



Meeting No. 2022-57

**San Pedro Bay Ports
Sustainable Supply Chain Advisory Committee
*September Meeting Summary***

Date: September 21st, 2022 | 11:00 am – 3:00 pm

Location: Via Zoom conference

Attachments: Attachment A - Attendees
Attachment B - Meeting Agenda
Attachment C - Presentation - Committee Meeting

Meeting Summary

1. Port Opening Remarks
 - a. Port staff reported that as of September 20th, 2022, nine ships were at anchor and another 39 were in transit from Asia. Since November 2021, long-dwelling containers at the terminals have reduced by 51% however there has been an increase in congestion of cargo moving west from inland rail yards including Chicago, IL, and this accounts for some of the cargo congestion relief currently playing out in the San Pedro Bay Ports. Meanwhile, in mid-September, 46% of the containers on-dock were empty.
 - i. To improve efficiency the ports are working on incentives with shipping lines such as a matching every loaded container with an empty to return, and incentivizing sweeper vessels to carry empties.
 - ii. POLB is also moving forward in Phase 2 of its Information Highway project, which aims to streamline data sharing between the ports and their partners while also improving the quality of the shared data.
 - b. Addressing recent economic reports, the ports shared that while August inbound cargo was 12% lower across both ports year-over-year, August 2022 was their second-busiest August on record. While the cargo volume trends of 2020 and 2021 were unusually high, the August figures align with the ports' 2019 growth forecast which was established before the COVID-19 pandemic. Signals from Chinese and global markets indicate that there will be a slow-down in activity through the rest of the calendar year. High inventory levels at U.S. warehouses and retailers due to shifting consumer behavior and rising inflation were flagged as the two main reasons for this forecast.
 - c. The ports shared that some of their low- or no- emission demonstration projects are wrapping up this calendar year and that the results will inform future phases of the ports' transition to a zero emission (ZE) operating standard. Charging infrastructure procured under CARB's ZANZEFF program is now operational and the trucks that they are supporting are in service. POLB has also executed leases with 4Gen and WattEV, which will install the first commercial HD truck charging facilities on port property. To support future project efforts, POLB is preparing a Request for Proposals (RFP) on



charging infrastructure based on information received from their recent Request for Information (RFI) on ZE drayage trucking fueling/charging.

- i. Port staff shared that they are participating in state- and region- level meetings about the federal Hydrogen Hub program and its potential to support the joint ports' goals under the CAAP.
 - ii. POLA staff updated the Committee that they are collecting approximately \$900,000 per month from the Clean Truck Rate program and began releasing some of these funds under a vehicle voucher system on September 12th, 2022. Another tranche of funding will be released later in the fall, as well.
- d. POLB staff noted that they had received their first call from a LNG-powered vessel in August and have also received calls from several Tier 3 vessels. Referring to the Governor's waiver of shore power use due to extreme heat between September 3 and September 9, because LADWP supplies power to OLA, they noted that they did not face the same level of power supply shortage that the state's system operator (CAISO) did. Therefore, ships calling at SPBP did not in fact need to unplug or avoid using shore power. The situation created confusion for port tenants and ship operators who were unsure of whether to plug-in at berth or idle on diesel generators. The ports are working with the Governor's office to develop a protocol that allows the ports to communicate about actual needs and exemptions in similar circumstances going forward.
 - i. The ports added that emissions inventories for CY2021 have been calculated and that presentations will be delivered in early October. Overall, the 2021 emissions levels were significantly higher than those in 2020 and most of the increase was associated with ships at anchor. This was largely prompted by the supply chain crisis of 2021 which featured over 100 ships at anchor for weeks at a time due to numerous congestion points in the goods movement system. [The ports agreed to give an update to the SSCAC at the November meeting](#) and added that they expect the 2022 emissions levels to be lower than the 2021 levels.
 - ii. POLA staff also noted that the joint ports' Green Shipping Corridor program is in active development and that an implementation plan will be released soon. They are also defining interim goals for the 2020s for low-CI-capable vessels in collaboration with shipping lines and cargo carriers.
- e. Both ports noted that they are in the process of shifting to hybrid work models that allow some or all staff to return to the office in some capacity. They continue to monitor case rates and adjust as needed.
- f. Port staff responded to several questions from committee and audience members:
 - i. Mayor Eric Garcetti's staff asked for more details on the two charging hubs being developed at the POLB. POLB staff clarified that there are two chargers that are currently operational at the Clean Truck Program Terminal Access Center. Two additional sites are being developed. 4Gen, Duncan & Sons and Electrify America are collaborating to develop one HD truck charging site at the ports. The facility will feature 30 charging stations and installation will be supported by Southern California Edison's HD Charge Ready program. The port expects that the first chargers will be commissioned for use in the spring although the utility's timeline is the main determining factor. This site will be available for public drayage fleet use for the first five years, and



ownership/operation after that point will be discussed. The second site is being developed through a lease with WattEV and will provide 25 charging stations on a narrow strip of land in the North Harbor area and will also be supported by SCE's HD Charge Ready program. Both facilities will be required to submit information on utilization as a part of their lease requirements.

- ii. The Mayor's staff also asked whether emissions in 2021 had increased only for vessels or for all equipment types. POLA staff clarified that NOx emissions from vessels had doubled due to the spike in anchorages, but that all equipment emissions had increased although on varying scales. Cargo volumes also dramatically increased during the same time period, so the emissions per unit of cargo was trending in a direction that the ports considered positive.
- iii. The Mayor's staff asked whether the discussion about future flex alerts and shore power waivers was solely with the Governor's office staff or whether multiple agencies were involved. POLA staff clarified that it is a discussion with the Governor's office but that the complexity of relationships across the state is being considered during the decision-making process.
- iv. South Coast AQMD asked how the first chargers that have been installed near the port complex for the Clean Truck Rate program have performed. Port staff advised that outside of commissioning, the two public chargers have not been used yet by HD trucks. Further, access controls were required to prevent excessive use from passenger vehicles. As part of the ZANZEFF grant, POLB staff will collect information on their performance to date.

2. Review & Approve July Meeting Summary

- a. The meeting summary was approved. GNA will post it on the Committee's website.

3. CARB Update

- a. CARB representative Heather Arias reported that the CARB staff member who had prepared the presentation on the ACF and HD I&M programs was unable to attend due to last-minute scheduling issues, but that she could provide a brief update and relay Committee questions upon request. GNA agreed to include a detailed update on these programs on the November agenda.
- b. ACF Rule
 - i. CARB staff updated the Committee that the draft language for this rule is posted publicly and available for open comment, and that the first of two hearings will be held in October. Depending on 15-day changes that are received the agency intends to present the rule to its board for final consideration in the second or third quarter of 2023. 2024 is still the anticipated start date.
 - Mayor Eric Garcetti's office commented that public fleets are nervous about equipment availability and that the office wants to be sure that the rule does not create unintended consequences such as old vehicles being purchased used and grandfathered into operation. CARB acknowledged the concern.
- c. Heavy-Duty Inspection and Maintenance Program
 - i. CARB staff shared that a pilot screening was conducted outside of the POLB in August 2022, and 10 citations were issued for the 2,500 trucks screened. The



agency was pleased with the system's performance and that the compliance rate appears to be high.

- d. CARB notified the Committee that a new Executive Officer was appointed and began work in September. Steve Cliff will participate in the upcoming hearing on the State Implementation Plan (SIP) which includes consideration of various rulemakings for the agency to develop over that time period. Committee and audience members were encouraged to participate. An interim evaluation of the SIP will be conducted in December.

4. ZE Trucks & CHE Implementation

a. Trends in Drayage Trucks & Business Models (CTA)

- i. Guest speaker Chris Shimoda of the California Trucking Association (CTA) acknowledged that its recent research has been done in partnership with Committee Member Harbor Trucking Association (HTA), and leverages information generated by CARB's Emissions Factor (EMFAC) model and the California Energy Commission's (CEC) HEVI-Load model. CTA's findings were summarized in a series of slides (**Attachment C**), and Mr. Shimoda emphasized several points as relevant to the joint ports.
 - Based on CARB's assumptions the additional electricity load that is expected from commercial trucking in 2040 amounts to approximately 4 GW in the peak period of 4 pm to 9 pm, and this is roughly equivalent to the load of 5.5MM households. CTA finds the assumptions underlying these figures to be conservative since they reflect charging rates of 50 kW and 150 kW while the industry is moving to 250 kW, 350 kW and as high as megawatt-level charging.
 - To meet state charging and electrification targets as outlined by CARB and its current SIP, the pace of charging station installation needs to increase dramatically. Using the state agencies' assumptions of vehicle and charging station volumes and charging speeds, CTA estimates that 310 chargers, or approximately 2 MW of power supply, needs to be installed each week between 2022 and 2035 to meet current goals. CTA reminded the group that this is based on volume and power level assumptions that it considers low relative to current industry behavior.
 - Current circuit capacity across the state limits charging rates to 150 kW in most cases, and there is very limited additional capacity to support higher-power charging, particularly in rural areas. CTA noted that utility-level data that was collected was primarily from large utilities so its study could not fully address the needs of smaller utilities in California.
 - a. CTA assessed one of its facility's capacity to support four new truck chargers. The randomly-selected site was found to have no capacity for the associated power supply. The local utility advised that the upgrades required would take two to three years to complete after project design and approval.
 - CTA estimates that the demand required by ACF will amount to several gigawatts. According to the last infrastructure study conducted by the POLB, full electric operations at its terminals would require 200 MW of



load which could not be met by existing supply and infrastructure. Drayage trucks face a unique challenge: one-third fuel at a central location (depot) while the remainder rely on mobile fueling vendors or public fueling stations. While a portion of this majority may own their depot land and operate return-to-base operations, a scenario that would make private fueling/charging installation a feasible solution, many drayage truck businesses do not include these features. CTA emphasized that of approximately 3,000 publicly available truck parking spots, 1,500 are located in the high desert where high power electricity supply is scarce and projects are time- and cost- intensive. There is currently no business model for building charging facilities in these rural areas with extreme climates.

- CTA cautioned that while the first projects have demonstrated that battery electric trucks can support some drayage operations the state is unprepared to support a total drayage fleet turnover of 16,000 to 24,000 trucks and their fueling requirements. More megawatt-scale projects are needed to meet this demand.
- ii. Member CCA asked for the CTA and others in the meeting to describe feasible business models for the ports' drayage fleet's electrification needs and flagged several confounding factors: vehicle costs over \$300,000, rising interest rates, changing and emerging ownership models (such as Trucks-as-a-Service), and impacts of state rule AB5.¹ CTA suggested that the current drayage business model is incompatible with the direction that electrification suggests.
- CTA agreed that this is an important question, adding that there is no known exemption for ZE trucks that an owner-operator may buy but be unable to fuel due to a lack of public infrastructure. The rigidity of the state's regulations on issues such as this are a turn-off and may be a reason for drayage operators to work elsewhere. Rising costs are another expected side effect.
 - Responding to the question of whether independent owner-operators (IOOs) would continue to exist in the new business environment, CTA advised that basic feasibility conditions were not favorable. He added that the blue-collar working industry in Southern California is based on this industry.
 - CCA urged the Committee and other stakeholders to discuss this question over the coming months.
- iii. POLA staff agreed that the sharp imbalance between vehicle demand and vehicle and electricity supply, especially in the first years of the ACF, is a concern and that it is being addressed in the ports' conversations with CARB. As conditions stand today, POLA and CARB anticipate that the large and corporate drayage fleets will lead the transition. Later in the decade, their first vehicles and equipment will become available on secondary markets and over the next 15-20 years on tertiary markets which will be accessible to smaller fleets and IOOs.

¹ In the November 2022 meeting, HTA noted to the audience that this figure does not accurately describe "out-the-door" costs and costs prior to incentives. See agenda item 2 in the November 2022 Meeting Summary.



- iv. POLB staff agreed with CTA that infrastructure is a critical problem that requires attention in the immediate term and stressed for the group that sufficient and timely funding is key. Citing the challenges of meeting demand for LNG in 2009 at the ports, POLB cautioned that the ports cannot be relied on to close the fuel supply gap – instead, this is a statewide issue requiring multi-stakeholder involvement.
 - Responding to CTA’s inquiry of how much of CalSTA’s \$2Bn funding program the ports would apply for to support drayage truck charging infrastructure, POLA advised that they are identifying projects to leverage these funds and that ZEV infrastructure is a component.
- v. Mayor Eric Garcetti’s staff called CTA’s findings “frightening” and recommended that the SSCAC take action by proposing or supporting proposed reforms of key project bottlenecks such as CEQA and utility approval processes. Staff noted that this is something the Mayors’ office is trying to make a priority in the state’s upcoming legislative session but that most attention is given to building decarbonization. GNA agreed to raise this for discussion under agenda item 4(e).
- vi. CARB staff agreed that infrastructure requires attention from agencies statewide but advised that there are enough trucks that are compliant with the Truck and Bus rule’s 2023 deadline and can support the ports, and that the fleets that are buying and/or expected to buy these vehicles are also those that CARB assumes will become “legacy fleets” under the ACF. Addressing supply concerns for 2024, CARB intends to collaborate with the CEC and CPUC on infrastructure needs. CARB added that many smaller fleets turned over their vehicles recently in anticipation of the Truck and Bus rules’ deadlines and so their current vehicles will not be retired for several years, meaning that they will not be the first fleets demanding ZEVs in the early years of the ACF.
 - CCA expressed hope that large funding resources from the state and federal governments can help support this claim.
 - POLB staff expressed concern about the years following 2023, noting that supply estimates and utility project timelines already reach beyond that point and do not indicate a steady growth to meet demand. They emphasized the need to have a clear and regular communication with CARB about market supply and demand.
 - PMSA pointed to the recent churn rates in the Port Drayage Truck Registry (PDTR) and noted that if the current rate (15% departure, 17% entry) continues in 2024 then 2,400 ZE drayage trucks per year and 380 chargers per month will be required. Another assumption that concerned PMSA was that a drayage truck only serves drayage activities, whereas many drayage truck operators can support other industries than the ports. PMSA cautioned that under the current business patterns, the drayage truck fleet has been shrinking faster than the industry anticipated and asked for the ports and members to advise on how to ensure that there is a sufficient fleet to move the cargo that is expected in the coming years? Beyond a certain point of shrinkage, there is no correction, PMSA observed.



- CARB staff clarified that the registry on which their current ACF estimates are based is different from the San Pedro Bay Ports' PDTR and affirmed that the agency is considering known gaps between registered and active vehicle populations. CARB also noted that SB1 was introduced after the Truck and Bus rule which will allow applicable trucks to continue service for up to 13 years, and this allowance is not over-ruled by the Truck and Bus rule. CARB offered to review figures and rule terms with PMSA off-line.
- vii. EarthJustice recommended that the Committee focus its attention on the material being presented to CARB's board in the near term and suggested that a recommendation urging measures to ensure that OEMs deliver, such as "an ACT 2 rule" [referring to the Advanced Clean Trucks rule], be considered. Noting that OEMs are positioned to gain significantly from the state and federal funding programs, EarthJustice invited the group to consider whether an amendment could ensure that OEMs are updating their supply forecasts to support the state and federal ZEV transition targets, including reducing the prices so that more fleets can adopt the new technology.
 - CARB advised that the federal EPA has announced plans to align its efforts with CARB's ACT rule and that this presents an opportunity to level the playing field including for smaller fleets.
 - CTA noted that the beachhead segments such as last-mile delivery and transit buses have all been return-to-base, lower weight class, or both, and that the rules have not considered the barriers for the heavier duty and long-range duty cycles and the vehicles they require. CTA expressed concern that its early engagement with the state on this issue did not translate into due consideration in the final rule. EarthJustice acknowledged CTA's comments and added that the infrastructure discussions were slow to begin in 2017 but now, five years later, the urgency is clear.
- b. Update – Drayage Truck & CHE Feasibility Assessment (GNA)
 - i. GNA presented a summary of the scope, status and findings of the joint ports' second technical feasibility assessments on drayage trucks and cargo handling equipment (CHE) (**Attachment C**). These assessments are conducted every three years in compliance with the Clean Air Action Plan (CAAP) and leverage the U.S. Department of Energy (DOE)'s Technical Readiness Level (TRL) scale. GNA cautioned that while the TRL rankings are used in the study, they alone do not define full viability for the San Pedro Bay Ports. Full viability is determined by performance under five metrics of feasibility: commercial, technical, operational, economic, and access to fueling infrastructure.
 - ii. GNA noted that since the first feasibility studies, CARB defined "NZE" in its low-NOx Omnibus rule as a truck with a minimum amount of all-electric ZE range which otherwise is supported by a combustion engine. This definition differs from the definition of NZE that the ports had previously used. To ensure consistency in definitions and standards across their assessments, the ports adopted the term "LE" to refer to vehicles that emit substantially lower levels of NOx compared to a 2010 diesel engine standard.



- iii. GNA pointed to several notable findings:
 - ZE and LE yard trucks are anticipated to achieve TRL 9 by 2024 due to market expansion, increased competition, and some adoption of a CCS 1.0 charging standard among several OEMs which reduced the barrier to infrastructure feasibility. However, ZE yard trucks still are unable to meet the two-shift requirement for the ports' operating standard. Meanwhile, LE yard trucks operating on natural gas are challenged by wet-hosing limitations with LNG fuel.
 - ZE RTG Cranes attained TRL 9 and there is no other significant innovation expected, but they persistently carry high fueling and associated installation costs. The report noted that diesel-electric hybrids are in use in many locations and perform well.
 - The battery electric drayage truck market has expanded significantly from one commercially available model in 2018 to 7 in 2021, and OEMs increased their production rates in 2022. GNA noted that demonstrations remain an important part of validation particularly for challenging barriers to feasibility such as payload, range, fueling infrastructure and cost. The 2022 NACFE Run-on-Less Electric study was released during the assessment period and GNA added that its findings aligned with the ports' findings. The study suggested that battery electric vehicles may achieve TRL 9 by 2024 in the short-haul duty cycle. Meanwhile, hydrogen electric vehicles are in an earlier stage of development but at least 10 commercial units are in demonstration now. The primary barrier to full feasibility is the high total cost of ownership. Natural gas trucks are considered at TRL 9 and may not be studied in a future assessment, as the assessments are intended to track equipment that is not yet fully commercialized.
 - Speaking to market forces surrounding battery electric truck development, GNA observed that while battery and vehicle prices have not declined significantly the vehicles' performance levels have improved with higher-capacity batteries and faster charging rates from vehicle and infrastructure providers. That said, the industry faces a new challenge at the megawatt-charging level: the MW charging standard (MCS) has not in fact been designed for backward compatibility with CCS standards, introducing limitations around vehicle-charger compatibility and vehicle designs.
 - EarthJustice asked whether the report included financial incentives and other market effects of the Inflation Reduction Act (IRA), and GNA advised that the study had been completed before IRA was announced so these new resources and measures were not considered.
 - iv. As of September, the CHE feasibility study is considered complete and the final copy has been posted. The drayage truck study is going through the public comment process, and meeting attendees were invited to submit comments for consideration.
- c. CEC Report – ZEV Infrastructure Planning



- i. Members of the CEC’s Vehicle-Grid Integration Unit and the Transportation Energy Forecasting Unit presented several preliminary results from modeling tools that compare anticipated EV populations with existing and anticipated infrastructure and power sources to identify patterns of supply and demand. These studies are conducted in support of the state’s Zero-Emission Infrastructure Plan (ZIP) which was published in May 2022. The CEC provided a brief overview of the ZIP’s purpose including supporting decision making and identifying solutions to grid upgrades and expansion (**Attachment C**).
 - A supporting report, the Electric Vehicle Charging Infrastructure Assessment (under Assembly Bill 2127) finds that by 2030, vehicle electrification in all weight classes will require 44,000 GWh of power, suggesting an 11-15 percent increase in state energy use annually relative to 2020 levels. The CEC noted that the second draft of this report is in development.
- ii. A study on the grid’s ability to support the anticipated adoption of electric commercial trucks was conducted with Lawrence Berkley National Lab (LBNL), using location data from Caltrans and charging demand projections from various sources including utilities and ports. The study found that 19% of the load exceeded the available capacity in the state. In the San Pedro Bay Port area, circuit capacity was found to be unable to support the expected load as drayage truck trip traffic increases this decade. The CEC emphasized that an intensive infrastructure planning effort is needed and that it should address both centralized and decentralized charging opportunities along key corridors.
 - The CEC added that more detailed logistics data on trip activity would support advanced modeling efforts. For example, the tool has the capability of considering the long-haul trips and their loads further up the supply chain but requires more granular electricity data.
- iii. The CEC anticipates that by 2030 there will be 5.3 MM LD BEVs and approximately 186,000 MDHD BEVs in California, although the total population of MDHD ZEVs would be slightly higher considering the advent of hydrogen fuel cell trucks later in the decade. The forecast suggests that adoption rates will accelerate later in the 2020 decade and into the 2030 decade, and that the greatest increase in grid load will occur several years into the transition rather than in the next few years.
 - Research on the available power supply suggests that this EV load will represent less than 5% of the state’s total grid load during typical peak hours of 4 pm and 9 pm on an average summer day. The study assumes that 20% of LDV BEVs will participate in vehicle-to-grid activity.
- iv. POLB staff asked whether the CEC’s study considers the role of regional power providers and loads including from trucks that travel from out of state. The CEC clarified that the HEVI-LOAD model is being developed with a state-wide view and that the research shared in this presentation is a small portion looking at trucks that the agency assumes are supporting the ports. Currently, the tool is not looking at the relationship with out-of-state entities’ demand and activity but the CEC noted that there is interest in developing a similar tool at the federal level that could support inter-state analysis. Meanwhile, the CEC is



- developing a load-bus allocation to identify which parts of the California's grid requires upgrades. This can support communication with state power providers, and the CEC noted that these kinds of upgrades can require as many as 7 to 10 years of planning.
- v. ILWU asked if the models considered forecasted demand from on-dock CHE at the San Pedro Bay.
 - The CEC said that they have separate models for on- and off- road activity, and that charging loads are based on data provided by the utilities so they cannot rely on them to forecast for specific operations. Forecasts for off-road ZE requirements are incorporated to guide the model and so far the study finds that these effects would remain small in the state context but have a measurable local impact. The CEC invited the group to discuss this further and support their effort to improve the model's accuracy.
 - PMSA noted that the CEC's modeling slides suggested that data and/or assumptions were based on the SDG&E territory which is not a good measure for the joint ports' servicing utilities. The CEC thanked PMSA for the observation and agreed to confirm whether this was a typo. Meanwhile, the study's current scope and contents are considered to be accurate within the bounds of the primary data that they can access; they cannot access data on circuits set up below the transformer level which would be most of the circuits supporting the ports' on-dock operations.
 - Mayor Eric Garcetti's staff observed that the LADWP and SCE circuits have separate voltages and that this has created planning issues including for power supply between the ports.
 - The CEC added that it's EDGE tool will allow fleet operators and utilities to compare capacity and potential utility performance across multiple locations. This is expected to be published in late 2022 or the first quarter of 2023.
 - vi. GNA agreed to follow up with the CEC at the turn of the year for updates on these modeling tools and results, and to identify opportunities for a follow-up presentation to the Committee.
- d. Recap of I-710 Project by LA Metro (GNA)
- i. GNA provided a brief overview of the July meeting's presentation on LA Metro's I-710 Task Force and its upcoming deadlines (**Attachment C**). The information was presented to provide context for discussions on funding and partnership opportunities related to the regional infrastructure development needs of the ports.
- e. Discussion – Opportunity for Committee Recommendation
- i. GNA provided a brief summary of points made during this agenda item and invited EarthJustice to expand on its earlier proposal for an ACT2-related recommendation and on one for infrastructure funding.
 - ii. EarthJustice reminded the group that several large funding resources are available but require some adjustment to ensure that they are being productively allocated to support the trucking industry. The state's NEVI



program was cited as one that recently moved forward without provisions for the commercial fleet segment's fueling/charging needs. A recommendation to urge consideration of this need in upcoming fund releases was requested.

- EarthJustice also pointed to the ports' Clean Truck Rate program and suggested that a recommendation specifying how these funds could appropriately be allocated to support fueling infrastructure would be helpful. POLB staff clarified that 25 percent of the revenues in the first two years will support fueling infrastructure, but that the ports are focused on incentivizing the clean trucks. Infrastructure "is a totally different category" as the ports cannot support this if it is not within or close to the gates, and available land in that territory is limited.
 - a. EarthJustice acknowledged these concerns and advocated for the ports supporting a responsible portion of the charging needs with available land and financial resources. The port funds are especially useful because they can be released quickly, filling a near-term need while utility direct investments are also cultivated. POLB staff clarified that port funds must be used in applications that secure funding for goods movement from the ports.
 - b. PMSA added that the ports' first priority is to prepare the land for tenant use of electric equipment. ILWU added that while opportunity charging within or near the ports is necessary, and projects like those by 4Gen and WattEV are welcome, the ports' land space is in high demand and should only be used for top-up charging and not as a primary power source for fleets. ILWU emphasized that hydrogen as a fuel source is also a consideration even if its development is a few years further down the road. ILWU suggested that as port tenant leases approach renewal periods in the coming years there is an opportunity to incorporate on-dock fueling/charging resources into these agreements. San Pedro Neighborhood Council agreed that port land must be treated judiciously.
 - c. POLB staff emphasized that the Committee's support for leveraging infrastructure funds to support regional corridor development beyond the port gates would be valuable. Mayor Eric Garcetti's staff noted that timeline uncertainty is a big issue and cited LADWP's current lead time of 18 to 24 months. Supporting EarthJustice's point about deploying funds quickly, the staff advised that simply starting the process and putting equipment in the ground is needed at this point in time. A recommendation to address bottlenecks and speed up equipment deployment timeline was requested. **GNA agreed to develop this draft recommendation and suggested that this be done with consideration for the Zero Emission Fueling Infrastructure Permit Readiness Recommendation that the SSCAC approved and published in May, and the state's**



September laws addressing utility and regulatory agency approval timelines.

- POLA staff commented that any use of public funds by the ports will be heavily scrutinized and that more data is required to determine the best use of funds. Near-term use should prioritize short-haul applications as there is more information available today on these duty cycles and suitability with battery electric technology. As the ports expand their fueling infrastructure investments they must do so in a step-wise fashion with clear communications about the rationale for each new effort. POLA advised that investments along the I-710 be considered at a later stage, after investments in and immediately around the port gates are in a more mature state.
 - a. POLB responded to three earlier questions about public HD charging facilities.
 - i. The WattEV site will provide 360 kW charging, and specs for the 4Gen site are not yet available.
 - ii. Two chargers installed at the Clean Truck Program Terminal Access Center have only been used for commissioning and are not widely advertised. The port is responding to companies that are asking about availability at these chargers as they prepare for their first trucks.
 - iii. The port anticipates that its two HD charging stations will provide data quarterly but said it would confirm the details and regularity of providing this new data.
- South Coast AQMD noted that the NEVI program, when authorized in 2022, overlooked HD fueling/charging needs and that it is working to address this with CARB and other agencies. EarthJustice commented that other states had not made this choice, and that that provides an example to support South Coast's argument. Both members recommended that the SSCAC develop a recommendation or submit a letter as a coalition in support of NEVI program use for HD charging infrastructure. GNA agreed to work with HTA, EarthJustice and the joint ports as well as any other interested members on a first draft.
- iii. POLA staff noted that Southern California Association of Governments (SCAG) is launching a regional ZEV infrastructure study and asked GNA to involve the SCAG research team in a future meeting to educate the Committee on this work and possible implications for port planning. GNA agreed to coordinate on outreach with POLA staff.

5. SSCAC Member Priorities & Activities

- a. EarthJustice reminded the audience that the federal EPA is administering a lot of funds in the near term and suggested that the group meet with the Region 9 administrator to discuss provisions and ensure that they support the ports' goals. POLA staff reminded the group that it sits on a committee at the EPA and could help facilitate that



discussion. GNA was asked to follow up with the port staff and EarthJustice to discuss this approach.

- b. EarthJustice and GNA observed that the EarthJustice funding tracker is not expected to benefit the Committee's work beyond the funding monitoring efforts that are already under way. This will be removed from future agendas, and funding program updates will be provided as-needed.
6. Update: Queen Mary Recommendation
 - a. GNA updated the Committee that it is working on a draft of this recommendation with several members and will circulate this for consideration before the November 2022 meeting, along with new recommendations as suggested by the members during this meeting.
 7. Committee Discussion: Action on Locomotives
 - a. Summary of Locomotive Deep Dive (GNA)
 - b. Due to time constraints, the Committee agreed to address this in the November meeting. GNA will update the next agenda accordingly.
 8. Funding Opportunities & Advocacy
 - a. Port Funding Programs for 2022-2023 cycle
 - i. POLA staff provided a brief summary of its current pursuit of state and federal funding. At the federal level, the joint ports anticipate approximately \$17Bn being invested in infrastructure over five years. Both ports have a roster of projects prepared to propose for these resources and will be requesting Committee support when the funding solicitations open.
 - b. DOE Hydrogen Hub Program (POLB)
 - i. POLB staff provided a brief summary of the \$8Bn federal Hydrogen Hub program, noting that the solicitation period is expected to open within the month. Both ports have been collaborating with state agencies and utilities under GoBiz, which will submit a proposal on behalf of the State of California for several hydrogen hubs located at three distinct points in the state including one near the San Pedro Bay Port complex. A public meeting will be held on October 6th to share details of the envisioned resource network.
 - EarthJustice observed that hydrogen fueling appears to get less resistance in the state than electrification in spite of its high price tag, and asked the ports and the group whether it has prioritized one energy type over the other. CCA asked for clarification on how the various entities involved in the GoBiz application are collaborating, and if there are sufficient checks and balances to prevent duplicate efforts.
 - Port staff clarified that the three hubs are being proposed under one program and effort, and that a distinct entity currently identified as "Arches" is being considered to oversee the three-hub program. The full scope and service of "Arches" is still being defined.
 - POLB staff noted that the state's proposal will be further developed by the November meeting and requested that the next meeting agenda



include a presentation on the proposal and time for a fulsome discussion. GNA agreed to incorporate this item into the November 2022 agenda.

- ILWU responded to EarthJustice’s observation by pointing out that multiple solutions are needed to address the fueling supply and technology requirements of the San Pedro Bay Ports and the region’s goods movement industry. ILWU asked the group whether they could share resources describing the full cost and environmental impact of batteries over their useful life, including mining and recycling methods. EarthJustice, POLB staff, and staff from Mayor Eric Garcetti’s office offered to share resources and GNA agreed to review these and consider how the information may be addressed in an upcoming meeting. The group concurred that battery production and disposal is an important and timely topic.

9. Conclusion & Next Steps

- a. Next Meeting: November 16th, 2022 – Workforce Development
 - i. Staff from both ports requested that a presentation and discussion of the new training center that is being developed for the goods movement workforce be included. The group agreed that a discussion of how workforce factors into the CAAP would be valuable and recommended several speakers. GNA agreed to follow up on these resources as it prepares the November agenda.



Attachment A
List of Meeting Participants

SSCAC Committee Members	
Marnie Primmer	FuturePorts
Erin Gardner	FuturePorts
Michele Grubbs	PMSA
Thomas Jelenic	PMSA
Aaron Katzenstein	South Coast AQMD
Heather Arias	CARB
Joe Lyou	CCA
Chris Chavez	CCA
Stella Ursua	Grid Alternatives
Sal DiCostanzo	ILWU-13
Adrian Martinez	EarthJustice
Michelle Vater	CEC
Louis Dominguez	San Pedro Neighborhood Council
Robert Nothoff	LA County Federation of Labor
Los Angeles Port & City Staff	
Teresa Pisano	Port of Los Angeles
Tim DeMoss	Port of Los Angeles
Chris Cannon	Port of Los Angeles
David Libatique	Port of Los Angeles
Erick Martell	Port of Los Angeles
Arley Baker	Port of Los Angeles
Michael Samulon	Mayor Eric Garcetti's Office
David Ou	Mayor Eric Garcetti's Office
Long Beach Port & City Staff	
Heather Tomley	Port of Long Beach
Rick Cameron	Port of Long Beach
Wei Chi	Port of Long Beach
Sam Joumblat	Port of Long Beach
Rose Szoke	Port of Long Beach
Meeting Facilitation Staff	
Patrick Couch	GNA
Eleanor Johnstone	GNA
Christopher Davis	GNA
Other Stakeholders	



Robin Pritchard	CARB
Mei Wang	SCAQMD
Chris Shimoda	California Trucking Association
Micah Wofford	CEC
Quentin Gee	CEC
Ajay Mangat	CARB



Attachment B

Meeting Agenda

1. Port Opening Remarks
2. Review & Approve July Meeting Summary
3. CARB Update
 - a. ACF Rule
 - b. Heavy-Duty Inspection and Maintenance Program
4. ZE Trucks & CHE Implementation
 - a. Trends in Drayage Trucks & Business Models (CTA)
 - b. Update – Drayage Truck & CHE Feasibility Assessment (GNA)
 - c. CEC Report – ZEV Infrastructure Planning
 - d. Recap of I-710 Project by LA Metro (GNA)
 - e. Discussion – Opportunity for Committee Recommendation
5. SSCAC Member Priorities & Activities
6. Update: Queen Mary Recommendation
7. Committee Discussion: Action on Locomotives
 - a. Summary of Locomotive Deep Dive (GNA)
8. Funding Opportunities & Advocacy
 - a. Port Funding Programs for 2022-2023 cycle
 - b. DOE Hydrogen Hub Program (POLB)
9. Conclusion & Next Steps
 - a. Next Meeting: November 16th, 2022 – Workforce Development



Attachment C
Presentation - Committee Meeting

San Pedro Bay Ports

Sustainable Supply Chain Advisory Committee Meeting

September 21st, 2022



Agenda

1. Port Opening Remarks
2. Review & Approve July Meeting Summary
3. CARB Update
 - a. Advanced Clean Fleets Rule
 - b. Heavy-Duty Inspection and Maintenance Program
4. ZE Trucks & CHE Implementation
 - a. Trends in Drayage Trucks & Business Models
 - b. Drayage Truck & CHE Feasibility Assessment Update (GNA)
 - c. CEC Report – ZEV Infrastructure Planning
 - d. Recap of I-710 Project by LA Metro (GNA)
 - e. Discussion – Opportunity for Committee Recommendation
5. SSCAC Member Priorities & Activities
6. Update: Queen Mary Recommendation
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8. Funding Opportunities & Advocacy
 1. Port Funding Programs for 2022-2023 cycle
 2. DOE Hydrogen Hub Program (POLB)
9. Conclusion
 - a. Next Meeting: November 16th , 2022 – Workforce Development

1. Port Opening Remarks



2. Review & Approve July Meeting Summary

3. CARB Update

- a. Advanced Clean Fleets Rule
- b. Heavy-Duty Inspection and Maintenance Program

3a. Advanced Clean Fleets Rule

3b. Heavy-Duty Inspection and Maintenance Program

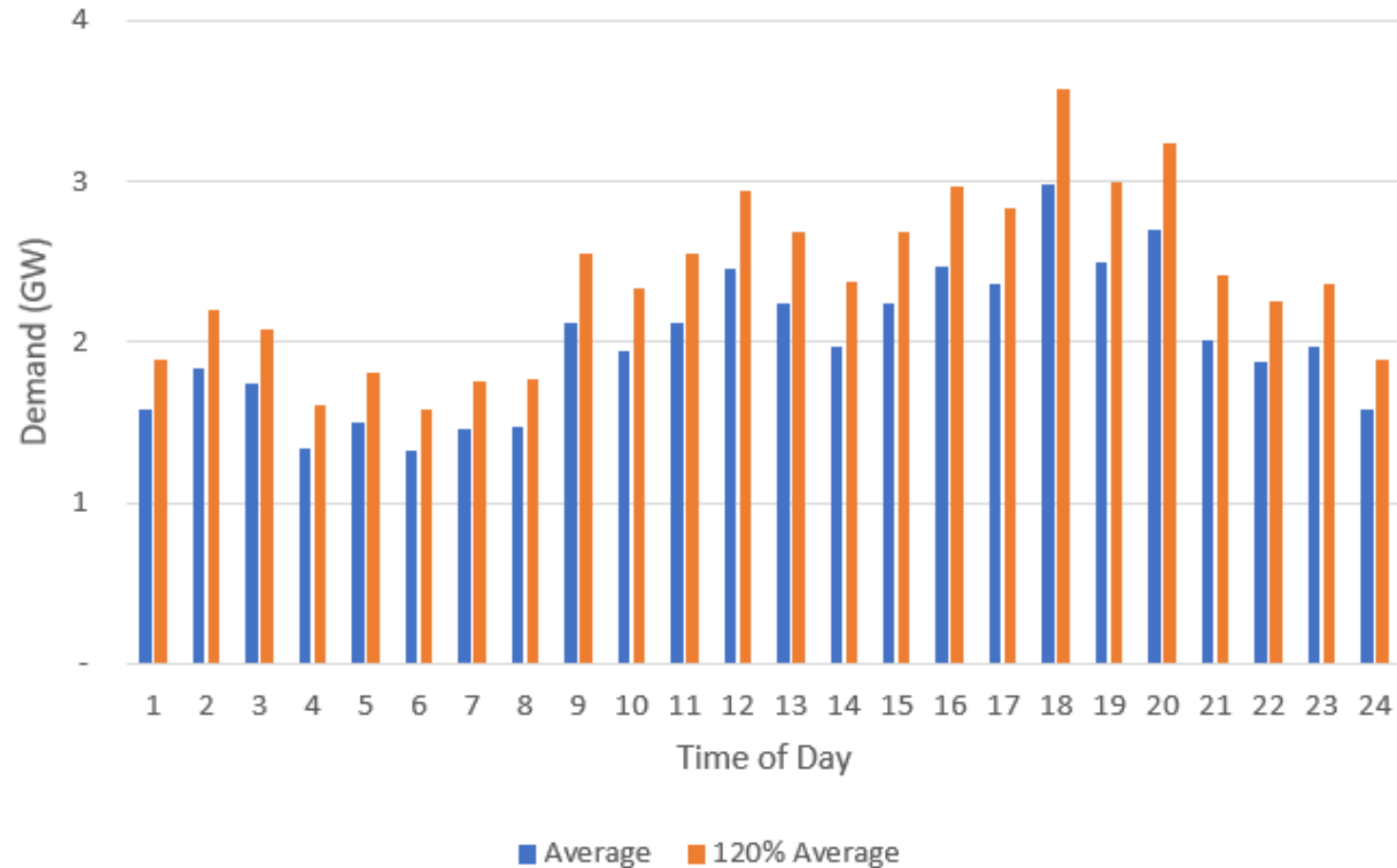
4. Deep Dive: ZE Trucks & CHE Implementation

- a. Trends in Drayage Trucks & Business Models (CTA)
- b. Drayage Truck & CHE Feasibility Assessment Update (GNA)
- c. CEC Report – ZEV Infrastructure Planning
- d. Recap of I-710 Project by LA Metro (GNA)

4a. Trends in Drayage Trucks & Business Models (CTA)

Infrastructure – 2040 Statewide Truck Electrification Demand

- Plausible Added Demand
 - 2.9-3.7 GW*
 - Equivalent to approx. 5.4 million** households
- Truck population
 - 52% Diesel vs. 48% Electric (1.02m vs. 920k)
 - Equals ZE population by 2040 via ACF
- Vehicle Miles Traveled
 - 67% Diesel vs. 33% Electric



*Demand curve from CEC AB 2127 Commission Report Figure Results (Fig 20 excluding buses)

**Assuming 8,000kWh Annual Household Consumption

2050.

Source: Population, kWh & VMT Data from EMFAC 202x Statewide for Cumulative ZEVs under ACF will hit 925k in 2041.

Infrastructure – Chargers

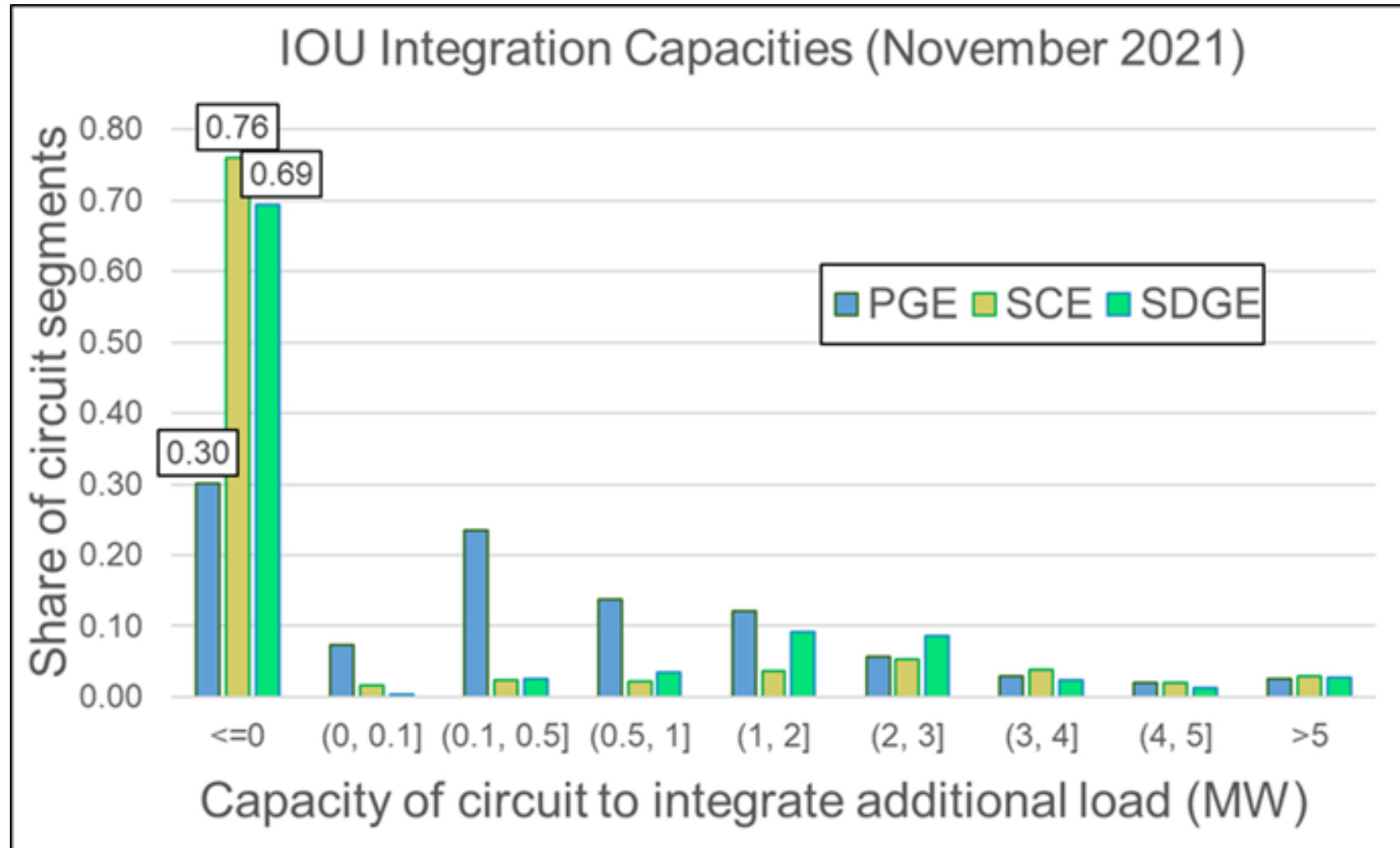
- CARB estimated charger needs for 112k BEVs by 2030 & 289k BEVs by 2035
 - Estimated charger #'s are low because ACF actually calls for 197k by 2030 & 513k by 2035
- In 2035 3% of high capacity public chargers will use 26% of electricity. This will drastically change peak demand scenarios.
- Avg chargers needed to be installed between now and 2035
 - 16,125 annually
 - 1,344 monthly
 - 310 weekly including 9 750kW+ retail chargers per week (approx. 1-2 stations/week)

Table 27 - HEVI-LOAD Infrastructure Results for 112,000 BEVs in 2030 and 289,000 BEVs in 2035¹⁰⁵

Charger Power Level	2030			2035		
	Number Chargers (% Depot / % Public)	Charging Energy (%)	Charging Time (%)	Number Chargers (% Depot / % Public)	Charging Energy (%)	Charging Time (%)
19; 25 kW	9,509 (100 / 0)	2.74	21.69	24,638 (100 / 0)	2.29	19.94
50; 75 kW	12,174 (87 / 13)	7.56	37.45	31,529 (88 / 12)	6.46	36.38
100; 150 kW	33,558 (96 / 4)	29.15	2.42	90,599 (97 / 3)	27.34	2.85
225; 250; 300 kW	12,257 (82 / 18)	20.17	23.71	31,362 (85 / 15)	19.10	24.40
350; 450; 500 kW	9,882 (83 / 17)	18.92	9.20	25,190 (86 / 14)	18.19	10.10
750; 900; 1,000; 1,050 kW	1,112 (0 / 100)	7.77	5.46	2,499 (0 / 100)	8.88	6.25
1,200; 1,400; 1,600 kW	1,498 (0 / 100)	13.69	0.07	3,809 (0 / 100)	17.73	0.09
Total	79,990 (88 / 12)	100	100	209,626 (90 / 10)	100	100

Source: Draft 2022 SIP

Infrastructure – Integration Capacity



Source: CEC Presentation to ACF Workgroup

Infrastructure – Site Specific

Source: <https://drpep.sce.com/drpep/>

Southern California Edison DRPEP

12510 Micro Dr, Mira Loma X

Show search results for 12510 ...

Integration Capacity (MW)		
	Static Grid	Operational Flexibility
Uniform generation	9.44	Redacted
Photovoltaic	0	Redacted

Integration Capacity (MW)	
Uniform Load	0

Date of last ICA Publication: 04/16/2022
ICA Values are being processed and reviewed.

DSP Engineering has studied the Project at Ave and has determined that System Upgrades are required in order to serve the customer and we cannot meet the customers requested energization date of 10-31-2022.

SCE has approximately 0 MW of capacity currently available. If wants to utilize this available capacity you will need to submit a method on how you would safely limit the sites capacity that would be reviewed by SCE. Some examples would be phasing your equipment installation or limiting by means of a protection device that can be approved by the AHJ.

The upgrades required for SCE are estimated to take approximately Substantial System Work (24-36 months) and will begin once has agreed to move forward and completed a full design submittal package to SCE. This feasibility result is valid for 90 days from the receipt of this email or until the customer completes and submits a full design package to SCE.

Infrastructure – Summary

- The Advanced Clean Fleets Rule will:
 - Create multiple gigawatts of new electricity demand
 - Require hundreds of chargers to be installed on a weekly basis
 - Require an average of at least 1-2 retail charging sites to be built per week
- Grid is already constrained in terms of overall capacity and circuit specific integration capacity
- Charging projects can take years to complete
- Without adequate charging infrastructure, California's supply chain will not function under ACF

4b. Drayage Truck & CHE Feasibility Assessment Update (GNA)

SAN PEDRO BAY PORTS CLEAN AIR ACTION PLAN



UPDATE:

2021 FEASIBILITY ASSESSMENTS for Cargo Handling Equipment and Drayage Trucks

September 2022

Patrick Couch
Gladstein, Neandross & Associates
September 21, 2022



Feasibility Assessment: Structure

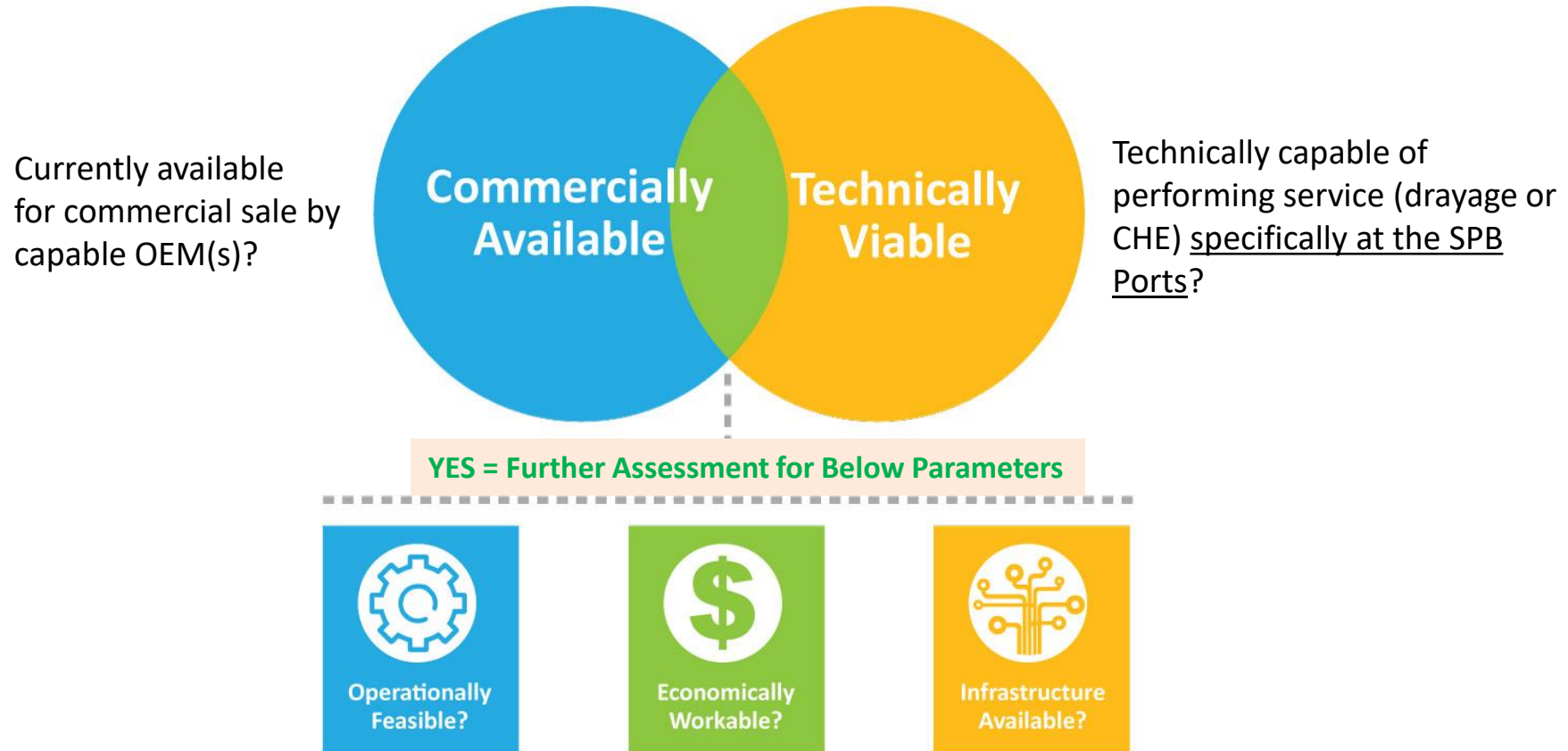
- 2021 Assessment **builds upon and updates** original (2018) Feasibility Assessment
- Continue to follow Ports' November 2017 "Framework" document
- Emerging **ZE** and **NZE** fuel-technology platforms are evaluated according to the following five basic parameters:
 1. Technical Viability
 2. Commercial Availability
 3. Operational Feasibility
 4. Availability of Infrastructure and Fuel
 5. Economic Workability



Feasibility Assessment: Structure (continued)

- **Breadth of Application** – Capability for widespread deployment
- **Timeframe** - 2021 to 2024
- **Fuel-Technology Platforms**
 - 1) Advanced diesel combustion
 - 2) Natural gas combustion
 - 3) Other combustion (e.g., propane)
 - 4) Hybrid-electric platforms (may include combustion)
 - 5) Pure battery-electric (or grid-electric) systems
 - 6) Hydrogen fuel cell
- **Sources of Information Used**
 - ✓ Technical reports, papers and literature resources
 - ✓ Key agencies (ARB, CEC, AQMD, Ports)
 - ✓ Surveys

Basic Screening Methodology:



TRL does not, by itself, determine feasibility

2021 CHE Assessment Update

- 4 CHE types (diesel / ~70% of Ports inventory):
 - ❖ Yard Tractors
 - ❖ RTG Cranes (RTG)
 - ❖ Top Handlers
 - ❖ Large-Capacity Forklifts

Yard Tractors

- **ZE Battery Electric:** emerging from pre-commercial into early commercial products
- **ZE H2 Fuel Cell:** proof-of-concept demos underway by OEMs with tech partners
- **NZE Natural Gas ICE:** multiple OEMs offer commercial units as option (special order)

RTG Cranes

- **ZE Grid-Electric:** multiple deployments of commercial conversions underway
- **NZE Diesel Hybrid:** dozens of deployments; OEMs have further improved emissions

Top Handlers and Large-Capacity Forklifts

- **ZE Battery-Electric:** pre- and early commercial demonstrations underway
- **ZE H2 Fuel Cell:** proof-of-concept development by OEMs (with tech partners)



← **ZE battery-electric yard tractor**



ZE H2 fuel cell yard tractor →



ZE grid-electric rubber-tired gantry crane



← **ZE battery-electric top handler**

ZE H2 battery-electric large-capacity forklift →



TRL 7 versus TRL 8

(2021 CHE Assessment)

- **TRL 8** requires the “successful demonstration” of a product or technology.
- **TRL 7** requires demonstration of the technology, but not *successful* demonstration
- Success of a demonstration depends on context:
 - The demonstration provides valuable lessons learned
 - The equipment is able to complete a minimum level of operation
 - The end user chooses to continue using the equipment beyond the demonstration period
- **For purposes of the CHE Assessment:** A Successful Demonstration is the proven ability of the CHE type to perform diesel-equivalent work moving containers for at least one full shift with sufficient remaining energy and charging/fueling speeds to complete a second shift after refueling or recharging between shifts.



CHE Assessment Update

Cargo Handling Equipment Progress Since 2018

2021 Updates:

- Progress toward *overall feasibility*, for both **ZE** and **NZE** platforms
- Both ZE and NZE yard tractors estimated between TRL 7 and TRL 8. Anticipated TRL 9 by 2024.
- **Blue pie wedges** identify progress from 2018

Feasibility Parameter	Yard Tractors		RTG Cranes	
	ZE Battery-Electric	NZE NG ICE	ZE Grid-Electric	NZE Diesel Hybrid-Electric
Commercial Availability				
Technical Viability (TRL Rating out of 9)	TRL 7 to 8 (2024: TRL 9)	TRL 7 to 8 (2024: TRL 9)	TRL 9	TRL 9
Operational Feasibility				
Infrastructure Availability				
Economic Workability				
Legend: Achievement of Each Noted Parameter / Criteria (2021) 				
<small>*These ratings for overall achievement of each five feasibility parameter are based on the analysis of several criteria within that parameter. Because each criterion is important for the success of a given fuel-technology platform in CHE operations, the overall achievement ratings are based on the lowest criterion rating for each feasibility parameter.</small>				

2021 CHE Assessment Update

Yard Tractors

- **ZE Battery Electric:**
 - Additional OEMs entering the market with battery-electric options.
 - Current demonstrations have mixed results, but newer generation platforms are being developed.
 - 2-shift operations, infrastructure, and incremental costs remain challenges.
- **NZE Natural Gas ICE:**
 - Multiple OEMs offer commercial units as option (special order).
 - 2-shift operation is possible for LNG systems, but lack of wet-fueling options remains a challenge.
 - LNG units still entail increased capital and total costs.

RTG Cranes

- **ZE Grid-Electric:**
 - Multiple deployments of commercial conversions underway
 - Considered commercially available and TRL 9
 - Significant incremental capital costs, total costs, and infrastructure requirements remain challenges.
- **NZE Diesel Hybrid:** dozens of deployments; OEMs have further improved emissions. Diesel hybrids are considered feasible (no change from 2018)

Overall Status / Next Steps (2021 CHE Assessment)

- **Completed:** extensive info gathering / interviews with dozens of stakeholders to **capture verifiable updates**
 - ✓ Information gathering with stakeholders
 - ✓ Manufacturers and Technology Partners
 - ✓ End Users (MTOs, Trade Associations, etc.)
 - ✓ Fuel / Energy / Infrastructure Providers
 - ✓ Regulators (CARB, SCAQMD, etc.)
 - ✓ Public Information and Literature
 - ✓ First full draft
 - ✓ Third party review of draft
 - ✓ Released for Public comment
 - ✓ Final Release
- **Next Steps:** Preparation for 2024 Assessment

2021 Drayage Truck Assessment Update

Key development since '18: OEM advancement of **ZE** platforms

ZE Battery-Electric Trucks:

- Seven (7) Class 8 OEMs offer commercial platforms with increasing production in 2022
- Demonstrations continue; completions are very important
 - Initial demos: promising results, some challenges emerged
 - Larger demos: underway or in planning
- 2022 NACFE Run on Less demonstrations largely support Assessment's operational assumptions for BE trucks.

ZE Hydrogen Fuel Cell Trucks:

- Solid OEM advancements
- At least 10 pre-commercial units in demo

NZE Natural Gas Trucks:

- Fully commercial options, multiple OEMs
- Primary remaining challenge is modest incremental TCO to baseline



← **ZE** battery-electric
Class 8 trucks



← **ZE** fuel cell
Class 8 trucks

NZE natural gas
Class 8 truck →



2021 Drayage Truck Assessment Update

Drayage Truck Progress Since 2018

Preliminary Results

2021 Updates:

- Progress toward *overall feasibility*
- Battery-electric trucks TRL 7-8. Anticipated TRL 9 by 2024 for short range drayage. →
- NZE Natural Gas likely to be considered sufficiently feasible to remove from future assessments
- **Blue pie wedges** identify progress from 2018
- Update of NZE term to Low Emission (LE) for consistency with ACT/Low NOx Omnibus

Feasibility Parameter / Criteria	Overall Achievement* of Criteria in 2021 (Commercially Available / Technically Viable Truck Platforms)	
	ZE Battery-Electric	LE NG ICE
Commercial Availability		
Technical Viability	TRL 7 to 8 (moving to 9) (for short-range drayage)	TRL 9
Operational Feasibility		
Infrastructure Availability		
Economic Workability		
Legend: Achievement of Each Noted Parameter / Criteria (2021) 		
<small>*These ratings for overall achievement of each five feasibility parameter are based on the analysis of several criteria within that parameter. Because each criterion is important for the success of a given fuel-technology platform in drayage, the overall achievement ratings are based on the <u>lowest</u> criterion score for each feasibility parameter.</small>		

2021 DRAYAGE Assessment Update

ZE Battery Electric:

- Several additional major OEMs entering the market with battery-electric options.
- Improved dealership networks and support relative to 2018 Assessment
- Significant increases in OEM-stated range and battery capacities.
- Market starting to consolidate around CCS-1 standard, although MCS represents a new challenge for standardization.
- 2-shift operations, infrastructure, and incremental costs remain challenges.

NZE Natural Gas ICE:

- Determined to be nearly fully feasible. May not be included in future Assessments.
- Modest cost increases over diesel TCO (prior to recent diesel price increases)

2021 DRAYAGE Assessment Update

Operational Feasibility Detail

Preliminary Results

2021 Updates:

- NGVs considered to “fully achieve” Operational Feasibility for most drayage applications.
- BE drayage truck range has increased significantly since the 2018 Assessment
- BE charging rates of 150-250 kW are an improvement over the 2018 Assessment
- Availability of BE Class 8 products from major OEMs (Daimler, Volvo, PACCAR) and support by major local dealerships (VVG, TEC, Rush)

Operational Feasibility Criteria/Parameter	Base Considerations for Drayage Platforms to Achieve Operational Feasibility	Achievement of Criteria for Remaining Drayage Truck Platforms	
		ZE Battery-Electric	LE NG ICE
Basic Performance	Demonstrated capability to meet drayage company needs for basic performance parameters including power, torque, gradeability, operation of accessories, etc.		
Range	Demonstrated capability to achieve per-shift and daily range requirements found in San Pedro Bay drayage.		
Speed and Frequency of Fueling/Charging	Demonstrated capability to meet drayage company needs for speed and frequency to refuel / recharge such that revenue operation is not significantly reduced relative to diesel baseline.		
Driver Comfort, Safety, and Fueling Logistics	Proven ability to satisfy typical drayage trucking company's needs for comfort, safety and refueling procedures.		
Availability of Replacement Parts and Support for Maintenance/Training	Verifiable existence of and timely access (equivalent to baseline diesel) to all replacement parts needed to conduct scheduled and unscheduled maintenance procedures.		
	Verifiable existence of maintenance procedure guidelines and manuals, including OEM-provided training courses upon purchase and deployment of new trucks.		
Legend: Operational Feasibility (2021) Little/No Achievement = Progress since 2018 Assessment Fully Achieved			
Source: Based on Drayage Truck Operator Survey responses, footnoted studies, OEM product information, and consultant’s industry knowledge.			










2021 DRAYAGE Assessment Update

Infrastructure Availability Detail

Preliminary Results

2021 Updates:

- Improved harmonization around the CCS-1 standard for BE trucks. MCS evolving new capability but represents a new standard.
- Recognized ability of NG infrastructure to build out at pace with NGV deployments.

Infrastructure Criteria/Parameter	Base Considerations for Assessing Infrastructure Availability	Achievement of Criteria for Remaining Drayage Truck Platforms	
		ZE Battery-Electric	LE NG ICE
Dwell Time at Station	Fueling/Charging can be accommodated within typical work breaks, lunches, other downtime compatible with trucking company schedules and operational needs.		
Station Location and Footprint	Fleets have existing onsite access to fueling infrastructure, or can be fueled/charged conveniently and affordably off site, at public or private stations. New infrastructure can be installed without extensive redesign, reconfiguration or operational disruptions and there is sufficient electrical or natural gas capacity at the site.		
Infrastructure Buildout	Infrastructure can be constructed at a pace consistent with fleet adoption and able to meet fleet fueling/charging requirements by the end of the assessment period.		
Existence of/Compatibility with Standards	A sufficient body of codes and standards exist from appropriate organizations that enables safe and effective refueling/recharging. The refueling/recharging station technology has already been installed at other trucking companies in the U.S., with sufficient time to assess performance and safety.		
<p>Legend: Infrastructure Availability (2021)</p>  <p>Little/No Achievement = Progress since 2018 Assessment Fully Achieved</p>			
<p>Source: based on preliminary OEM survey responses, OEM product information, various government sources, and Tetra Tech team's industry knowledge.</p>			

2021 DRAYAGE Assessment Update

Economic Workability Detail

Preliminary Results

2021 Updates:

- BE drayage truck costs have not decreased, although capability (range) has increased.
- Base case for determining ratings remains a “no purchase incentives” case
- No changes “pie” ratings since 2018 Assessment

Economic-Related Criteria/Issue	Base Considerations for Assessing General Economic Workability	Achievement of Criteria for Remaining Drayage Truck Platforms	
		ZE Battery-Electric	LE NG ICE
Incremental Vehicle Cost	The upfront capital cost for the new technology is affordable to end users, compared to the diesel baseline.		
Fuel and Other Operational Costs	The cost of fuel/energy for the new technology is affordable, on an energy-equivalent basis (taking into account vehicle efficiency). Demand charges/TOU charges (if any) are understood and affordable. Net operational costs help provide an overall attractive cost of ownership.		
Infrastructure Capital and Operational Costs	Infrastructure-related capital and operational costs (if any) are affordable for end users.		
Potential Economic or Workforce Impacts to Make Transition	There are no known major negative economic and/or workforce impacts that could potentially result from transitioning to the new equipment.		
Existence and Sustainability of Financing to Improve Cost of Ownership	Financing mechanisms, including incentives, are in place to help end users with incremental vehicle costs and/or new infrastructure-related costs, and are likely remain available over the next several years.		
Legend: Economic Workability (2021) Little/No Achievement = Progress since 2018 Assessment Fully Achieved			
Source: based on preliminary OEM survey responses, OEM product information, various government sources, and Tetra Tech team’s industry knowledge.			

Overall Status / Next Steps (2021 Drayage Assessment)

- **Completed:** extensive info gathering / interviews with dozens of stakeholders to **capture verifiable updates**
 - ✓ Information gathering with stakeholders
 - ✓ Manufacturers and Technology Partners
 - ✓ End Users (Drayage Fleets, Trade Associations, etc.)
 - ✓ Fuel / Energy / Infrastructure Providers
 - ✓ Regulators (CARB, SCAQMD, etc.)
 - ✓ Public Information and Literature
 - ✓ First full draft
 - ✓ Third party review of draft
 - ✓ Released for Public comment
- **Next Steps:** Review public comment and prepare final release

SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

Thank You!

Port of LONG BEACH
THE GREEN PORT

LA
THE PORT
OF LOS ANGELES

2021 UPDATE:
FEASIBILITY
ASSESSMENT
for DRAYAGE
TRUCKS



July 2022

DRAFT – Do Not Cite

SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

TETRA TECH

4c. CEC Report – ZEV Infrastructure Planning



California Energy

Meah Wofford

Commission

Vehicle-Grid Integration Unit

Quentin Gee, PhD

Supervisor, Transportation Energy Forecasting Unit

September 21, 2022



Draft Zero-Emission Infrastructure Plan (ZIP)

- Overview
 - Support decision-making in public/private sectors with actions to ensure infrastructure deployment meets ZEV market needs
 - Pathways to success via strategic public, private, and utility investments
 - Long-term planning for grid accommodation of growing ZEV charging load
 - Equity in every decision
 - Emphasis on MDHD vehicles – increase equity by rapidly transitioning the most polluting vehicles to ZEVs



CA's Grid Will Adapt to ZEV Load

- **44,000 GWh by 2030** by charging light-, medium-, and heavy-duty vehicles ([CEC AB 2127 Assessment Report](#))
- An increase in annual state energy usage by **11-15% in 2030** as compared to 2020 usage levels
- Planning and foresight are needed to ensure grid can accommodate large increases in clustered ZEV charging load
- Near-term distribution system impacts by MDHD charging loads may require circuit upgrades in areas with little to no available capacity
 - Further explored in a simulation case study analysis via HEVI-LOAD model

Drayage Trip Simulation Scenario

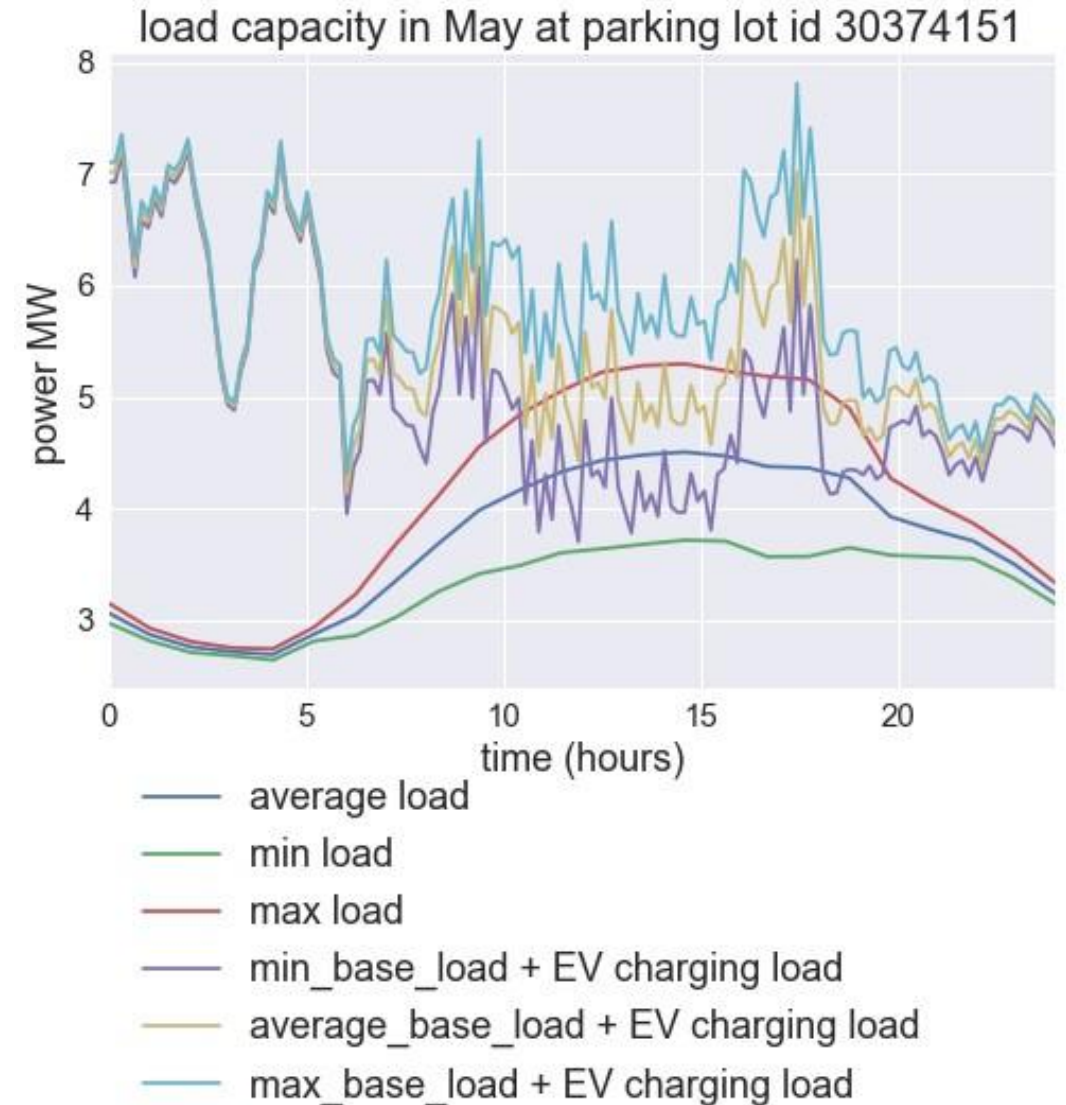
- ◆ **Battery capacity level:** [B1: 200kWh, B2: 400kWh, B3: 600kWh]
- ◆ **Ports: Port of Oakland, Port of LA, Port of Long Beach**
- ◆ **Drayage Trip Scenario:** ACT+ACF 2030 (Approx.: 3900 drayage trip per day, enter/exist above ports)
- ◆ **Charging rate level:** we define three vehicle charging rate during the day for each level:
 - Cn: [rate1(18:00-24:00), rate2(6:00-12:00), rate3(0:00-6:00, 12:00-18:00)]
 - C1: [10 kWh/h, 20 kWh/h, 50 kWh/h]
 - C2: [20 kWh/h, 50 kWh/h, 100 kWh/h]
 - C3: [50 kWh/h, 100 kWh/h, 150 kWh/h]
- ◆ **Vehicle groups:** based on different **battery capacity levels, charging rate levels and vehicle classes from EMFAC**, we divided the 34 vehicle types into 6 vehicle groups:
 - LHD: [B1, C1], Class 4-6: [B2,C1], Class 7: [B2,C2], Class 8: [B2, C3], [B3,C2], Buses: [B3,C3]
- ◆ **Charging Scenario:**
 - Overnight charging/parking: Assume of 70% vehicles will charge/park nearby the port to charge overnight before the trip start
 - Max num charger per parking lot: 100

Charging Demand at parking lot id 30374151

PG&E territory, close to Port of Oakland



* Note that these are preliminary results needs to be validated with PG&E

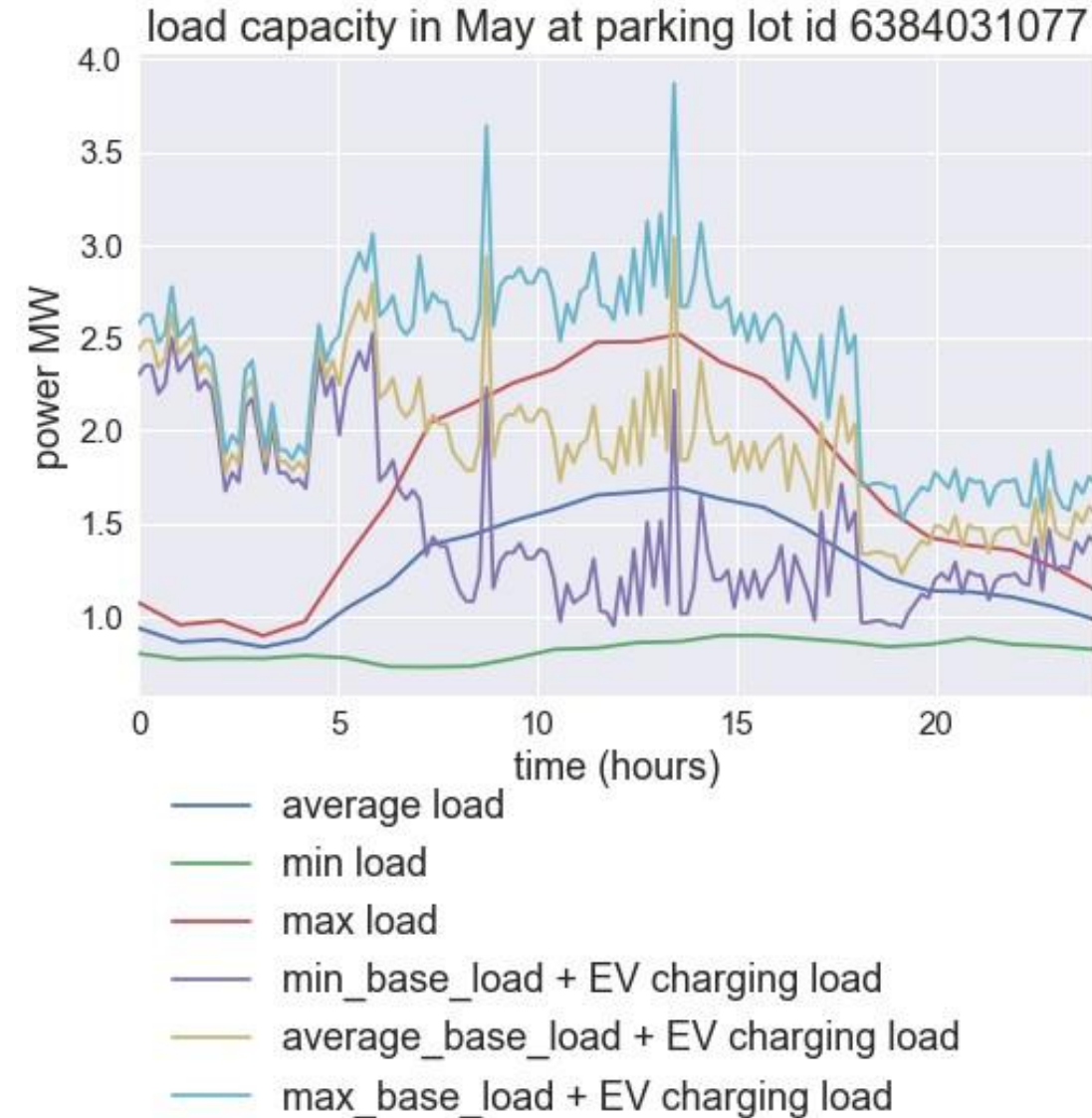


Charging Demand at parking lot id 6384031077

SDG&E territory, close to Port of LA/Long Beach

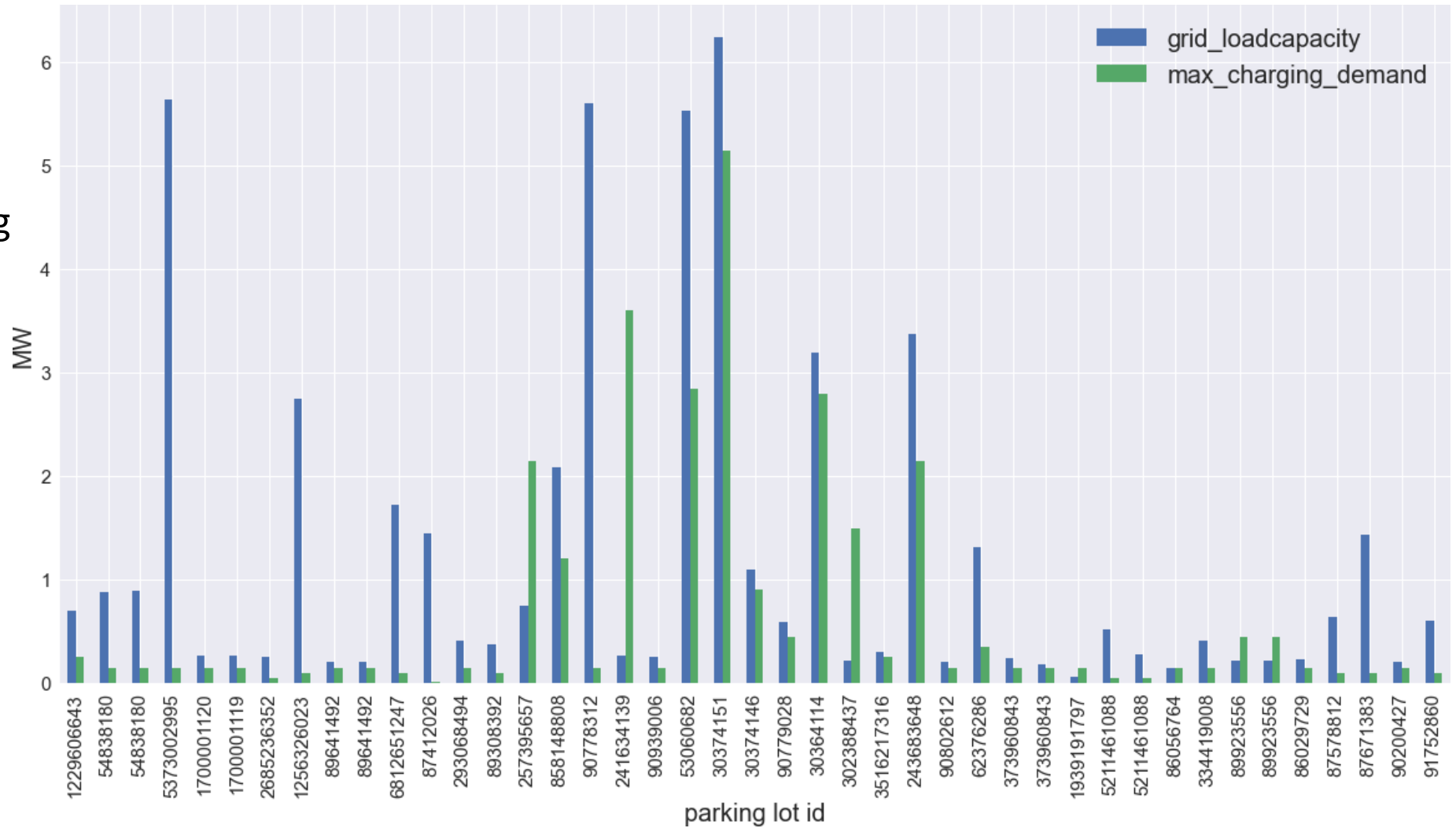


* Note that these are preliminary results needs to be validated with SDG&E

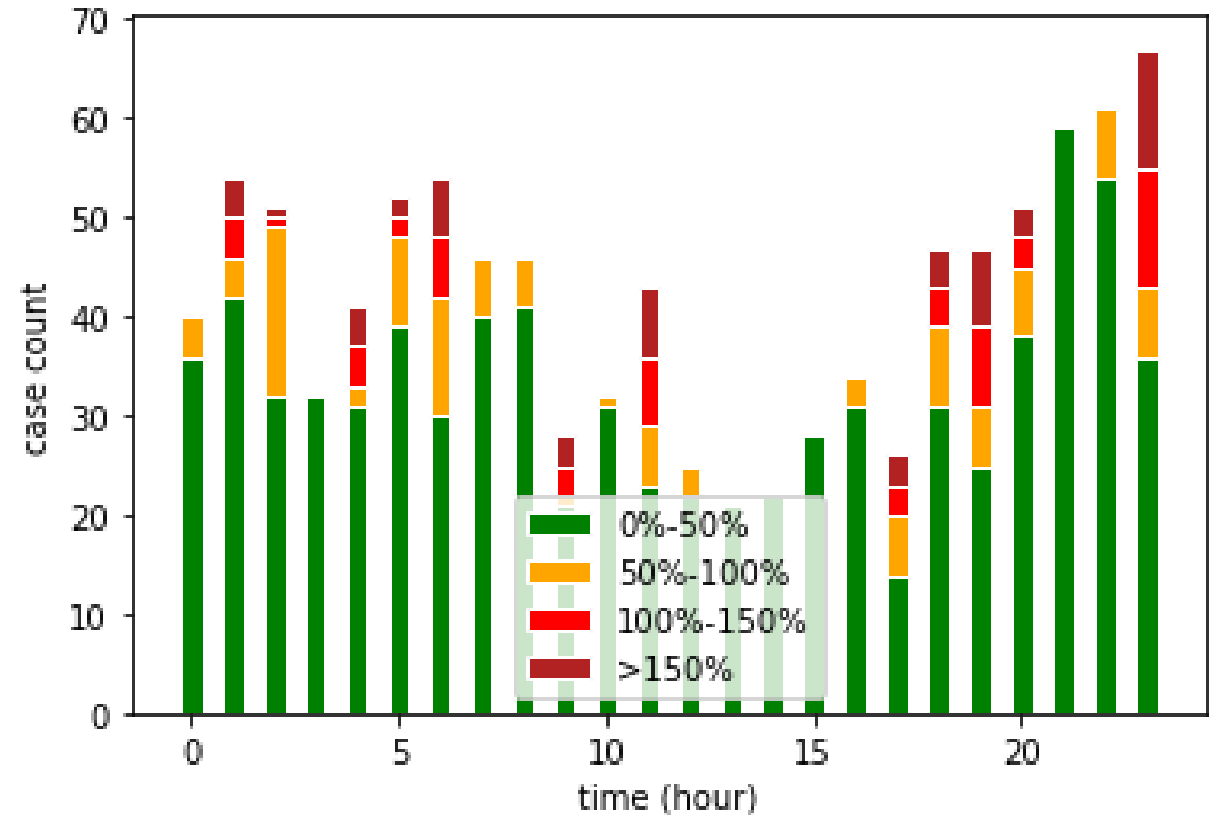
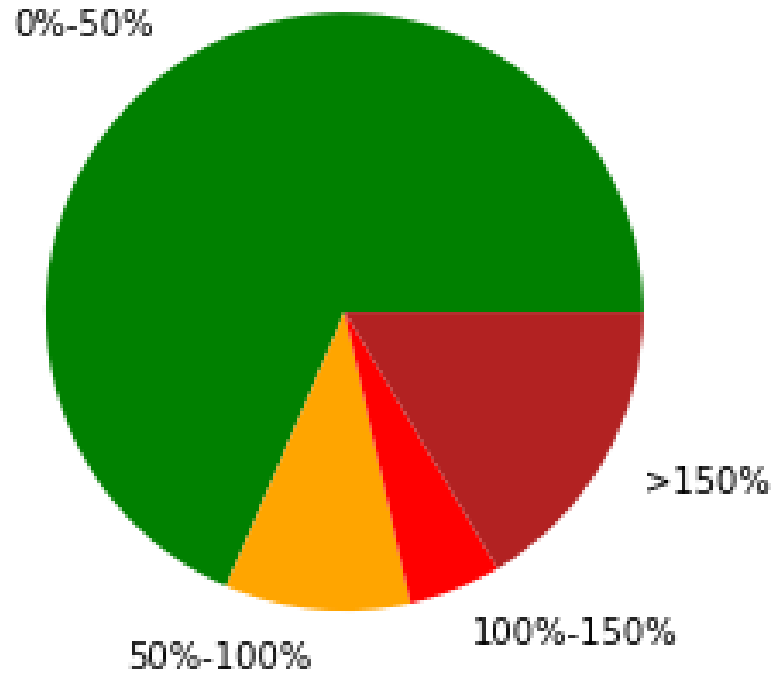


Grid Capacity analysis

- ◆ Maximum truck charging demand at near port locations compared to available grid load capacity data (preliminary results)



Grid Capacity analysis



- ◆ Count of load percentage (charging load/load capacity %) near port regions
- ◆ With the current simulation assumption and hourly monitored load analysis , 19% of all monitored events are overloading events

Discussion

◆ Main take-away messages

- ❑ The circuit capacity near the port area may not fulfill the charging demand with the increasing amount of electrified drayage trips
- ❑ Infrastructure planning strategy is needed for drayage trips: one centralized charging infrastructure versus multiple decentralized ones
- ❑ HEVI-LOAD is able to identify the charging demand near the port area and advise utility suppliers on potential circuit updates

◆ Limitation:

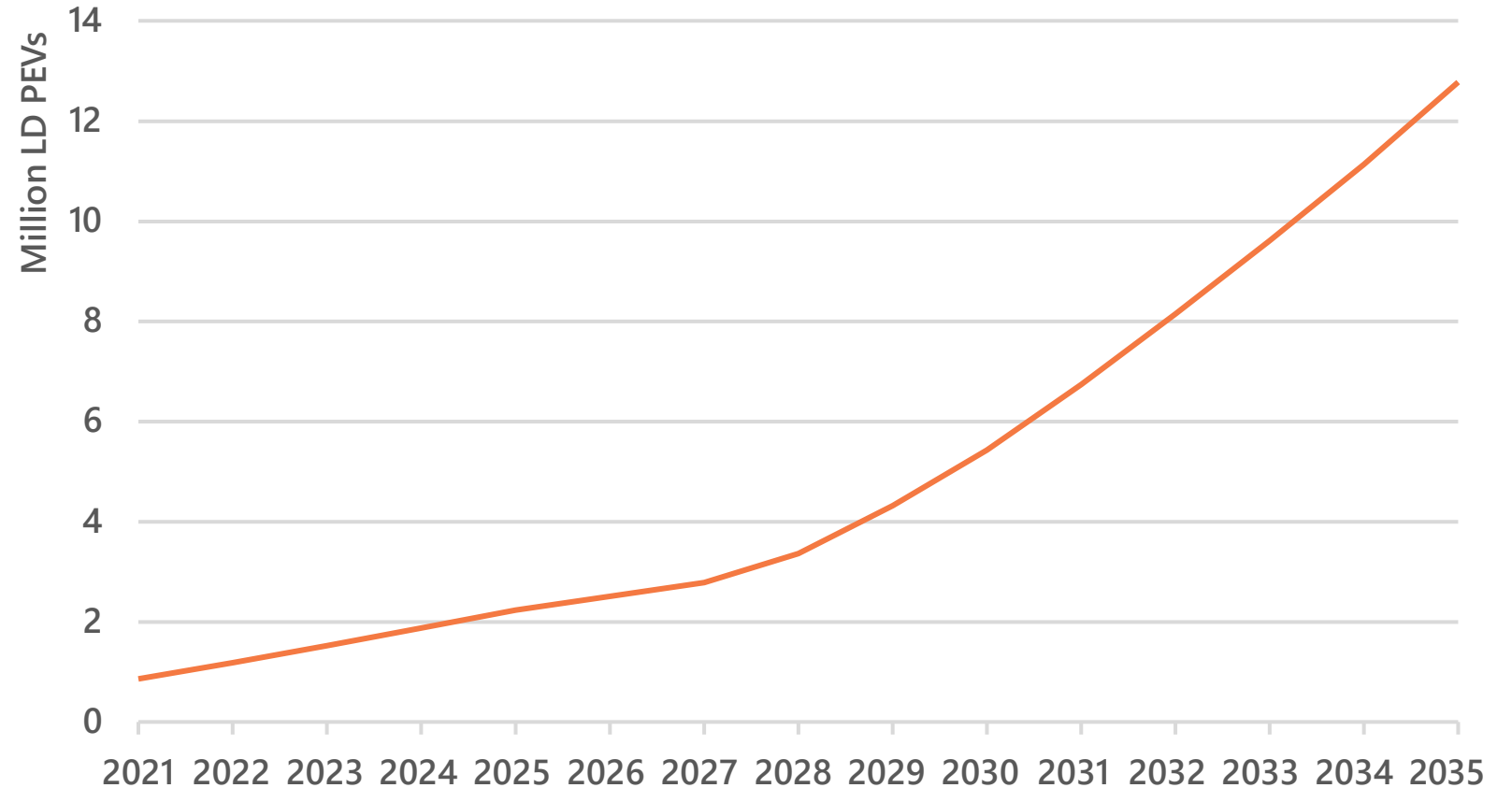
- ❑ Port logistic data is needed to further characterize and calibrate the drayage trip demand, as long-haul trucks may arrive at the nearby warehouses or distribution centers instead of charging within the port area.



The CEC Anticipates More EVs

- The Commission adopted the ATE scenario in May 2022 for utility and CPUC planning efforts
- Scenario anticipates 5.3M light-duty EVs and 186k medium- and heavy-duty EVs (slightly more ZEVs, which includes fuel-cell electric vehicles)

Light-Duty ZEV Population ATE Scenario (Incorporates CARB's Advanced Clean Cars II Regulation)

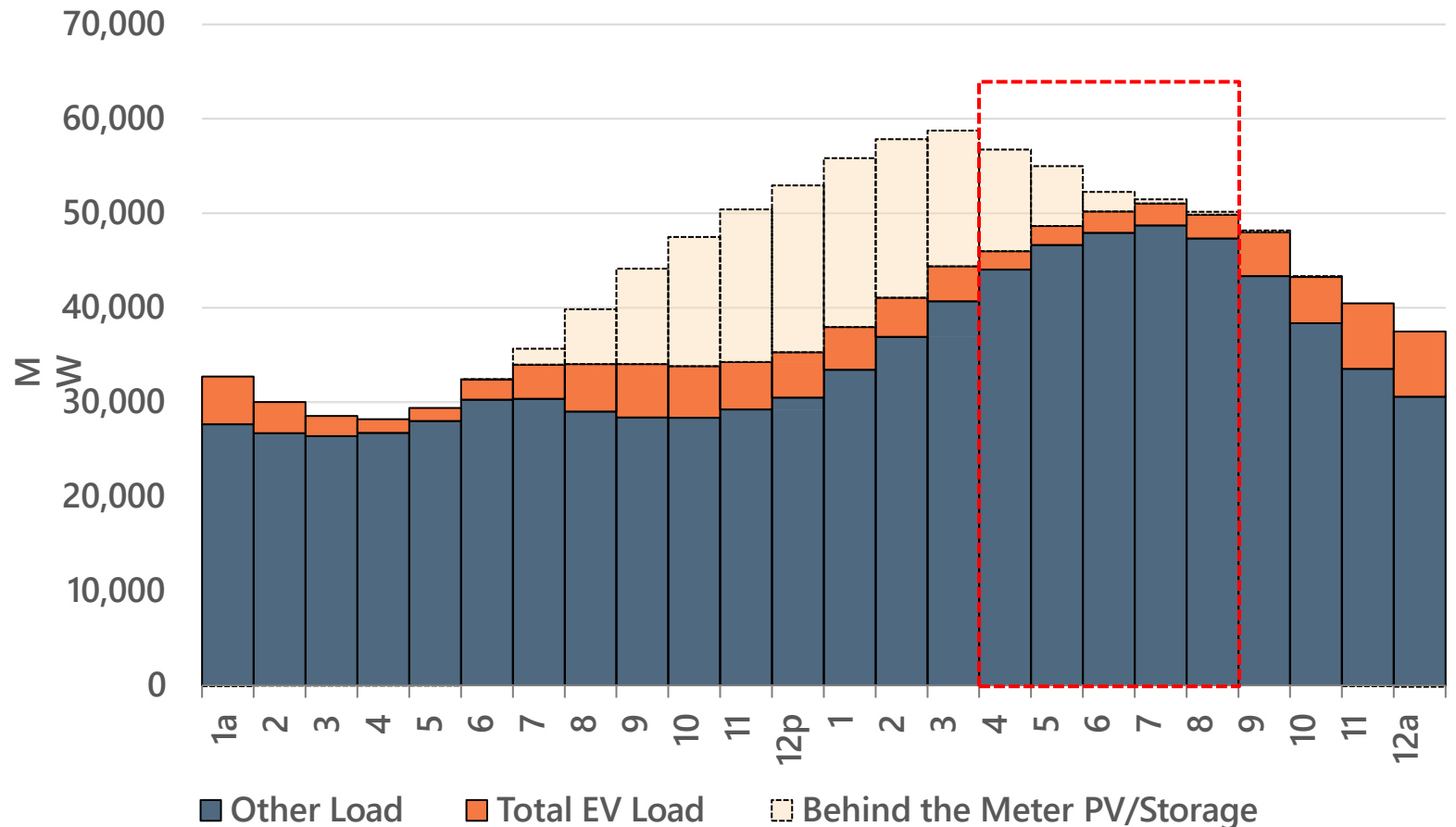




Planning for 2030 and Beyond

- EV load is forecasted to represent less than 5% of grid load during key peak hours (4:00-9:00).
- Scenario incorporates time-of-use impacts. Other technologies can mitigate this load impact further
- V2G potential suggests nearly 3 times more vehicle charging load could be sent back to the grid if 1 in 5 EVs participate in V2G

Additional Transportation Electrification (ATE) Scenario
Typical Summer 2030 Peak Day Load Profile



4d. Recap of I-710 Project by LA Metro (GNA)

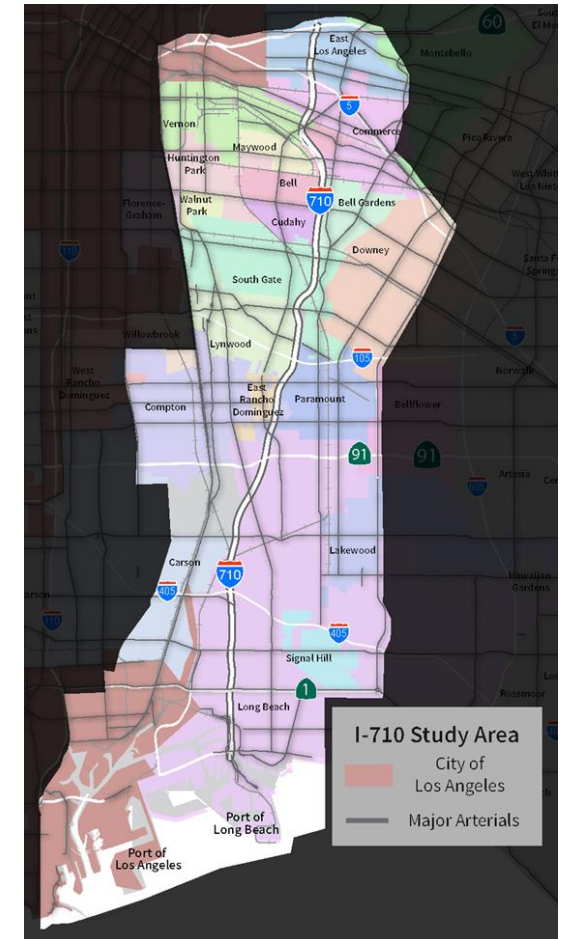
4d. Recap of I-710 Project by LA Metro

In May 2021, Metro's Board suspended work on the final EIR and subsequently took a "no build" vote due to the following factors:

- EPA requirement of a hotspot analysis for air quality conformity determination
- Ongoing concerns about community and environmental impacts
- New State direction withdrawing support due to equity and climate change policy considerations.

Metro and Caltrans were tasked with following actions:

- Re-evaluate project elements to meet policy objectives
- Re-engage communities and corridor stakeholders to develop a new vision that is multimodal and sensitive to community needs
- Re-evaluate candidate projects through new process
- Develop a new multimodal investment plan for the I-710 South Corridor



I-710 Task Force Membership / Ex Officio

Community Based Organizations and Advocacy Groups

- > Members of Coalition for Environmental Health and Justice
- > Southeast Los Angeles Collaborative
- > East Yard Communities for Environmental Justice
- > Communities for a Better Environment
- > Long Beach Alliance for Children with Asthma



Labor and Economic / Workforce Development

- > Teamsters
- > International Longshore and Warehouse Union
- > BizFed
- > Los Angeles Economic Development Corporation



Regional and Subregional Transportation Agencies

- > California Department of Transportation
- > Southern California Association of Governments
- > Metrolink
- > LA County Metropolitan Transportation Authority
- > Gateway Cities Council of Governments - Ad Hoc Committee
- > Alameda Corridor Transportation Authority
- > Access Services
- > Long Beach Transit



Community

Freight Industry

- > Ports (Los Angeles, Long Beach, Harbor Commission)
- > Railroads
- > Trucking
- > Logistics
- > Pacific Merchant Shipping Association



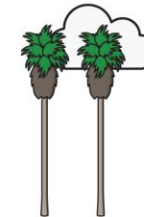
Academic / Research / Policy

- > METTRANS
- > Cal State Long Beach / Center for International Trade and Transportation
- > USC Equity Research Institute
- > CalStart
- > California Endowment



Regulatory Agencies

- > US Environmental Protection Agency Region 9
- > California Air Resources Board
- > South Coast Air Quality Management District



Local Jurisdictions

- > LA County Supervisorial Districts (1, 2, 4)
- > LA County Public Works
- > Cities (Long Beach, Los Angeles, Bell, Cudahy and Commerce)



Environmental Organizations

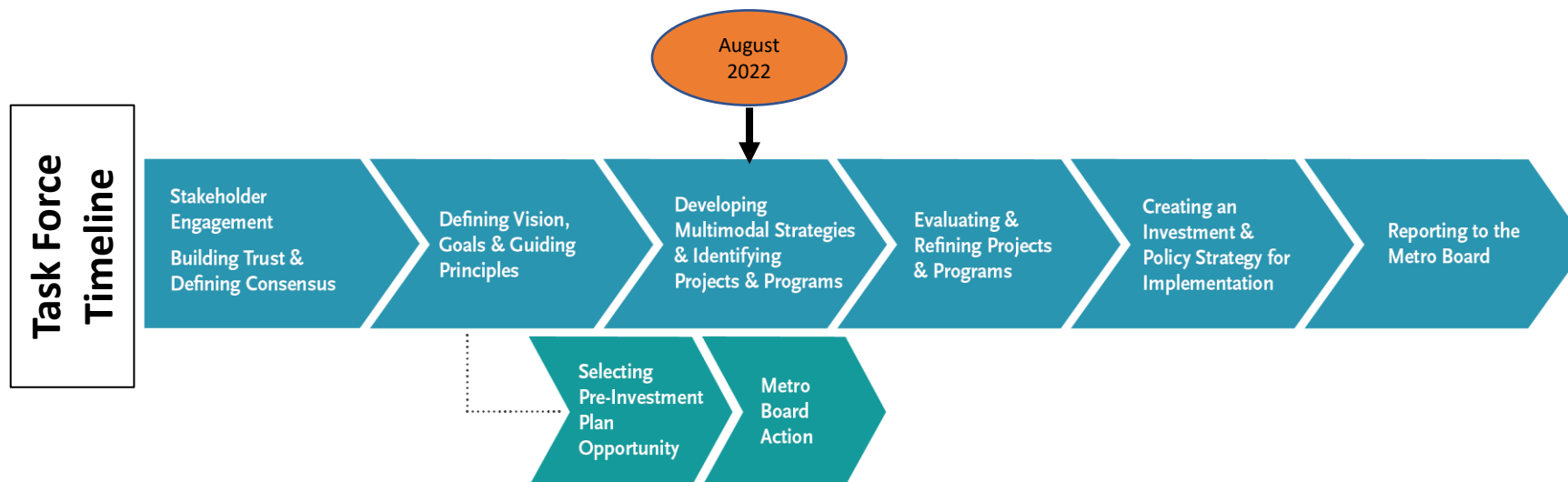
- > Coalition for Clean Air
- > Earthjustice
- > National Resources Defense Council



An Investment Plan for the I-710

The I-710 Task Force will present its Investment Plan to the Board in 2023. As it solicits input from community stakeholders Metro notes the following goals:

- Avoid an increase in vehicle trips
- Develop ZE charging/fueling infrastructure within the corridor
- Coordinate with POLA and POLB on Class 8 truck deployments
- Leverage state & federal funds to meet its \$200MM target
- Leverage funds from Measure M and Measure R to maximize deliverables and federal/state matches
- Specify an Early investment plan (fund applications in 2022-2023) and a Mid- and Long- term plan, for projects that can be completed by 2028



Metro has identified the following grant programs to support its \$200MM target:

Federal	DOT	Consolidated Rail Infrastructure and Safety Improvements (CRISI) Port Infrastructure Development Program
	EDA	Build Back Better Regional Program Rebuilding American Infrastructure with Sustainability and Equity (RAISE)
	Other	National Highway Freight Corridor Improvement Program
State	CTC	Local Partnership Program (LPP) Trade Corridor Enhancement Program (TCEP) Active Transportation Program (ATP) Solutions for Congested Corridors Program (SCCP)
	CEC	Blueprint Project
	Caltrans	Local Highway Safety Improvement Program
Local	Metro	Traffic Signal Priorities for Transit Safe Streets and Roads

4e. Discussion – Opportunity for Committee Recommendation

5. SSCAC Member Priorities & Activities

6. Update: Queen Mary Recommendation

7. Committee Discussion: Action on Locomotives

- a. Summary of Locomotive Deep Dive

7a. Summary of Locomotive Deep Dive

CARB Locomotive Regulation

- Presenting to board in November 2022
- Proposed rule based on four key concepts
 - CA railroads would pay per-megawatt hour basis for its operation in California
 - Locomotives 23 yrs+ are prohibited starting 2030, and line haul must be ZE by 2035
 - Implementation of U.S. EPA 30-minutes idle time limit
 - Defining equipment documentation and annual reporting requirements

Impact of I-710 No-Build Vote

- Earlier this year, Metro voted to cancel the I-710 expansion project, taking into consideration commentary from Caltrans. However, Metro and Caltrans are collaborating to identify more sustainable projects and programs to appropriately support regional growth needs.

7a. Summary of Locomotive Deep Dive

POLB Pier B On-dock Rail Update

- Increase percent of cargo moved by rail from 20% to 35%.
- Adding 5 arrival/departure tracks and infrastructure for up to 30 locomotives to support the forecasted growth in cargo demand (anticipate 7-10 trains/day). Also, some existing tracks will be replaced.
- The project is in the final stages of approval and completion is expected by 2032 for estimated \$1.5 billion.

POLA ZE Locomotive Activity

- 35% of intermodal containers use POLA's rail network
- 26% of all cargo that travels through POLA uses on-dock rail service for building and sorting double-stack trains.
- UP, BNSF and PHL use the port rail network of 116 miles of track and 11 facilities - five on-dock, five off-dock, and one near-dock.
- POLA has been aggressive in using available funding to meet CAAP goals
 - 2021: U.S. EPA DERA awarded POLA and UP \$2,025,000 to replace one existing Tier 0 switcher with a new BEL
 - 2022: the Ports' joint Technology Advancement Program (TAP) recommended ~\$1.2 million in funding for PHL's ZE switcher demo project

7a. Summary of Locomotive Deep Dive

Progress Rail Advanced Technologies Update

- Plans to deploy the world's largest battery electric vehicle for mining operations in Australia in 2023
- Exploring hydrogen fuel cell technology with BNSF and Chevron
- **Infrastructure is the most critical component of achieving ZE in the locomotive segment**
- **Recommends industry adoption of megawatt charging standard, eliminating single-yard tech and standard issues**

BNSF's ZE Locomotive Project Update

- 2021: ran a 2.4 MWh linehaul BEL between Barstow and Stockton funded by CARB's ZANZEFF
 - 4,000 miles in 5 months, performing 18 round trips, saving 800,000 gallons of fuel
- **OEMs and utilities have been key partners**; currently working with Progress Rail and WABTEC to identify BEL-appropriate routes

Union Pacific ZE Locomotive Project Update

- Company-wide goal is to reduce GHG emissions by 26% by 2030 compared to the 2018 baseline
- Using BD and RD, fuel efficiency technologies, and design improvements to reduce emissions.
- Exploring BEL tech in both freight and yard-switching services to accelerate emissions reduction
 - Freight service has zero point source emissions, reduced complexity and maintenance, and is grid-compatible, but has interoperability and cost challenges
 - **Yard switching is ready-to-go, grid-compatible zero point source emissions, with no interoperability challenges, but has high cost and requires growth testing**
 - Green hydrogen option doesn't require catenary, but prices are still too high and there is limited fueling and storage infrastructure options

8. Funding Opportunities & Advocacy

- a. Port Funding Programs for 2022-2023 cycle
- b. DOE Hydrogen Hub Program (POLB)

9. Conclusion & Next Steps

- a. Next Meeting: November 16th, 2022 – Workforce Development

Appendix: Committee Focus in 2022

Date	Theme	Specific Topics	Potential Guests
January 26 th	<ul style="list-style-type: none"> SSCAC 2022 Level-Set 	<ul style="list-style-type: none"> Updates from Members, Mayors, Ports on 2022 activities & priorities Updates from CARB, Ports on funding programs, strategies Progress with existing SSCAC recs Definition of “sustainability” 	
March 16 th	<ul style="list-style-type: none"> CTP Implementation & ZE Infrastructure 	<ul style="list-style-type: none"> CTP Implementation Regional blueprint projects 	<ul style="list-style-type: none"> UCLA CEC
May 18 th	<ul style="list-style-type: none"> Marine Vessels – 2021 activity & technology opportunity 	<ul style="list-style-type: none"> Approach to the 2021 emissions inventory Commercial Harbor Craft regulation hearing SPBP Technology Feasibility Assessment 	<ul style="list-style-type: none"> Thetius (IoT on vessels) Ballard (Fuel Cell propulsion)
July 20 th	<ul style="list-style-type: none"> Increased Efficiency & On-dock Rail 	<ul style="list-style-type: none"> Federal focus & funding Research & resources for needs, impact assessments Short-haul rail ZE opportunities CARB locomotive regulation 	<ul style="list-style-type: none"> Everport Terminal Services METRANS
September 21 st	<ul style="list-style-type: none"> ZE Trucks & CHE Implementation 	<ul style="list-style-type: none"> CTP Update ACF Rulemaking 	<ul style="list-style-type: none"> TBD
November 16 th	<ul style="list-style-type: none"> Workforce Development 	<ul style="list-style-type: none"> Training center developments Member activities Research & findings in 2022 	<ul style="list-style-type: none"> Green Workforce Coalition CSULB, UCLA