



TERMINAL VALENCIA S.A.U.

Dedicated to you!

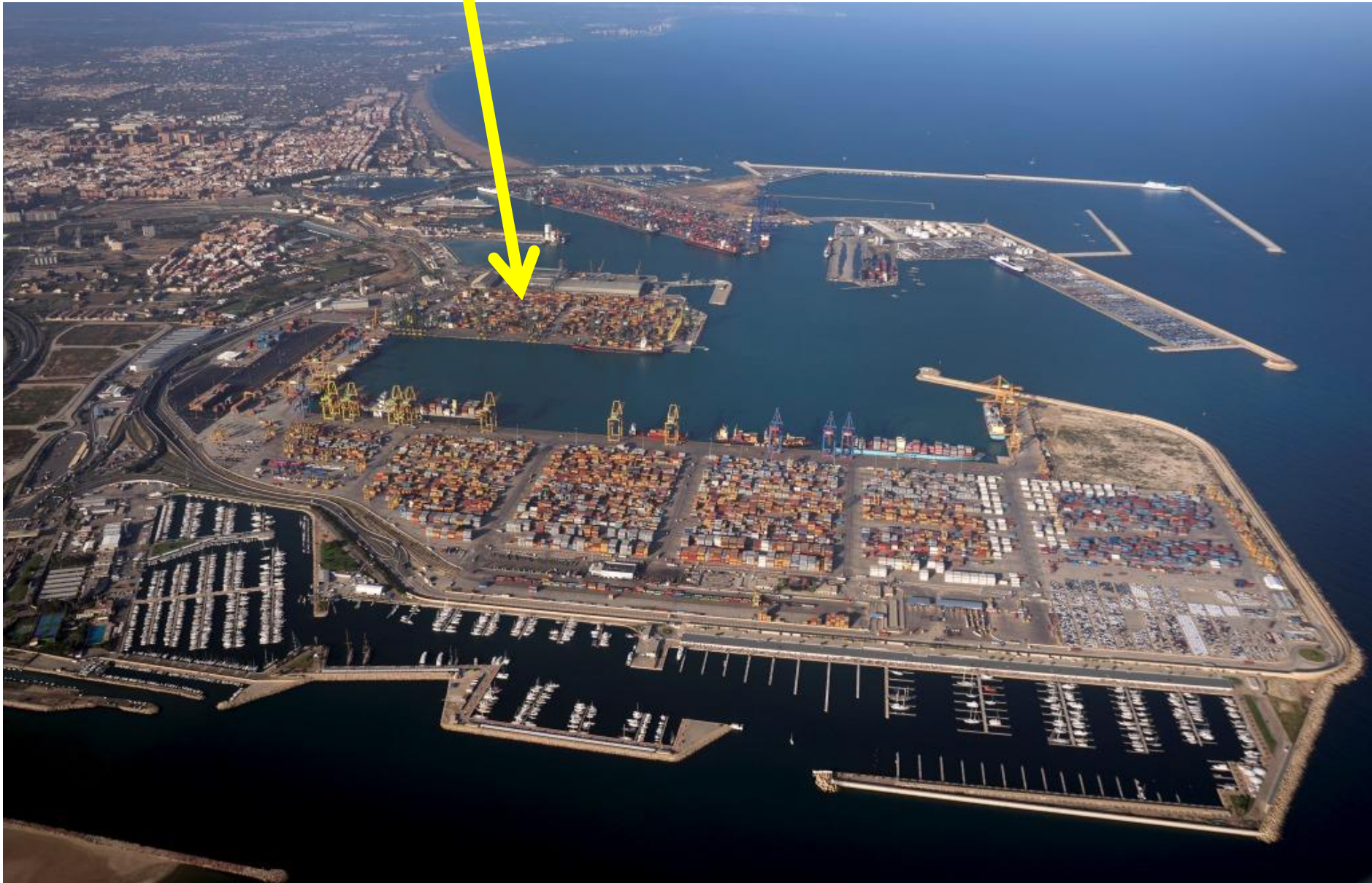
Muelle MSC, s/n - Puerto de Valencia 46024

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www.msctv.es

6/29/2007

MSCTV in the Port of VLC - 2017



6/29/2017

Source: VLC Port Auth

- History of the company
 - **MSC** has been the **biggest client** of Valencia, since 1996
 - >>>> in **2003**, **MSC requested a dedicated terminal** to the VLC Port Authority (VPA).
 - >>>> in **2004**, the **VPA granted MSC** the permission to set up a **dedicated terminal**,
 - MSCTV **started Operations** in October **2006**
 - **MSCTV is owned by Terminal Investment Ltd (TiL) (MSC)**
 - **MSCTV is a traditional RTG terminal >< semi/full automated terminals (TTI ALG and BEST in BCN or EUROMAX/APMT MVII in RTM or CTA in HAM)**



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MSC Terminal VLC SAU: our Mission

- ❑ **MSCTV** = a strategic dedicated terminal in the West Med for MSC services
- ❑ **MSCTV**, as dedicated terminal, we must be a flexible terminal, executing all operations instructions and priorities received by MSC Planning Department in Geneva, concerning their ships.
- ❑ Today, container ships are Slow Steaming (reduce fuel costs and emissions): MSCTV must compensate the longer sailing times between the ports of the Far East, Mediterranean, Atlantic, Europe, Africa, etc...
- ❑ MSCTV must discharge and load the MSC operated ships and those of the Partners in the shortest possible time frames
- ❑ MSCTV must fulfill this mission, respecting all industry regulations, H&SE regulations, social regulations, and especially reduce all possible negative consequences for the environment of our activities!
- ❑ MSCTV must constantly look for improvements in its operations, more efficient procedures, introduce modern technology to speed up the operations, where possible

A leading global container operator with a world-class portfolio of terminals

Diversified geographic footprint with interests in 29 terminals in 19 countries across 5 continents

TIL owns terminals located in strategic Origin & Destination (O&D) ports and key hubs globally

Substantial exposure to emerging market growth

TIL enjoys a presence at 7 of the world's 25 busiest ports by volume with significant positions in Antwerp, Rotterdam, Long Beach, Ningbo, Newark, Bremerhaven and Singapore





European ports, where MSC/TiL is present

TOP 30 EUROPEAN UNION PORTS BY TOTAL CARGO IN 2016

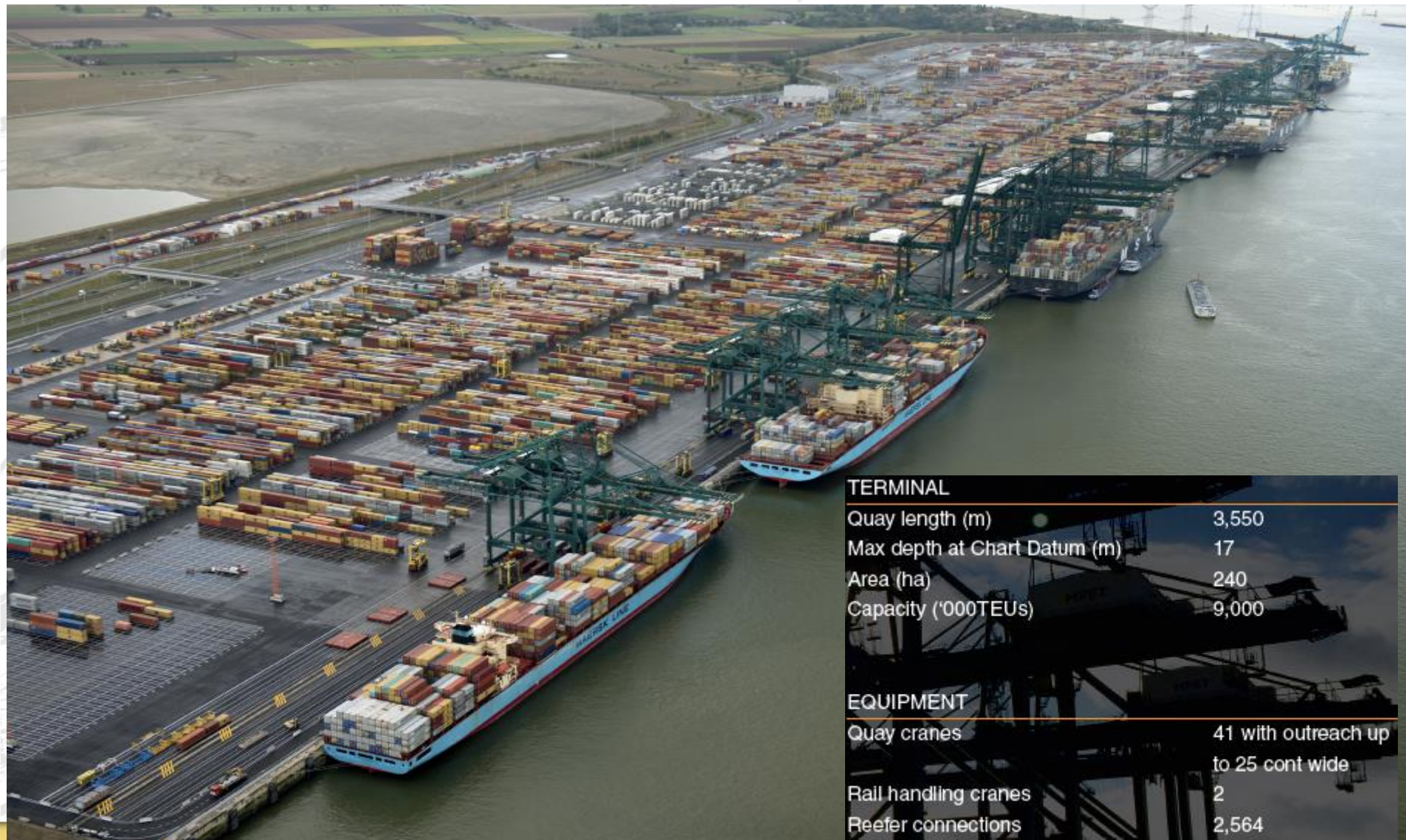
	Rk	PORT	Country	2016	2015	2008	%16/15	%16/08
MSC	1	Rotterdam	Netherlands	461.20	466.40	421.10	-1%	+10%
	2	Antwerp	Belgium	214.00	208.40	189.40	+3%	+13%
	3	Hamburg	Germany	138.20	137.80	140.40	+0%	-2%
	4	Algeciras	Spain	96.83	91.95	74.80	+5%	+29%
	5	Amsterdam	Netherlands	96.50	97.00	94.80	-1%	+2%
MSC	6	Le Havre	France	87.06	91.44	80.50	-5%	+8%
MSC	7	Marseille	France	81.00	81.70	95.90	-1%	-16%
MSC	8	Bremerhaven	Germany	73.80	73.40	74.70	+1%	-1%
MSC	9	Valencia	Spain	70.82	69.60	59.80	+2%	+18%
	10	Duisburg	Germany	66.80	68.50	54.50	-2%	+23%
	11	Constanza	Romania	59.50	56.34	61.80	+6%	-4%
	12	Trieste	Italy	59.24	57.13	48.30	+4%	+23%
	13	Gr. & Immingham	United Kingdom	n/a	59.10	65.30	-	-
MSC	14	Ghent	Belgium	51.02	46.47	47.10	+10%	+8%
	15	Sines	Portugal	51.00	43.90	25.10	+16%	+103%
	16	Genoa	Italy	50.79	51.30	54.20	-1%	-6%
	17	London	United Kingdom	50.40	45.43	53.00	+11%	-5%
	18	Barcelona	Spain	47.70	45.92	51.80	+4%	-8%
	19	Dunkerque	France	46.70	46.60	57.70	+0%	-19%
	20	Gothenburg	Sweden	40.90	38.20	43.30	+7%	-6%
	21	Klaipeda	Lithuania	40.14	38.51	29.90	+4%	+34%
	22	Zeebrugge	Belgium	38.00	38.30	42.80	-1%	-11%
	23	Southampton	United Kingdom	n/a	37.66	40.97	-	-
	24	Riga	Latvia	37.07	40.06	35.50	-7%	+4%
	25	Tees & Hartlepool	United Kingdom	n/a	35.85	45.44	-	-
MSC	26	Livorno	Italy	32.82	32.72	34.03	+0%	-4%
	27	Bilbao	Spain	31.95	32.40	37.98	-1%	-16%
	28	Cartagena	Spain	31.74	32.58	25.65	-3%	+24%
	29	Tarragona	Spain	31.32	32.93	32.97	-5%	-5%
	30	Liverpool	United Kingdom	n/a	31.26	32.20	-	-
Total top 30 *				2,086.50	2,228.84	2,150.94	+1%	+4%

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- MPET terminal in Antwerp = MSC's biggest terminal worldwide: 9M Teu/year



TERMINAL

Quay length (m)	3,550
Max depth at Chart Datum (m)	17
Area (ha)	240
Capacity ('000TEUs)	9,000

EQUIPMENT

Quay cranes	41 with outreach up to 25 cont wide
Rail handling cranes	2
Reefer connections	2,564

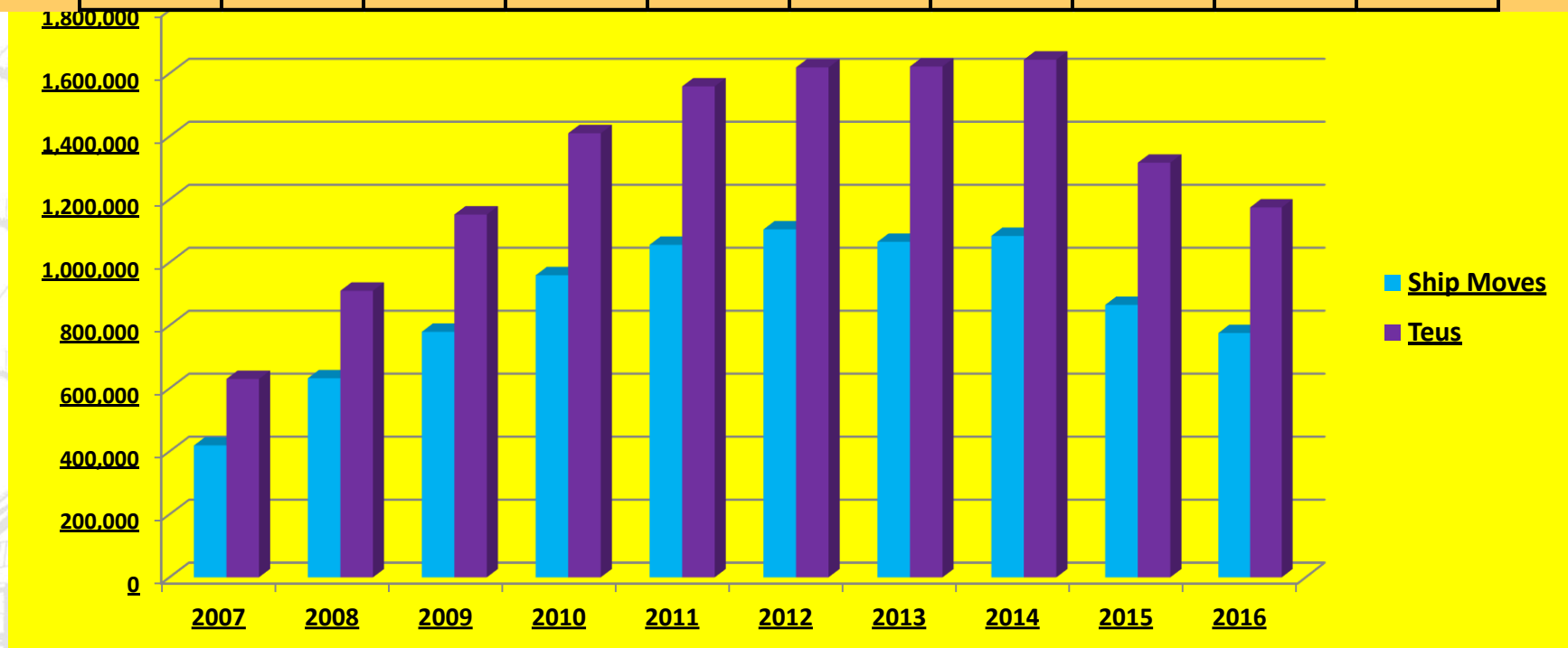
WHAT DOES MSCTV OFFER?



- **360,000m2 total terminal area**
 - **260,000m2 stacking area**
- **770m BERTH LINE + 1 dolphin(= total 810m)**
 - **8 STS Container cranes**
 - **25 RTG's**
 - **54 Yard Tractors**
 - **7 Reach stackers +4 ECH**
 - **670 reefer plugs**
 - **5 Truck Gates IN**
 - **3 Truck Gates Out**
 - **A-Check Parking Trucks**
 - **No Rail connection**

EVOLUTION CONTAINERS HANDLED at MSC TERMINAL VLC SAU

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	totals
Ship Moves	418.908	632.082	779.654	959.278	1.055.813	1.104.973	1.065.331	1.084.052	865.110	775.711	8.740.912
Teus	629.854	910.000	1.152.000	1.410.138	1.558.904	1.619.197	1.622.109	1.643.926	1.316.524	1.174.524	13.037.176
Gate Moves	179.519	217.043	184.651	183.202	196.300	205.929	235.856	251.119	310.335	281.980	2.245.934
Shuttle Mvs	15.275	26.183	25.517	25.416	28.800	31.707	37.869	35.399	37.740	26.694	450.982
Ship Calls	483	688	877	1.030	1.017	1.076	1.068	1.109	950	849	9.147
Mvs/Call	867	919	889	931	1.038	1.027	998	978	911	914	



- ❖ To load/discharge the ships, MSCTV needs STS Cranes >>>> electricity
- ❖ To load/discharge the Yard Tractors + Street Trucks: we use RTG's + Reachstackers + Empty Container Handlers + Fork lifts >>>> diesel!!



Airpollution in VLC seen from MSCTV





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FUEL CELLS AND HYDROGEN 2 JOINT UNDERTAKING

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<http://www.fch.europa.eu>

Data	Total 2009	Total 2010	Total 2011	Total 2012	Total 2013	Total 2014	Total 2015	Total 2016	Total 2017	Total 2018
MSC - Electricity global (kwh)	8.169.240	9.521.946	10.814.450	12.093.370	12.286.130	13.122.760	13.278.330	11.097.138	12.327.892	13.392.292
TOTAL Lt. Combust.	2.770.320	2.923.745	3.168.600	3.246.300	3.191.300	3.152.050	2.805.507	2.441.937	2.187.624	1.788.474
MSC - Lt. Combustible RTG's	1.115.729	928.982	1.238.804	1.334.779	1.271.979	1.247.804	1.150.720	955.389	498.938	99.788
MSC - Lt. Diesel Trucks		1.079.989	1.442.487	1.514.126	1.525.468	1.478.237	1.223.563	1.048.267	1.223.563	1.223.563
other(F-L, etc..)	1.654.591	914.774	487.309	397.395	393.854	426.009	431.224	438.281	438.281	438.281
MSC - Total Movements (w. hach)	779.596	955.578	1.055.808	1.104.910	1.083.969	1.116.796	887.992	790.156	790.156	790.156

50% RTGs 90% RTGs
hrs electric hrs electric

- ACTIVITIES INCREASE >>> ELECTRICITY + DIESEL CONSUMPTION INCREASE >>>> EMISSIONS INCREASE
- How can MSCTV reduce its emissions in the future???

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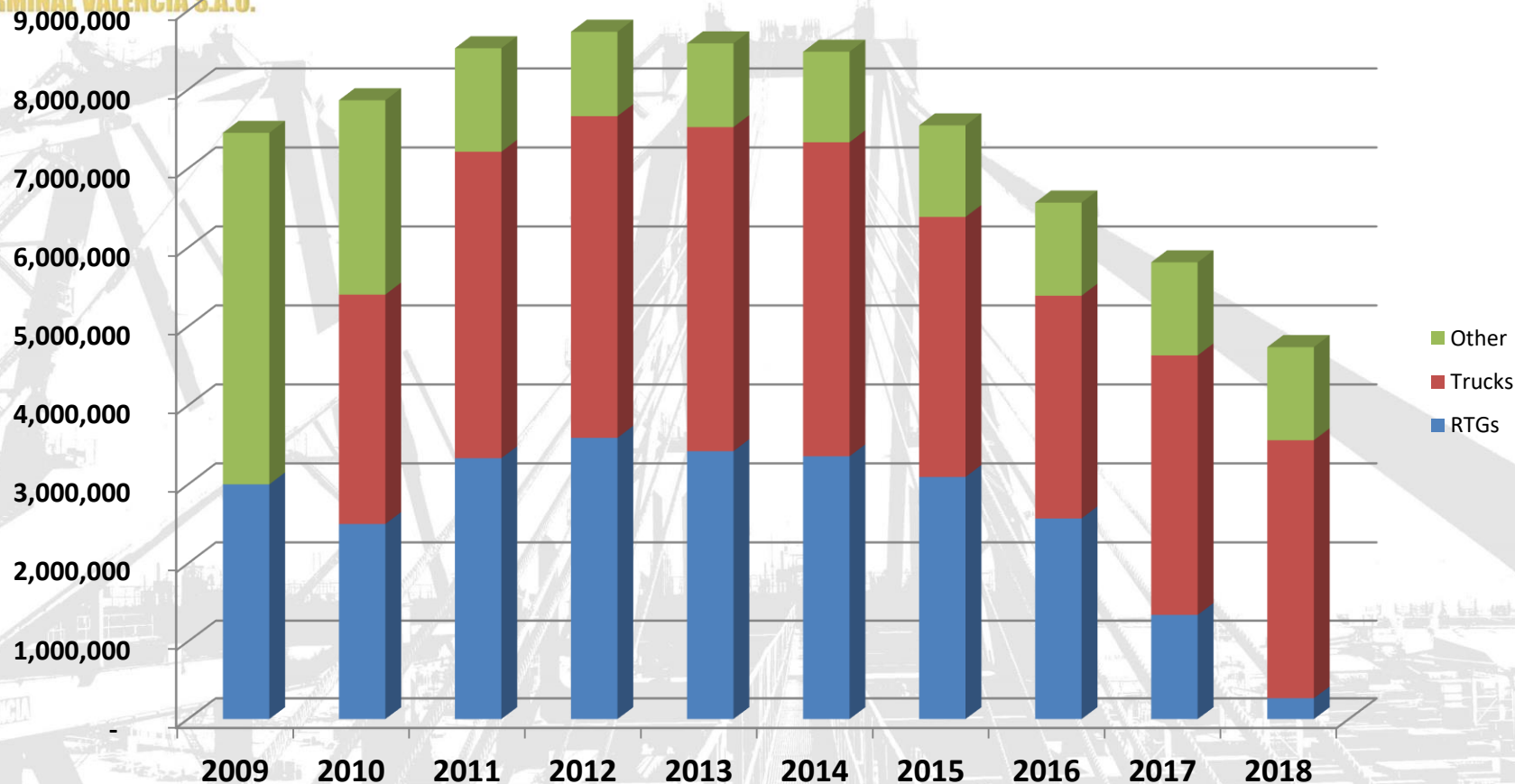
	Kgs CO2									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Kgs CO2 electricidad	2.124.002	2.475.706	2.811.757	3.144.276	3.194.394	3.411.918	3.452.366	2.885.256	3.205.252	3.481.996
Kgs CO2 combustible diesel	7.452.161	7.864.874	8.523.534	8.732.547	8.584.597	8.479.015	7.546.814	6.568.811	5.884.709	4.810.996
Kgs CO2 total	9.576.163	10.340.580	11.335.291	11.876.823	11.778.991	11.890.932	10.999.180	9.454.066	9.089.961	8.292.992
Kgs CO2 total/mov	12,28	10,82	10,74	10,75	10,87	10,65	12,39	11,96	11,50	10,50
										-14%
										dif 2016 -2018

- **Main sources of Energy Consumption in the Port Terminals:**
 - STS Cranes (weigh up to 1,420tons and use up to 11KV)
 - Reefer containers: cooling the cargo at their right tº
 - Diesel consumption by RTG's
 - Diesel consumption by Yard Tractors
 - Diesel consumption by smaller vehicles



Split Fuel/Diesel - CO2 Emissions RTG's-Yard Tractors

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MSCTV: EQUIPMENT QUAY + YARD

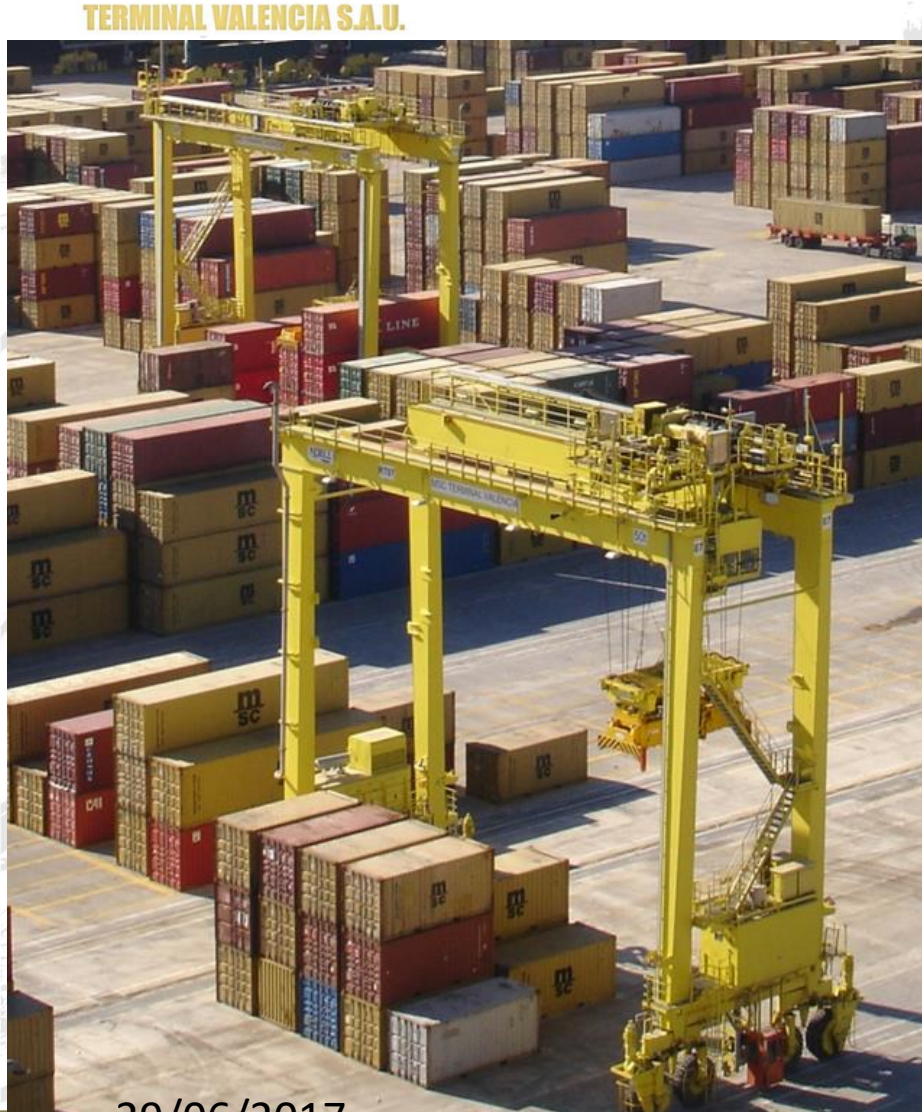


- ❖ 8 STS with 65 tons twinlift, to handle up to 20,000 Teu container carriers
- ❖ STS cranes use 11,000 Volts



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25 manned RTG to discharge/load Yard and Street trucks = originally all DIESEL





Equipment used for transfer between STS and RTG's in Yard



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**54 Yard Tractors MAFI +
Terberg = diesel**



**7 Reach Stackers = diesel
4 Empty Container Handlers =
diesel**



EU to cut carbon emissions by 40% by 2030

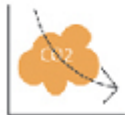
How will this be done??

THE KEY ELEMENTS OF THE PARIS AGREEMENT

A text with universal scope, adopted by 195 countries



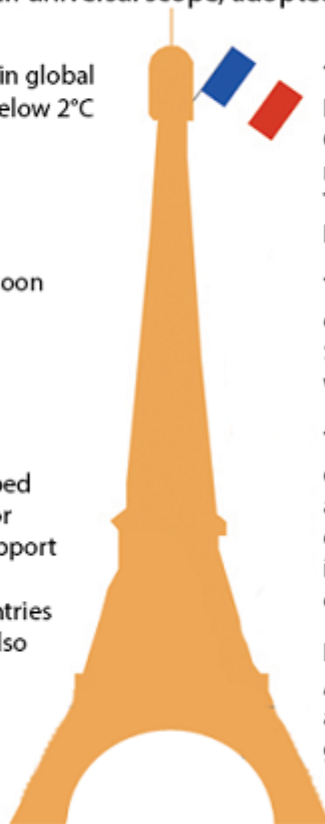
The aim: to keep the increase in global average temperature to well below 2°C and to 1.5°C if possible.



The objective: to level off greenhouse gas emissions as soon as possible.



The principal: to differentiate between developed and developing countries. Developed countries must lead the way for reduction of emissions and support developing countries in implementing this. Other countries with the ability to do so may also contribute their support on a voluntary basis to achieve this target.



The means: Countries must submit Intended Nationally Determined Contributions (INDCs) which are revised upwards every 5 years. The 1st report is due in 2023. North-South technology transfer.



The financing: from 2020, rich countries must contribute at least \$100 billion per year. This amount will be reviewed in 2025.



The new mechanism: loss and damage. Measures must be taken to avert, minimize and address the concrete effects of climate change, in order to help the most vulnerable countries.



Entry into force: 2020 if the Agreement is ratified by 55 countries accounting for 55% of global greenhouse gas emissions.



IMPACT of Paris Agreement on Ports and Shipping??

The Paris climate agreement: key points

The historic pact, approved by 195 countries, will take effect from 2020



Temperatures

2100



- Keep warming “**well below 2 degrees Celsius**”.
- Continue all efforts to limit the rise in temperatures to **1.5 degrees Celsius**”

Finance

2020-2025



- Rich countries must provide **100 billion dollars** from 2020, as a “**floor**”
- Amount to be updated by 2025

Differentiation



- Developed countries **must** continue to “**take the lead**” in the reduction of greenhouse gases
- Developing nations are encouraged to “**enhance their efforts**” and move over time to cuts

Emissions objectives

2050



- Aim for greenhouse gases emissions to peak “**as soon as possible**”
- From 2050: **rapid reductions** to achieve a balance between emissions from human activity and the amount that can be captured by “**sinks**”



What has MSCTV done so far???

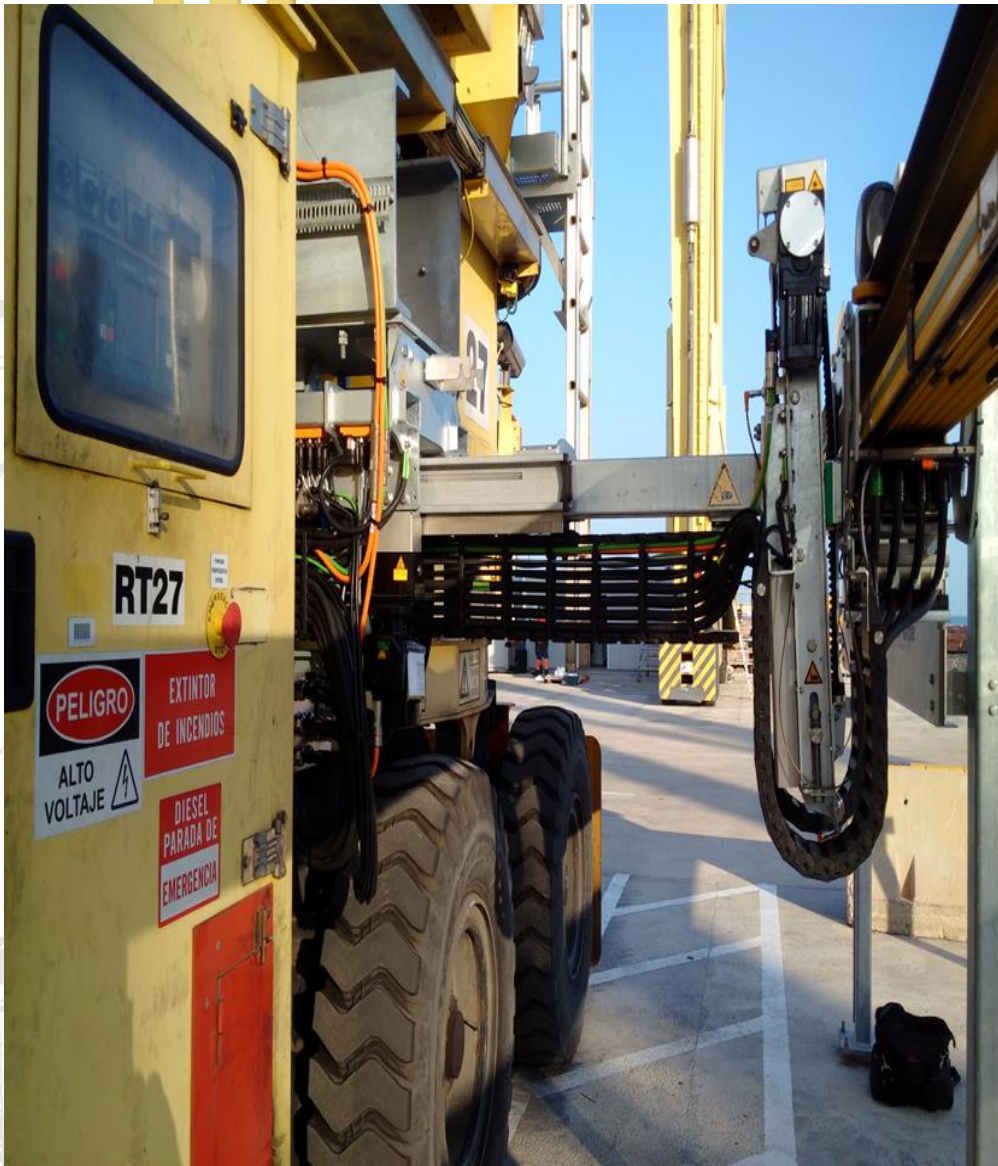
- Use of Solar panels for Maintenance Building
- Introduction of Cable Reel Electricity system for diesel RTG's in 2014-2015

>> **not flexible for a high labor cost and intensively used**

Yard operations

- after traveling to different ports (England, Turkey, Togo) that were doing similar projects, MSCTV decided to **electrify the whole of the stacking area with the bus bar system**.
- The **advantage is the flexibility**, a must have aspect for a Terminal like ours.
- MSCTV **retrofitting 15 existing diesel RTG cranes into fully E-RTG's**
- the **acquisition of 3 hybrid RTG,**
- increase the electrical power capacity by installation 10 new substations by 12,5 MW,
- By June 2017, **60% of stacking area electrified and 9 RTG retrofitted, plus the addition of three brand new hybrid RTG.**

ELECTRIFICATION PROJECT RTG's at MSCTV



- Benefits
- Significant Carbon Footprint and local pollution reduction, up to 2,000 CO2 tonnes (20% of CO2 emissions) saved per year for a fleet of 18 RTG cranes.
- Elimination of particulate matter from exhaust gasses
- Elimination of local greenhouse and pollution emissions
- Significant noise reduction
- Less maintenance costs

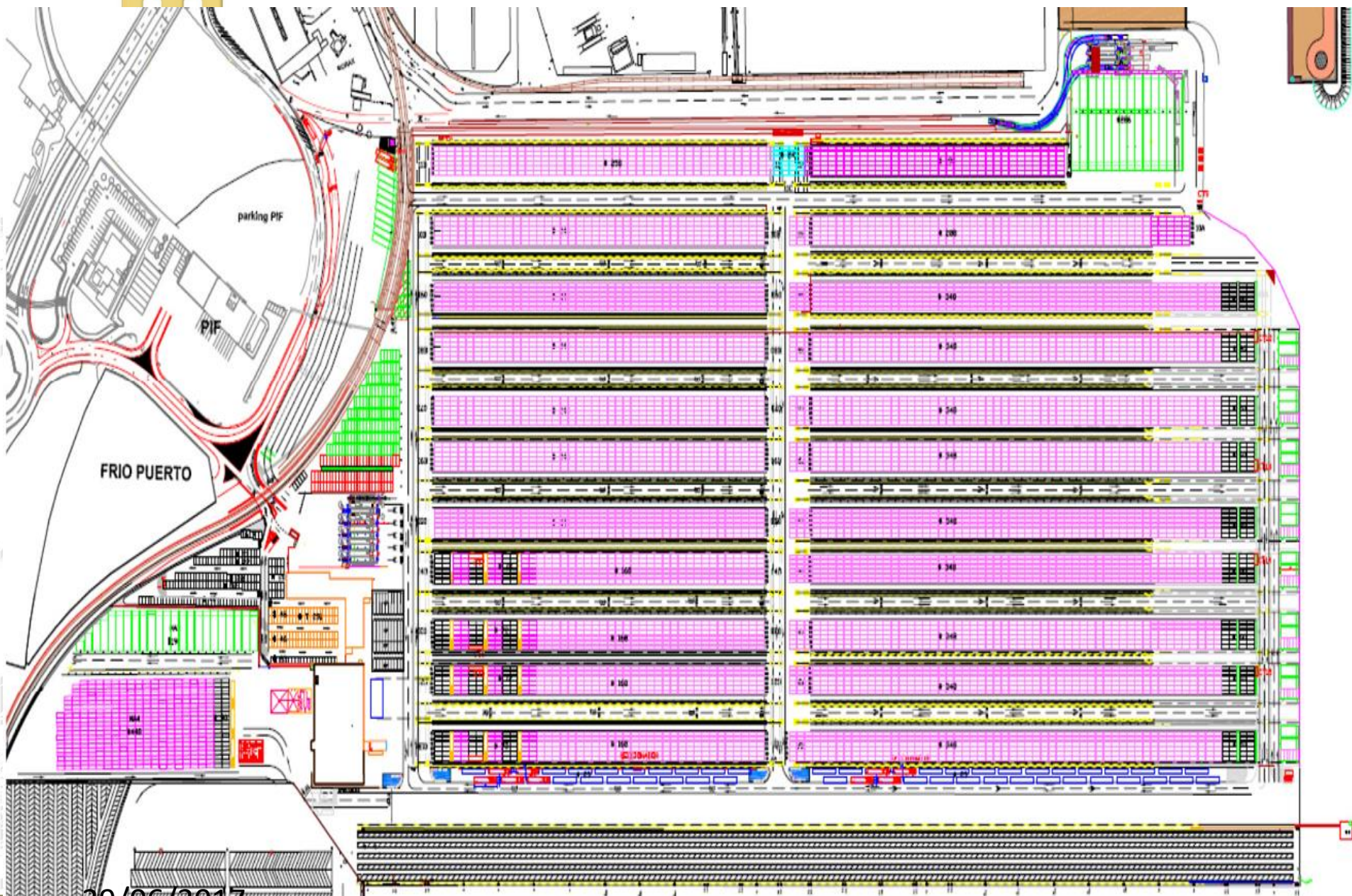
Electrification Project = +/-10M€



- installing +/- 20 km of conductors rails, MSCTV is migrating from diesel powered RTG yard cranes towards a low carbon concept, by mid-2018.



MSCTV YARD LAYOUT IN 2017: +3,000Teu



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Where can we reduce more emissions?



- MSCTV will finish the Electrification Project for Konecranes RTG's in 2018
- NEXT STEPS???
- Can we reduce/eliminate the emissions of the Yard Tractors?
- >>>We need partnership with Manufacturers: TERBERG Benschop
- >>> MSCTV cannot do this alone
- >>> MSCTV needs financial support from Authorities/Institutions

- TERBERG = Yard Tractor Manufacturer >>> LNG project with neighboring terminal Noatum for LNG use in Yard Tractors
- ASYAPORT (Turkey) TERBERG Yard Tractors = all LNG units!!



Reduce Ship Emissions

- MSCTV +VLC Port Authority >>> automatic Shore Power??
- Cfr RTM- Long Beach- Los Angeles



LNG is more known as future fuel for ships and port operations

- Advantages of LNG as a fuel:
- Lower emission of particulates, sulphur and nitrogen oxides and CO2
- Meets the more stringent emission standards (SECA)
- LNG-powered engines require less maintenance
- LNG-powered engines are much quieter
- Cheaper than petroleum-based fuels
- Higher energy value than other fossil fuels
- Incentives from the Port of Rotterdam Authority



LNG- Zeebrugge starts ship-ship bunkering

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What do you mean: Can Port Terminals use Hydrogen gas??

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- Hydrogen is a gas that is produced and not extracted from the earth, like natural gas or oil. This makes it a virtually inexhaustible source of energy. Only water is emitted during the conversion from hydrogen to energy.
- Fuel Cells A fuel cell is a device similar to a battery that converts the energy from a fuel into electricity through a chemical reaction with oxygen or other substances. Hydrogen is the most common fuel, but natural gas and alcohols may be used. Fuel cells are dispatchable, but work best with slowly changing loads
- How can the Hydrogen gas facilities fit in with port terminals?
- Terminals, like MSCTV are not prepared for Hydrogen nor LNG installations: >>>> how much space (=\$\$\$\$\$\$) necessary?
- Can the VLC Port Authority help here? Partner with EU??
- Lack of knowledge of EU and Spanish strategy on Reduction of Emissions!!

Press releases on Hydrogen projects in Ports

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- Integration of new **Air Products plant with ExxonMobil** refinery **saves energy and reduces CO2**
- [?] Overall energy efficiency will improve by more than 15%.
- [?] **CO2 emissions will be 200.000 tons per year lower, comparable to taking 90.000 cars off the road annually.**
- [?] Air Products increases hydrogen production capacity at the site by approximately 50%
- **Rotterdam, 8 February 2012 – Today, Air Products and ExxonMobil celebrated the start-up of a new world-scale hydrogen production plant in Rotterdam. Integrating ExxonMobil's refinery with Air Products new hydrogen plant will lead to a 15% improvement in energy efficiency and reduce related CO2 emissions by 200.000 tons per year**



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hydrogen-fueled 18-wheeler at L.A., Long Beach ports emits only water from tailpipe



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hydrogen-fueled 18-wheeler at L.A., Long Beach ports emits only water from tailpipe

- Toyota delivered a zero-emissions 670-horsepower truck to the ports of Los Angeles and Long Beach on Wednesday that could ultimately reverse the region's high cancer-causing pollution levels.
- If the hydrogen-powered big rig performs well during a summer-long pilot test dubbed "Project Portal," the new heavy-duty carrier could be the model to replace thousands of diesel trucks that pass to and from the twin ports daily.
- "We're honored to be Toyota's test lab," said Tony Gioiello, deputy executive director at the Port of Los Angeles. "Ultimately, our hope is in the coming years Toyota demonstrates the viability of this technology and helps us make the zero-emissions truck viable in the marketplace here at the nation's largest port complex."
- **RACING TO ZERO**
Vehicles propelled by hydrogen don't have the drawback of cumbersome batteries or molasses-slow charging sessions like all-electric cars.

- We should ask ourselves: what can we do individually and all together to improve our Environment!!
- All companies should act
- All citizens should act
- All governments should act
- We'll have to change our way of life!!!
- Thank You