

#### October 28, 2019

#### Report of Citizens Advisory Committee "Shore Power"

#### <u>Summary</u>

The Port of Olympia Citizens Advisory Committee (POCAC) for 2019 was introduced to six tasks each of which has been assigned to a POCAC sub-committee. This Shore Power task was introduced by Commissioner Zita. The full task is attached herewith as Attachment 1.

The premise was, "The Port of Olympia has potential markets for new business in small cruise ships and fast passenger ferries, which can be electric powered. If the Port has shore power available for electric boat charging, we will be more likely to attract these market opportunities".

The proposed benefits were, "Shore power can help the Port clean the air, slow climate change impacts on oceans, serve growing needs of local boat and ship customers, and improve our local economy in the process."

#### **Subcommittee**

A subcommittee of the following POCAC members (Subcommittee) was established: Deborah Pattin (Chair) Tom Szymoniak Thom Woodruff No specific Port of Olympia staff was assigned to support this task.

#### Scope of Work

The specific assignment was presented as: Produce a *REPORT* for Commission to consider:

Evaluate opportunities for installing shore power at the Port of Olympia

- What programs are available?
- What could/should we install, and where?
- Estimate costs and benefits.
- Work with staff to apply for grants

#### **General Findings/Discussion/Summary Issues**

The Subcommittee first researched an overall study of shore power for all vessels and determined:

- Very few ports in Washington offer shore power, except for docking ferries.
- Very few ships are capable of utilizing shore power, and those that do, primarily refrigerated ships, container ships, large cruise ships, and ferries, do not use the Port of Olympia.

- Typically, tankers, non-container ships, and log ships (the primary customer to Port of Olympia) are not equipped to utilize shore power.
- If the Port of Olympia were to install shore power to attract new customers, would the environmental benefit offered by shore power offset the CO2 emissions and associated pollution generated by the vessels transporting from more northern ports, e.g., Port of Seattle, Port of Tacoma, to realize an environmental net gain benefit?
- The International Maritime Organization (IMO) continues to contribute to the global fight against climate change, in support of the UN Sustainable Development <u>Goal 13</u>, to take urgent action to combat climate change and its impacts. Refer to the attached link for further information <u>http://www.imo.org/en/MediaCentre/HotTopics/Pages/Reducing-greenhouse-gas-emissionsfrom-ships.aspx</u>

The Subcommittee then proceeded to evaluate the specifics of the feasibility of Port of Olympia having shore power to attract small cruise ships and fast passenger ferries.

Regarding fast passenger ferries (or, for that matter, slow passenger ferries):

- Clearly electric and electric hybrid ferries are fast becoming a reality in Washington, in the U.S., and around the world.
- When these ferries dock, and even the existing diesel ferries, they need to plug into shore power.
- If the City of Olympia were to have ferry service, regardless of destination, the Port of Olympia would need to provide shore power. Without shore power, it is unlikely Olympia could have ferry service.
- However, having shore power will not bring in ferry service. It is not a "build it and they will come" scenario. As the POCAC 2018 Passenger Ferry Study concludes, there are significant considerations for ferry service in Olympia, but shore power was never cited as a consideration.
- The existence of shore power will not bring in ferries as a new market.

Regarding small cruise ships:

- The most recent opportunity for the Port of Olympia to host a small cruise ship was the summer of 2019 when two such ships were to visit the Port, however both canceled. It was determined that one of those ships was not equipped for shore power.

#### **Recommendation:**

Research by the Subcommittee concludes that shore power to power ships at the docks of Port of Olympia could not currently be utilized. None of the ships currently docking at the Port of Olympia have the ability to utilize shore power. However, as shore power has been in place in several ports outside of Washington State and for several years at Port of Seattle (however, just utilized by local tugs), and as California standards force vessels there to become shore power-capable (Port of Long Beach is one of the most used ports in the U.S.), it is the recommendation of the Subcommittee at this time that the Port of Olympia should not develop shore power facilities but to keep this task as appropriate for POCAC for monitoring and staying current on development. Secondly, the site plan update should also address any future power infrastructure requirements for shore power. Additionally, although not part of the current task for evaluating shore power, there is a recommendation for a future study to determine benefit of non-electric equipment and vehicles used by the Port of Olympia to be replaced with electrical versions. This would include automobiles, trucks, forklift, cranes, generators, etc. The Port of Long Beach has several demonstration projects using electric vehicles (See Attachment A).

#### Response to Initial "Scope of Work" questions/statements:

- 1. What programs are available? Based on information from ports that provide shore power, some funding programs include Diesel Emissions Reduction Act (DERA) and small grants from WA State Dept. of Ecology.
- 2. What could/should we install, and where? At this time, due to cost, lack of immediate benefit and use, no shore power facilities should be installed. If the opportunity existed, or develops, plug in charging stations capable of providing 440 amps would be an appropriate initial installation.
- 3. Estimate costs and benefits. The cost for the Port of Olympia to provide the necessary facilities for ships to have shore power would exceed \$600,000 per charging unit. There is perceived to be no business or economic benefit to the Port of Olympia (e.g., as there are limited vessels capable of utilizing shore power, providing such would not attract new business), but there may be an environmental benefit to offer electrical power to replace the power currently generated by diesel power. It appears that of the ships currently docking at the ports in Washington utilizing shore power are local vessels, commonly either tugboats or ferries, that have permanent berthing arrangements with specific ports, i.e., Port of Tacoma or Port of Seattle.
- 4. Work with staff to apply for grants. It is beyond the responsibilities of POCAC or the Subcommittee to supplement or complement staff processes and work responsibilities by seeking funding and applying for grants. The Subcommittee can share the information of this report and the funding sources it has identified for funding, so staff can proceed with its processes

#### **ACKNOWLEDGMETS:**

The Shore Power Sub-Committee wishes to acknowledge and thank the contributions of the following individuals who added their expertise and insight into this report:

- Len Faucher, Marine Terminal Director, Port Olympia
- Sam Gibboney, Executive Director, Port of Olympia
- Linda Lyshall, PhD,Climate Policy Specialist, Puget Sound Clean Air Agency
- Beth Carper, Air Resource Specialist, Puget Sound Clean Air Agency
- Graham VanderSchelden, Ph.D., Northwest Seaport Alliance, Air Quality and Sustainable Practices Environmental Project Manager
- Jim Thomas, Ship Leasing, Weyerhaeuser, Longview, WA
- Lisa Lefeber, Deputy Executive Director, Port of Everett, WA
- John Klekotka, P.E., Chief of Engineering & Planning, Port of Everett, WA

- Ron Stuart, Senior Diesel Program Specialist, Air Quality Program, WA State Department of Ecology
- Washington State Ferries
- Puget Sound Energy
- Peter Bryn, Technical Solutions Manager, ABB Marine & Ports. Meeting notes from the onsite meeting with Peter and Port Staff on October 15, 2019 is presented in Attachment B.
- Greg Reese, North American Product Manager for TransTech, a Wabtec Company, and sister company, Stemmann-Technik.
- Conley Booth, Port of Olympia Marine Terminal Operations Coordinator

Attachment B; Electrifying a Major Seaport; Green Transportation Summit

# ELECTRIFYING A MAJOR SEAPORT

## MORGAN CASWELL

FRED PATRICIO

PORT GRANT MANAGER (Environmental Planning)

PORT PROJECT MANAGER (Program Management)

Green Transportation Summit Expo – May 23, 2019



# CLEAN AIR ACTION PLAN



# 2030 TERMINAL EQUIPMENT

# ZERO EMISSIONS

# ZERO EMISSIONS EQUIPMENT

## 

#### START PHASE 1 CARB **\$50 MILLION**

33 ELECTRIC YARD TRACTORS

- 1 ELECTRIC TOP HANDLER
  - NZE TUGBOAT
  - TIER 3 SHIPS
  - 5 ELECTRIC TRUCKS

# \$76 MILLION GRANT-FUNDED, ZERO-EMISSIONS PROJECTS

#### ZE EQUIPMENT TRANSITION PROJECT CEC **\$9.75 MILLION**

12 ELECTRIC YARD TRACTORS • 1 FC YARD TRACTOR

- 9 ELECTRIC RTG
- 1 BE TOP PICK

#### PAVE PROJECT CEC **\$8 MILLION**

6 ELECTRIC YARD TRACTORS
10 ELECTRIC FORKLIFTS
INSTALL ELECTRICAL
CHARGING INFRASTRUCTURE AND BATTERY STORAGE ELECTRIC VEHICLE BLUEPRINT CEC \$200,000 EVALUATE ELECTRIC INFRASTRUCTURE

REQUIREMENTS, FINANCING AND OTHER NEEDS C-PORT PROJECT CARB **\$5.3 MILLION** 

- 3 ELECTRIC TOP PICK
- 1 ELECTRIC YARD TRACTOR
- 1 FUEL CELL YARD TRACTOR







## ELECTRICAL ZERO EMISSIONS PORTFOLIO PROJECTS

Pier B

TOPC OF C

**Pier T** 

Pier C

Pier F

**Pier E** 

## " Uhr

**Pier G** 

Pier J

## CEC18 - PAVE PROJECT



## CHARGE POINT AND TRANSPOWER CHARGERS, KALMAR YARD-HOSTLERS AND FORKLIFTS

- 29 CHARGING STATIONS, WITH 4 TO ENERGIZE THE YARD-HOSTLERS
- 10 CHARGING STUB-OUTS FOR ELECTRIC FORKLIFTS
- 4 CHARGEPOINT FAST CHARGERS, AND 1 BATTERY STORAGE SYSTEM
- DEPLOY 6 KALMAR YARD-HOSTLERS FOR 12-MONTH DEMONSTRATION BY DECEMBER 2020

# CEC17 - FREIGHT TRANSPORT PROJECT



### BYD CHARGER, CAVOTEC CHARGER, BYD YARD-HOSTLERS

- 4 BYD CHARGER UNITS, AND 1 CAVOTEC UNIT
- DEPLOY 5 ELECTRIC YARD-HOSTLERS
- START 12-MONTH DEMONSTRATION BY SEPTEMBER 2019

# CARB - C PORT PROJECT -1





## **BYD CHARGER UNITS**

- 2 BYD CHARGERS
- WORK BY MAINTENANCE STAFF/ON-CALL CONTRACT



## TAYLOR TOP-HANDLERS

- 2 TAYLOR TOP-HANDLERS
- 6-MONTH DEMONSTRATION
   STARTS FEBRUARY 2019



# CARB - C PORT PROJECT -2



## BYD CHARGER, TAYLOR TOP HANDLER, TRANSPOWER CHARGER, KALMAR YARD HOSTLER

- 1 BYD CHARGER AND 1 TRANSPOWER CHARGER
- DEPLOY 1 TAYLOR TOP-HANDLER, AND 1 KALMAR YARD-HOSTLER
- START 6-MONTH DEMONSTRATION FEBRUARY 2019
- WORK AS CHANGE ORDER UNDER EXISTING MIDDLE HARBOR PROJECT

# SIMPLE LESSONS LEARNED TO DATE



VENDOR EQUIPMENT ISSUES ENCOUNTERED AND LESSONS LEARNED:

- UL Listing requirements
- Short Circuit Current Rating (SCCR) capacity
- Equipment parking site configuration layout challenges
- Charging cable weight challenges from the equipment operators

#### Attachment B

Meeting notes from visit to Port of Olympia on October 15, 2019 by Peter Bryn, Technical Solutions Manager, ABB Marine & Ports +1 281 468 0136

#### Some follow ups:

- 1. **Presentation:** please find attached a PDF of the presentation I delivered.
- 2. **Shore charging for bulk/breakbulk ships:** as discussed, there is an opportunity for shore charging, however I think several challenges should be considered:
  - a. **International fleet of tramp ships:** Len confirmed that most of the vessels calling on Olympia are older, international vessels on tramp runs. While many newer vessels are fitted with shore charging connections upon construction, that may not be true for many of the vessels calling on Olympia. This effectively means that the majority of the vessels calling there are likely not fitted with sufficient shore power capacity or connections, and the port seldom sees the same vessel with any regularity. That has traditionally been the biggest challenge for "cold ironing." Ports that have been successful requiring vessels to electrify typically work with vessels on a liner route that call at the same ports frequently (e.g. cruise ships, containerships).
  - b. Limited electrical load: these vessels are likely typically running 1x generator set while in port likely between 500-1000kW, which I expect would be enough power for the onboard auxiliaries plus hydraulic power pack for any of the onboard cranes. They don't have the significant hotel load of a cruise ship, or reefer load of a containership.
  - c. **Fuels being considered:** while shore power would definitely reduce CO2 emissions, other particulates (NOX, SOX) have reduced quite dramatically with the introduction of ECA/SECA zones. Vessels calling there should already be using LSFO when they enter the region.
  - d. **Non-electric loads:** there will also likely be non-electric loads, e.g. heating for hotel services, possibly HFO fuel, and the main engine/idle auxiliaries. Waste heat from the aux generator is often used to serve these consumers, so the vessel would either need an electric heater in the FW cooling loop to provide this heat, else they'll likely be burning fuel in a boiler to provide this heat anyway (negating some of the emissions reduction).
  - e. **Conclusions:** I am very excited that Olympia is ahead of the curve, looking at these solutions, and ABB would be excited to partner with the Port on this opportunity. That said, I am currently skeptical of the opportunity to achieve significant emissions reductions given the challenges I noted above, though I wouldn't want to offer any firm conclusions at this point. Instead, I'd like to ask my ABB Ports colleagues, @David Shore and @Steven Deutsch, to offer their views as they have much more experience working with other ports than I do.
- 3. **Shore charging for tug:** another option to consider is electrifying the harbor tug that is captive to the port. Per Len, I understood that tug is not owned by the port, but exclusively services it. ABB would happily assist with both electrifying the vessel itself, as well as integrating a shore charging solution, e.g. from Stemmann, for it. If there is an opportunity here, I'd like to get my colleague <u>@David Lee</u> involved, as he leads our Sales effort in the tug segment. I'd remain involved in developing the specific solution if we were to go down that route.
- 4. **Electrifying the crane:** aside from the tug, the other major piece of equipment that you have there is the port's crane. I'd believe that electrifying that might prove easier and offer much greater emissions reduction benefit than the vessels. Honestly,

I'm not sure what experience ABB would have in that type of conversion, though replacing an onboard electric generator with a fixed connection (or even battery installation) would look a lot like when we electrify vessels. If there's interest in seeking a solution, we and Stemmann can both investigate what we might have to offer.

- 5. **Olympia ferry service:** the desire for an Olympia/Seattle ferry service was described. There are a few thoughts I'd have there:
  - a. All-electric: an Olympia/Seattle ferry service would be a great feature for Olympia. If it's a conventional propeller-powered mono-hull vessel (i.e. 10-15 kts) then all-electric using batteries is likely quite feasible. If WSF provides this service, then it will be all-electric by state mandate. If you are, instead, looking for a fast catamaran style, waterjet ferry (i.e. 20-25kts), the power requirements and weight restrictions of these vessels make all-electric quite difficult to achieve. We can look at options like a hydrogen fuel cell in this service.
  - b. Olympia/Tacoma: I'd suspect that a stop in Tacoma would be desired for this service, which opens up an important partnership opportunity to defray costs from this opportunity. I believe that Olympia has discussed this service with folks in Tacoma, but I'm not sure if you're familiar with an initiative underway by the Tacoma City Council to develop a Tacoma/Seattle service. In a separate email, I'll introduce Tacoma Councilmember Mellow to Len/Conley, as I believe he has been leading on this effort.

<u>@Reese, Gregory</u>/<u>@Rainer Altmeppen</u>: thanks for partnering with ABB on the presentation. Please feel free to weigh in as you see fit.

<u>@Steven Deutsch/@David Shore</u>: please do weigh in on my thoughts RE shore charging for bulk/breakbulk vessels. I'm somewhat skeptical at this point based on my knowledge of those vessel types, but perhaps your experience has been different.