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GLOBAL INTEGRATION IN PORTS

FUTURE OPPORTUNITIES

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STUDY OF PORT RECIPTION FACILITIES IN SCZONE PORTS

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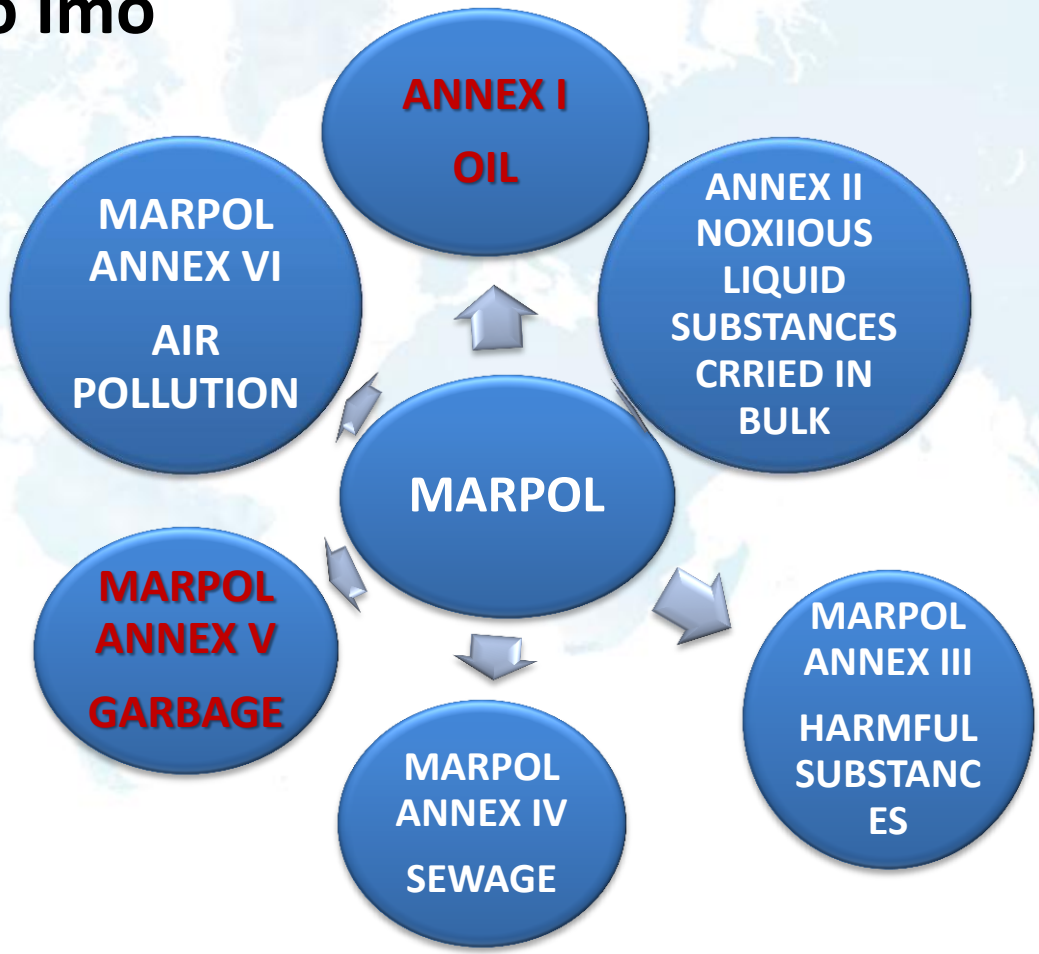
STUDY OBJECTIVES

1-Requirements of port reception facility (PRF) according to Imo

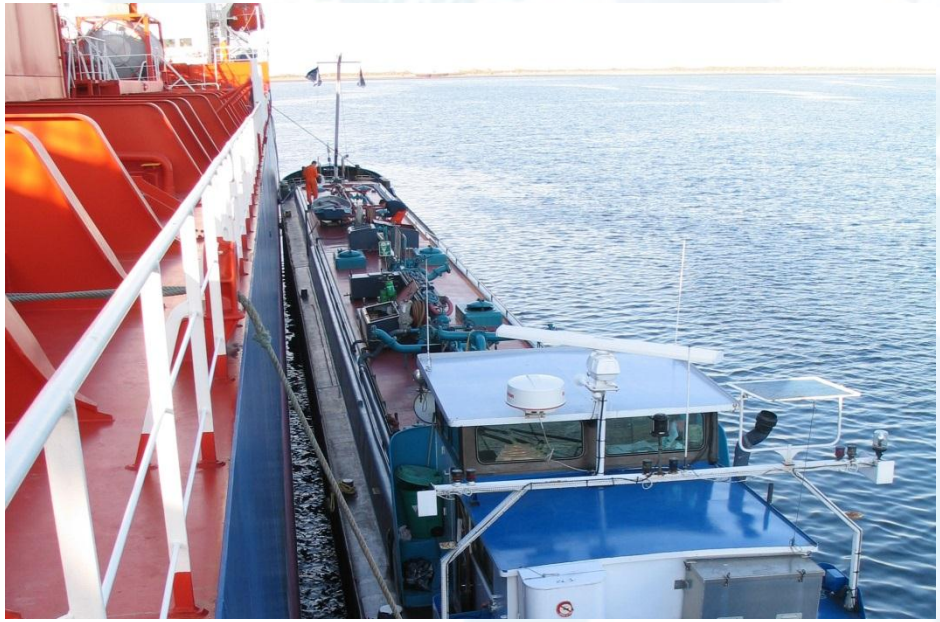


2. Action requested of Member States, status of Egypt ports according to IMO and specific connection of prevention pollution from ship.
3. Prepare waste volume sheets for identified ports based on figures received and design equations.
4. Describe the applied waste handling system and managements of all action required between the port and the ship in mentioned port.
5. Analyze and Design facility of ports (ELADABYA, AIN SOKHNA, and WEST PORTSAID –EAST PORTSAID-ARESH-TUR).

PORT RECIPTION FACILITY

- ✓ TYPES
- ✓ choose

1. Mobile reception facilities Selection:



- Advantage:

The investment cost is less .

- Disadvantages

The interference of movements on the quay/in the water with other operations, such as loading/unloading of cargo, and a restricted or prohibited access for mobile facilities on jetties, such as those where oil products, liquefied gases, bulk chemicals or packaged dangerous goods are handled, are possible.

TYPES:

Floating reception facilities usually barges, either towed or self-propelled.

1. Liquid MARPOL residues by barges.
2. Solid MARPOL residues

2. Vehicles reception facilities selection:

Advantages:

- Scope of collected wastes will be wider (as they can be designed and equipped in a way that all MARPOL wastes and residues can be collected).
- a larger capacity for collection and storage, and that they can combine the collection.
- storage and treatment of different waste types.

Disadvantages

- The loading capacity of vehicles is usually much smaller than the capacity of barges.
- terrain and road surfacing should be suitable for safe and swift transport.

3. Fixed reception facilities selection

Advantages:

- Scope of collected wastes will be wider (as they can be designed and equipped in a way that all MARPOL wastes and residues can be collected).
- a larger capacity for collection and storage.
- combine the collection, storage and treatment of different waste types.

Disadvantages

- The higher investment cost for these facilities.

For larger ports a ship has to shift berth, if reception of the waste is located at a fixed place.

- Shifting berths is a difficult, time-consuming and expensive affair, which might lead to undue delay. If reception facilities are located in the wrong place, delays, congestion and an increased risk of accidents and collisions will result.
- The construction of pipelines to each berth might be a feasible option, especially if the reception is combined with a tank cleaning facility, e.g. at an oil terminal.

CALCULATIONS OF QUANTITIES

- ✓ OIL
- ✓ GARBAGE

1. Oily bilge water and oil residues:

Q t=Q si +Q m (m3/day) ..... (1)

Where:

Q si=N1 * Psi*T/365..... (2)

And

Q m=N2*Pm*T/365..... (3)

Where:

Qt = Volume of oily wastes from the machinery spaces of ships to be received (m3/day)

Qsl = Volume of oil residues (sludge) to be received (m3/day),Qm = Volume of oily bilge water to be received (m3/day),N1 = Number of ships calling at the port annually

N2 = Number of ships without oily bilge water separating and filtering equipment (with only bilge holding tanks) calling at the port on an annual basis,

Psl = Oil residues daily production (0.02 x fuel oil daily consumption per day (gr/HP * hr.) of voyage (m3/day),

Pm = Oily bilge water production per sailing day from N2 ships calling at the port (m3/day),

2. Garbage:

$$G = GD + GM + GC \text{ (kg/week)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Or

$$G = GD + GM + GC / \rho \text{ (m3/week)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

Where:

P 250 kg/ m3 the average density of shipboard garbage

G the quantity of garbage received in peak seven day period (kg/week)

GD the quantity of domestic solid waste received in a peak seven day period (kg/week)

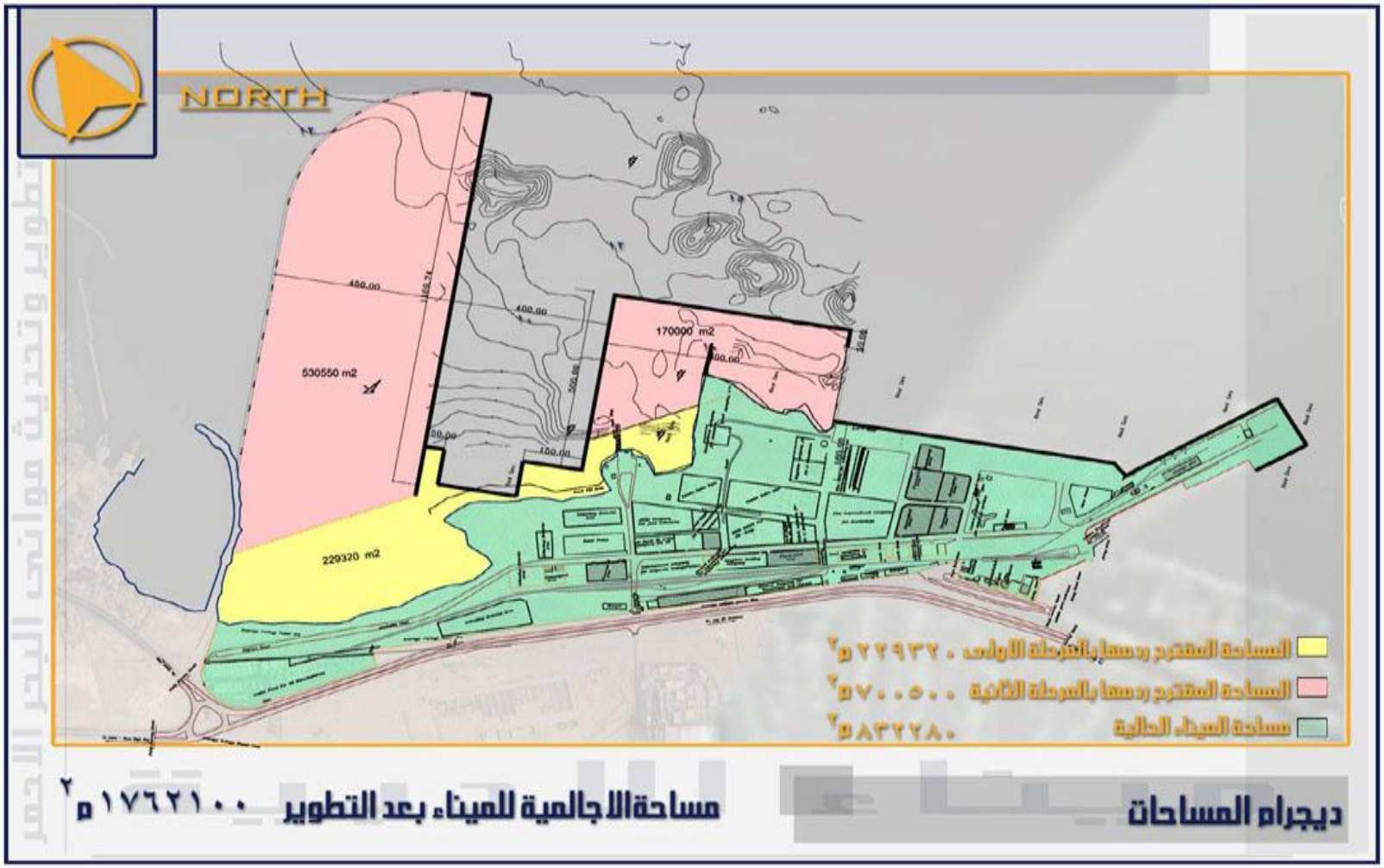
GM the quantity of maintenance solid wastes received in a peak seven day period (kg/week)

GC the quantity of cargo associated waste received in a peak seven day period

PORT ANALYSIS

- ✓ EL ADABYA Port.
- ✓ AIN-SOKHNA port.
- ✓ WEST PORT-SAID port.
- ✓ EAST PORT-SAID port.
- ✓ ARESH port.
- ✓ AL-TOR port.

✓ EL ADABYA Port:



❑ Oily bilge water and oil residues in ELADBIA Port :

SHIP TYPE	Fuel Consumption (M3/DAY)	Psi (M3/ DAY)	P mi (M3 /DAY)	Q m =N2*Pm *T/365	Q si =N1 * Psi*T/365	Q t(m3/day)	**Q t (m3/year)**
CONTAINER	90.00	1.80	0.90	1.11	4.44	5.55	**4,613**
bulk carrier ship	16.67	0.33	0.17	0.13	0.54	0.67	
tanker ship	27.78	0.56	0.28	-	-	-	
CARGO SHIP	16.67	0.33	0.17	1.28	5.13	6.42	
LNG	66.67	1.33	0.67	-	-	-	
Σ	**217.78**	**4.36**	**2.18**	**2.53**	**10.11**	**12.64**	

arrangement for sec.Sludge Handling and Disposal

15 m3/ day

50 m3

6.5 m 3/ hr

Minimum storage capacity 15x2x1.7

Oil water separation process QT/8hr

6.5 m 3/ hr

30 m3

Further treatment of water based effluent

Recovered oil storage tank

MARPOL Waste Collection Vessel MARPOL CAT 20

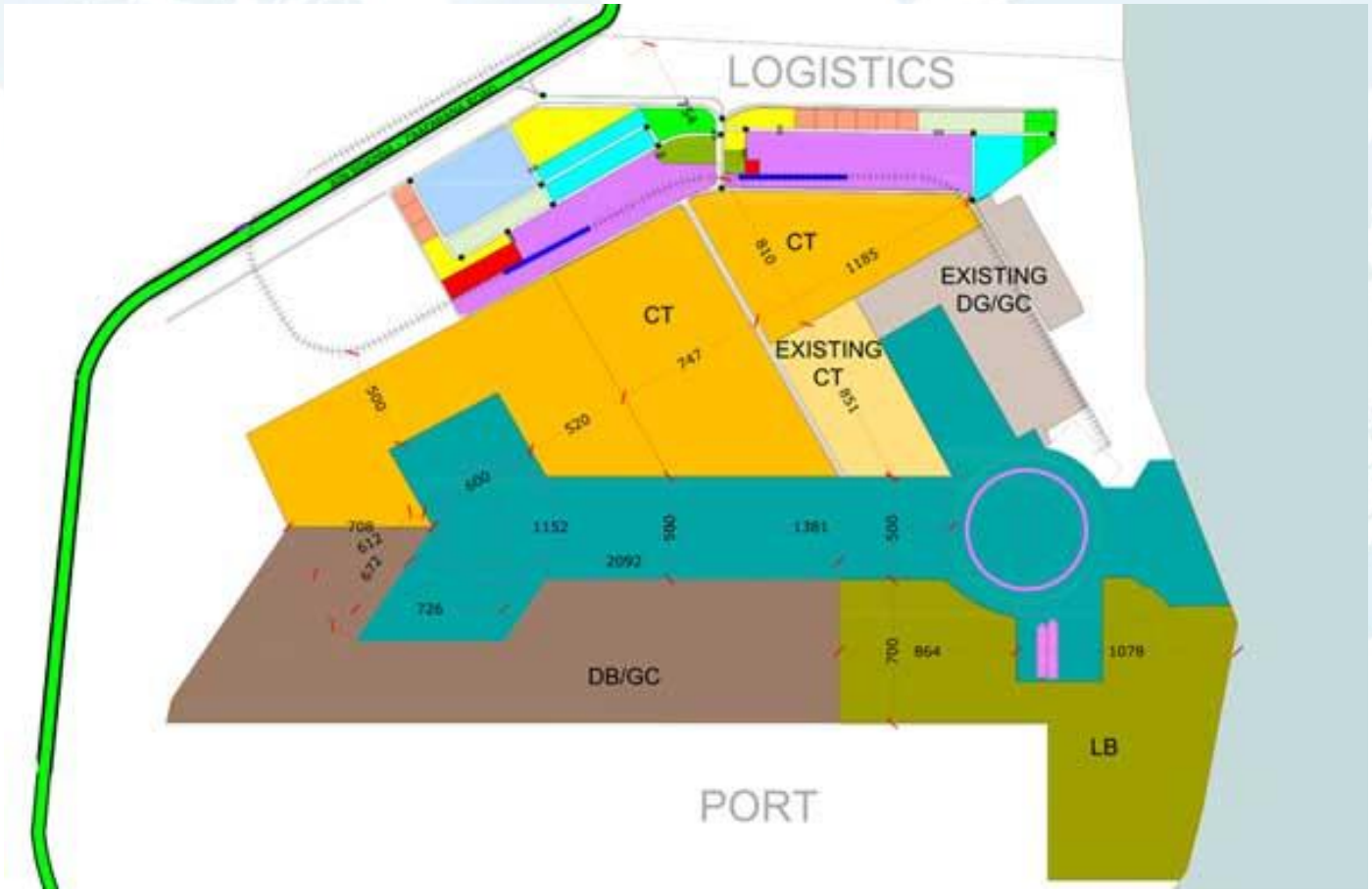
OILY WASTE TREATMENT AT ELADABYA PORT

Water to the sea or urban sewage

❑ Garbage estimated in ELADBIA Port.

	GD = GB + GP + GH(Quantity of domestic waste)	GM (Quantity of maintance waste)	GC = CB + CD + CC(Quantity of cargo waste)			TOTAL Garbage WEIGHT(Ton/year)	TOTAL Garbage volume(m3/year)
	GB = NB * TB * QB * PB (cargo ship)	GM = N * T * M	CB= WB * 1/123 break bulk	CD = WD * 1/10,000 Dry bulk	CC = WC 1/25,000 CONTAINER		
N (SHIP/WEEK)	13.64	13.64	6,788.62	565.20	0.92	600.33	2,401.31
T	10	10					
Q kg/person / day	2	11					
P person	36.2	0					
G kg/week	9872.2	1499.9	130.19	10.84	0.02		

✓ AIN-SOKHNA port.



❑ Oily bilge water and oil residues in AIN-SOKHNA Port :

SHIP TYPE	Fuel Consumption(M3/ DAY)	Psi(M3 /DAY)	Pmi(M3/ DAY)	Qm=N2*Pm* T/365	Qsi= N1 * Psi*T/3 65	Qt(m3 /day)	Qt(m3 /year)
CONTAI NER	90.00	1.80	0.90	9.78	39.1 1	48.88	43,17 4
bulk carrier ship	16.67	0.33	0.17	1.81	7.24	9.05	
tanker ship	27.78	0.56	0.28	3.02	12.0 7	15.09	
CARGO SHIP	16.67	0.33	0.17	1.81	7.24	9.05	
LNG	66.67	1.33	0.67	7.24	28.9 7	36.21	
Σ	217.78	4.36	2.18	23.66	94.6 3	118.2 9	

arrangement for sec.Sludge Handling and Disposal

40m3/ day

140m3

18 m 3/ hr

Minimum storage capacity 15x2x1.7

Oil water separation process QT/8hr

18 m 3/ hr

85 m3

Further treatment of water based effluent

Recovered oil storage tank

MARPOL Waste Collection VesseL
MARPOL CAT 26

OILY WASTE TREATMENT AT ELSOKHNA PORT

Water to the sea or urban sewage

❑ Garbage estimated in AIN-SOKHNA Port :.

	GD = GB + GP + GH(Quantity of domestic waste)	GM (Quantity of maintance waste)	GC = CB + CD + CC(Quantity of cargo waste)			TOTAL Garbage WEIGHT(Ton /year)	TOTAL Garbage volume(m3/year)
	GB = NB * TB * QB * PB] **(cargo ship)**	GM = N * T * M	CB= WB * 1/123 break bulk	CD = WD * 1/10,000 Dry bulk	CC = WC 1/25,000 CONTAINER		
N (SHIP/WEEK)	21.02	21.02	1,357.72	41.80	101.04	915.56	3,662.26
T Average duration of voyage	10	10					
Q kg/person / day	2	11					
P person	36.2	0					
G kg/week	15217.9	2312.1	26.04	0.80	1.94		

✓ WEST PORT-SAID port.

❑ Oily bilge water and oil residues in WEST PORT-SAID port:

SHIP TYPE	Fuel Consumption(M3/ DAY)	Psi(M3 /DAY)	Pmi(M3/ DAY)	Qm=N2*Pm* T/365	Qsi= N1 * Psi*T/3 65	Qt(m 3/day)	Qt(m3 /year)
CONTA INER	90.00	1.80	0.90	9.78	39.1 1	48.88	43,174
bulk carrier ship	16.67	0.33	0.17	1.81	7.24	9.05	
tanker ship	27.78	0.56	0.28	3.02	12.0 7	15.09	
CARG O SHIP	16.67	0.33	0.17	1.81	7.24	9.05	
LNG	66.67	1.33	0.67	7.24	28.9 7	36.21	
Σ	217.78	4.36	2.18	23.66	94.6 3	118.2 9	

arrangement for sec.Sludge Handling and Disposal

150m3/ day

525m3

68 m 3/ hr

Minimum storage capacity 15x2x1.7

Oil water separation process QT/8hr

68 m 3/ hr

320 m3

Further treatment of water based effluent

Recovered oil storage tank

Marpol Waste Collection VesseL MARPOL CAT 40

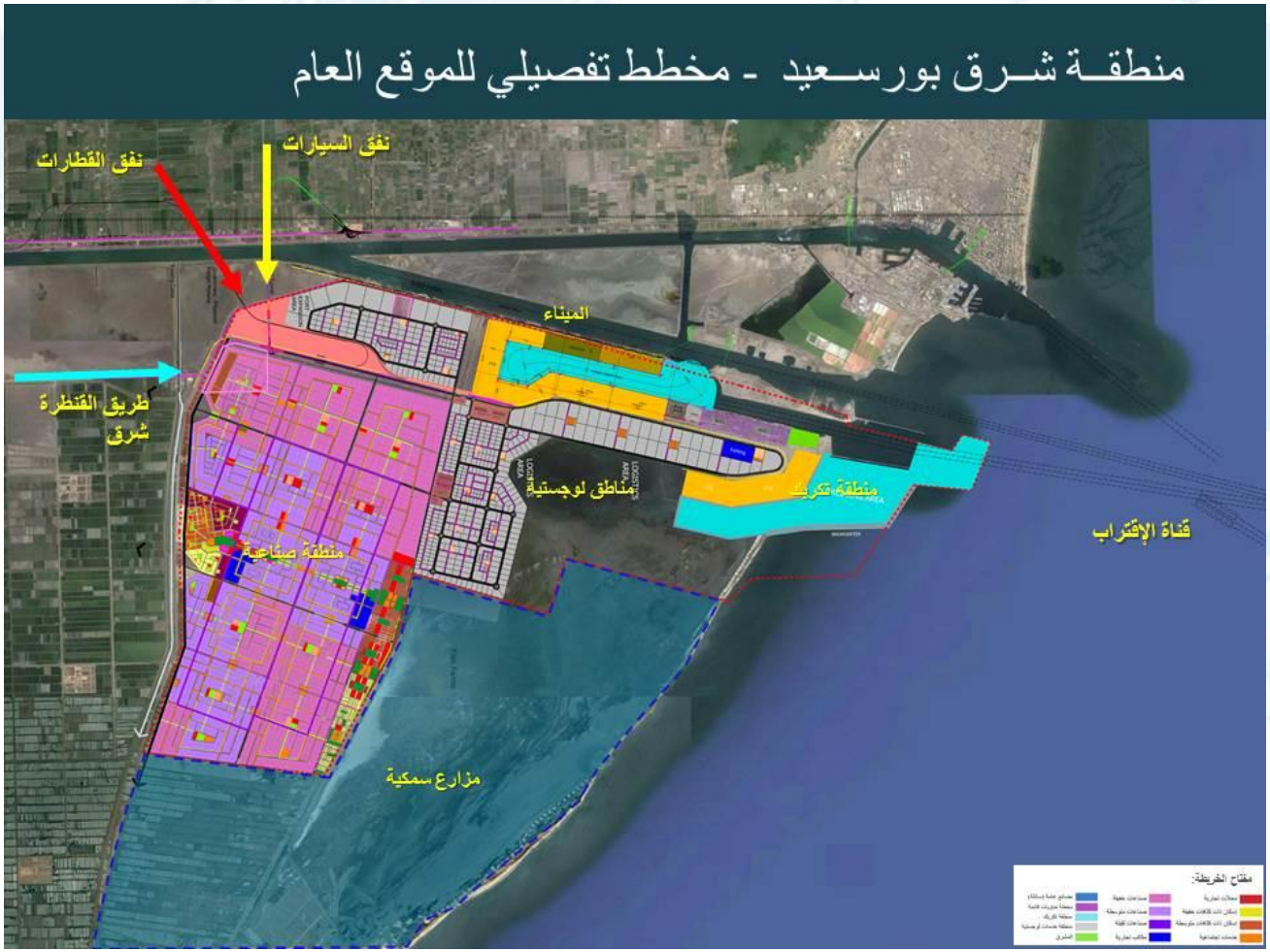
2- OILY WASTE TREATMENT AT WEST PORT

Water to the sea or urban sewage

❑ Garbage estimated in WEST Port :.

	GD = GB + GP + GH(Quantity of domestic waste)	GM (Quantity of maintance waste)	GC = CB + CD + CC(Quantity of cargo waste)			TOTAL Garbage WEIGHT (Ton/year)	TOTAL Garbage volume (m3/year)
	GB = NB * TB * QB * PB **(cargo ship)**	GM = N * T * M	CB= WB * 1/123 break bulk	CD = WD * 1/10,000 Dry bulk	CC = WC 1/25,000 CONTAINER		
N (SHIP/WEEK)	11.70	11.70	41,073.17	656.10	19.64	550.49	2,201.96
T	10	10					
Q kg/person / day	2	11					
P person	36.2	0					
G kg/week	8469.8	1286.8	787.70	12.58	0.38		

✓ EAST PORT-SAID port.



❑ Oily bilge water and oil residues in EAST PORT-SAID port:

SHIP TYPE	Fuel Consumption(M3/ DAY)	Psi(M3/ DAY)	Pmi(M3 /DAY)	Qm=N2* Pm*T/365	Qsi=N1 * Psi*T/365	Qt(m 3/day)	Qt(m3 /year)
CONTA INER	90.00	1.80	0.90	25.63	102.53	128.1 6	46,77 8
bulk carrier ship	16.67	0.33	0.17	-	-	-	
tanker ship	27.78	0.56	0.28	-	-	-	
CARGO SHIP	16.67	0.33	0.17	-	-	-	
LNG	66.67	1.33	0.67	-	-	-	
Σ	217.78	4.36	2.18	25.63	102.53	128.1 6	

arrangement for sec.Sludge Handling and Disposal

150m3/ day

525m3

68 m 3/ hr

Minimum storage capacity 15x2x1.7

Oil water separation process QT/8hr

68 m 3/ hr

320 m3

Further treatment of water based effluent

Recovered oil storage tank

Marpol Waste Collection VesseL MARPOL CAT 40

2- OILY WASTE TREATMENT AT EAST PORT

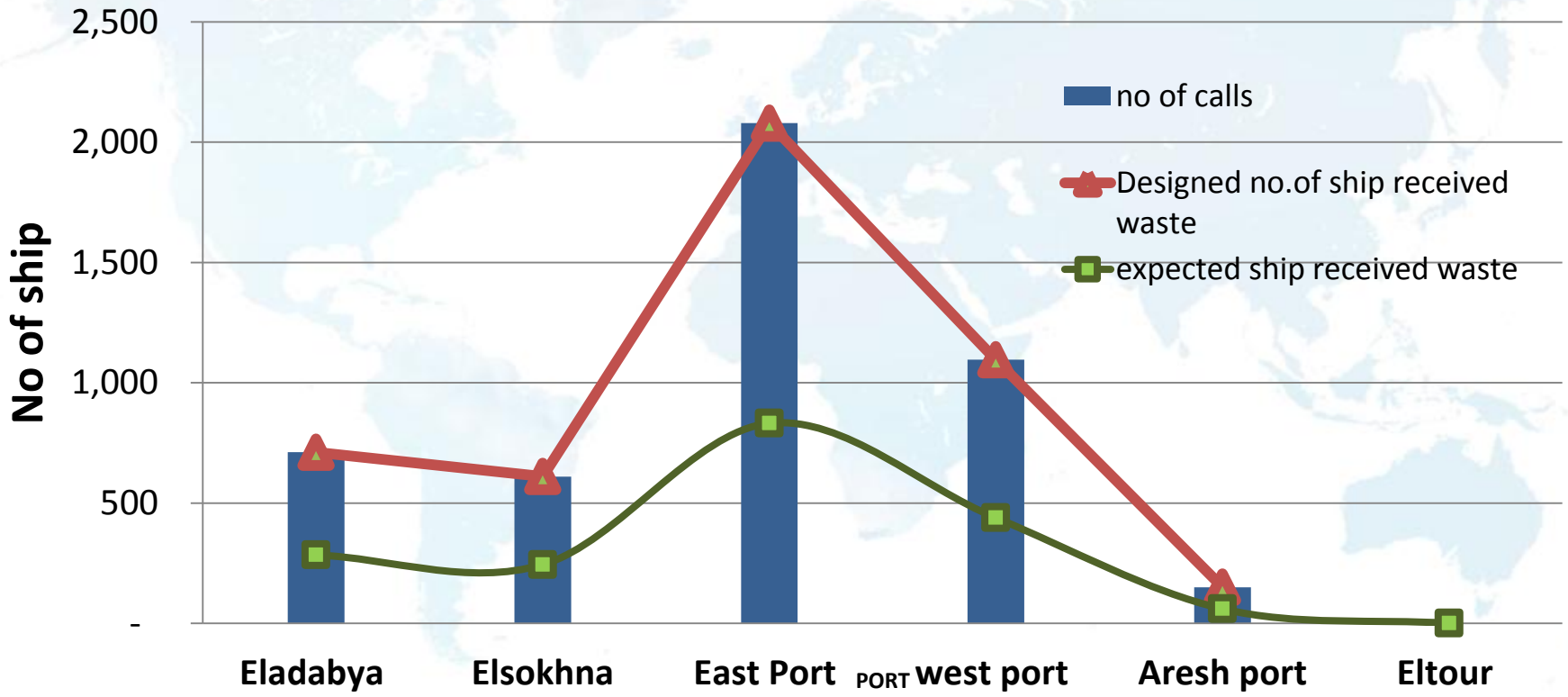
Prepared By:Eng.Thuraya Abo Zied

Water to the sea or urban sewage

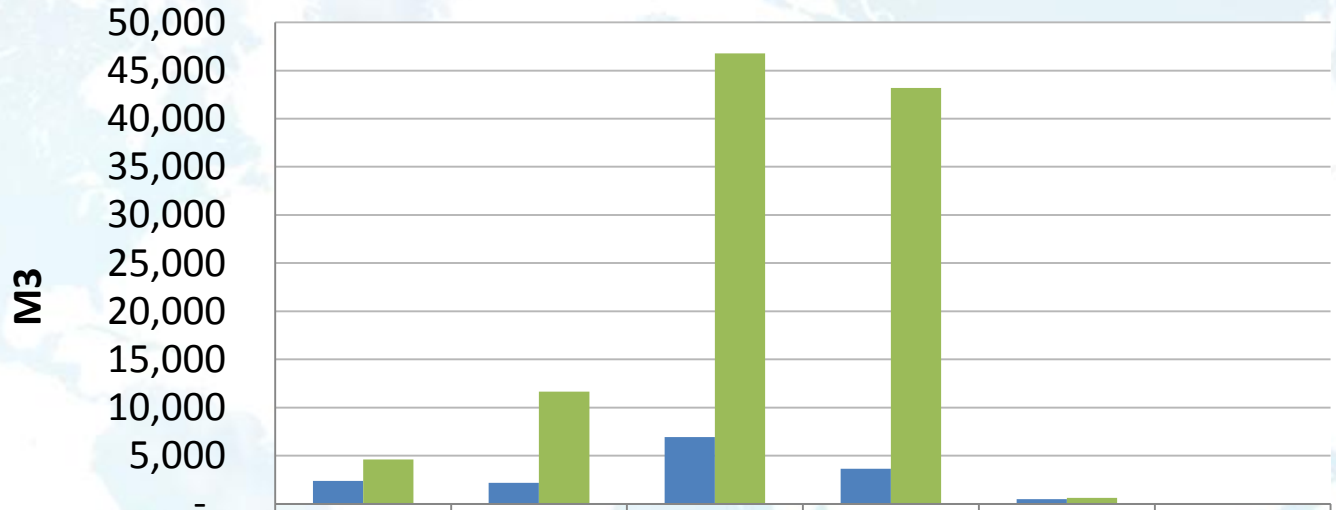
❑ Garbage estimated in EAST PORT-SAID port :.

	GD = GB + GP + GH(Quantity of domestic waste)	GM (Quantity of maintance waste)	GC = CB + CD + CC(Quantity of cargo waste)			TOTAL Garbage WEIGHT(Ton/year)	TOTAL Garbage volume(m3/year)
	GB = NB * TB * QB * PB **(cargo ship)**	GM = N * T * M	CB = WB * 1/123 break bulk	CD = WD * 1/10,000 Dry bulk	CC = WC 1/25,000 CONTAINER		
N (SHIP/WEEK)	39.87	39.87	-	-	640.00	1,734.53	6,938.10
T	10	10					
Q kg/person / day	2	11					
P person	36.2	0					
G kg/week	28866.8	4385.8	-	-	12.27		

Designed No. of ship received waste in ports:

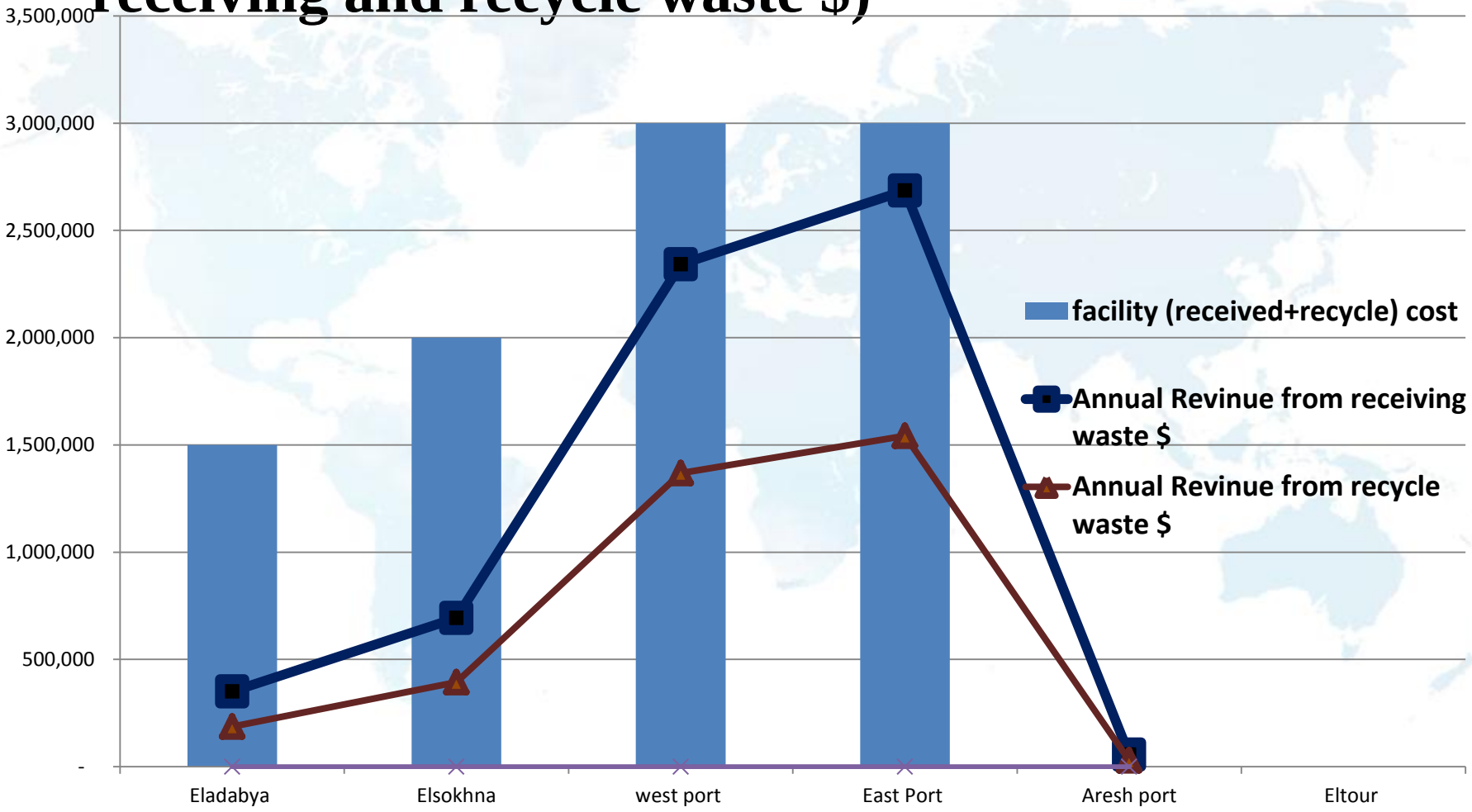


Designed quantities of ship generated waste (oil-garbage) in SCZONE port:

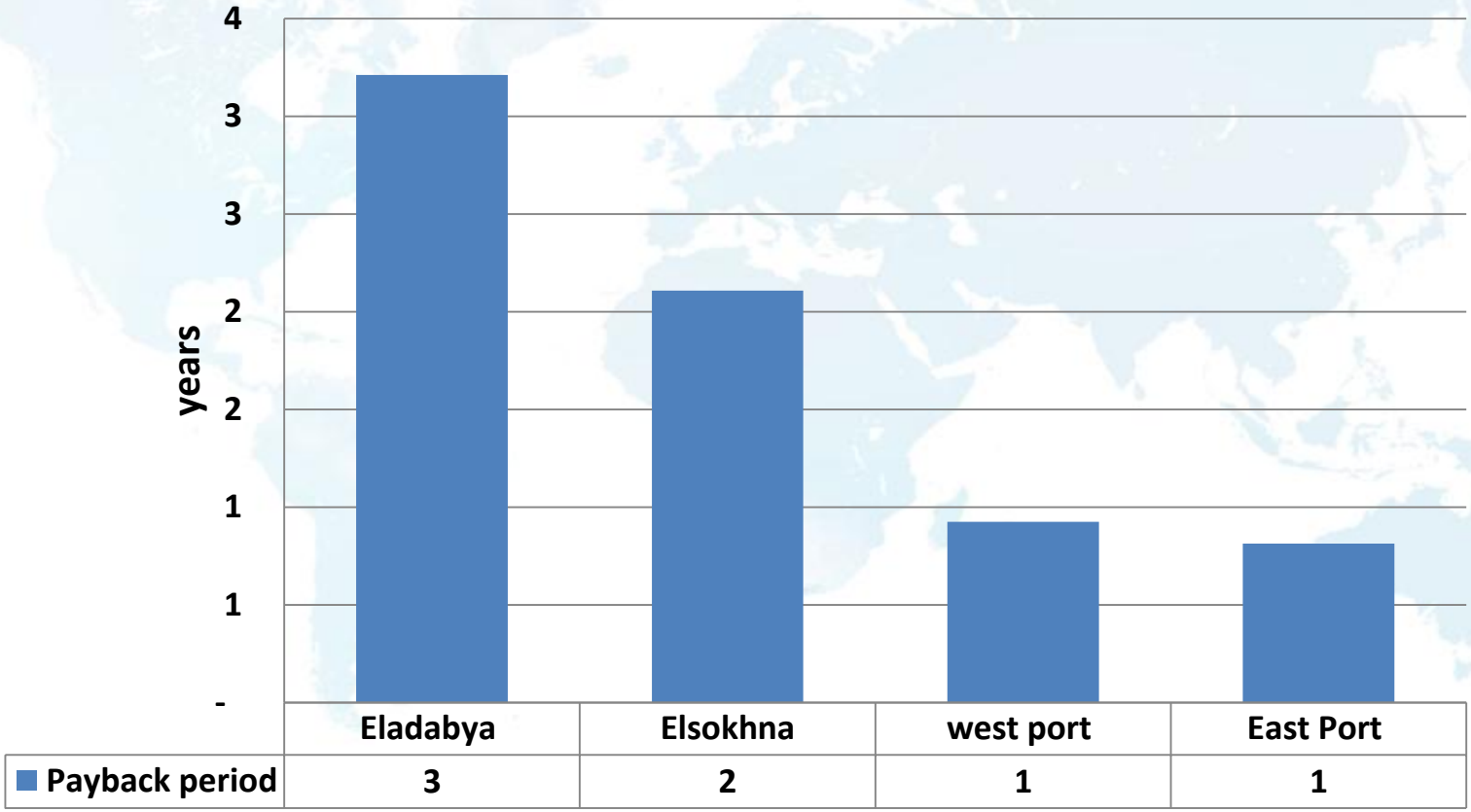


	Eladabya	Elsokhna	East Port	west port	Aresh port	Eltour
Garbage Voume m3	2,401	2,202	6,938	3,662	501	-
Oil Bilge Water and Oil Residues m3	4,613	11,672	46,778	43,174	625	-

Facility (construction cost $-annual revenue of receiving and recycle waste $)



Facility (construction cost $-annual revenue of receiving and recycle waste $)



CONCLUSIONS

(1) Apply the implementation of IMO Marpol annex I,V in Egypt ports as soon as possible because the last inspection of IMO committee in NOV.2016 gave scope to EGYPT port to implement the facilities and the committee comments in Egypt ports .

(2)According to analysis of ship waste in SCZ ports and the current stage of every port , SCZ authority should construct the PRF required to make a profit from these facilities and implement IMO requirements.

(3) WEST port said and EAST port said will be the first stage of the facility construction according to its demand volume.

(4) The facility types should be carefully chosen as the previous analysis it can be used the mobile facility in AIN-SOKHNA port and ADABYA port but in EAST and WEST port-said port its preferable to construct fixed facility according to the waste volume and port properties.

(5)Port fees of theses service should cover the construction of facility and the choice of every facility .

(6)Recycling of garbage and oil is high priority , However some reception facilities may not have access to recycling systems due to remoteness or other local reasons but if the facility will recycle the waste it will increase the valuable of fess which lead to increase the income .

(7) The pay pack period of a big waste port such west and east port is less than the small port.

(8) The project will achieve a big return of revenue from receiving waste and recycle it also the project put Egypt port at the list of the Green port .

THANK YOU FOR ATTENTION