

## Electrifying Drayage Alliance



# Electrifying Drayage Alliance 2030 Roadmap Los Angeles & Long Beach

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*An implementation pathway to scale electric drayage by 2030*

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## Executive summary

The Electrifying Drayage Alliance (EDA) was established by Smart Freight Centre, with support from The Climate Pledge, to accelerate the deployment of electric drayage by bringing together cargo owners, logistics providers, carriers, ports, terminals, charging providers, vehicle manufacturers, utilities and public agencies. The EDA 2030 Roadmap for the Ports of Los Angeles and Long Beach establishes an implementation pathway to accelerate the deployment of electric drayage across the San Pedro Bay Port Complex by 2030.

Electric drayage is one of the most promising early applications for heavy-duty vehicle electrification because many port-adjacent freight movements are short, repeatable, and concentrated around major logistics hubs. Yet successful deployment depends on more than vehicles and charging infrastructure alone. Scaling electric drayage requires coordinated progress across freight demand, vehicle and charging readiness, port operations, market conditions, and ongoing collaboration across the freight ecosystem.

The Ports of Los Angeles and Long Beach are well positioned to lead this transition. The region already benefits from active electric truck deployments, expanding charging infrastructure, supportive public investment, and strong engagement from ports, cargo owners, carriers, charging providers, and other stakeholders. The opportunity now is to move beyond demonstrating technical feasibility and focus on the implementation needed to scale deployment.

The coalition has a shared ambition of enabling 2,000 electric drayage trucks to operate in the San Pedro Bay Port Complex by 2030. This roadmap establishes an implementation pathway to achieve that ambition through five implementation pillars:

- Build demand confidence
- Expand vehicle & charging readiness
- Optimize port & terminal operations
- Enable market conditions
- Coordinate, measure & scale deployment

Each implementation pillar pairs stakeholder commitments with the resources that EDA will develop to support implementation, measure progress and share lessons learned. The timeline sets primary objectives for each year from 2026 to 2030, followed by a detailed action plan.

The roadmap is intended to be a living document that can evolve alongside the market. The EDA will conduct annual reviews to inform annual roadmap updates, guide implementation priorities for the following year, and support replication across the broader EDA network.

### How to use this roadmap

This roadmap is intended to support voluntary collaboration across the Los Angeles–Long Beach drayage ecosystem. It should be used by ports, terminals, cargo owners, logistics providers, carriers, charging providers, utilities, public agencies, and other stakeholders to:

- identify practical actions within their respective roles;
- align implementation efforts around a shared 2030 ambition;
- monitor progress through annual roadmap reviews; and
- inform updates and replication across future EDA port roadmaps.

The roadmap is designed to evolve alongside the market through annual progress reviews and coalition feedback.

### NOTICE

This roadmap is not a procurement commitment, demand-aggregation mechanism, or substitute for carrier-specific support. It is a shared implementation pathway that provides a voluntary implementation framework for cargo owners, logistics providers, ports, terminals, carriers, and infrastructure partners around practical action to improve electric drayage utilization. All companies retain autonomy over prices, volumes, suppliers, routes, financing arrangements, and all commercial decisions.

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# 1. Purpose: why this port complex matters

The San Pedro Bay Port Complex, comprising the Ports of Los Angeles and Long Beach, is the largest container gateway in the United States, handling approximately 20 million TEU annually. Together, the two ports serve as the primary entry point for trans-Pacific trade and connect marine terminals with warehouses, rail facilities, distribution centres and logistics hubs across Southern California and the Inland Empire. These frequent, short-haul container movements make the port complex one of the world's most promising locations for large-scale deployment of electric drayage.

Reducing emissions from drayage activity also presents a significant opportunity to improve air quality and public health in the communities surrounding the port complex. As a result, Los Angeles and Long Beach have become a focal point for public investment, private sector innovation and operational demonstrations aimed at accelerating zero-emission freight.

The Electrifying Drayage Alliance (EDA) was established by Smart Freight Centre, with support from The Climate Pledge, to accelerate the deployment of electric drayage by bringing together cargo owners, logistics providers, carriers, ports, terminals, charging providers, vehicle manufacturers, utilities and public agencies. Rather than focusing on individual projects, the EDA provides a collaborative platform to identify common barriers, align implementation efforts and develop practical solutions that enable deployment at scale.

This roadmap translates that collaboration into a shared implementation pathway for the San Pedro Bay Port Complex. It does not prescribe commercial decisions or procurement commitments. Instead, it identifies the actions needed to strengthen demand signals, improve operational readiness, optimise port operations, address remaining market barriers and coordinate implementation between now and 2030.

Unlike many emerging markets, Los Angeles and Long Beach have already demonstrated that electric drayage can work operationally. The challenge is no longer proving the technology, but making electric drayage the default solution wherever operationally and commercially viable.

Under the right operating conditions, electric drayage has already reached, and in some cases surpassed, cost parity with diesel. Where carriers can combine existing incentives with efficient vehicle utilisation, access to charging and operational measures such as the APM Terminals Green Lane, electric trucks can deliver a lower total cost of ownership than older diesel vehicles. The next phase is therefore to create the market conditions that allow these business cases to become the standard rather than the exception.

This roadmap focuses on that next phase. It provides a practical implementation pathway to scale electric drayage through coordinated action across the freight ecosystem between 2026 and 2030.

## 2. Market Readiness Assessment

The roadmap has been informed by a market assessment undertaken by Smart Freight Centre to establish the current state of electric drayage in the San Pedro Bay Port Complex. The assessment considered fleet deployment, charging infrastructure, market conditions, policy support and operational readiness to identify where collaboration is needed to accelerate deployment.

### 2.1 Current market position

Unlike many regions that are still testing the feasibility of electric drayage, Los Angeles and Long Beach already benefit from one of the world's most mature deployment environments. More than 500 electric drayage trucks are currently operating in the port complex as of mid-2026, supported by a rapidly expanding charging network, state and local incentive programs, progressive port policies and active participation from stakeholders across the freight ecosystem.

| Category                         | Baseline                                                                           | Why it matters                                                 |
|----------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Container throughput             | ~20 million TEU (combined)                                                         | Largest U.S. container gateway                                 |
| Electric drayage fleet           | 5 trucks                                                                           | Existing deployment base                                       |
| Charging infrastructure          | 102 operational chargers + 92 planned to be operational by EOY 2026                | Expansive in- and near-port charging to support existing fleet |
| Public investment                | Local and state incentives active                                                  | Supports fleet and infrastructure deployment economics         |
| Market maturity                  | Technical feasibility demonstrated                                                 | Shifts focus to building demand confidence                     |
| Primary implementation challenge | Building demand confidence, improving utilization and strengthening TCO conditions | Focus of the roadmap                                           |

## 2.2 Market strengths and remaining barriers

The assessment found that many of the technical barriers to deployment have already been addressed. Vehicle availability has improved, charging infrastructure continues to expand and significant public funding has reduced investment costs for carriers. However, the market has not yet reached self-sustaining growth.

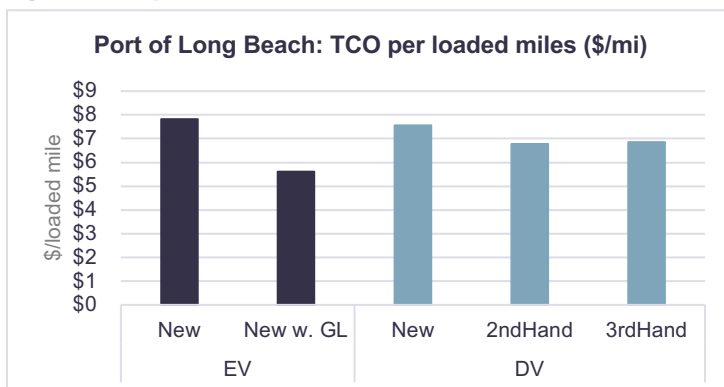
The remaining barriers are primarily commercial and operational rather than technological.

| Market strengths                  | Remaining barriers                                                   |
|-----------------------------------|----------------------------------------------------------------------|
| Strong policy environment         | Limited freight demand certainty                                     |
| Growing EV fleet                  | TCO gap remains                                                      |
| Charging investments              | Charging utilization                                                 |
| Experienced, engaged stakeholders | Port and terminal operational practices that maximize EV utilization |

## 2.3 Total Cost of Ownership assessment

To better understand the economic conditions under which electric drayage becomes competitive with diesel, a market-informed Total Cost of Ownership (TCO) assessment was completed. While the inputs are based on market data, the key assumptions and results have been verified with stakeholders.

Figure 1. TCO per loaded mile in LA/LB



Class 8 tractors used for drayage services at ports are often second- and third-hand, or older, diesel vehicles. Replacing these vehicles with electric vehicles can deliver significant emissions benefits, but faces a major economic challenge: the high upfront cost of the vehicle. This creates a significant cost parity gap, as purchasing a new electric truck can require approximately twice the upfront cost of a new diesel vehicle and ten to fifteen times that of a used diesel vehicle.

An earlier version of the TCO model assumed an electric truck price of \$350,000. Given the current market, the model assumes a price of \$290,000, which is a 17% price drop and is based on the latest discussions on prices within SFC's ZETSCALE project. Consequently, the revised TCO values for eTrucks have dropped by about 9 to 10% across the North-America ports. Even with OEMs lowering the purchase price of electric trucks, the gap remains significant, particularly when compared with second- and third-hand diesels.

Several factors can substantially improve deployment economics. California's incentive programmes reduce capital costs, while operational measures such as the APM Terminals Green Lane reduce waiting times and increase daily vehicle utilisation. At the same time, maintenance costs for older diesel trucks increase over their remaining service life.

The combined effect is that electric drayage can already achieve cost parity and, in some operating scenarios, outperform diesel, with a cost reduction of up to 15% on a \$/mile basis. This is particularly the case where carriers have access to available incentives, efficient charging, and operational benefits that maximise vehicle utilisation.

This demonstrates that the challenge is no longer whether electric drayage can be commercially viable, but how to make these favourable operating conditions commonplace across the market.

The TCO assessment will be updated periodically as vehicle prices, diesel costs, incentive programs and operational experience continue to evolve. Future roadmap updates will incorporate the latest market data to ensure implementation priorities remain aligned with changing deployment economics.

### 3. Implementation framework for San Pedro Bay Port Complex

The coalition has a shared ambition of enabling 2,000 electric drayage trucks to operate across the San Pedro Bay Port Complex by 2030. This roadmap organizes implementation around five complementary pillars that define the 2030 stakeholder commitments, the EDA implementation resources that will support stakeholders in achieving those commitments, and the phased action plan that will guide implementation through 2030.

Throughout this roadmap, the following terms are used consistently:

- **Implementation pillars** describe the five areas of focus for the roadmap.
- **2030 stakeholder commitments** describe the voluntary actions coalition stakeholders aim to have adopted by 2030.
- **EDA implementation resources**, also referred to as **outputs**, are the tools, guidance, analyses, and other tangible resources resulting from those priority actions that EDA will develop to support implementation.
- **Annual outcomes** describe what the coalition aims to achieve by the end of each year.
- **Priority actions** are the quarterly activities undertaken to achieve those annual outcomes.
- **Progress indicators** are the measures used to monitor implementation in the progress dashboard and inform annual roadmap updates.

| Implementation pillar               | LA/LB 2030 stakeholder commitments                                                                                                                                                                                                                                                                                                                                    | EDA implementation resources                                                                                                                                                                           |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strengthen demand signal            | Integrate EV drayage into procurement by including electric drayage in each procurement cycle in all RFIs issued (shipper, LSP)                                                                                                                                                                                                                                       | Business case studies; freight flow at TCO parity map; model RFI guidance.                                                                                                                             |
| Enable operational readiness        | Align vehicle deployment and charging plans with available infrastructure, operational needs and relevant utility requirements as the market scales (carriers, CPOs, infrastructure partners and utilities)<br>Evaluate EV replacement for retiring diesel trucks where operational requirements, charging readiness and TCO conditions support deployment (carriers) | Strategic overview and map of operational and planned charging infrastructure, with links to relevant utility/interconnection resources and recurring readiness considerations raised by stakeholders. |
| Optimize port & terminal operations | Commit to implement operational and/or economic measures, share lessons learned with other ports and terminals, and drive                                                                                                                                                                                                                                             | Resource on Port & Terminal Solutions; feasibility study for terminals in LA and LB.                                                                                                                   |

|                                     |                                                                                                                                                                                                                                                                    |                                                                                                                                            |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | continuous improvement (terminals and ports)                                                                                                                                                                                                                       |                                                                                                                                            |
| Enable supportive market conditions | Support development and implementation of coalition-informed recommendations that identify practical policy, financing, workforce, utility, permitting, and regulatory actions to improve deployment economics and reduce barriers to electric drayage (ecosystem) | Incentive and policy inventory; truck availability and cost analysis; EV depreciation analysis; Coalition-informed market recommendations. |
| Coordinate, measure & scale         | Participate and continue to contribute to coalition through 2030, including data relevant to business for monitoring progress (EDA)                                                                                                                                | Roadmap dashboard; annual progress report; implementation resource hub.                                                                    |

## 4. Timeline

The implementation timeline establishes the primary objective for each year from 2026 through 2030, reflecting the expected progression from coalition alignment to deployment at scale and long-term knowledge transfer.

| Year | Annual LA/LB objective                  | Annual outcomes                                                                                                                                                                                                                                                                                                                                              |
|------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2026 | Coalition alignment & market activation | Coalition aligns around a shared implementation pathway; stakeholder workstreams are established; foundational EDA resources are launched; early freight opportunities and implementation priorities are identified.                                                                                                                                         |
| 2027 | Deployment readiness & learning         | Initial deployments are supported through stronger demand confidence, coordinated vehicle and charging planning, and operational pilots; implementation resources are refined based on early lessons learned.                                                                                                                                                |
| 2028 | Market expansion & replication          | Proven deployment approaches are expanded across additional fleets, terminals, and charging locations; successful implementation models begin to be replicated across the region.                                                                                                                                                                            |
| 2029 | Scaling and optimization                | Coalition partners focus on addressing remaining market barriers, strengthening utilization and economics, and embedding proven operational practices to support sustained deployment growth.                                                                                                                                                                |
| 2030 | Assessment & knowledge transfer         | Final progress toward the coalition's shared ambition is assessed; the roadmap is updated based on implementation experience; lessons learned and implementation resources are shared to support replication across the broader EDA network. Coalition determines whether to develop a 2030-2035 roadmap to support further adoption of EV drayage in LA-LB. |

## 5. Action plan for San Pedro Bay Port Complex

The Action Plan translates the implementation framework and annual objectives into a sequence of priority actions through 2030. Each action contributes to achieving the annual outcomes described in the Timeline and advancing the coalition's shared ambition of enabling 2,000 electric drayage trucks across the San Pedro Bay Port Complex.

Implementation is intended to be collaborative. While each action identifies a primary implementation lead, successful delivery will require continued coordination across coalition members and stakeholder groups. Each of these

stakeholder groups is related to the implementation pillars; Demand, Carrier, Port & Terminal, Charging Infrastructure, and Market Enablement, and stakeholders are categorized by nature of their business and expressed expertise and interest. Actions taken by each working group are highlighted in the roadmap through colorcoding, as shown in the below table.

| Working Group Colour Coding           |
|---------------------------------------|
| Demand Working Group                  |
| Carrier Working Group                 |
| Ports & Terminal Working Group        |
| Charging Infrastructure Working Group |
| Market Enablement Working Group       |

EDA will focus on convening stakeholders, developing shared implementation resources, monitoring market progress and capturing lessons learned. Companies' individual procurement, infrastructure development, utility interconnection, permitting and investment decisions remain with the organizations responsible for those activities.

The Action Plan will be reviewed annually and updated as market conditions evolve, implementation progresses, and new opportunities emerge.

## 2026: coalition alignment & market activation

By 2026, the coalition aims to have:

- Identify lanes where EV solutions are offered at TCO parity.
- Publish an overview of public and semi-public charging infrastructure available for the coalition members.
- Complete the feasibility study of terminal solutions in LA and LB.
- Confirm current and expected policies and incentives to feed into the Market Enablement Framework.
- Finalize roadmap actions and confirmed owners, start implementation by completing all 2026 actions

| Q  | Pillar                                 | Priority Action                                                                                                                                                                                | Lead                                                     | Output                                                                  |
|----|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------|
| Q3 | Coordinate, measure & scale deployment | Finalize the roadmap, establish implementation workstreams, determine progress indicators, and confirm annual reporting processes.                                                             | EDA                                                      | Final Roadmap & Implementation Governance                               |
| Q3 | Coordinate, measure & scale deployment | Public launch of the LA/LB Roadmap at the USC Supply Chain Excellence Conference on 14 August, 2026                                                                                            | EDA supported by APM Terminals, Forum Mobility, King Fio | Visibility for coalition and potential to attract new coalition members |
| Q3 | Strengthen demand signals              | Establish a baseline understanding of potential demand for electric drayage, based on voluntarily provided coalition data, and expand participation from cargo owners and logistics providers. | Demand Working Group                                     | Aggregated demand baseline (TEU at LA/LB), where data are available     |
| Q3 | Optimize port & terminal operations    | Document operational pilots and publish practical guidance for terminal implementation.                                                                                                        | Ports & Terminal                                         | Port & Terminal Solutions Guide (Published on EDA website)              |

|    |                                     |                                                                                                                                                                                                               |                                              |                                                |
|----|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------|
|    |                                     |                                                                                                                                                                                                               | Working Group                                |                                                |
| Q4 | Strengthen demand signals           | Identify delivery locations/lanes currently at TCO parity for electric drayage.                                                                                                                               | EDA based on data from Carrier Working Group | Priority Freight Opportunity Map               |
| Q4 | Strengthen demand signals           | Publish initial business case studies using available coalition deployment examples.                                                                                                                          | EDA                                          | Initial Business Case Series                   |
| Q4 | Strengthen demand signals           | Develop model procurement guidance timed to participating shipper/LSP procurement cycles, including practical ways to request and evaluate electric drayage options.                                          | Demand Working Group                         | Model Procurement Guidance                     |
| Q4 | Enable operational readiness        | Compile a regional overview of existing and planned charging infrastructure and incorporate available information on relevant utility processes and recurring readiness barriers raised by coalition members. | Charging Infrastructure Working Group        | Charging Infrastructure Overview               |
| Q4 | Optimize port & terminal operations | Assess current terminal operational practices and ease and impact of solutions in Port & Terminal Solutions Guide at LA/LB on a terminal level                                                                | Ports & Terminal Working Group               | Port & Terminal Solutions Assessment for LA/LB |
| Q4 | Enable supportive market conditions | Compile current and expected policies and incentive programs affecting electric drayage trucks and charging infrastructure, including program eligibility and known stacking limitations where applicable.    | Market Enablement Working Group              | Policy and Incentive Overview                  |

## 2027: Deployment readiness & learning

By 2027, the coalition aims to have:

- Provide resources to support the use-case of economic and operational viable EV solutions.
- Create a charging readiness strategy in line with expected EV growth.
- Confirm the implementation plan for terminal solutions in LA and LB.
- Create market recommendations needed to close the TCO gap.
- Update roadmap actions for 2028 based on 2027 learnings.

| Q  | Pillar                    | Priority Action                                                                          | Lead | Output                        |
|----|---------------------------|------------------------------------------------------------------------------------------|------|-------------------------------|
| Q1 | Strengthen demand signals | Expand the business case series with additional deployment examples and lessons learned. | EDA  | Expanded Business Case Series |

|    |                                        |                                                                                                                                                                                         |                                       |                                                               |
|----|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------|
| Q1 | Strengthen demand signals              | Review and refine model procurement guidance based on member use, market developments and upcoming procurement cycles.                                                                  | Demand Working Group                  | Updated Model Procurement Guidance                            |
| Q1 | Enable supportive market conditions    | Create coalition recommendations that enable the market by closing the TCO gap, based on policy, financing, workforce, utility, permitting, and regulatory actions.                     | Market Enablement Working Group       | Market Recommendation                                         |
| Q2 | Enable supportive market conditions    | Info session on WAIRE program for warehouse operators                                                                                                                                   | Market Enablement Working Group       | Awareness on impact of WAIRE program for Demand Working Group |
| Q2 | Enable operational readiness           | Update the charging infrastructure overview based on expected fleet growth and available stakeholder information, and surface recurring readiness constraints for coalition discussion. | Charging Infrastructure Working Group | CPOs, infrastructure developers, carriers, utilities, EDA     |
| Q2 | Optimize port & terminal operations    | Identify opportunities to improve EV utilization based on ease and impact assessment                                                                                                    | Ports & Terminal Working Group        | Port & Terminal Solutions Implementation Plan                 |
| Q3 | Enable market conditions               | Refine coalition recommendations based on implementation experience and policy developments.                                                                                            | Market Enablement Working Group       | Updated Market Recommendations included as Actions in Roadmap |
| Q3 | Strengthen demand signals              | Confirm lanes where EV drayage solutions were included in RFI                                                                                                                           | Demand Working Group                  | % EV solution included in RFI ( <i>Progress Dashboard</i> )   |
| Q4 | Coordinate, measure & scale deployment | Identify lessons learned and impact of actions taken across all working groups                                                                                                          | EDA                                   | Annual Progress Report and updated actions for 2028           |

## 2028: Market expansion & replication

By 2028, the coalition aims to have:

- Provide resources proving deployment approaches and confirm use cases where TCO gap closed.
- Identify new and planned charging infrastructure.
- Share best practice learnings of terminal solutions implementations in LA and LB.
- Update barriers for electric drayage market growth.
- Update roadmap actions for 2029 based on 2028 learnings.

| Q  | Pillar                    | Priority Action                                              | Lead                        | Output                           |
|----|---------------------------|--------------------------------------------------------------|-----------------------------|----------------------------------|
| Q1 | Strengthen demand signals | Update Priority Freight Opportunity map based on revised TCO | EDA / Carrier Working Group | Priority Freight Opportunity Map |

|    |                                        |                                                                                                                                                                     |                                       |                                                                                     |
|----|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|
| Q1 | Strengthen demand signals              | Determine 2027 volumes for electric drayage, based on data provided by coalition members                                                                            | Demand Working Group                  | Aggregated demand volume + share moved on e-trucks<br>( <i>Progress Dashboard</i> ) |
| Q1 | Enable supportive market conditions    | Refine coalition recommendations based on implementation experience and policy developments.                                                                        | Market Enablement Working Group       | Updated Market Recommendations included as Actions in Roadmap                       |
| Q2 | Enable operational readiness           | Update the charging infrastructure overview based on fleet deployment, new/planned charging assets and implementation lessons shared by participating stakeholders. | Charging Infrastructure Working Group | Updated Charging Infrastructure Overview                                            |
| Q2 | Optimize port & terminal operations    | Document and share replicable operational practices across participating terminals.                                                                                 | Ports & Terminal Working Group        | Operational Best Practices Guide                                                    |
| Q3 | Enable supportive market conditions    | Evaluate progress toward improved deployment economics and update coalition recommendations.                                                                        | Market Enablement Working Group       | Market Conditions Assessment                                                        |
| Q3 | Enable supportive market conditions    | Refine coalition recommendations based on implementation experience and policy developments.                                                                        | Market Enablement Working Group       | Updated Market Recommendations included as Actions in Roadmap                       |
| Q4 | Coordinate, measure & scale deployment | Identify lessons learned and impact of actions taken across all working groups                                                                                      | EDA                                   | Annual Progress Report and updated actions for 2029                                 |

## 2029: Scaling and optimization

By 2029, the coalition aims to have:

- Build on expanded demand confidence through increase EV-volumes within the coalition.
- Identify new and planned charging infrastructure.
- Update guide based on learnings of terminal solutions implementations in LA and LB.
- Identify actions to overcome current TCO gap for electric drayage.
- Update roadmap actions for 2029 based on 2028 learnings.

| Q  | Pillar                              | Priority Action                                                                                 | Lead                            | Output                                                            |
|----|-------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------|
| Q1 | Strengthen demand signals           | Expand freight opportunity mapping and strengthen engagement across additional market segments. | Demand Working Group            | Updated Freight Opportunity Map                                   |
| Q1 | Enable supportive market conditions | Refine coalition recommendations based on implementation experience and policy developments.    | Market Enablement Working Group | Updated Market Recommendations included as Actions in Roadmap     |
| Q2 | Enable operational readiness        | Review available charging-utilization information and operational lessons voluntarily           | Charging Infrastructure         | Charging Utilization & Lessons Summary (where data are available) |

|    |                                        |                                                                                                                    |                                 |                                                               |
|----|----------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------|
|    |                                        | shared by participating CPOs, and identify recurring opportunities to improve network performance and reliability. | Working Group                   |                                                               |
| Q2 | Optimize port & terminal operations    | Update operational guidance based on implementation experience and emerging best practices.                        | Ports & Terminal Working Group  | Updated Port & Terminal Solutions Guide                       |
| Q3 | Enable supportive market conditions    | Identify remaining deployment barriers and recommend targeted actions to accelerate adoption.                      | Market Enablement Working Group | Market Barrier Assessment                                     |
| Q3 | Enable supportive market conditions    | Refine coalition recommendations based on implementation experience and policy developments.                       | Market Enablement Working Group | Updated Market Recommendations included as Actions in Roadmap |
| Q4 | Coordinate, measure & scale deployment | Identify lessons learned and impact of actions taken across all working groups                                     | EDA                             | Annual Progress Report and updated actions for 2030           |

## 2030: Assessment & knowledge transfer

By 2030, the coalition aims to have:

- Increase demand within coalition by including EV solutions in RFI.
- Identify charging infrastructure strategy and implementation is at par with current number of EVs.
- All LA and LB terminals have taken action where feasible to implement solutions.
- Identify main drivers enhancing and barriers hindering further adoption of electric drayage.
- Progress towards coalition's targets assessed and determine if a continued roadmap till 2035 is necessary.

| Q  | Pillar                              | Priority Action                                                                                    | Lead                                  | Output                                                        |
|----|-------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------|
| Q1 | Strengthen demand signals           | Evaluate progress toward demand confidence objectives and document lessons learned.                | Demand Working Group                  | Demand Assessment Summary                                     |
| Q1 | Enable supportive market conditions | Refine coalition recommendations based on implementation experience and policy developments.       | Market Enablement Working Group       | Updated Market Recommendations included as Actions in Roadmap |
| Q2 | Enable operational readiness        | Assess regional deployment outcomes and identify remaining infrastructure needs.                   | Charging Infrastructure Working Group | Deployment Assessment                                         |
| Q2 | Optimize port & terminal operations | Evaluate operational performance and document lessons learned for future implementation.           | Ports & Terminal Working Group        | Operational Performance Review                                |
| Q3 | Enable supportive market conditions | Evaluate market conditions and update recommendations to support continued deployment beyond 2030. | Market Enablement Working Group       | Updated Market Recommendations                                |

|    |                                        |                                                                                |     |                                                                  |
|----|----------------------------------------|--------------------------------------------------------------------------------|-----|------------------------------------------------------------------|
| Q4 | Coordinate, measure & scale deployment | Identify lessons learned and impact of actions taken across all working groups | EDA | Annual Progress Report and decision made on extension of roadmap |
|----|----------------------------------------|--------------------------------------------------------------------------------|-----|------------------------------------------------------------------|

## 6. Progress dashboard for San Pedro Bay Port Complex

The dashboard is updated annually and adapted to local market conditions. It replaces the static 'success indicators' and supports annual roadmap reviews.

| Pillar                              | Indicators                                                                                        | 2026 baseline    | 2027   | 2028   | 2029   | 2030   |
|-------------------------------------|---------------------------------------------------------------------------------------------------|------------------|--------|--------|--------|--------|
| Strengthen demand signals           | EV drayage solutions included in RFIs                                                             | TBD              |        |        |        | 100%   |
|                                     | Share of coalition-reported freight moved by electric drayage (where data are available)          | TBD              |        |        |        | 10%    |
| Enable operational readiness        | EV trucks (based on port registries)                                                              | 548              |        |        |        | 2,000  |
|                                     | Charging stations/ports (operational; planned assets tracked separately where data are available) | 102              |        |        |        | TBD    |
| Optimize port & terminal operations | Number of participating terminals (with active green lines, priority appt. systems, etc.)         | 2                |        |        |        | 13     |
| Enable supportive market conditions | Relevant active/funded incentive programmes tracked                                               | #                |        |        |        | TBD    |
|                                     | Lanes/use cases at or near TCO parity (based on available analysis)                               | TBD<br>Current % |        |        |        | TBD    |
| Coordinate, measure & scale         | Annual progress report completed, including actions taken and lessons learned                     | Yes/No           | Yes/No | Yes/No | Yes/No | Yes/No |
|                                     | Number of engaged coalition members                                                               | #                |        |        |        | #      |

### Rationale for the 2030 targets

The 2030 targets are intended to provide a clear and measurable indication of whether the coalition is helping move the electric drayage market from early deployment toward broader adoption. They reflect the coalition's ambition, while recognising that market conditions, policy support and technology availability will continue to evolve.

- **EV drayage solutions included in RFIs:** Coalition members are expected to include an electric option in **all relevant RFIs**. This is a non-binding step that builds market visibility and learning without requiring a commitment to procure electric services.
- **Share of coalition-reported freight moved by electric drayage:** The target aligns with the ambition of 2,000 electric trucks, representing approximately **10% of the estimated drayage fleet** in the San Pedro Bay

Port Complex. It provides a demand-side measure of whether coalition members are contributing meaningfully to market uptake.

- **EV trucks:** The target of **2,000 electric trucks** represents approximately 10% of the estimated drayage fleet and reflects an ambitious but achievable level of deployment based on the region's existing electric truck base, improving vehicle economics and expected development of a second-hand EV market.
- **Charging stations/ports:** The target will be determined based on the charging capacity needed to support the 2,000-truck ambition, informed by the charging infrastructure assessment and deployment patterns.
- **Participating terminals:** All **13 container** terminals in the San Pedro Bay Port Complex are expected to assess and, where feasible, implement operational or economic measures that can support electric drayage.
- **Relevant active/funded incentive programs:** The objective is to reduce reliance on incentives as market conditions improve, while recognising that some support is likely to remain necessary through 2030. The indicator will track the evolution of relevant programmes rather than target a fixed number.
- **Lanes/use cases at or near TCO parity:** The target will be set based on the completed TCO freight-flow mapping. Current analysis indicates that electric drayage can already achieve a cost advantage in suitable operations, particularly where the APM Terminals Green Lane is available. The map will identify where these conditions apply.
- **Annual progress report:** A simple annual measure to ensure the coalition reviews progress, actions and lessons learned each year.
- **Number of engaged coalition members:** Tracks growth and continuity of participation, ensuring the coalition remains sufficiently representative to support market change while maintaining a practical implementation focus.

## Looking ahead

Achieving 2,000 electric drayage trucks by 2030 will require continued leadership across the freight ecosystem. This roadmap provides a shared implementation pathway—not a fixed prescription. As technology, markets, and policy evolve, so too will the roadmap. Through annual updates, shared learning, and continued collaboration, the coalition will refine this implementation pathway and support replication across additional EDA port regions.

# Appendices

Appendix A. Baseline market assessment

Appendix B. LA-LB Roadmap stakeholders and participants [placeholder]

Appendix C. References

Appendix D. Glossary

## Appendix A. Baseline Market Assessment

Below are the baseline inputs for the TCO calculation discussed in Chapter 2.3. These numbers have been validated with stakeholders in the LA/LB coalition.

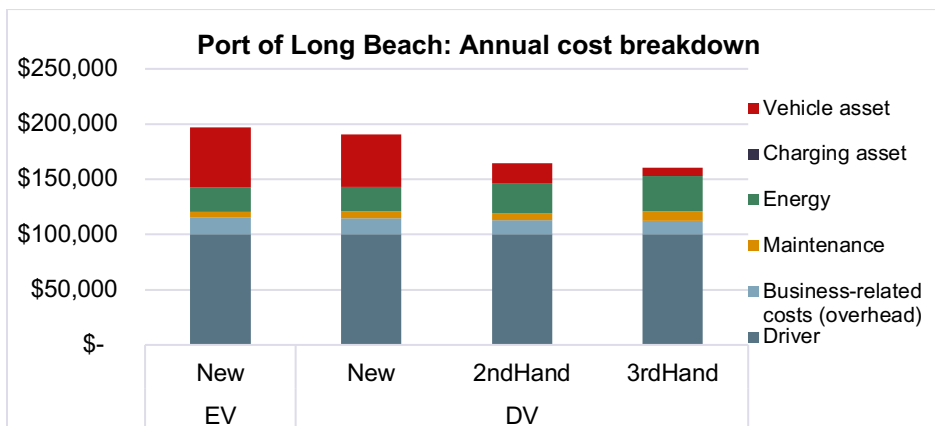
| Metric                       | New eTruck            | New Diesel Truck | 2nd-Hand Diesel | 3rd-Hand Diesel |
|------------------------------|-----------------------|------------------|-----------------|-----------------|
| <b>Purchase Price</b>        | \$290,000             | \$150,000        | \$55,000        | \$20,000        |
| <b>Resale value</b>          | \$58,000              | \$37,500         | \$15,000        | \$15,000        |
| <b>Operational Days/Year</b> | 250                   | 250              | 240             | 235             |
| <b>Fuel Efficiency</b>       | 2.00 kWh/mile         | 7.69 mpg         | 6.15 mpg        | 5.00 mpg        |
| <b>Maintenance Cost</b>      | \$0.18 / mile         | \$0.20 / mile    | \$0.23 / mile   | \$0.30 / mile   |
| <b>DEF Efficiency</b>        | —                     | 385 mpg          | 308 mpg         | 250 mpg         |
| <b>DEF Cost</b>              | —                     | \$0.013 / mile   | \$0.016 / mile  | \$0.020 / mile  |
| <b>ZET Subsidy</b>           | \$150,000 - \$175,000 |                  |                 |                 |

Numbers related to LA specific taxes and policies, as well as impact on operational metrics.

|                                                 |           |                           |                            |                         |
|-------------------------------------------------|-----------|---------------------------|----------------------------|-------------------------|
| <b>State registration annual fees (\$)</b>      | \$2,064   | <b>Operational Metric</b> | <b>Standard Conditions</b> | <b>Greenlane Policy</b> |
| <b>Vehicle excise tax (% of purchase price)</b> | 25.1%     | Average Lane Distance     | 50 miles                   |                         |
| <b>ZET State Subsidy (\$/truck)</b>             | \$150,000 | Total Waiting Time        | 3 hours                    | 1.5 hours               |
| <b>Commercial Electricity Rate (\$/kWh)</b>     | 0.25      | Total Roundtrip Time      | 4.2 hours                  | 2.7 hours               |
| <b>Add on public charging price (\$/kWh)</b>    | 0.15      | Daily Roundtrips          | 2                          | 3                       |
| <b>Diesel Price (\$/gal)</b>                    | \$6.13    | Annual Mileage            | 28,000                     | 42,000                  |

Looking into the costs, we consider both the annual cost (figure 2) and the cost per mile (figure 1). Comparing these two, we see that 3<sup>rd</sup> hand diesel trucks are lower for annual cost but cost/mile are higher compared to 2<sup>nd</sup> hand diesel given cost for diesel, maintenance, and expected downtime.

Figure 2. Annual cost in LA/LB



## **Appendix C. References**

This list of reference is extended as the work within the roadmap continues.

### **C1. Local policies and incentive programs**

- (a) Clean Air Action Plan (CAAP)
- (b) Clean Truck Program

### **C2. State policies and incentive programs**

- (a) CARB Clean Fuel Reward Program
- (b) HVIP Drayage Truck Set-Aside
- (c) EnergIIZE Drayage Set-Aside

### **C3. Federal policies and incentive programs**

### **C4. Technical guidance**

### **C5. Related studies**

## Appendix D. Glossary

| Acronym | Definition                                                                                                                                                                        |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BEV     | Battery-electric vehicle                                                                                                                                                          |
| CARB    | California Air Resources Board                                                                                                                                                    |
| CPO     | Charge Point Operator; an organization that owns and/or operates electric vehicle charging infrastructure                                                                         |
| EDA     | Electrifying Drayage Alliance                                                                                                                                                     |
| EPA     | U.S. Environmental Protection Agency                                                                                                                                              |
| EV      | Electric vehicle                                                                                                                                                                  |
| GHG     | Greenhouse gas                                                                                                                                                                    |
| HDV     | Heavy-duty vehicle                                                                                                                                                                |
| ICE     | Internal combustion engine                                                                                                                                                        |
| kW      | Kilowatt, a unit of power                                                                                                                                                         |
| MCS     | Megawatt Charging System; a high-power charging standard designed for heavy-duty electric vehicles                                                                                |
| MW      | Megawatt, equal to 1,000 kilowatts                                                                                                                                                |
| OEM     | Original Equipment Manufacturer (vehicle manufacturer)                                                                                                                            |
| RFI     | Request for Information; a preliminary procurement document used to gather information from suppliers before formal solicitation                                                  |
| TEU     | Twenty-foot Equivalent Unit; the standard measure of containerized cargo capacity                                                                                                 |
| TCO     | Total Cost of Ownership; the full lifecycle cost of owning and operating a vehicle, including purchase, fuel or electricity, maintenance, depreciation, and other operating costs |