

# Multi-Source Green Omni Terminal Demonstration



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# Background



- In June 2015, CARB released a grant solicitation for the Air Quality Improvement Program and Low Carbon Transportation Greenhouse Gas Reduction Fund Investments.
  - Grant stipulates that public agencies must apply on behalf of proposers.
- Pasha assembled and presented a team of Green Omni Terminal project partners (Burns & McDonnell, BYD, TransPower, Clean Air Engineering Maritime, and Perma City) to the Harbor Department for the CARB grant application.
- The Harbor Department reviewed Pasha's proposed project and determined it had strong potential to reduce emissions. The Harbor Department prepared a detailed grant application and submitted it to CARB in September 2015.
- In 2016, the California Air Resources Board awarded the Harbor Department \$14,510,400 for the Green Omni Terminal Project.
  - Pasha Match funding: \$12,092,000
  - Total cost: \$26,602,400



# Grant Proposal Concept



## Pasha Green Omni Terminal

**Vessel Exhaust Treatment System**  
Reduces smog-forming NOx emissions by more than 90%

**Electric Yard Tractors**

**High Tonnage Electric Forklifts**

**Electric Top Handler**

**Solar Powered Microgrid**  
Solar panels and battery storage

**Electric On-Road Drayage Trucks**

**Zero and near-zero emission technologies to improve air quality in our community**

<b>3,200</b> Tons Per Year	<b>56,000</b> Pounds Per Year	<b>14,100</b> Cars Off The Road Per Day
Greenhouse Gases <b>REDUCED</b>	Diesel Particulate Matter, Nitrogen Oxides & Other Harmful Emissions <b>ELIMINATED</b>	Equivalent South Coast Air Basin <b>CLEAN AIR GAINS</b>

**PASHA**  
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# Project Benefits



- This was one of the first big Cap and Trade Proceed Grant Programs issued by CARB (2015) and the first such grant received by the Harbor Department
- Substantial benefits for progress toward zero emissions:
  - Use of solar power and batteries establishes a micro grid for this terminal
  - This type of power self sufficiency can apply to any moderately sized light to heavy industrial facility such as warehouse, distribution center or medium sized marine terminal
  - Department of Defense informally expressed interest to see how this turns out because of its value in the event of a natural or other type of disaster
  - Tests zero emissions equipment that can be used in a variety of settings
- Harbor Department has learned a lot from the tests undertaken in this program

# Green Omni Terminal Project Detail

- Solar rooftop array with microgrid controls and battery storage
- 5 electric yard tractors (1-Kalmar Ottawa, 2-BYD, and 2-TransPower )
- 2 electric Class 8 on-road trucks (TransPower using new International truck )
- 3 electric heavy duty forklifts (TransPower rebuild)
- ShoreKat - land-based capture and control system (Clean Air Engineering Maritime)
- Data collection by CARB contractor - Ricardo



# Vehicle Status – Yard Tractors



2 BYD battery electric yard tractors are in regular use at Pasha. The 1<sup>st</sup> generation equipment was not reliable, so BYD exchanged with 2<sup>nd</sup> generation. BYD 3<sup>rd</sup> generation are currently in demonstration at other POLA terminals incorporating lessons learned.



The 3 TransPower/Kalmar yard tractors are no longer in use. There were 2 thermal events due to damaged battery packs resulting from rigorous use of the equipment. It was determined that the location of the batteries was not conducive with terminal operations.

# Vehicle Status

## Forklifts and Class 8 Trucks



3 forklifts were repowered to battery electric by TransPower. These went through several modifications and tests prior to being used at the terminal. After thermal events with batteries on yard tractors, the forklifts were taken out of service for safety concerns.

2 International trucks were repowered to battery electric by TransPower. These trucks were not reliable and unable to carry loaded trailers over the bridge. They are no longer in service.

# Battery Storage System Status



Solar installation is underway—Pasha’s contractor is currently working on permits. The Battery Storage systems are mounted in their permanent location and fire suppression systems have been installed by the Harbor Department. Complete electrical tie-in, testing, and commissioning will be done by Pasha’s contractor after power station upgrade which is on schedule for this summer.

# ShoreKat - Capture and Control System Status

- The ShoreKat was developed by Clean Air Engineering Maritime to be a mobile shore based capture and control system to reduce oxides of nitrogen and diesel particulate matter from ocean going vessels at berth
- CARB issued an Executive Order identifying the approved use of the ShoreKat on bulk vessels in December 2022
- Pasha is now the owner of the ShoreKat and plans to move it to a barge to use it from the water side





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**THANK YOU**