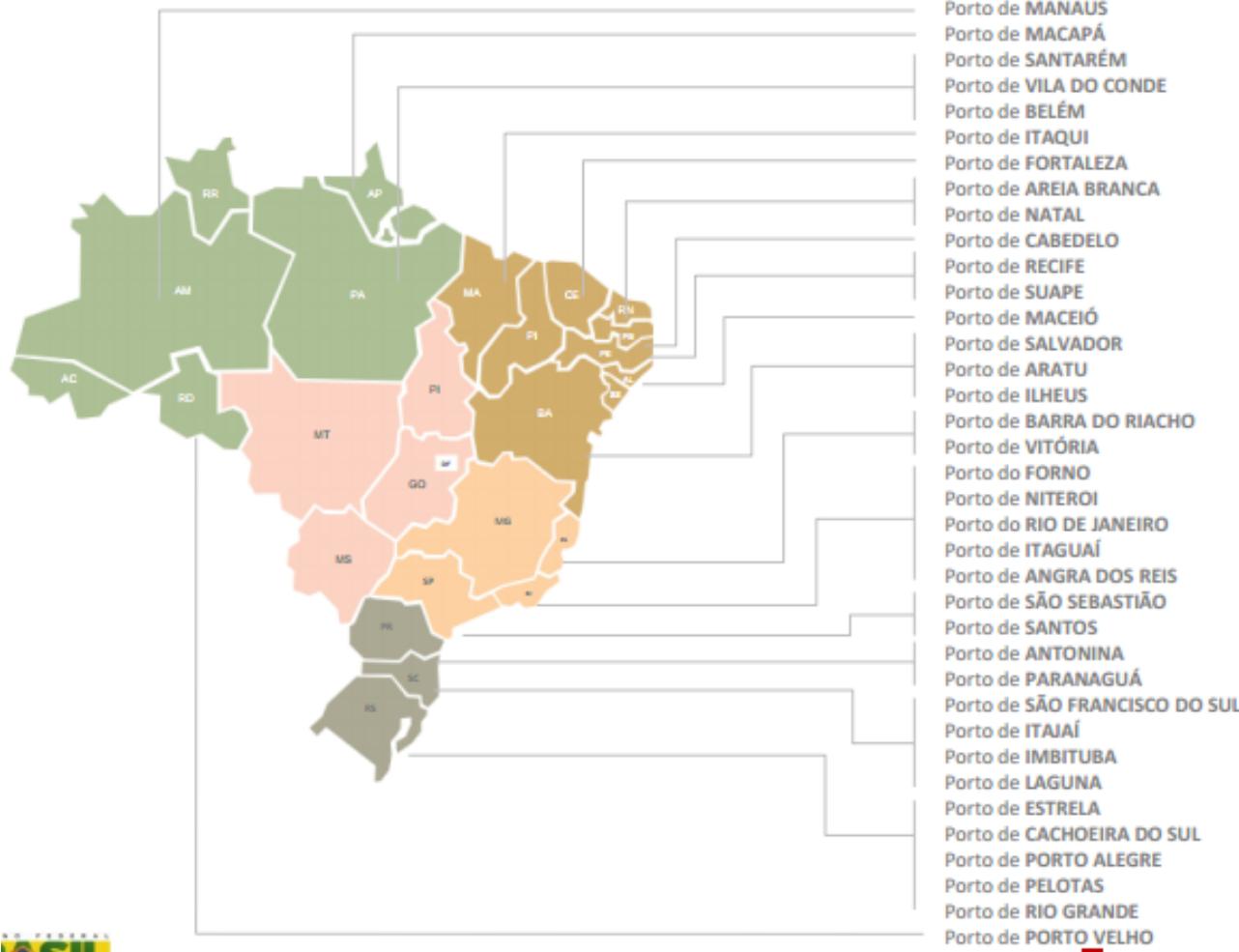
Sustainable ports keep things moving in several parts of the world (Europe, Asia and North America). So, Brazil has to be integrated with world tendency about Green Port Developments.



Source: Kathleen Bailey (2009)

Brazil has big ports that are very representative like Port of Santos, Tubarão and Ponta da Madeira Ports with more than 100 millions tons per year cargo handled.

Brazilian Public Ports: 37 Ports

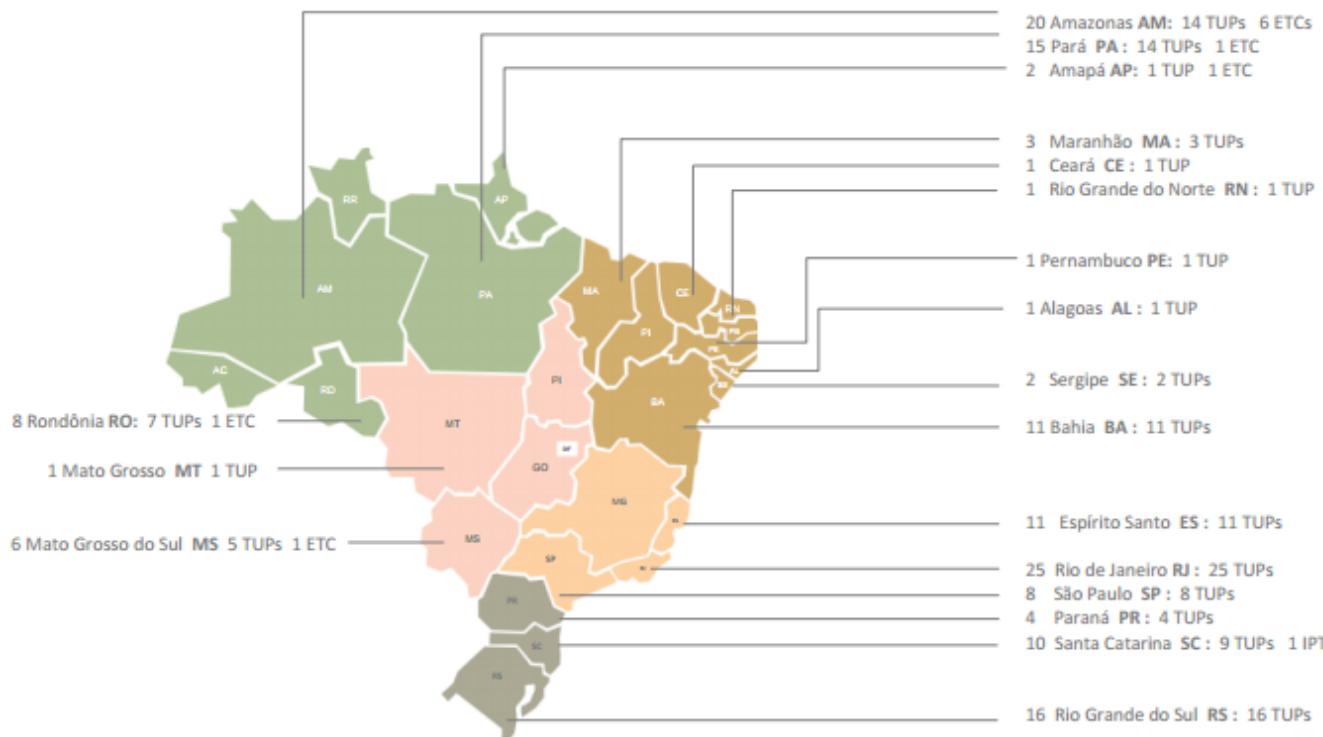


SOME NUMBERS

ABOUT BRAZIL:

- ~7,400 km of coast line
- a major exporter of agricultural and food products to third countries
- Big exporter of iron ore and oil
- Great diversity species and animals
- Amazon region is the most important natural ecosystem in the world and there are 6 ports in Amazon basin
- + 200 million people living here;

Brazilian Private Terminals: 146 Terminals



TUP – Terminal de Uso Privado
 ETC – Estação de Transbordo de Carga
 IPT – Instalação Portuária de Turismo



Source: SEP

PERSPECTIVES FOR NEW CONCESSIONS

- 159 areas organized in 4 Groups (U\$ 7,2 billion investment)
- Port Efficiency
- Goal: to reduce logistic costs in Brazil

The tables compare the environment performance index of organized ports in Brazil. These results were presented by National Waterway Transportation Agency – ANTAQ.

Environmental Performance Index of Organized Ports (IDA)						
Organized ports	First Semester 2014				IDA VGk	
	Environmental Indicator Categories					
	Cm	Cm	Cm	Cm		
Itajaí/SC	87,8	91,5	98,4	100,0	90,38	
São Sebastião/SP	90,0	91,5	93,8	74,6	89,94	
Paranaguá/PR	76,1	91,5	86,2	100,0	80,02	
São Francisco do Sul/SC	68,8	83,3	87,5	100,0	74,35	
Fortaleza/CE	73,9	83,3	82,0	39,0	74,19	
Rio Grande/RS	58,4	91,5	84,2	87,3	72,28	
Itaqui/MA	68,6	79,2	88,2	54,6	71,81	
Suape/PE	70,2	79,2	69,7	80,0	71,24	
Angra dos Reis/RJ	74,2	36,8	77,6	34,6	70,02	
Niterói/RJ	70,9	19,2	83,5	34,6	67,25	
Santarém/PA	61,6	100,0	74,9	34,6	65,27	
Pecém/CE	64,3	17,6	84,5	87,3	65,11	
Natal/RN	62,5	75,7	57,8	72,5	63,20	
Forno/RJ	63,0	36,8	81,5	45,5	63,13	
Vila do Conde/PA	65,6	12,6	74,4	39,8	61,77	
Itaguaí/RJ	69,4	25,4	33,0	72,5	60,54	
Belém/PA	60,7	42,4	74,4	39,8	60,45	
Santos/SP	59,1	83,3	59,1	39,0	59,88	
Imbituba/SC	53,2	11,1	89,5	100,0	58,10	
Recife/PE	53,5	19,0	64,9	60,0	53,04	
Rio de Janeiro/RJ	51,8	83,3	34,1	60,0	51,77	
Cabedelo/PB	46,9	28,7	71,8	5,3	47,41	
Ilhéus/BA	51,1	30,1	29,8	10,8	44,22	
Vitória/ES	47,3	28,7	35,3	39,8	43,69	
Salvador/BA	48,9	34,2	29,8	10,8	42,95	
Aratu/BA	49,6	30,1	25,6	10,8	42,46	
Maceió/AL	40,9	70,2	17,7	65,3	40,63	
Macapá/AP	44,0	10,5	24,3	19,0	37,16	
Porto Velho/RO	32,5	19,2	18,1	60,0	30,56	
Porto Alegre/RS	18,7	3,1	20,2	65,3	20,04	
Sum of the scores	1783,3	1509,1	1852,1	1642,6	1772,86	

Environmental Performance Index of Organized Ports (IDA)						
Organized ports	Second Semester of 2014				IDA VGk	
	Environmental Indicator Categories					
	Cm	Cm	Cm	Cm		
São Sebastião/SP	97,7	91,5	95,3	74,6	95,73	
Itajaí/SC	91,2	91,5	98,4	100,0	92,81	
Itaqui/MA	79,5	83,3	95,1	80,0	82,26	
Paranaguá/PR	77,3	91,5	87,7	100,0	81,07	
Fortaleza/CE	73,7	79,2	82,0	80,0	75,76	
Suape/PE	72,0	91,5	69,7	65,3	72,76	
Rio Grande/RS	58,4	83,3	75,8	100,0	70,90	
Angra dos Reis/RJ	74,2	36,8	77,6	34,6	70,02	
Natal/RN	68,8	75,7	57,6	72,5	67,73	
Niterói/RJ	70,1	19,2	83,5	34,6	66,66	
Forno/RJ	63,2	50,9	81,5	45,5	64,30	
Santos/SP	62,9	91,5	59,7	54,6	64,12	
Santarém/PA	60,0	100,0	74,4	34,6	64,02	
São Francisco do Sul/SC	51,6	83,3	87,5	100,0	61,97	
Belém/PA	62,6	42,4	74,4	39,8	61,83	
Itaguaí/RJ	69,4	25,4	33,0	72,5	60,54	
Vila do Conde/PA	59,8	42,4	74,4	39,8	59,85	
Cabedelo/PB	54,4	77,8	70,5	24,3	57,23	
Pecém/CE	58,6	77,2	84,5	87,3	65,51	
Imbituba/SC	51,9	6,4	89,5	100,0	56,77	
Recife/PE	53,5	19,0	64,9	60,0	53,04	
Rio de Janeiro/RJ	52,5	83,3	34,1	60,0	52,28	
Ilhéus/BA	51,1	30,1	29,8	10,8	44,22	
Vitória/ES	47,7	28,7	35,3	39,8	43,92	
Salvador/BA	48,9	34,2	29,8	10,8	42,95	
Aratu/BA	49,6	30,1	25,6	10,8	42,46	
Maceió/AL	44,1	32,3	9,9	65,3	38,85	
Macapá/AP	44,0	10,5	24,3	19,0	37,16	
Porto Velho/RO	28,7	19,2	14,0	60,0	27,18	
Porto Alegre/RS	16,0	3,1	30,6	65,3	19,72	
Sum of the scores	1793,2	1631,5	1850,6	1741,6	1793,61	

IDA consider only the aspects present in the environmental license.

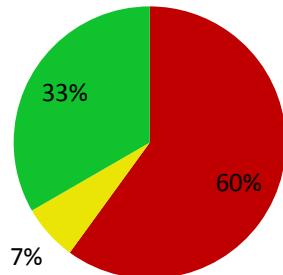
Label
Score higher than 75
Score between 50 and 75
Score between 25 and 49
Score lesser than 25

Environment situation of Brazilians Ports

ANTAQ has been publishing some results about environment management of organized ports in Brazil. All these data base were collected in second semester 2014 and show the commitment of Brazilian ports with environmental management.

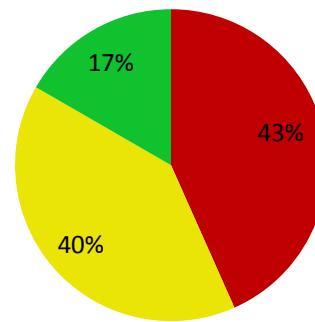
Oceanography, climate and weather data

■ N1 ■ N2 ■ N3



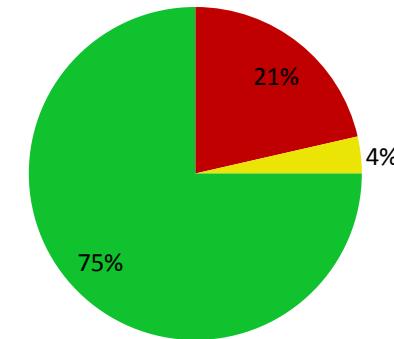
Energy efficiency

■ N1 ■ N2 ■ N3



Dredging disposal

■ N1 ■ N2 ■ N3



Weather data base

N3 - There database with semester minimal upgrade.

N2 - There database, but there is no minimum half-yearly update.

N1 - There is no database.

Energy efficiency

N3 - All three options : the current condition assessment and definition of reducing energy consumption targets , adopting measures / actions / strategies for reducing energy consumption and monitoring them through efficiency indicators.

N2 - Meets two of the options N3.

N1 - Does not meet any of the options N3.

Dredging disposal

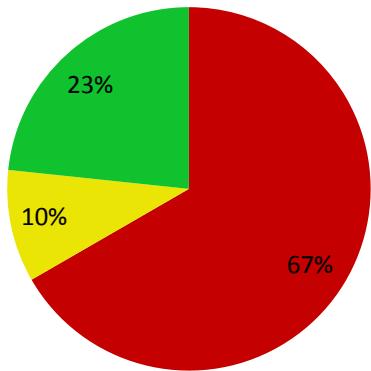
N3 - Environmental monitoring of the dredged area and disposal area.

N2 - Monitoring of dredged area or disposal site.

N1 - No environmental monitoring of dredging.

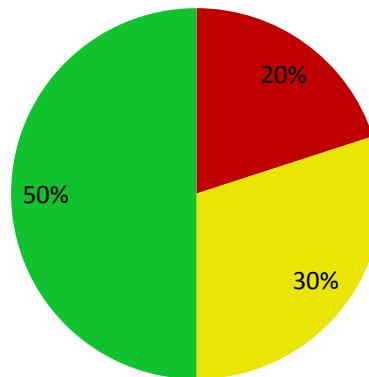
Survey and monitoring of invasive species

■ N1 ■ N2 ■ N3



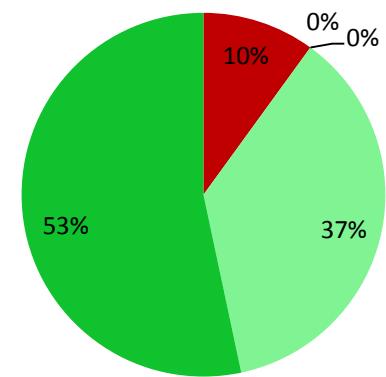
Environment audity

■ N1 ■ N2 ■ N3



Waste removal from ships

■ N1 ■ N2 ■ N3 ■ N4 ■ N5



Survey and monitoring of invasive species

N3 – Port has a program to identify invasive species in their surrounding area / periodic monitoring of invasive species / port has effective control action.

N2 – Meet two options of N3.

N1 – Meet only one option of N3.

Environment audity

N3 – Environment audit was realized until two years ago.

N2 – Environment audit was realized more than two years ago.

N1 – Never was realized a environment audit

Waste removal from ships

N5 - All four options: The harbor has adequate facilities or means for receiving and processing of various types of waste/ there is waste disposal for recycling for control of the port on the disposal/ and the harbor updated the GISIS information.

N4 - Meets three of N5 options.

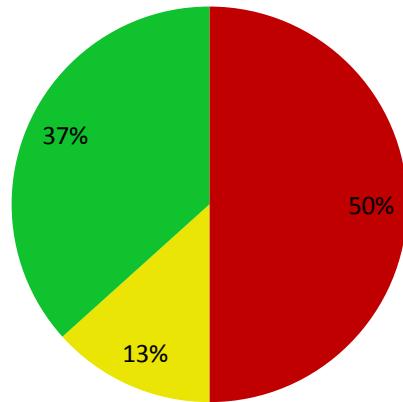
N3 - Meets two of N5 options

N2 - Meets one of N5 options

N1 – There is not waste removal from ships in port .

Institutional Environmental agenda

■ N1 ■ N2 ■ N3



Intitutional Environmental Agenda

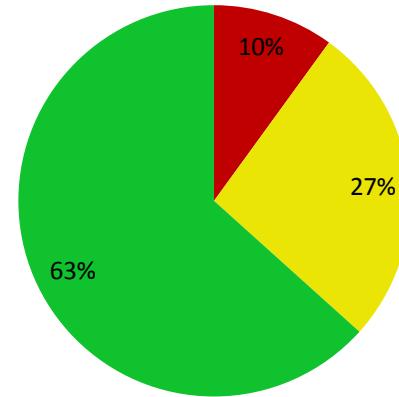
N3 - There is not institutional environmental agenda and implementation of actions .

N2 - There are institutional environmental agenda , but there is no implementation of actions .

N1 - Institutional environmental agenda has not been drawn.

Environment training people

■ N1 ■ N2 ■ N3



Environmental Training and Development:

N3 - More than 50% of employees participated in education / training.

N2 - Lesser than 50% of employees participated in education / training.

N1 - Not participated in education / training or has not reached the minimum number of hours / person.

Challenges for Brazilians Ports

Old Trucks



Old Trucks



Oil Spill without identifications



Source: <http://blogdocaminhoneiro.com/>

Source: <http://blogdocaminhoneiro.com/>

Source: <http://g1.globo.com/>

Truck Queue



Source: <http://www.pastre.com.br/>

Ship Queue



Source: <http://www.enfoquenet.com.br/>

Dust from ship load



Source: <http://www.esperanceexpress.com.au/>

Conservation



Source: portogente.com.br



Source: el.erdc.usace.army.mil/

Ballast Water



Source: blog.ted.com/

Waste



Source: acritica.uol.com.br/

Port x city



Source: gersoneguchiimoveissantos.blogspot.com.br/

International Experience

Shore power for ships



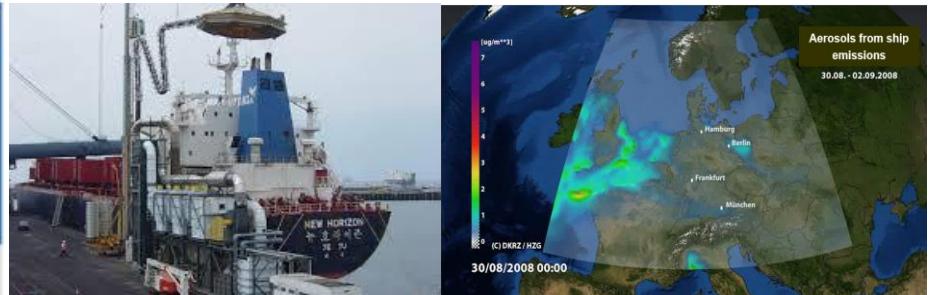
Source: Siemens

Shore-based exhaust treatment



Source: Siemens

Ship emission simulation



Source: Volker Matthias

Energy alternative in ports



Source: Eurogate

Use of LED Light in port operations



Source: Eurogate

Integration of port environment within of cities



Source: JEAN-CLAUDE TERRIER



Considerations:

- We created a procedure to environment port certification in Brazil.
- This procedure was developed within a partnership between CILIP and Vanzolini Foundation.
- Vanzolini Foundation has a certification based in the High Environment Quality – AQUA.
- It is an adaptation of the French Démarche HQE green rating system;
- A tool to evaluate the performance criteria from Environment Quality of Building (QAE).
 - It considers:
 - Enhanced quality of live users
 - Water use efficiency
 - Energy efficiency
 - Efficiency low-impact waste disposal and other aspects;
 - Socioeconomic and environmental contribution to the region.
 - Therefore, we had adapted this concept applied to building to ports with the inclusion of new categories and particularities with focus in port project and operations.

THE AQUA CERTIFICATION ASSESSES 14 CATEGORIES

For a project to receive an AQUA certification, it should address requirements in 14 categories, receiving the following classifications:



ECO CONSTRUCTION

- Relationship between the building and its surroundings
- Integrated choices for construction, system and building processes
- Low-environmental impact worksite



COMFORT

- Temperature and humidity
- Acoustics
- Visual
- Olfactory



ECO MANAGEMENT

- For energy
- For water
- Residues used in the building's operations
- Maintenance: permanence of environmental performance



HEALTH

- Sanitary quality of the settings
- Sanitary quality of the air
- Sanitary quality of the water

Categories structure

VIDA SOCIAL E ECONOMIA - SOCIAL LIFE AND ECONOMY

- | | | |
|--|---|---|
| | 1 | O Porto e o seu entorno
<i>Port and surround</i> |
| | 2 | Abordagem econômica e social
<i>Economic and social approach</i> |
| | 3 | Segurança patrimonial
<i>Property security</i> |
| | 4 | Manutenção e conservação
<i>Maintenance and conservation</i> |

QUALIDADE DE VIDA - LIFE QUALITY

- | | | |
|--|---|--|
| | 5 | Acessibilidade e mobilidade
<i>Accessibility and mobility</i> |
| | 6 | Conforto
<i>Comfort</i> |
| | 7 | Saúde
<i>Health</i> |

MEIO AMBIENTE - LOCAL ENVIRONMENT

- | | | |
|--|----|--|
| | 8 | Energia (AQUA e PBE edifica)
<i>Energy</i> |
| | 9 | Água
<i>Water</i> |
| | 10 | Canteiro de obras e materiais
<i>Building site and materials</i> |
| | 11 | Resíduos
<i>Waste</i> |
| | 12 | Ambientes naturais e ecossistemas
<i>Nature environment and ecosystem</i> |
| | 13 | Qualidade do ar
<i>Air quality</i> |
| | 14 | Mudanças climáticas
<i>Climate change</i> |
| | 15 | Qualidade do solo
<i>Soil quality</i> |

An example of environmental profile of a port that will be present in AQUA-Port Certificate.

Certification port phases

Certification process

Pre-project

Phase 1

Criterias
development

Evaluation of
conceptual port project

Project

Phase 2

Port engineering project

Build

Build of port in local

Green field

Operation port

Cargo load or unload

Green and Brown field

Scores to be reached by the port

- These scores are listed below:
 - **Base (5):** - ENVIRONMENTAL LICENCE - level corresponding to the minimum acceptable performance for an enterprise of High Environmental Quality. This may correspond to the rules which is demanding enough about the performance of an enterprise, or in the absence thereof, to the current practice.
 - **Good Practices (7):** corresponding to the level of good practice. It means that the port will improve their environment project obtained by Environment license.
 - **Best Practices (3):** level calibrated in line with the maximum performances recorded in High Environmental Quality projects, but ensuring that they can be attainable. It considers the Brazilian port realities.

Case Study: Itaoca Port



about us

Itaoca Offshore is a Brazilian company focused on meeting the demand of offshore logistic services in the domestic oil and gas market, working with excellence in marine terminal operation with world-class performance, promoting sustainable development of local communities, and generating returns to shareholders, partners, customers, and its employees. [Learn more](#)



An example of evaluation criteria

Social Life and Economy

Port and surround community

Referencial		Avaliação			
Critério de avaliação	Pontos	Ciclo	Justificativa	Pontos obtidos (ciclo C)	Pontos obtidos (Ciclo Op)
1.1 Assegurar que não haja impacto na atividade pesqueira e nas atividades recreativas em corpos d'água.					
Demonstrar em todas as etapas do empreendimento que as ações foram tomadas para mitigar os impactos na atividades pesqueiras e recreativas.	3	C/Op			
1.2 Controlar a emissão de particulados provenientes do transporte de granel sólido					
Implementar um programa de supressão de particulados para estradas não pavimentadas nas propriedades, incluindo a pulverização de água em intervalos frequentes durante o uso e manutenção das estradas (horas e tipos de veículos/equipamentos permitidos).	1	Op			
1.3 Assegurar a boa relação a comunidade local					
Distribuir e anunciar informações de contato (números de telefone/fax, correio eletrônico, endereço postal e páginas WEB) da autoridade portuária (pública e/ou privada), para incentivar consultas e geração de relatórios de reclamações e atribuir a um funcionário da autoridade portuária como a pessoa de contato para receber/encaminhar inquéritos e reclamações.	B	C/Op			
Participar ativamente em organizações de bairro, de comunidades e de negócios para promover melhores relações comunitárias.	1				
Desenvolver o relacionamento com a equipe de execução do código municipal para aprender sobre os códigos e o nível de conformidade esperada.	1				
1.4 Assegurar aos usuários do porto o direito a qualidade do ar					
Demonstrar como os funcionários dos portos e arrendatários sejam capacitados para identificar odores provenientes da combustão dos motores diesel realizada por equipamentos terrestres e navios e pelos vapores provenientes da transferência dos produtos de granéis líquidos e realizar a comunicação à gerência responsável no porto.	B	Op			
Demonstrar a eficácia de equipamentos de controle da poluição (ao exemplo de purificadores) para fontes fixas de emissões de odores.	B				

The figure above shows an example of the full spreadsheet developed, in which the user can make their self assessment and can identify the hit score.

An example of evaluation criteria

Diagnostic from client about some categories

The Itaoca conducted a preliminary assessment, filling in the green, as shown below:

Referencial	Avaliação				
Critério de avaliação	Pontos	Ciclo	Justificativa	Pontos obtidos (ciclo C)	Pontos obtidos (Ciclo Op)
1.1 Assegurar que não haja impacto na atividade pesqueira e nas atividades recreativas em corpos d'água.					
Demonstrar em todas as etapas do empreendimento que as ações foram tomadas para mitigar os impactos na atividades pesqueiras e recreativas.	3	C/Op	Devido a importância da atividade pesqueira na região, foi realizado um diagnóstico sobre a atividade nos municípios de influência direta do empreendimento e elaborado um Programa de compensação das atividades de pesca artesanal e mariscagem a ser implantando nas fases subsequentes de instalação e operação do empreendimento.	3	3
1.2 Controlar a emissão de particulados provenientes do transporte de granel sólido					
Implementar um programa de supressão de particulados para estradas não pavimentadas nas propriedades, incluindo a pulverização de água em intervalos frequentes durante o uso e manutenção das estradas (horas e tipos de veículos/equipamentos permitidos).	1	Op	Não aplicável		
1.3 Assegurar a boa relação a comunidade local					
Distribuir e anunciar informações de contato (números de telefone/fax, correio eletrônico, endereço postal e páginas WEB) da autoridade portuária (pública e/ou privada), para incentivar consultas e geração de relatórios de reclamações e atribuir a um funcionário da autoridade portuária como a pessoa de contato para receber/encaminhar inquéritos e reclamações.	B	C/Op	Será implantado um setor de relações com a comunidade na empresa.		B
Participar ativamente em organizações de bairro, de comunidades e de negócios para promover melhores relações comunitárias.	1		Será implantado um setor de relações com a comunidade na empresa.		1
Desenvolver o relacionamento com a equipe de execução do código municipal para aprender sobre os códigos e o nível de conformidade esperada.	1		Não será aplicado.		
1.4 Assegurar aos usuários do porto o direito a qualidade do ar					
Demonstrar como os funcionários dos portos e arrendatários sejam capacitados para identificar odores provenientes da combustão dos motores diesel realizada por equipamentos terrestres e navios e pelos vapores provenientes da transferência dos produtos de granéis líquidos e realizar a comunicação à gerência responsável no porto.	B	Op	Está previsto no escopo da Licença de Instalação a elaboração de um Programa de Controle de Emissões Atmosféricas para a fase de operação.		B
Demonstrar a eficácia de equipamentos de controle da poluição (ao exemplo de purificadores) para fontes fixas de emissões de odores.	B		Está previsto no escopo da Licença de Instalação a elaboração de um Programa de Controle de Emissões Atmosféricas para a fase de operação.		B

Certification parameters

Evaluation of main parameters

The certification has QAIP 15 categories, consisting of 342 items in total, as shown below.

Categoria	Nº itens	nº itens			P	nº itens Op.			P	Critério de classificação
		B	BP	MP		B	BP	MP		
O Porto e o seu entorno	27	3	1	3	12	9	11	6	36	BP ≥ 35% MP ≥ 60%
Abordagem econômica e social	15	3	8	3	30	3	8	3	30	BP ≥ 35% MP ≥ 60%
Segurança Patrimonial	16	0	0	0	0	3	9	4	26	BP ≥ 35% MP ≥ 60%
Manutenção e Conservação	12	4	4	3	21	4	2	2	11	BP ≥ 35% MP ≥ 60%
Acessibilidade e mobilidade	6	1	1	1	6	3	1	1	6	BP ≥ 20% MP ≥ 80%
Conforto	23	3	12	3	39	4	13	5	51	BP ≥ 35% MP ≥ 60%
Saúde	32	7	8	3	28	6	15	5	47	BP ≥ 35% MP ≥ 60%
Energia (AQUA e PBE edifica)	26	2	7	10	52	5	8	10	54	BP ≥ 30% MP ≥ 50%
Água	23	7	5	7	38	8	6	8	42	BP ≥ 20% MP ≥ 50%
Canteiro de obras e materiais	52	20	25	8	71	0	0	0	0	BP ≥ 30% MP ≥ 60%
Resíduos	15	4	0	3	14	9	1	4	21	BP ≥ 35% MP ≥ 60%
Ambientes naturais e ecossistemas	18	3	3	3	18	6	8	4	28	BP ≥ 35% MP ≥ 60%
Qualidade do ar	46	3	5	11	62	11	13	18	107	BP ≥ 20% MP ≥ 50%
Mudanças climáticas	12	2	2	8	42	2	2	8	42	BP ≥ 20% MP ≥ 50%
Qualidade do solo	19	8	4	0	4	14	4	0	4	BP ≥ 25% MP ≥ 50%

Evaluation of results

The analysis of the first self diagnosis of Itaoca shows the following result:

Categoria	Nº itens	Não avaliado	%	N.A.	%	Não implem.	%
O Porto e o seu entorno	27	1	4%	2	7%	4	15%
Abordagem econômica e social	15	0	0%	0	0%	0	0%
Segurança Patrimonial	16	2	13%	0	0%	1	6%
Manutenção e Conservação	12	2	17%	0	0%	0	0%
Acessibilidade e mobilidade	6	2	33%	0	0%	0	0%
Conforto	23	2	9%	0	0%	8	35%
Saúde	32	2	6%	9	28%	7	22%
Energia (AQUA e PBE edifica)	26	3	12%	0	0%	4	15%
Água	23	2	9%	2	9%	3	13%
Canteiro de obras e materiais	52	2	4%	11	21%	6	12%
Resíduos	15	2	13%	2	13%	1	7%
Ambientes naturais e ecossistemas	18	0	0%	0	0%	4	22%
Qualidade do ar	46	2	4%	11	24%	11	24%
Mudanças climáticas	12	0	0%	1	8%	6	50%
Qualidade do solo	19	3	16%	0	0%	1	5%

The table analysis shows the items that were considered in the analysis. Some of them are not applied in this project and did not were evaluated by client.

It shows that certification process is very flexible and adapted for each kind of port.

Certification parameters

Evaluation of main parameters

The tables below represent the levels achieved in the self diagnosis for QAIP certification related to the level of effort.

ITAOCA - CONSTRUÇÃO

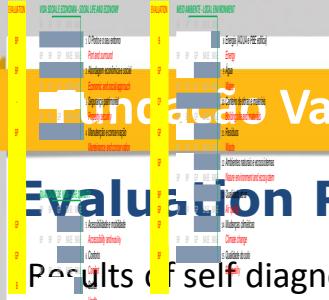
Categoria	Nível de esforço		
	Baixo	Médio	Alto
	BP>35%	BP>30%	BP>20-25%
MP>60%	MP>50-60%		MP>50-80%
O Porto e o seu entorno	MP		
Abordagem econômica e social	MP		
Segurança Patrimonial	MP		
Manutenção e Conservação	MP		
Acessibilidade e mobilidade			BP
Conforto	BP		
Saúde	B		
Energia (AQUA e PBE edifica)		B	
Água			BP
Canteiro de obras e materiais		MP	
Resíduos	BP		
Ambientes naturais e ecossistemas	BP		
Qualidade do ar			B
Mudanças climáticas			B
Qualidade do solo			MP

ITAOCA - OPERAÇÃO

Categoria	Nível de esforço		
	Baixo	Médio	Alto
	BP>35%	BP>30%	BP>20-25%
MP>60%	MP>50-60%		MP>50-80%
O Porto e o seu entorno	BP		
Abordagem econômica e social	MP		
Segurança Patrimonial	MP		
Manutenção e Conservação	BP		
Acessibilidade e mobilidade			BP
Conforto	B		
Saúde	B		
Energia (AQUA e PBE edifica)		B	
Água			MP
Canteiro de obras e materiais		MP	
Resíduos	BP		
Ambientes naturais e ecossistemas	BP		
Qualidade do ar			BP
Mudanças climáticas			BP
Qualidade do solo			BP

Above is possible to assess the level of effort associated with each category. This demonstrates that there are categories that are naturally more difficult to control, as well as monitored by the port.

- High effort to port considering project aspects: (Air Quality, Climate Change, Energy and Health).
- High effort to port considering operational aspects: (Comfort, Health and Energy).

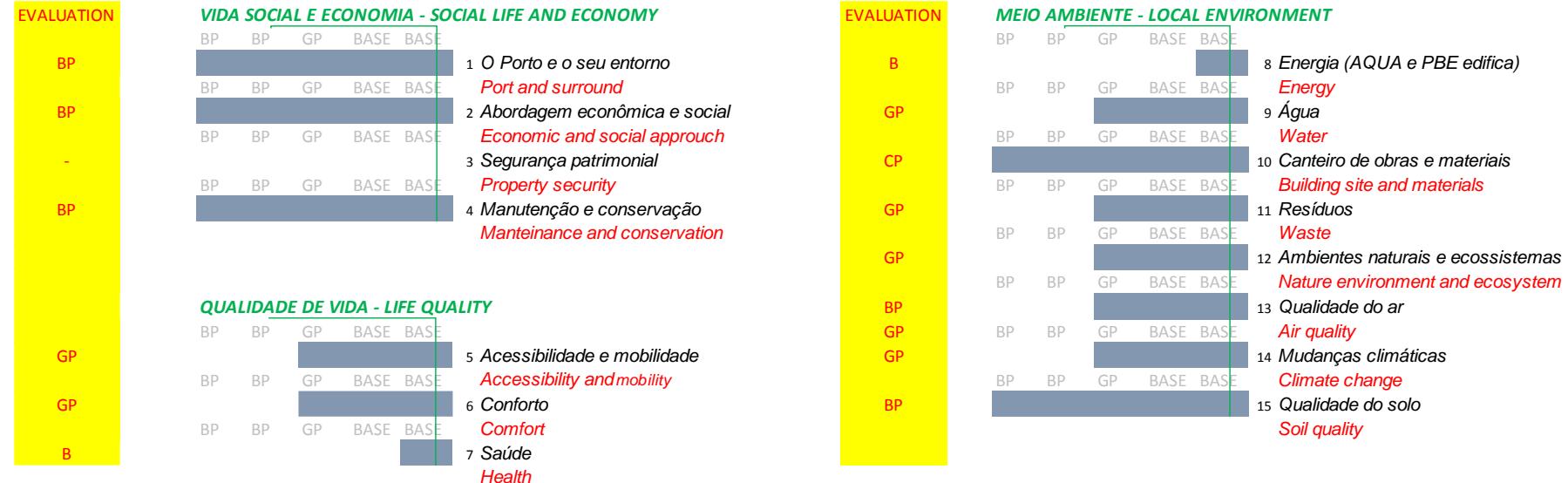


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Evaluation Results

Results of self diagnostic realized by Itaoca port is present below:



Port assessment reached:

5 – Best practices

7 – Good practices

3 – Base practices

By evaluation from Itaoca we can see that Terminal is able to receive the Pre-Project Certificate. It shows the commitment of high environmental quality of Itaoca Port.

Certification parameters

Contribution to the state of the art

We can compare the parameters evolution utilized to analyse the port environment evaluation.

	1996	2004	2009	2013	QAIP
1	Port development (water)	Waste	Noise	Air quality	Community relationship
2	Water quality	Dredging disposal	Air quality	Waste	Economic and social approach
3	Dredging disposal	Dredging operation	waste	Energy consumption	Maintenance and conservation
4	Dredging operation	Dust	Dredging operation	Noise	Build and material site
5	Dust	Noise	Dredging disposal	Waste from ships	Soil quality
6	Port development (soil)	Air quality	Community relationship	Community relationship	Property safety
7	Soil contaminated	Damage cargo	Energy consumption	Dredging operation	Accessibility and mobility
8	Degradation / Habitat lost	Ship load	Dust	Dust	Comfort
9	Traffic volume	Port development (soil)	Port development (water)	Port development (soil)	Water quality
10	Industrial Effluent	Ship unload (sanitary effluent)	Port development (soil)	Water quality	Waste
11	---	---	---	---	Nature environment and ecosystem
12	---	---	---	---	Air quality
13	---	---	---	---	Climate changes
14	---	---	---	---	Health
15	---	---	---	---	Energy

According to this study we could introduce new parameters that have to be evaluate to certificate ports in Brazil. The Brazilian port characteristics are very different when compared with Europe ports.

Certification conclude

Phase 1 - Certified



Conclusions

- We could create a new generic process to environment port certification in Brazil.
- It will open the door to create a new conscience for the port managers.
- The procedures are very flexible and have to adapted to new types of ports.
- There are a great opportunity to improve the environment quality in Brazilian ports. An environment certification is a continuos process that ports have to reach to be integrated with new demands for a world more green.