

**California Governor's Office of Business and Economic Development Office  
of Supply Chain – California Containerized Ports Interoperability Program**

**Grant Agreement # CPDIP2024-L10**

1. This Agreement is entered into between the State Agency and the Grant Recipient named below:

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STATE UNIT/AGENCY NAME

CALIFORNIA OFFICE OF SUPPLY CHAIN, GOVERNOR'S OFFICE OF BUSINESS AND  
ECONOMIC DEVELOPMENT

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GRANT RECIPIENT NAME

PORT OF LOS ANGELES (City of Los Angeles Harbor Department)

2. The term of this Agreement is:  
October 3, 2024 – March 02, 2026
3. The maximum amount of this Agreement is:  
\$3,700,000
4. The parties agree to comply with the terms and conditions of the following Agreement including exhibits which are by this reference made a part of this Agreement.

**IN WITNESS THEREOF**, the parties have executed this AGREEMENT hereto.

<b>GRANT RECIPIENT</b>	
GRANT RECIPIENT'S NAME CITY OF LOS ANGELES HARBOR DEPARTMENT, By its Board of Harbor Commissioners	
BY (Authorized Signature)  x.	DATE SIGNED
PRINTED NAME AND TITLE OF PERSON SIGNING EUGENE D. SEROKA, EXECUTIVE DIRECTOR	
ATTESTED BY  x.	
PRINTED NAME AND TITLE OF PERSON SIGNING AMBER KLESGES, BOARD SECRETARY	
APPROVED TO FORM, LA CITY ATTORNEY'S OFFICE  x. <i>Joy M. Crose</i> 9/25/24	
PRINTED NAME AND TITLE OF PERSON SIGNING JOY M. CROSE, ASST. GEN COUNSEL	
ADDRESS 425 S. PALOS VERDES STREET, SAN PEDRO, CA 90731	
<b>STATE OF CALIFORNIA</b>	
STATE UNIT/AGENCY NAME OFFICE OF SUPPLY CHAIN, GOVERNOR'S OFFICE OF BUSINESS AND ECONOMIC DEVELOPMENT	
BY (Authorized Signature)  x.	DATE SIGNED
PRINTED NAME AND TITLE OF PERSON SIGNING	
ADDRESS 1325 J STREET, SUITE 1800, SACRAMENTO, CA 95814	

**CALIFORNIA GOVERNOR'S OFFICE OF BUSINESS AND ECONOMIC DEVELOPMENT**  
**CALIFORNIA CONTAINERIZED PORT INTEROPERABILITY PROGRAM**  
**GRANT AGREEMENT**

This Containerized Port Interoperability Program 2024/2025 (hereinafter referred to as the "PROGRAM") Grant Agreement (hereinafter referred to as the "AGREEMENT") dated October 3, 2024 is entered into by and between PORT OF LOS ANGELES (hereinafter "RECIPIENT"), and the Office of Supply Chain within the Governor's Office of Business and Economic Development (hereinafter, "GO-Biz"), hereafter jointly referred to as the "parties" or individually as the "party."

- A. **WHEREAS**, GO-Biz is the sponsor and the manager of this award issued to the RECIPIENT under Agreement Number CPDIP2024-L10 ("Award");
- B. **WHEREAS**, GO-Biz desires to retain RECIPIENT to perform and/or manage services as described in the 2024/25 Program Announcement and Exhibit A ("Scope of Work, Performance Metrics and Budget") to help containerized ports achieve efficient container movement, reduce greenhouse gas emissions, and increase operational efficiency through real time, cloud based port data interoperability systems and;
- C. **WHEREAS**, RECIPIENT is leading development of their port interoperability data systems in California pursuant to the Memorandum of Understanding ("MOU") between five containerized ports of Hueneme, Oakland, Long Beach, Los Angeles and San Diego;
- D. **WHEREAS**, AUTHORIZED REPRESENTATIVE is the designated point of contact authorized to communicate with GO-Biz on behalf of the RECIPIENT and is responsible for reporting and invoicing requirements as described in the AGREEMENT;
- E. **WHEREAS**, all parties acknowledge that this AGREEMENT and the Award are only available to eligible containerized ports in the State of California;
- F. **WHEREAS**, GO-Biz desires to retain RECIPIENT to perform services as specified in Exhibit A and intends to compensate RECIPIENT for such services, as described in Exhibit A;
- G. **WHEREAS**, RECIPIENT desires to be retained by GO-Biz to perform and/or manage such services as described in Exhibit A and to be compensated as set forth in Exhibit A.

**NOW, THEREFORE**, in consideration of the mutual and reciprocal promises and subject to the terms and conditions set forth herein, the parties agree as follows:

1. **Scope of Work and Performance Metrics.** RECIPIENT shall be responsible for the results and progress described in the Scope of Work and Performance Metrics, and Project Deliverables which is attached and incorporated as Exhibit A.
2. **Term of Agreement.** The period of performance of this AGREEMENT shall be from October 3, 2024 – March 02, 2026.
3. **Delivery.** All materials, services and/or deliverables required under this AGREEMENT must be completed and delivered to GO-Biz on or before March 02, 2026.
4. **Termination of Agreement.** Either party may terminate this AGREEMENT upon ninety (90) calendar days advance written notice to the other party. Upon termination of this AGREEMENT, GO-Biz agrees to compensate RECIPIENT for all allowable, unavoidable, expenses reasonably incurred by RECIPIENT in the performance of its work under this AGREEMENT prior to the date of termination. RECIPIENT agrees to complete services and/or provide required deliverables through the date of termination. In the event of termination, the state is obligated to compensate the RECIPIENT only for all allowable and unavoidable expenses reasonably incurred by the RECIPIENT in the performance of its work under the AGREEMENT as of the effective date of the terminating event or otherwise agreed period to allow project closeout activities, as determined appropriate by GO-Biz Office of Supply Chain. In addition, if a RECIPIENT has received notification from its federal funding partner that its cooperative agreement is scheduled for termination or that its operations are placed under a probationary status, the recipient must notify the Office of Supply Chain via email at [supplychain@gobiz.ca.gov](mailto:supplychain@gobiz.ca.gov) -within 3 business days. Failure to notify the Office of Supply Chain may impact future eligibility.
5. **Material Breach** GO-Biz will assess each grant award based on achievements against goals and respective scope of work. GO-Biz reserves the right to terminate the AGREEMENT in the case of a material breach. A material breach for the purposes of the Program may include, but shall not be limited to:
  - a) Failure to comply with established deadlines including failure to file timely reports.
  - b) Deficient compliance with metric reporting requirements.
  - c) Deficient compliance with narrative reporting requirements.
  - d) Deficient compliance with financial reporting or record-keeping requirements.
  - e) Deficient compliance in carrying out the scope of work established in the AGREEMENT.
  - f) Deficient compliance with the ports' MOU.
  - g) Failure to follow communication expectations set forth in this AGREEMENT, including meeting with the TAC (Technical Advisory Committee) for requested meetings. Meetings with the TAC will take place at least quarterly to review milestones, deliverables, and metrics reporting.
  - h) Failure to spend funds in a timely manner, in accordance with the AGREEMENT.
  - i) Termination of the Recipient's AGREEMENT.

- j) Closure or termination of the AGREEMENT for any reason prior to completion.
6. **Waiver**. The waiver by one party of any breach of any term or condition of this AGREEMENT shall not be construed as a waiver of any other obligation by a party to perform pursuant to the terms and conditions of this AGREEMENT. Nor shall said waiver be construed as a continuing waiver of the original breach.
  7. **Assignment**. No part of this AGREEMENT may be assigned by either party without the prior written consent of the other party.
  8. **Amendments**. No part of this AGREEMENT shall be modified without the express written agreement of both parties.
  9. **Compensation**. The RECIPIENT is entitled to the compensation as set forth in Exhibit B for the term of AGREEMENT.
  10. **Allowable Costs and Fees**. Allowable costs and fees eligible for reimbursement to the RECIPIENT for performance of this AGREEMENT must be in accordance with the Exhibit A.
  11. **Invoicing and Reporting Requirements**. RECIPIENT must provide the required reports to GO-Biz by the established deadlines. Failure to file timely reports will be tracked for grant performance and may result in withholding reimbursements GO-Biz will provide RECIPIENT with reporting and invoicing instructions by July 31, 2024.
    - a. **Reporting and Monitoring Requirements**. The Authorized Representative must electronically submit performance reports quarterly during the 2024/25 Period of Performance. Quarterly performance reports are due within 15 business days following the end of the previous quarter. Performance reports will be used to monitor activities for compliance with work progress to ensure grant activities are performed according to the quality, quantity, objectives, timeframes and manner specified within the AGREEMENT. The RECIPIENT obligated to meet, at minimum, once a quarter with GO-Biz staff to share performance progress and discuss any barriers or opportunities including shared best practices. RECIPIENT will respond to requests for reporting revisions and clarifications within 15 business days of the request being sent from GO-Biz. If no revision or approved extension is received within that time, this could result in delayed payment by GO-Biz for the reporting period until requested revisions have been resolved.
    - b. **Invoicing Requirements**. The Authorized Representative must electronically submit a semiannual invoice to GO-Biz within forty-five (45) days after the completion of the first six months and within sixty (60) days of the completion of the final semiannual period for the program. With the exception of the final invoice, any invoice submitted for less than \$1000 will be held for payment with the following semiannual invoice. GO-Biz will not process any payment request submitted more than ninety (90) calendar days after the end of the specified semiannual period, except for the initial semiannual invoice referenced in this subsection (b). Invoice backup documentation that includes more than three contractor invoices and/or general ledger or payroll documents exceeding four (4)

pages must be accompanied by an invoice summary spreadsheet using a template and attached as Exhibit E provided by GO-Biz. RECIPIENT will respond to requests for invoicing revisions and clarifications within 15 business days of the request being sent from GO-Biz. If no revision or approved extension is received within that time, this could result in delayed payment by GO-Biz for the reporting period until requested revisions have been resolved.

12. **Payment.** GO-Biz agrees to pay approved invoices within forty-five (45) calendar days upon receipt in the form of a physical warrant issued from the State Controller's Office. In no event shall the RECIPIENT request reimbursement from GO-Biz for obligations entered into or for costs incurred prior to the commencement date or after the expiration of this AGREEMENT. Invoices shall be paid upon satisfactory completion of AGREEMENT work and submittal of all reports required in this AGREEMENT as described in the AGREEMENT and the Exhibits. "Satisfactory completion" as used in this AGREEMENT means that the RECIPIENT has complied with all terms, conditions, and performance requirements of this AGREEMENT. All Award Funds shall be used solely for the purpose of performing the work as set forth in this AGREEMENT. RECIPIENT is responsible for notifying GO-Biz of any changes to the payment remittance address and changes must be submitted to GO-Biz at least five (5) business days in advance of reporting deadlines. Payment remittance address changes submitted after a reporting deadline will not be guaranteed to be updated prior to the release of the payment warrant from the State Controller's Office. The remaining balance of an award that does not receive an extension and does not submit an approved final invoice within thirty (30) days of the final reporting deadline, will be considered unclaimed and returned to the State fund.
13. **Third-party contracts.** RECIPIENT acknowledges that additional third-party contracts related to the performance and duties of this AGREEMENT, in which RECIPIENT seeks to enter, beyond the scope of the original approved budget, must be approved by GO-Biz prior to execution.
14. **Publicity and Acknowledgement.** The RECIPIENT is required to include their own business name, mailing address, logo and disclosure on all materials produced in whole or in part with Project Funds:

1. "Funded in part through a Grant with the California Governor's Office of Business and Economic Development."

Materials that include editorial content must include the following alternate acknowledgement:

2. "Funded in part through a Grant with the California Governor's Office of Business and Economic Development. All opinions, conclusions, and/or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the California Governor's Office of Business and Economic Development."

The GO-Biz logo (to be provided by GO-Biz) may be placed in close proximity to the Recipient's logo or placed in a prominent location elsewhere on the material. The GO-Biz logo may not be placed in close proximity to any third-party logo or used in such a way as to imply that a relationship exists between GO-Biz and any third party. Any use of the GO-Biz logo must be accompanied by one of the above disclosure statements within reasonable proximity to the logo. Neither the GO-Biz logo nor the acknowledgement statement may be used in connection with activities outside the scope of work. Similarly, the GO-Biz logo and acknowledgement statement may not be used on items used in conjunction with fundraising, lobbying, or the express or implied endorsement of any goods, service, entity, or individual. The GO-Biz logo and acknowledgement statement may not be used on social media sites without GO-Biz's prior written approval. Failure to comply with the publicity and acknowledgement constitutes poor performance and may affect future funding opportunities from GO-Biz.

15. **Indemnification/Warranty Disclaimer/Limitation of Liability**. RECIPIENT agrees to indemnify, defend and hold harmless the GO-Biz, and the State of California, its officers, agents and employees from any and all claims and losses accruing or resulting to any and all Contractors, subcontractors, suppliers, laborers and any other person, firm, or corporation furnishing or supplying work, services, materials or supplies in connection with the performance of this AGREEMENT, and from any and all claims and losses accruing or resulting to any person, firm or corporation which may be injured or damaged by RECIPIENT in the performance of this AGREEMENT.
16. **Force Majeure**. If by reason of Force Majeure the RECIPIENT's performance hereunder is delayed, hampered or prevented, then the performance by the RECIPIENT may be extended for the amount of time of such delay or prevention. The term "Force Majeure" shall mean any fire, flood, earthquake, or public disaster, strike, labor dispute or unrest; embargo, riot, war, insurrection or civil unrest; any act of God; any act of legally constituted authority; or any other cause beyond RECIPIENT's control which would excuse the RECIPIENT's performance as a matter of law.
17. **Notice of Force Majeure**. RECIPIENT agrees to give GO-Biz written notice of an event of Force Majeure under this Paragraph within ten (10) days of the commencement of such event and within ten (10) days after the termination of such event, unless the Force Majeure prohibits RECIPIENT from reasonably giving notice within this period. RECIPIENT will give such notice at the earliest possible time following the Force Majeure.
18. **Public Records**. RECIPIENT acknowledges that GO-Biz is subject to the California Public Records Act (PRA) (Government Code sections 7920.000 – 7930.215.). This AGREEMENT and materials submitted by RECIPIENT to GO-Biz may be subject to disclosure in response to a PRA request. In the event records of the RECIPIENT are requested through a PRA request, GO-Biz will notify the RECIPIENT, as soon as practicable that a PRA request for the RECIPIENT's information has been received, but not less than five (5) business days prior to the release of the requested information to allow the RECIPIENT to seek an injunction or otherwise prevent exempt, non-disclosable information from being disclosed. GO-Biz will work in good faith with the RECIPIENT to protect the

information to the extent an exemption is provided by law.

19. **Nondiscrimination.** RECIPIENT shall comply with all applicable federal and state laws and statutes related to nondiscrimination, including those acts and amendments prohibiting discrimination on the basis of race, color, religion/creed, sex/gender (including pregnancy, childbirth, breastfeeding or related medical condition), sexual orientation or gender identity/expression, ancestry/national origin, age (40 or older) , marital status disability (mental and physical), medical condition, genetic information, military or veteran status.
20. **Retention of Records.** RECIPIENT agrees to maintain and preserve all records **related** to this AGREEMENT for three (3) years after termination of the AGREEMENT.
21. **Audit.** The books and accounts, files, and other records of the RECIPIENT, which are applicable to this AGREEMENT, shall be available for inspection, review, and audit during normal business hours by GO-Biz and its representatives to verify performance metrics and determine the proper application and use of all funds paid to or for the account or benefit of the RECIPIENT. The RECIPIENT, not GO-Biz, will retain possession and control of any and all reporting materials and backup documentation and will make them available to GO-Biz for inspection and audit upon request so that GO-Biz can verify that RECIPIENT has complied with PROGRAM terms and conditions and have executed the AGREEMENT and effectuated the PROGRAM consistent with the goals as described in the Program Announcement.
22. **Severability.** Should any part, term, or provision of this AGREEMENT be declared or determined by any court or other tribunal or appropriate jurisdiction to be invalid or unenforceable, any such invalid or unenforceable part, term, or provision shall be deemed stricken and severed from this AGREEMENT. Any and all other terms of this AGREEMENT shall remain in full force and effect.
23. **Applicable Law and Consent to Jurisdiction.** This AGREEMENT will be governed, construed, and enforced according to the laws of the State of California without regard to its conflict of laws rules. Each party hereby irrevocably consents to the exclusive jurisdiction and venue of any state court located within Sacramento County, State of California in connection with any matter arising out of this Agreement or the transactions contemplated under this Agreement.
24. **Attorneys' Fees.** In the event of any litigation between the parties concerning the terms and provisions of this AGREEMENT, the party prevailing in such dispute shall be entitled to collect from the other party all costs incurred in such dispute, including reasonable attorneys' fees.
25. **Interpretation.** Each party has had the opportunity to seek the advice of counsel or has refused to seek the advice of counsel. Each party and its counsel, if appropriate, have participated fully in the review and revision of this AGREEMENT. Any rule of construction to the effect that ambiguities are to be resolved against the drafting party shall not apply in interpreting this AGREEMENT. The language in this AGREEMENT shall be interpreted as to its fair meaning and not strictly for or against any party.
26. **Days.** Any reference to days in this AGREEMENT, unless specifically stated to be business days (which shall be Monday through Friday and shall not include weekends or state holidays), shall

mean calendar days.

27. **Notices.** Any notices required or permitted to be given under this AGREEMENT shall be given in writing and shall be delivered (a) in person, (b) by certified mail, (c) by facsimile with confirmed receipt required, electronic communication with confirmed receipt required, or (d) by commercial overnight courier that guarantees next day delivery and provides a receipt, and such notices shall be addressed writing.
28. **Representation on Authority of Parties/Signatories.** Each person signing this AGREEMENT represents and warrants that he or she is duly authorized and has legal capacity to execute and deliver this AGREEMENT. Each party represents and warrants to the other that the execution and delivery of the AGREEMENT and the performance of such party's obligations hereunder have been duly authorized and that the AGREEMENT is a valid and legal agreement binding on such party and enforceable in accordance with its terms.
29. **Integration.** This AGREEMENT, including any referenced attachments, exhibits, appendices and references, constitutes the entire AGREEMENT and supersedes any other written or oral representations, statements negotiations, or agreements with respect to the Award described herein.
30. **Recitals.** The parties acknowledge and agree that the recitals are true and accurate and are hereby incorporated by reference into this AGREEMENT. The language provided in the recitals shall take precedence over any conflicting language in the program announcement.
31. **Contents and Order of Precedence.** Included in this AGREEMENT are the following exhibits and all exhibits are hereby incorporated by reference into this AGREEMENT
  - a. Exhibit A – Scope of Work, Performance Metrics, Schedule and Budget
  - b. Exhibit B – 2024/25 California Containerized Port Interoperability Program Information
  - c. Exhibit C – MOU
  - d. Exhibit D – Quarterly Report Template
  - e. Exhibit E – Invoice Summary Spreadsheet
  - f. Exhibit F – Submitted Proposal

# Exhibit A – Scope of Work, Performance Metrics, and Budget

This establishes the California Containerized Port Interoperability Program scope of work, metrics, and budget for the RECIPIENT during the 2024/25 Program.

## Scope of Work

POLA's Carbon Intensity Gateway project proposes to develop and deploy a Carbon Intensity Gateway by building on the strong foundation established through POLA's CAAP, Air Emissions Inventory, the Environmental Management System, the Clean Truck Program, and the Alternative Maritime Power program. These programs provide a variety of significant data feeds that can be ingested and deployed to help in the creation of a single pane of glass view of a Carbon Intensity Gateway. Through this new portal, POLA seeks to unify these efforts and augment the intelligence gathered while also addressing some of the limitations of these programs. Furthermore, POLA will utilize data sharing of federal agencies such as the Federal Maritime Commission (FMC) and USDOT to provide an enhanced view of the US cargo movement. The objectives of the proposed solutions are as follow:

1. **Eliminate data fragmentation.** Currently, much of the data resides in separate documents using multiple formats. While the information is useful, it is not easily retrievable considering the size and format of some of the documents. The proposed gateway will simplify this process and provide an access-controlled, single source view.
2. **Effectively reach relevant stakeholders.** POLA envisions a system to address the needs of supply chain stakeholders, such as beneficial cargo owners, shippers, and truckers. Furthermore, POLA believes that consumer awareness is vital to better decision making since the supply chain evolves around the urgency of shipments requested by consumers. Hence many shippers encourage consumers to lower their shipment urgency when possible. As part of its awareness objectives, the system may display the basics of Scope 1, 2 and 3 emissions by user profile and their impact on the carbon footprint of supply chain.
3. **Update and optimize available data sources.** The data residing in many current reports represent historical views. While helpful, these reports do not necessarily enable the most informed decisions. The proposed portal will utilize more recent data and, when possible, it will leverage near real-time information to generate simulation models and determine the sensitivity to inputs such as routes, low carbon infrastructure rollout, GHG reductions, and other variables that can help foster resiliency and smart decision making.
4. **Leverage Machine Learning.** With AI generated simulations and predictive models, the new portal will feed users multiple shipping scenarios with the goal of improving the intermodal freight voyage from origin to destination by optimizing operations in an up-to-date and self-evolving model. Using predictive modeling of emissions in the port hinterland can serve as a valuable tool in identifying areas of concern, evaluating the effectiveness of emission reduction strategies, and promoting sustainable development within ports.

In this application, Phase 1 will deploy an up-to-date emissions measurement system that captures emissions produced by both trucks and trains and will leverage its annual inventories of air emissions as a baseline for migrating into a current view. POLA will then introduce a comprehensive baseline repository portal for emissions using established methodologies for estimating ports related emissions at POLA. This web-based viewer can be accessible publicly through a portal linked to POLA's website. This step will evolve around POLA, the City of Los Angeles, the Port of Long Beach, and the local region. Once the platform is built and the UI/UX and API design and specifications are complete, ocean vessel voyages, on-terminal motor moves, and docked vessel power can be integrated in a subsequent stage not included in this phase.

The areas that are covered in Phase 1 include the trucks and vehicles serving the Port of Los Angeles, as well as on-dock rail movements.

### Task 0: Project Reporting

No.	Task Name	Task Goal	Milestones	Deliverables / Products
0.1	Progress Reports	Provide implementation status updates and report issues and accomplishments	-Baseline reporting -Ongoing evidence of progress	Ongoing quarterly reporting
0.2	Baseline Report	Provide information about the current state of project in order to measure progress.	-Documents summarizing initial state of work as well as metrics baselines provided within 2-3 months of start.	Baseline reporting documentation
0.3	Draft Final Report	Documentation of project development information consistent with quarterly reporting, including issues, solutions and best practices	-Draft report & updated metrics provided for review and comment	Draft Final Report document due 02/01/2026 (one month before project end date)
0.4	Final Report	Provide documentation of project development, implementation, issues, solutions and best practices	-Completed final report incorporating draft final report feedback	Final Report document due 03/02/2026

### Tasks 1 - 8

Task #	Description	Milestones and Deliverables	Deliverables	Start Date	End Date
<b>Task 1 Discovery Phase</b>					
1.1	Discovery Phase 1	Research, collect and analyze the Carbon Intensity Gateway project information and plans. Validate the scope of work, deadlines, and user experience expectations. Ensure necessary data in making technical and architectural decisions are available.	Provide updated project plans, research findings and data samples.	Jan 25	Mar 25
1.2	Discovery Phase 2	Engage different stakeholders, including MTOs, Shipping Lines, BCOs, Dray Providers, Railroads, and others to ensure applicability of data and information.	Provide report of stakeholder interactions and findings.	Jan 25	May 25
1.3	Documentation Phase 1	Phase 1 - Establish a repository for software engineers, UX designers and developers to store and maintain processes and functions to develop the portal.	Provide required project reporting to state agencies as required.	Jan 25	Mar 25
1.4	Documentation Phase 2	Phase 2 – Complete open tasks in repository set up as final product is near completion. Deliverables include planning, metrics, scheduling,	Provide required project reporting to state agencies as required.	Sept 25	Feb 26

		estimation, and system documentation among others. Provide required project reporting to state agencies as required.			
<b>Task 2 Data Ingestion and Integration</b>					
<b>2.1</b>	Data Acquisition Phase 1	Identify data sources, from available stakeholders, acquire feeds converting data to a digital content and ensuring data feeds are complete and accurate. This includes batch 1 of data sources.	Provide data dictionaries that describe data.	Jan 25	Apr 25
<b>2.2</b>	Data Acquisition Phase 2	Complete Batch 2 and 3 of data sources.	Provide data dictionaries that describe data.	Feb 25	Jun 25
<b>2.3</b>	Data Implementation Phase 1	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for batch 1	Provide normalization documentation, software process diagrams and data flow diagrams.	Feb 25	Jun 25
<b>2.4</b>	Data Implementation Phase 2	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for batch 2 and a portion of batch 3.	Provide normalization documentation, software process diagrams and data flow diagrams.	Jun 25	Nov 25
<b>2.5</b>	Data Implementation Phase 3	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for final batch. Run testing for the entire data model. Ensure seamless data transfer between environments.	Provide normalization documentation, software process diagrams and data flow diagrams.	Nov 25	Jan 26
<b>Task 3 Back-End Environment, Data modeling and Foundation</b>					
<b>3.1</b>	Data Foundation	Establishment of Database warehouse and Extract, Transform, and Load (ETL) processes.	Provide ETL process diagrams, architecture diagrams, and CI/CD process flow	Jan 25	Nov 25
<b>3.2</b>	Data Modeling	Creation of representation of data, relationship, structure, constraints and rules of organization and data storage. Completion of an Entity-Relationship Diagrams (ERDs).	Provide ERD's and data storage map/plan	Feb 24	Dec 25
<b>3.3</b>	API Development	API design and specification. Complete	Provide API specs	Sep 25	Jan 26

		and test API coding including error management.			
<b>Task 4 Algorithm Development</b>					
<b>4.1</b>	Development	Conceptual design of the AI-Driven LCA/GHG emission prediction methodology. Analysis of the energy efficiency process in the hinterland intermodal transportation system. Algebraic formulation of container carbon reduction mathematical models.	Provide conceptual design and algorithm pseudocode, and analysis of energy efficiency in hinterland intermodal transport system findings	Jan 25	Jul 25
<b>4.2</b>	Implementation	Deployment of AI structures for enhanced prediction and optimization. Integration with Data sources.	Provide Machine Learning scoring report, final algorithm design.	Jul 25	Dec 25
<b>Task 5 Rail Feature</b>					
<b>5.1</b>	UX Development	UX Development and analysis of the energy efficiency process in the hinterland intermodal transportation system for Railroad assets.	Provide UX/UI wireframes & Analysis findings.	Jan 25	Jun 25
<b>5.2</b>	UI Implementation	Complete User Interface and visual design for Railroad and related vehicles.	Provide UX/UI wireframes, Analysis findings, and recorded demo of UI.	Jun 25	Dec 25
<b>Task 6 Truck Feature</b>					
<b>6.1</b>	UX Development	UX Development and analysis of the energy efficiency process in the hinterland intermodal transportation system for trucks.	Provide UX/UI wireframes & Analysis findings.	Feb 25	Jul 25
<b>6.2</b>	UI Implementation	Complete User Interface and visual design for trucks.	Provide UX/UI wireframes and recorded demo of UI.	Jul 25	Jan 26
<b>Task 7 QA Testing</b>					
<b>7.1</b>	QA Testing	Execute Functional, performance, security and usability testing and User Acceptance Testing for the portal. Address errors, bugs, and defect repairs.	Provide testing plan taken and QA test results	Jan 26	Fab 26

Task 8 Production Deployment					
8.1	Deployment	Final push of the code of the Carbon Intensity Gateway to the production environment.	Provide CI/CD process flow as updated.	Feb 26	Feb 26

## Budget

Funding herein is allocated to the specific tasks below. If there is excess budget remaining from completing a task, it may be only reallocated to a different task below upon approval of a budget amendment request. Any task or tasks with remaining funds requested for reallocation must be determined completed by GO-Biz and ISC. Tasks with more than 20% of funds remaining will require GO-Biz Administration approval for reallocation.

Task Description	Award Amount
Discovery	\$220,000
Data Ingestion and Integration	\$480,000
Data modeling and Foundation	\$1,100,000
Optimal Routing AI	\$500,000
UX Development	\$550,000
UI Implementation	\$550,000
QA	\$250,000
Deployment	\$50,000
<b>Total</b>	<b>\$3,700,000</b>

## Performance Metrics

Metrics the port will report on include the below list, in addition to the success criteria listed in the project deliverables. If it's not possible to measure some of these metrics today in service of providing a comparison between the before-and-after state at the port, it must be justified. Metrics will be included in the quarterly report and in the final report. Additionally, the port will provide a baseline of these metrics within 3 months of the contract initiation.

- **System Capacity [Task 4]:** A measure of the ability to handle traffic volumes during normal/peak periods, considering number/capacity of lanes, number/frequency of vehicles, availability of modes.
- **Travel Time Reliability [Task 4]:** A measure of a network's predictability. This metric considers i.e., congestion, incidents, and weather conditions that can cause delays or disruptions.
- **System Adaptability [Task 4]:** A measure of the ability of a transportation network to adapt to changes in demand, technology, or other factors that can impact services. This metric considers factors such as new technologies, flexibility to adjust based on demand, and response to disruptions.
- **System Redundancy [Task 4]:** A measure of availability of alternative routes or modes in the event of disruptions to the primary network. This metric considers factors such as number and location of

alternative routes, availability of transit or other modes, and ability to switch between modes.

- **Environmental Impact [Task 8]:** A measure of sustainability, which takes into consideration factors such as energy consumption, emissions, and the impact on local ecosystems.
- **Algorithm Performance [Task 4]:** Algorithm performance metrics showing accuracy, precision, recall and any other scores relevant to the design demonstrating model correctness.

## Special Considerations & Stipulations

- Cloud Costs are only covered at 50% by state funds.
- The port will ensure that API access and direct data downloads are available to users.
- The findings of the collaboration with SDSU and resulting system implementation must be published in an academic format at the completion of the project implementation. Arxiv pre-print publishing is required before any submission to formal peer-reviewed journals. Findings must be usable and tangible, and make training data available where it was used in development of the system. Published data may be reasonably anonymized, but the process and findings must be repeatable.
  - The announcement of this pre-print will be delivered to the California Air Resources Board, in addition to GoBiz and the TAC.
- Methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) will be included in determining the climatic impact (beyond solely CO<sub>2</sub>) due to their outsized global warming potential (as compared to CO<sub>2</sub>) and increasing awareness by the IMO and regulatory bodies of these emissions from the implementation of new technologies and fuels, particularly in maritime shipping operations.
- The resulting findings must be reportable in a standardized manner; in alignment with industry standard practices (e.g., GHG Protocol) and state/federal requirements (e.g., CA SB 253 Climate Corporate Data Accountability Act)

# California Containerized Ports Interoperability Grant Program

Application Manual | December 2023

 Insight Softmax



**CALIFORNIA**  
Governor's Office of Business  
and Economic Development

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## **1. Introduction**

The Governor’s Office of Business and Economic Development (GO-Biz) is mandated by Article 12 of SB-193: Economic Development: Grant Programs and Other Financial Assistance to establish the California Containerized Ports Interoperability Grant Program. This program aims to improve the supply chain interoperability of five California ports by strengthening the ports’ cloud-based data systems. This document provides Applicants with information regarding the California Containerized Ports Interoperability Grant Program and instructions to complete and submit the program application.

## **2. Background and Purpose**

California is the preeminent global goods movement gateway in the United States, responsible for handling forty percent of all containerized imports and thirty percent of all containerized exports in the Nation. In June 2022, Governor Gavin Newsom signed the California Budget Act of 2022, which included a historic multi-billion-dollar state investment to support and enhance goods movement and the supply chain, including port and freight infrastructure, climate adaptation and resilience, workforce training, zero-emission vehicle deployment, grid support and grid reliability, and port data system development.

The Governor and the California Legislature are investing in strengthening the state’s supply chain following the COVID-19 pandemic and challenges shared by California industries. With supply chains becoming more complex, data systems, tracking software, and other technologies can help all parties that facilitate and do business with port complexes. Of the amount appropriated in the most recent budget, \$27,000,000 is available to provide direct grant support to containerized ports via the California Containerized Ports Interoperability Program (Program). Utilizing existing data from the U.S. Army Corps of Engineers and the Waterborne Commerce Statistics Center, GO-Biz has determined that five California ports are eligible applicants to the Program to develop cloud-based management systems: Port of Hueneme, Port of Long Beach, Port of Los Angeles, Port of Oakland, and Port of San Diego.

To fulfill the statute, GO-Biz contracted Build Momentum (Momentum), a grant management service provider, to administer the grant program and award funds to the specified Applicants to the Program. Momentum, in partnership with Insight Softmax Consulting (ISC), conducted research on existing data initiatives within this space at the state and federal levels to incorporate alignment into the structure of the grant program guidelines. Momentum and ISC established a Technical Advisory Committee (TAC) of industry experts—with representation from GO-Biz, ISC, DataCRT, Latacora, and Cloud303—to support the development of the proposal framework and scoring criteria. The TAC will review and score all applications to determine final awards and disbursement of funds.

### **2.1 California Port Data Partnership**

As required, the five eligible California ports reached a Memorandum of Understanding (MOU) with all other ports on April 26, 2023, that defines how they will work together to help achieve real-time interoperability among the containerized ports in California. The MOU launched the “California Port Data Partnership” to support improved freight system resilience, goods

movement efficiency, emissions reductions, and economic competitiveness. This MOU is required for funding. GO-Biz shall report to the chairpersons of the committees in each house of the Legislature that consider appropriations and the Chairperson of the Joint Legislative Budget Committee that an MOU has been reached.

## 2.2 *Program Objectives*

The Program will support cloud-based port data system development at California's containerized ports and support emerging data aggregation and analysis to improve freight and supply chain efficiency. Increased interoperability will allow the ports to securely share information and expedite information exchange across port users and relevant transportation service providers. The Program will drive statewide economic, supply chain, and environmental benefits, supporting operational improvements, efficiency, and emissions reductions at California ports. The development of data management systems will provide a replicable model for other ports across the United States, incentivizing data system collaboration and improving efficiencies in goods movement. Key Program objectives include:

- **Federal Alignment:** Ensuring that port proposals and data systems align with Federal goals and initiatives related to goods movement, efficiency, and environmental benefits
- **Emissions Reductions:** Improving efficiencies through data management to drive emissions reductions, achieving regional, State, and Federal climate goals
- **Economic Competitiveness:** Addressing the economic competitiveness of California ports through comprehensive data management and organization
- **Stakeholder Engagement:** Facilitating broad community and port ecosystem stakeholder engagement to ensure equitable participation, knowledge sharing, and benefits

## 2.3 *Guiding Principles for Proposal Development and Funding Allocation*

The California Containerized Ports Interoperability Grant Program is supplying funding to the five containerized ports in California in support of building cloud-based data systems that enhance interoperability, support federal data initiatives, and advance the California climate goals as outlined in the MOU. Funding will be awarded based on several key factors:

- Individual port shares of TEU volume
- Key performance metrics:
  - Vessel dwell times
  - Container dwell times
  - Truck turn times
- Demonstrated data needs
- Interoperability improvements proposed
- The scoring rubric

The TAC will assess funding impact based on annual TEU volume and impacts on port operational efficiency. Efforts will be made to address demonstrated data needs, as each port has unique needs and different capabilities of existing data systems. The intention is to raise the floor of data systems within all ports to enable cohesive future data initiatives.

The primary goal of this funding is to support interoperability, which was identified as a primary challenge of the 2021-22 supply chain crisis. The grant administrators interpret data interoperability as making information readily available to port ecosystem stakeholders **uniformly**. Stakeholders must be able to interface with the ports to access information that increases the efficiency of cargo movements through the ports and general port operations.

While interoperability may also extend port-to-port data sharing, this should be a natural byproduct of uniform data interfaces to stakeholders. If port-to-port data sharing is a goal of a grant proposal, it should be done as part of a collaborative effort. Data sharing should ideally be structured around uniform interfaces rather than specific agreements between parties.

The intermediary supports the recommendations of the Federal Maritime Commission's (FMC) Maritime Transportation Data Initiative (MTDI)<sup>1</sup>. Proposals should follow these recommendations whenever possible.

A tenet of achieving interoperability is the adoption of standards. The FMC **strongly** recommends adopting the [standards developed by the Digital Shipping Container Association \(DCSA\)](#). Any new system or improvements to existing systems need to adopt these standards. Automatic interoperability will be achieved by adopting these standards in lexicon, definitions, format, and Application Programming Interfaces (APIs). It also creates a foundation for future systems that can be developed faster and in the same language.

Ports are highly encouraged to collaborate to attain these goals where their current statuses and goals align to maximize the funds' efficacy and further the interoperability goals. Interoperability will best be achieved through mutual efforts during pre-planning and execution. The intermediary will award extra points to projects that include two or more ports collaborating on shared systems.

In the spirit of collaboration and shared systems (where appropriate), open-source development is encouraged. By publishing non-sensitive software components or integrations you develop, other ports can leverage these investments. Benefits of this arise when others build upon the solution and add features or fix defects. One area the TAC has identified for open sourcing is the ingestion and normalization of data from stakeholders such as carriers, Beneficial Cargo Owners (BCOs), or Marine Terminal Operators (MTOs) via Electronic Data Interchanges (EDIs), APIs, and other available means. Proposals that include this open-source roadmap will further interoperability for everyone and will be evaluated favorably.

The grant administrators are aware that each port has unique cargo profiles and stakeholders; they will consider this when evaluating proposals. Additionally, the administrators are available to collaborate with the ports during the proposal writing process. They come with rich expertise in building data systems and avail themselves with the intention of helping each port build the proper technical infrastructure and catalyzing port-to-port collaboration. They wish to see the

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<sup>1</sup> *Recommendations on the Maritime Transportation Data System Requirements, 2023*  
<https://www.fmc.gov/wp-content/uploads/2023/04/MTDIReportandViews.pdf>

entire cargo shipping industry leap forward. The partnership between the TAC and the ports will continue during the implementation phase to ensure everyone’s success. Please take advantage of this opportunity.

The proposal guidelines in Section 8.2 are extensive and should encourage thoughtful consideration. The intention is to ensure projects maximize future success for the State of California. Proposals must address technical requirements and cover system and process integration, stakeholder engagement, and ecosystem impacts.

**2.4 Program Coordinator**

Application development, scoring, award decisions, and program communications are coordinated by Mike Mansour, Lead Data Scientist at ISC.

Contact Information - Project Lead: [mike@insightsoftmax.com](mailto:mike@insightsoftmax.com)

**3. Timeline**

Date	Deliverable/Milestone
December 12, 2023	Application Manual and FAQs Released
December 12, 2023- February 8, 2024	Application Acceptance Window
January 10, 2024	Deadline to submit optional first drafts for TAC feedback
January 24, 2024	Deadline for TAC to return drafts with feedback/questions
February 8, 2024	Final Applications Due
March, 2024	Funds Awarded
April, 2024	Public Announcement of Awards
18 months	Period of Performance

**4. Funding**

*Total funding available to Applicants: \$27,000,000*

Funding for the Program comes from Schedule (1) of AB-178, of which \$30,000,000 has been appropriated for the support of the Program. Of the \$30,000,000, \$27,000,000 will be awarded directly to the ports. There is no award minimum or maximum, and there is no required cost share.

**5. Eligible Applicants**

Utilizing existing data from the U.S. Army Corps of Engineers and the Waterborne Commerce Statistics Center, GO-Biz determined that five California ports are eligible applicants to the Program: Port of Hueneme, Port of Long Beach, Port of Los Angeles, Port of Oakland, and Port of San Diego.

**5.1 Collaborative Applications**

Applicants are permitted to submit collaborative applications, with up to all five ports as partners. Collaborative proposals must include a budget breakdown that designates the amount of funding allocated to each port and for which purposes.

While the TAC expects individual proposals from each port, ports may share the writing on sections relevant to collaboration. Due to potential necessary approvals by Boards of Harbor Commissioners, the governance of shared projects may take longer to finalize than the allotted proposal development timeline. In this case, ports should provide a template for the ideal and realistic collaborative project structure and a roadmap to achieve it.

**6. Eligible Uses of Funding**

California is seeking competitive proposals that support cloud-based data system development to securely share information and expedite information exchange across port users and relevant transportation service providers. Projects must support operational improvement, efficiency, and emissions reductions, advancing interoperability among other ports or public sector-based, computerized, and cloud-based cargo data systems. All costs must be explicitly justified in the proposal.

**7. Definitions**

Term	Definition
<b>Applicants</b>	The five specific ports in California with container terminals that specialize in handling goods transported in intermodal shipping containers. GO-Biz has utilized data from the U.S. Army Corps of Engineers to determine that only the ports of Hueneme, Long Beach, Los Angeles, Oakland, and San Diego are eligible applicants.
<b>Interoperability</b>	The ability for a port’s computerized and cloud-based data systems to securely share information and expedite information exchange across port users and relevant transportation service providers, including other port or public sector-based, computerized, and cloud-based cargo data systems as needed, in support of operational improvement, efficiency, and emissions reduction. The grant administrators primarily interpret data interoperability as making information easily available to port ecosystem stakeholders <b>uniformly</b> . Stakeholders must be able to interface with the ports to access information that increases the efficiency of cargo movements through the ports and general port operations.
<b>Program</b>	The California Containerized Ports Interoperability Program created by SB-193. Funding for the program comes from Schedule (1) of AB-178, of which \$30,000,000 has been appropriated for the support of the Program. Of the \$30,000,000, \$27,000,000 will be awarded directly to the ports.

**8. Application Submission Process**

*8.1 Application Limit*

Applicants are permitted to submit multiple applications for discrete projects. However, each lead applicant may submit **no more than three applications**. Unrelated project components should not be bundled in a single application for the purpose of adhering to the limit.

### 8.2 Application Components

Applicants must submit a single Word document containing the Proposal Narrative per application. Proposal Narratives may not exceed 25 pages, not including the Cover Page, Table of Contents, and Appendices. Appendices may include supplemental information that supports the Narrative, including relevant figures, architectural diagrams, and process flow charts. Proposals must be written in Calibri, Arial, or Times New Roman, 11 or 12 pt with 1” margins, single-spaced with a single line in between paragraphs. Text in tables, captions, and footnotes may be 10 pt. Proposals must include headers and page numbers.

Proposals must include a Cover Page containing the following information:

<b>Cover Page</b>	
<b>Port Name</b>	
<b>Address</b>	
<b>Project Name</b>	
<b>Technical Point of Contact</b> <ul style="list-style-type: none"> <li>● Name</li> <li>● Title</li> <li>● Email</li> <li>● Phone</li> </ul>	
<b>Business Point of Contact</b> <ul style="list-style-type: none"> <li>● Name</li> <li>● Title</li> <li>● Email</li> <li>● Phone</li> </ul>	
<b>Total Project Cost</b>	
<b>Requested Funding Amount</b>	
<b>Cost Share</b>	
<b>Project Summary (500 words max)</b>	

The proposal document must include a Table of Contents and address the following prompts in narrative format, utilizing the headers provided. Cross-reference sections where necessary and applicable; many sections include overlapping content that may be relevant in multiple places.

### Proposal Narrative

#### 1. Introduction

- *The Introduction section should provide a high-level summary of the project and should not exceed one page.*

#### 1.1. Vision

- Describe the full vision for future data interoperability. This vision can span across multiple individual project proposals. The vision should be big-picture and demonstrate where the proposal fits into the port's business vision, where it pertains to data usage and interoperability.
  - Demonstrate the connection between the overall business vision, the goals in the Memorandum of Understanding (MOU), and the proposal vision.
- 1.2. Current State**
- Explain the current state of the systems and processes relevant to the proposal scope.
  - Describe pain points, demonstrating why change is necessary.
  - Clearly explain the reason for action and the cost of inaction.
- 1.3. Proposed Future State**
- Briefly describe the scope of the actual proposal.
  - Describe how and to what degree the identified pain points are addressed.
- 2. Scope**
- 2.1. Problem Statement**
- What business problems/needs does the proposed solution address?
  - What are the economic costs of inaction?
  - Describe the affected processes and up/downstream stakeholders. Describe the extent of the impacts in a measurable way.
- 2.2. Current Data Systems and Processes**
- Describe the current processes, systems, and workarounds used to solve the business need.
- 2.3. Proposed Solution**
- Describe the proposed solution.
  - How and to what extent does it solve the problem?
  - Describe the expected economic impact.
  - What are the time horizons of impact (immediate, one year, and five years)?
  - Describe expected impacts on business processes and the workforce.
  - What is the expected cost of building and implementing the solution? This may reference the Project Budget.
  - How does the solution support the big-picture vision?
  - How will the proposed data system address the challenges faced during the 2021-22 supply chain crisis?
- 2.4. Scope of Work**
- *The tasks described in the Scope of Work must correspond to the Project Timeline and Budget.*
  - Describe the technical work to be performed under this agreement. The work effort should be divided into a series of logical, discrete, and sequential tasks. Each task must be numbered and contain the following components:
    - Task Name
    - Goal of the task
    - Milestones: individual activities related to the task
    - Deliverables/products

### 3. Software Development and System Architecture

#### 3.1. Software Development and Technical Collaboration

- Show the system and data architecture of current systems and proposed solutions (showing the environment holistically). Highlight any areas that are undergoing change.

##### 3.1.1. Custom Solutions

- Are interface changes needed? If so, how will change be managed and tested?
- Include software architecture diagrams of the system(s).
- If the proposal calls for in-house software development, what is the proposed software management approach (i.e., Agile, Waterfall, Kanban)?
- How will version control be managed?
  - If the proposal calls for in-house software development, what will the culture of Code Reviews be?
- Describe Unit Test Coverage goals, if applicable.
- How will Dev, Staging, and Production environments be established and maintained?
- What software language(s) and services (i.e., cloud services, open-source software frameworks) will be used, and how will this impact maintainability?
- What are the standards for documentation? Will Interface Control Documents (ICDs) be established?
  - *An ICD determines the format of various subcomponents of the system that will communicate with each other and the schemas of database records.*
  - *The Digital Container Shipping Association ([DCSA](#)) defines some interfaces for resources and data structures. These are recommended to be followed where applicable. Link: [Track & Trace Standards](#).*
- If choosing an external implementation vendor, explain the vendor selection process. If applicable, describe the request for proposals (RFP) process.
- Who retains ownership of the software and intellectual property (IP)?
  - Identify any risks of vendor lock-in associated with the vendor agreement. Describe how these risks will be mitigated.
- Describe any open-source software components.
  - Will any parts of the system be made open source for the benefit of the state port community? If yes, describe the release roadmap and planned governance structure.
- Is the solution based on any proprietary software components?

##### 3.1.2. Off-the-Shelf Software Proposals

- Explain the software/vendor selection criteria and comparison process. Describe how needs were identified and compared against a suite of solutions.
  - How will the solution be integrated into existing data systems at the port?
  - Identify any risks of vendor lock-in associated with the vendor agreement. Describe how these risks will be mitigated.
  - Describe the degree of data portability or extractability from the solution and how it can be used in future projects and initiatives.
  - Does the solution provide open interfaces for stakeholder access?
- 3.1.3. Scalability**
- How are storage and compute patterns optimized for the use case?
    - For off-the-shelf solutions, are there limitations to how much the product can scale that might be an issue with the amount of data to be generated?
  - Describe the monitoring and alerting systems in place to alert maintainers before problems with scale arise.
    - *For off-the-shelf solutions, this also applies to possible disconnections between the product and data sources.*
- 3.1.4. Reliability and Resiliency**
- Can the system be rebuilt easily, both from a data backup and infrastructure standpoint?
    - This might be useful for a Disaster Recovery scenario, as well as for establishing dev/staging environments.
  - If processes are disrupted, or an incorrect processing step occurs, how difficult is recovery?
  - Describe any systems in place to monitor whether the structure of the data, or the data itself, adheres to standards and rules.
- 3.2. Usability and Downstream Stakeholder Engagement**
- *The system should not only streamline operations within the ports but also empower downstream stakeholders to understand where their cargo is and optimize their systems.*
  - Describe the needs of your port stakeholders. How do these differ from the other ports?
  - How will downstream stakeholders have input to the data endpoints of the system? Describe opportunities for stakeholders to voice feedback during development.
  - How will you work directly with stakeholders to integrate into their systems and APIs?
    - Break this down for each of the different types of stakeholders (i.e., BCOs, truckers, rail, ocean carriers, and MTOs)
  - Describe how you will manage relationships with on-port stakeholders (i.e., terminal operators) to make integration and data sharing successful.

- How will you ensure stakeholder participation in the contribution of data (i.e., incentives, mandates, tariffs, MOUs)?
    - If applicable, how will you ensure that each terminal operator contributes data?
  - Downstream stakeholders are diverse in technical capabilities. How will this system serve both technical and non-technical consumers?
  - Describe any additional planned interfaces outside of an API and Direct-Data-Download that will be implemented.
  - Describe access to both open-facing and closed-facing data (i.e., free, by subscription, or pay-per-access).
- 3.3. Sustainability and Maintenance**
- Explain how the system will be sustained and maintained after initial deployment for security patches, scalability, and bugs. How will possible system downtime be managed during upgrades?
    - For off-the-shelf solutions, describe vendor commitment to delivering upgrades. Do they have a service-level-agreement (SLA) for providing support?
  - How often will schemas change? Is the system set up to handle changes?
  - Will a maintainer know how to make necessary changes? Will each change require extensive knowledge of the system?
  - Is there documentation embedded in the data system to allow maintainers to understand how the system works (e.g., lineage)?
    - For off-the-shelf solutions, how will you document the solution's implementation and integration into your system?
  - Describe the ongoing cost of maintenance and the budget source. This may reference the Project Budget.
  - Describe staffing requirements for the ongoing operation of the system.
  - If choosing an external vendor for implementation, what is the plan for software/technology asset handoff?
- 3.4. System Testing Plan**
- Discuss plans for Quality Assurance (QA) Regression testing and unit testing. If you are still deciding on a product or vendor, please address these questions by setting up a general approach that will be followed.
    - How will you test the integration of the solution into your overall architecture?
    - Will tests cover all interfaces?
    - Describe the process of end-user testing.
- 3.4.1. Custom Solutions**
- Describe how the system was built to be “testable” in the architecture. How will this pattern be enforced during development?
  - When and how will you define and document test cases? Identify the chosen QA Testing platform, if applicable.
  - How will QA be managed and staffed? If you plan to continue feature development, how will this process be maintained?

### 3.4.2. Off-the-Shelf Solutions

- Outline the project plan for established and documented test cases to be carried out once implementation and integration are complete. Describe the execution process and associated timeframe.
- If the solution has a variable price or component of pricing, how will utilization and data inputs be tested to avoid incurring large and unexpected costs?
- How will you be alerted to changes in data schema or data processing logic within the solution?

## 4. Data

### 4.1. Standardization

- *To achieve interoperability and uniformity, systems should be using a standardized lexicon and open API definitions, particularly from the [DCSA standards](#), which are recommended by the Federal Maritime Commission (FMC)<sup>2</sup>. If the proposal has a plan to implement a track-and-trace methodology, please describe how the [DCSA's Track & Trace Standards](#) will be incorporated.*
- Explain the chosen standard. How will it be incorporated and enforced in the design and implementation of the system?
- Describe other procedures to be implemented to align your port with the other ports in uniformity.
- How will the project support uniformity in the ingestion of data from the ecosystem?
- Describe any existing MOUs related to standardization with the other ports in California and the United States.
- Considering that ocean carriers are committing to using electronic bills of lading by 2030, how will the proposed system be modular and ready to incorporate this standardization deployment?
- While the DCSA standards have a particular focus on containerized cargo, many of the standards are applicable to vessel operations in general or to other cargo types (e.g., [Operational Vessel Schedules](#), [Electronic Bill of Lading](#), and others). If standards do not yet exist for your case, explain how you will either choose a standards paradigm or develop your own in coordination with others in the CA shipping ecosystem. It is also acceptable to advance a standards paradigm that is in development.

### 4.2. Data Culture and Change Management

- *Implementing a marine transportation data system is part of a broader process. An adoption plan by the port, ocean vessel carriers, marine terminal operators, intermodal carriers, and others must be established.*
- How will you **motivate your internal organization** (i.e., the Port Authority) to adopt and participate in the new data system?
- How will you **encourage external stakeholders** within and outside of the terminal gates to integrate into the data system?

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<sup>2</sup> (Recommendations on the Maritime Transportation Data System Requirements, 2023)

- How will you **ease the transition** for internal and external stakeholders to integrate and adapt into the system?
- What data culture and **internal processes** will support this effort?
- 4.3. Data Journey**
  - Describe the journey that data will take as it passes through the proposed system. Organize the steps of this journey according to your actual architecture. At minimum, address the following:
    - Acquisition and ingestion
    - Normalization and transformation
    - Movements between systems
    - Exposure to end users
  - At each stage, address the following points as applicable:
    - Format of data
    - Processing type (batch or streaming)
    - Expected data quality concerns and methods to monitor and improve data quality
    - Volume of data to be handled by the solution (both as a total and per unit time)
    - Data volume variability and scaling requirements
    - How metadata will be captured
- 4.4. Governance**
  - Discuss how the port and the proposed system will govern the data that it utilizes. Describe how this governance will integrate with existing systems and any components unique or isolated to the proposed system. Address the following key points:
    - Documentation
    - Data tests (note: this refers to tests for the compliance of data to expected behavior, not unit or integration tests for software)
    - Data classification and policies
    - Cost monitoring and controls
- 4.5. Data Privacy**
  - Describe the data privacy management plan and policies for the proposed system, including integration points.
  - Can the port document what types of data the application stores?
    - Where is each type of data stored?
    - How sensitive is each type of data?
    - Does the solution access/store legally protected information (PII, PCI, HIPAA, etc.)?
    - Does the solution need to be able to handle non-US PII and be EU General Data Protection Regulation (GDPR) (or other countries' laws) compliant?
    - What protections are in place for storing sensitive data?
    - Will the port track who has access to sensitive data?
    - How is sensitive data access managed?

- Will the port handle financial transactions directly within the application?

## 5. Cloud Infrastructure

### 5.1. Operations

- Include system diagrams of the proposed infrastructure architecture.
  - If an existing solution exists (off-the-shelf product), include the reference architecture for self-hosting the product in the cloud. In this case, “self-hosting” means rather than paying for a third party to manage and own the backend infrastructure, the port can reduce your operating costs by deploying the software and managing/owning the infrastructure itself.
  - If a custom solution is to be developed, describe its necessary functions and features.
- Describe the cloud vendor selection process. If applicable, identify the chosen vendor.
- Describe required compliance, including [FedRAMP compliance](#).
- Identify data and metrics to be made publicly accessible (with appropriate authentication) and data and metrics that must not be externally accessible.
- What is the expected frequency of data ingestion into the cloud? If known, include the expected size of each data ingestion.

### 5.2. Availability and Resiliency

- What are your recovery requirements? How long can different functionalities be unavailable (i.e., interfaces, visualization tools, access to infrastructure, etc.)?
- Is a multi-cloud deployment required? Are on-premise components required to function with newly provisioned infrastructure and systems?
- How frequently should restorable backups (data, databases, computation images, etc.) be created and referenced/tested? Who will be managing the backup configurations and tests?
- Who will be managing the cloud environments (e.g., internal team of engineers or a third-party/managed service agreement)?

## 6. System Security

- *This section covers a wide array of topics relevant to most organizations when developing a product or system. Address each section that is applicable to your project. Consult with vendors or outside development teams as necessary to answer any questions if you are planning to purchase software.*

### 6.1. Application Security

- Authentication
  - What type of users will access your system?
  - How are those users authenticated?
  - Will different types of users have different authentication requirements?
- Authorization
  - What kind of permissions model will be used?
  - Which part of the system enforces those permissions?
  - Who has access to modify permissions for users and groups?
- Audit Logging

- What kind of sensitive activity do you log?
    - Where are those logs stored?
    - How are logs protected from modification after they have been written?
  - Internal Administration Interface
    - Do internal users have an administrative interface to your data?
    - How do you identify internal users?
    - Does this interface have different authentication requirements from the main application?
    - How will you manage access to this interface?
  - Implementation Verification (if developing software in-house)
    - How will you verify that your system was implemented as planned?
    - Who will perform this verification?
    - Will you have any automated verification (e.g., software test suites)?
  - Secure Development
    - What training does the development team receive for secure coding practices?
    - Do developers have a process for reviewing code with security implications?
    - How is that process enforced?
- 6.2. Cloud Security**
- *The following sections may not be applicable if a third party owns the cloud environment: Preferred Environment, Resource Organization, Network Configuration, Secrets Management, Infrastructure as Code.*
  - Preferred Environment
    - Is the environment one of the “big 3” (AWS, GCP, Azure)? These are generally preferred as they are considered the services that are most mature security-wise.
    - Note: Using multiple services for infrastructure may be necessary (some vendors may require a specific service to be used), but it increases complexity and attack surface.
  - Resource Organization
    - Can resources be deployed to different environments (development, production, sandbox, etc.)? This is valuable to allow developers a chance to test new features in non-production environments, allowing production to maintain uptime.
  - Identity Management
    - Who will own the accounts/environments in the cloud? Who requires access keys/hard credentials? Who requires temporary access?
    - How will users be audited? For example, how will you remove users that are no longer employees?
  - Access Management
    - How will your team access the environment (single-sign-on, role-based access, programmatic access, user-based access)?

- How will your team audit access controls (e.g., removing permissions from users who no longer need access to certain controls/features)?
- Logging Requirements
  - *Note: Many cloud services will be able to facilitate comprehensive logging. Focus on who has access to those logs, where the logs should be stored, and what value can be derived from the captured logs.*
  - Do your logs need to be centralized for auditing purposes?
  - Are there specific infrastructure metrics that *must* be captured?
  - How long should logs be retained (consider any legal requirements to maintain logs for a certain amount of time)?
- Data Ingress and Manipulation
  - What are the requirements for data at rest and in transit?
  - Does your data require transformation/standardization?
  - Are there multiple points of data ingress into the cloud environment?
- Network Configuration
  - Are there specific requirements for infrastructure accessibility (Virtual Private Network (VPN) connection required for remote access, isolating databases/storage solutions from the internet, etc.)?
  - Are there any requirements for asset distribution?
    - Will the environment be hosting data/content that will be public?
- Secrets Management
  - How will secrets be protected in your infrastructure (e.g., encryption keys, parameterization, etc.)?
  - Describe the process for rotation. This is valuable in the event that a secret is leaked, such as through accidental upload to public source code.
- Infrastructure as Code
  - If the infrastructure will be managed internally, will a robust/replicable solution like Terraform be desired, or a cloud-specific Software Development Kit (SDK)?
    - If managed by a third-party/managed services team, this is not applicable.
  - If IaC is being utilized:
    - How is security built into the pipeline (e.g., source code analysis tools)?
    - Is extra scrutiny given to security-relevant changes (e.g., terraform being updated that provides a certain user group administrator-level permissions)?
    - How is drift detected (e.g., identify where alerts go when a certain user group obtains administrator-level permissions despite IaC only providing them a small subset of permissions)?
- Automated Threat Detection

- Is automated or AI-powered threat or vulnerability detection a desired component of the environment?

### **6.3. Corporate Security**

- *These questions refer to the existing environment in which the proposed system will be used.*
- Software and Asset Inventory
  - Do you track what hardware is used by your staff?
  - Do you have a policy on how that hardware should be used?
  - Do you maintain a list of approved software on staff computers?
  - Is this enforced by any automated systems?
- Account Management
  - Where are account credentials managed?
  - Do staff use a password manager?
  - Do you perform periodic audits of account access to ensure that only the right people have the access they need?
- Access Control Management
  - Do you have an organization-wide single-sign-on (SSO) provider?
    - How widely is SSO utilized for services your staff uses regularly?
    - Will your proposed system be connected to SSO?
  - Do you require multi-factor authentication for staff?
- Vulnerability Management
  - Describe any policies for keeping software up to date, particularly regarding security updates. Is this enforced by software?
  - Do you maintain an inventory of devices on local networks?
    - How often is it updated?
    - How often is it audited for accuracy?
- Security Awareness and Skills Training
  - Do you provide security awareness training for staff?
  - Describe any training specific to certain roles.
- Service Provider Management
  - Do you maintain a list of third-party services that you use?
  - What process do you use to gauge the security practices of those services?
  - Do you identify any third-party services as a higher security risk than others?
- Incident Response Management
  - Do you have an incident response process?
  - Describe any recent instances in which this process has been used.
  - Do you run incident simulations to test the process?
  - Do you refine the policy based on incident responses?

## **7. Legal and Regulatory**

### **7.1. Integration and Support of State and Federal Data Initiatives**

- *As mandated by SB-193, systems built with this funding must directly support relevant state and federal data initiatives by providing data and reporting.*
  - Federal program examples include:
    - United States Department of Transportation (USDOT) FLOW Program
    - Ocean Shipping Reform Act of 2022
    - US EPA's Clean Ports Initiative
    - USDOT and Federal Highway Administration's Port Cooperative Driving Automation Drayage Truck Development program, implemented by Leidos
    - Additional relevant programs administered by Leidos
  - State agency and program examples include:
    - CARB
    - CalSTA
    - California Freight Mobility Plan
    - California Sustainable Freight Action Plan
    - CalTrans Port and Freight Infrastructure Program
    - Senate Bill 671/CTC
- Explain how the proposal supports any listed initiatives. Include other state and federal initiatives as applicable and relevant. If the proposal does not directly include effort to send data to a program, explain how the proposal will address and reduce existing gaps.

#### **7.2. Environmental Data and Emissions Reductions**

- What specific dimensions of emissions reporting will be collected?
- How will this system improve the accuracy of reporting and estimates of emissions impacts from the ports and their stakeholders?
- Will emissions or environmental data be publicly accessible?
- What is the expected impact on emissions you believe you will achieve through monitoring?

#### **7.3. Labor Protections**

- The California Port Data Partnership MOU & SB-193 state that any data or information cannot be collected or used in a manner that will hurt labor collective bargaining rights. Describe how system design and implementation will safeguard these interests.

### **8. Project Structure**

#### **8.1. Project Timeline**

- *Utilizing the template below, provide a project development timeline that includes all Tasks and Milestones described in the Scope of Work and Budget. The timeline should include the vendor identification and stakeholder outreach processes. The timeline should represent a high-level project plan with clear milestones. Tasks lasting longer than three months should be broken down into more granular sub-tasks.*

- *The performance period ends May 2025. Ports may submit POs to vendors and the State no later than June 2025, which affords an extra year of development time. However, POs cannot be modified after June 2025.*

Task #	Description	Milestones and Deliverables	Start Date	End Date
<b>Task 1</b>				
1.1				
1.2				
1.3				
<b>Task 2</b>				
2.1				
2.2				
2.3				

**8.2. Project Team**

- Describe the project management structure. Identify the team members responsible for managing and implementing the project. Describe their experience managing similar projects. Include resumes for all key personnel in the Appendix.
  - What is the size of the internal implementation team?
  - Who will be the project sponsor?
  - Who will be responsible for change management?
  - Who will be responsible for stakeholder relationship management?
- If applicable, which vendors have been identified to execute the project? Describe their qualifications.
  - If an implementation vendor has not been selected, what are the criteria for your RFP?
  - What is the staff count they will provide on the project?

**8.3. Collaboration**

- If you are working with other ports on a common solution, purchase, or system, describe project team structure:
  - Identify partner ports
  - Describe high-level goals that will be attained by working together that would not be possible individually.
  - Distinguish the components of the effort that are explicitly owned by your port, other ports, or a joint body.

- Describe the governance system for establishing consensus on standards, design decisions, and ongoing maintenance and expenses after project implementation.
- If you are not working with another port to solve a shared data gap, justify why collaboration is impossible.

#### **8.4. Project Risks**

- *Identify the risks to the success of your project. Utilize the following guiding questions to structure the approach to risk identification. Consider your project's risk holistically and add any necessary project-specific risks and mitigation measures. For each risk identified, explain the steps to mitigate those risks (before or during the project). We encourage you to use the [ROAM Framework](#).*
- Stakeholder risks
  - Who needs to contribute data to the solution? How likely are they to do so?
  - Who needs to utilize the solution? How likely are they to adopt it? What barriers to adoption are anticipated?
- Personnel risks
  - Are there key personnel on your team or on vendor teams who hold critical and unique knowledge?
  - Are there vendor relationships where the vendor has disproportionate leverage or lock-in?
  - Are there any ambiguities in your definition of “done” that could lead to misalignment between project goals and implementation expectations?
- Implementation risks
  - Will aspects of the system involve new technologies?
  - Will the system be required to process data at a larger scale than your current systems?
  - Does the completeness or format of the data itself present any significant challenges?
  - Which parts of the proposal are most likely to run over budget (time or cost)?
- Collaboration risks
  - If you are collaborating with another port, what challenges might arise in gathering consensus on decisions? What processes will you set up to resolve those?
- Risks to standardization and interoperability
  - Are there any datasets involved in your proposal that do not have a clear standard already available? If so, how do you plan to keep your implementation aligned with what other ports or stakeholders in the ecosystem will build?

#### **8.5. Project Budget**

- Describe the project budget, addressing the questions below. Provide a budget table and budget justification. Example templates are provided below. The budget items should be organized according to their respective tasks in alignment with the Scope of Work.
  - Break down the project budget according to the tasks and milestones described in the Scope of Work. Show how the overall cost number for the project has been derived. Break down the budget by type of spend (e.g., internal labor, contractor, material, etc.). Outline if and how buffers are used and who has authority to access them.
  - Describe project financial reporting processes.
  - What measures are planned if the project is likely to run over budget (e.g., reduce scope by specific items, use other funding sources)?
  - Describe how the proposed budget is cost-effective.
  - Describe how the project costs are reasonable, whether match is committed and adequate to support the project, and how administrative costs have been minimized.
- Example Budget Template:

<b>Task 1 [NAME]</b>			
<b>Cost Category</b>	<b>Grant Funds</b>	<b>Outside Funds</b>	<b>Total</b>
Budget Item A			
Budget Item B			
Budget Item C			
Etc.			
<b>Cost Category</b>			
Budget Item A			
Budget Item B			
Budget Item C			
Etc.			
<b>Task 2 [NAME]</b>			
<b>Cost Category</b>			
Budget Item A			
Budget Item B			
Budget Item C			
Etc.			

<b>Cost Category</b>			
Budget Item A			
Budget Item B			
Budget Item C			
Etc.			
<b>TOTAL</b>			

- Example Budget Justification Template:

1. Personnel Salaries, Wages, and Fringe Benefits

Staff Position	Annual Salary	Annual Fringe	% of Time on Project	Year 1	Year 2	Etc.	Total

2. Travel

Description	Total Cost

3. Equipment

Item	Description	Quantity	Cost Per Item	Total Cost

4. Supplies

Item	Description	Quantity	Cost Per Item	Total Cost

5. Contractual Costs

Partner	Role	Funding Allocated

6. Indirect Costs

Description	Total Cost

7. Matching Funds and Additional Funding Sources

Funding Source	Description	Total

**8.6. Additional Funding Resources**

- If the Port is planning to supplement this funding with additional federal funding opportunities, please enumerate those funding sources and the risks to the project if those are not attained:
  - State the project funding amount
  - Describe the funding criteria, including any overlap with the criteria of the California Containerized Ports Interoperability Grant Program.
  - Are there any restrictions associated with supplemental funding?
  - Describe the process for securing ongoing funding for the system once built. Will the port seek continued federal/state funding, or will the port institute a fee (pre-existing or new)?
- Looking into the future, how will you leverage this funding opportunity in the pursuit of other funding opportunities (e.g., Clean Ports Initiative, Port Infrastructure Development Program, Port Security Grant Program)? Address the following:
  - Identify and describe future opportunities that may be enabled by the implementation of your data system.
  - If there is a gap between the results of this project and needs for future funding, how will you address those gaps?

**8.7. Project Metrics**

- How will the success of the project be measured both during and after system deployment? Metrics should be specific, measurable, and time-bound. For example:
  - Do you expect this system to increase TEU volumes over a period of time, and by how much?
  - What environmental and climate-related metrics will be tracked, and how will this system impact your ability to improve those metrics?
  - How will you measure the efficiency of the system before and after implementation? How do you reasonably forecast key performance metrics to change?

*8.3 Required/Supporting Documents*

Applications must be submitted via an email consisting of the following attachments:

- Proposal Narrative

If an applicant is submitting multiple applications, each application should be submitted in a separate email.

#### 8.4 *Submission Process and Deadlines*

Applications are due **February 8, 2024, at 11:59 PM (Pacific Standard Time)**. Proposals must be submitted to the TAC in a Word document via email with the subject line “Ports Grant Submission – [PORT NAME] – Project[PROJECT NUMBER] – V[VERSION NUMBER]” to [Ports-Grant-Submission@buildmomentum.io](mailto:Ports-Grant-Submission@buildmomentum.io).

Applicants must follow the proposal document naming convention:

PortsGrantProposal\_[PORT NAME]\_Project[PROJECT NUMBER]\_V[VERSION NUMBER]\_YYYYMMDD

*Example: PortsGrantProposal\_PortofHueneme\_Project1\_V1\_20230109*

Optionally, applicants may submit a draft proposal by January 10, 2024 to receive feedback from the TAC. Feedback will be returned by January 24, 2024 to allow applicants time to revise and resubmit by February 8, 2024. Applicants may submit one draft proposal per application (maximum three proposals).

#### 8.5 *Communications*

Communications for project submission, tracking, and reporting will primarily take place via email. Applicants may submit questions to the TAC via email at [ports-tac@insightsoftmax.com](mailto:ports-tac@insightsoftmax.com). Questions relevant to all applicants will be addressed in the Frequently Asked Questions document, updated on a weekly basis. Questions containing confidential information and those specific to an individual proposal will be answered directly.

The Program Guidelines and FAQs are both available on the following websites:

- <https://buildmomentum.io/ca-port-data-interoperability-grant-program/#>
- <https://business.ca.gov/about/publications/>

Proposal drafts and final proposals must be submitted to the TAC via email at [Ports-Grant-Submission@buildmomentum.io](mailto:Ports-Grant-Submission@buildmomentum.io).

#### 8.6 *Confidentiality*

Proposals submitted to the TAC are confidential and will not be disseminated publicly.

### 9. **Application Evaluation**

#### 9.1 *Application Review and Award Process*

The TAC will accept proposal submissions from December 12, 2023 until February 8, 2024. The TAC will review and provide feedback to proposals submitted by January 10, 2024 (Applicants limited to one draft per application). The TAC will review final submissions and score applications using the Scoring Criteria (Section 9.2). Final awards will be announced on February 26, 2024. Awardees will be publicly announced, and the TAC will provide award details via email.

#### 9.2 *Scoring Criteria*

Refer to Section 8.1 for detailed guiding questions for the Narrative. Narrative documents shall not exceed 25 pages (not including Cover Page, Table of Contents, and Appendices) and must be written in Calibri, Arial, or Times New Roman, 11 or 12 pt with 1” margins, single-spaced with a single line in between paragraphs. Text in tables, captions, and footnotes may be 10 pt. Narratives must utilize the headers provided in the proposal framework and address all questions and prompts provided.

The TAC will incorporate equity in decision-making, scoring, and fund disbursement, evaluating ports according to their needs and ensuring that benefits are shared across the port ecosystem and broader supply chain.

Proposals may earn up to 100 points: 60 points for Program Alignment and 40 points for Technical Review. The following scoring scale will be applied to all **subsections** within Program Alignment and Technical Review. The percentage score will determine the number of points eligible to win from each subsection.

The TAC expects that all ports should have a passing score, considering the availability of the TAC to provide feedback on drafts. The TAC reserves the right to veto or disqualify proposals if any section is deemed incomplete, unsatisfactory, or ineligible.

Percent	Interpretation	Explanation
0%	Not Passing	Response minimally addresses the requirements being scored. The omissions, flaws, or defects are significant and unacceptable.
40%	Adequate	Response addresses the requirements being scored, but there are one or more omissions, flaws, or defects or the requirements are addressed in such a limited way that it results in a slightly lower degree of confidence in the proposed solution.
60%	Good	Response fully addresses the requirements being scored with a good degree of confidence in the Applicant’s response or proposed solution. No identified omissions, flaws, or defects. Any identified weaknesses are minimal, inconsequential, and acceptable.
80%	Excellent	Response fully addresses the requirements being scored with a high degree of confidence in the Applicant’s response or proposed solution. Applicant offers one or more enhancing features, methods, or approaches exceeding basic expectations.
100%	Exceptional	All requirements are addressed with the highest degree of confidence in the Applicant’s response or proposed solution. The response exceeds the requirements in providing multiple

		enhancing features, a creative approach, or an exceptional solution.
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### Program Alignment

Program Alignment reviews the proposal as a whole body, evaluating the proposal’s potential impact considering the port’s current data interoperability state and the project’s contribution to the California cargo shipping ecosystem. This scoring section is subjective in comparison to the Technical Review.

This section is eligible for **60 total points**, giving it a 60/40 ratio to the Technical Review. Subsections will be scored according to the scoring scale provided above. The Program Alignment subsections and their relative values are described below.

#### **Impact - 30%**

The TAC will consider the overall impact of the proposed project under the goals of the statute. Impact will be assessed in terms of the value gained by funding the proposal, economic competitiveness, operational efficiency, stakeholder engagement, and environmental impact.

Questions that will be evaluated here include:

- If this proposal were funded, would the value gained be worth the money spent?
- Does the project support current and future market demands?
- Does the project support future growth in cargo volume?
- Will the project enable the port(s) to respond to problems more quickly?
- Will the project enable the port(s) to supply data to stakeholders more quickly or easily?
- How will the project affect key performance metrics?
- Does the project address the needs of all stakeholders, including shippers, carriers, BCOs, MTOs, labor, and the local community?
- Does the project support regional, state, and federal emissions reductions goals?
- What, if any, impact will the project have on the local ecosystem?

#### **Interoperability - 30%**

The TAC will evaluate the interoperability of the proposal in terms of standardization and accessibility. In an interoperable system, data can be sent and received in a uniform manner.

Questions that will be evaluated here include:

- Does the proposal adopt recommended standards for software interfaces and/or data models?
- Will data be available to relevant stakeholders?
- Will data be shared with federal programs (FLOW)?
- Will data be transferred via open, standard interfaces (e.g., the DCSA OpenAPI standards)?

- Will the project involve development of (or contribution to) any open-source software components?

**Demonstrated Data Need - 20%**

The TAC will consider the port's current overall data system and its current ability to have their data accessed by internal and external stakeholders. The cargo shipping system in California will be able to move faster into the future if all ports advance towards a more equitable foundation.

Questions that will be evaluated here include:

- What is the port's current data system implementation?
- Is the port able to interoperate easily with other ports and/or other modes of freight (rail, trucking)?
- How are they hampered from participating in or providing interoperable data to stakeholders
- Does the proposal actually address the port's pain points?
- Data quality needs
- Data accessibility needs
- Data interface needs

**Future Funding Leveragability / Extensibility - 10%**

An intention of this program is to treat this funding opportunity as a "seed funding." It should make it easier for ports to pursue other federal funding opportunities and become more competitive.

Questions that will be evaluated here include:

- How does this solution lay a foundation for future work?
  - Is there a clear roadmap for improvements targeting other funding opportunities?
  - Are there any factors that may *limit* avenues for future work (e.g. vendor lock-in)?

**Collaboration - 10%**

Collaboration on shared systems is a path to achieving interoperability as a port ecosystem. However, the proposal window may not leave adequate time for finding agreement on implementing complex data systems, and each port has its own set of unique needs. Theoretically, collaboration would be a multiplier of impact or interoperability. Here, it is structured as an optional collection of points that a port may score.

Questions that will be evaluated here include:

- What is the plan for cross-stakeholder communication during the implementation to ensure that the vision is achieved?

- Has governance on shared systems been considered, and to what extent? Will the governance system last a sufficient time and also be amenable to changes or additions of new members?
- If this is an individual proposal that solves shared data gaps between ports, justify why collaboration was not pursued.

**Technical Review**

The Technical Review evaluates the claims made in each section of the Proposal Narrative for completeness and overall quality. Importantly, the Tasks and Milestones in the Scope of Work, Project Timeline, and Budget must be consistent throughout the document; the TAC will evaluate proposals for consistency and clarity throughout. Sections 1.1 and 1.2 of the Project Narrative (Vision and Current State) are not considered in the scoring rubric.

This section is eligible for **40 total points**. Subsections will be scored according to the scoring scale, and their relative values are described below.

Section	Points
Data	25%
Project	25%
Software	15%
Cloud	15%
Legal + Regulatory	10%
Security	10%

**Overall Scoring**

After all subsections have been scored, a final score will be calculated. The TAC will use the following table as a *guideline* for making decisions.

Percent	Interpretation
0-40%	A proposal with this percent of the overall points will not receive funding
40-60%	The proposal may be subject to funding adjustments and could be eligible for winning grant funding if there are funds remaining
60+%	A Proposal with this percent of the overall points should receive funding within a stack-ranking of all other proposals as long as funding is available.

**Funding Adjustments**

Acting in the interest of the State of California, the TAC reserves the right to amend elements of the proposal, including the budget and the requested funds.

Though not an exhaustive list, the TAC may adjust the budget for the following reasons:

- TEU Container Volume: These are the “guiding light” for the total amount that can be awarded to a port as a proportion of the five containerized California ports. If the requested amount for a single port is not proportional to 2022 TEU container volume compared to the other ports, an adjustment *may* be warranted.
- Demonstrated Data Need: The TAC will consider if the proposed budget is appropriate to the actual needs of the port and in line with the overall needs of the California cargo shipping ecosystem. A higher demonstrated data need in comparison to other ports *may* increase the total awarded amount in order to ensure success of the project and aid adoption.
- Budget and Estimated Cost Disconnect: If the TAC sees a disconnect between the budget and their best estimate of the expected cost, TAC *may* amend the award amount.

*Note: This is not explicitly part of the scoring process but will be considered at the end of the evaluations.*

### **Draft Evaluations**

In the spirit of efficiency and to discourage the overfitting of proposals to the scoring system, the TAC will not provide scores when providing feedback on early draft submissions. The TAC will provide a written summary covering positive highlights, red flags, and areas that need additional development. Further, the TAC may provide constructive feedback on implementation details if requested to ensure the best design decisions are made.

### **Disclaimer**

Proposals may be disqualified if deemed inconsistent with the statutory or programmatic requirements of the California Containerized Ports Interoperability Grant Program. GO-Biz and the TAC reserve the right to score and fund proposals at their discretion. GO-Biz and the TAC reserve the ability to modify budgets if included costs are deemed unreasonable, unnecessary, or ineligible.

## **10. Program Administration**

### *10.1 Reporting Requirements*

The period of performance for this program is 18 months. Grantees must adhere to the program reporting requirements, including attending monthly update meetings facilitated by ISC. Grantees shall submit quarterly progress reports to determine if the grantee is adequately progressing in accordance with the terms and conditions of the grant agreement, provide interim findings, and prompt occasions for airing difficulties or special problems encountered so that the program administration team may better assist grantees in finding solutions to such problems. Progress reports are also an opportunity for grantees to highlight their successes and accomplishments.

The quarterly progress reports shall include all activities, program implementation, and evaluation efforts and must adhere to a template that GO-Biz and the TAC will provide. Grantees are to use the following procedures to prepare and submit a progress report:

- Progress reports must be submitted in the format required and should address all related topics.
- The report should describe the overall progress, including results to date, a comparison of the actual progress with the proposed goals and schedule for the period, any current problems or favorable or unusual developments, and the work to be performed during the succeeding period.
- The report shall include all supporting documents that reflect the completion of activities.

Grantees will also be required to submit a final report at the end of the grant period.

## Exhibit C - 2023 Memorandum of Understanding

# CALIFORNIA PORT DATA PARTNERSHIP

## MEMORANDUM OF UNDERSTANDING BETWEEN THE PORT OF HUENEME AND THE PORT OF LONG BEACH AND THE PORT OF LOS ANGELES AND THE PORT OF OAKLAND AND THE PORT OF SAN DIEGO

**WHEREAS**, in June of 2022, Governor Gavin Newsom signed the California Budget Act of 2022, which included an unprecedented and historic multi-billion-dollar state investment to support and enhance goods movement and the supply chain, including port and freight infrastructure, climate adaptation and resiliency, workforce training, zero-emission vehicle deployment, grid support and grid reliability, and port data system development.

**WHEREAS**, this budget includes a one-time state investment of thirty million dollars (\$30,000,000) that will support direct cloud-based port data system development at California's containerized ports and support emerging data aggregation and analysis to support freight and supply chain efficiency.

**WHEREAS**, California is the Nation's preeminent global goods movement gateway: California's twelve ports are responsible for handling forty percent of all containerized imports and thirty percent of all containerized exports in the United States.

**WHEREAS**, of these twelve ports, the five ports that handle containerized cargo are the Port of Hueneme, the Port of Long Beach, the Port of Los Angeles, the Port of Oakland, and the Port of San Diego.

**WHEREAS**, the Port of Hueneme is a vital hub for global maritime trade, and significantly contributes to the economic health of Ventura County and

Southern California. The Port of Hueneme generates \$14.9 billion in annual trade value, provides \$2.2 billion in overall economic impact, and provides more than 20,032 direct, indirect, induced and influenced jobs regionally.

**WHEREAS**, the Port of Long Beach is recognized as one of the world's busiest seaports providing nearly 7,600 acres of wharves, state-of-the-art cargo terminals, roadways, rail yards, and shipping channels. As a public landlord port, it is tasked with managing a variety of environmental conditions while emphasizing sustainability to ensure that shipping terminal services by private operators continue uninterrupted; and to serve as a good partner to neighboring property owners and communities while remaining a favored port within the shipping industry.

**WHEREAS**, the Port of Los Angeles is among the busiest seaports in the world and a global model for security, sustainability, and social responsibility. It delivers value by providing superior infrastructure and promoting sustainable and efficient operations that maintain its essential role in the national and state economy. Consistent with the State Tidelands Trust, the Port of Los Angeles is committed to managing resources and conducting developments and operations in both an environmentally and fiscally responsible manner.

**WHEREAS**, the Port of Oakland, a public landlord port, oversees 20 miles of waterfront and loads and discharges 99% of containerized goods moving through Northern California, and leads U.S. ports in the value of agriculture products exported (\$6.7 billion). The Port of Oakland generates 98,000 jobs in the region and is responsible for \$1.5 billion of local purchases.

**WHEREAS**, the San Diego Unified Port District (Port of San Diego) is a vital economic engine for the San Diego region and the State of California, providing maritime commerce, trade, recreational opportunities, tourism, and environmental protection on behalf of the citizens of California. The Port of San Diego, through its diversified activities, generates \$24.6B in overall economic impact, and provides more than 37,000 Direct Jobs regionally. The Port of San Diego is also a federally designated Strategic Port, providing facilities and services for vital logistical movements of the US military and national security.

**WHEREAS**, this Memorandum of Understanding (MOU) by and between the Port of Hueneme, the Port of Long Beach, the Port of Los Angeles, the Port of Oakland, and the Port of San Diego, hereinafter referred to collectively as "the Participants" is entered into so as to cooperatively advance computerized and

cloud-based port data system development with the aim of achieving Interoperability.

**WHEREAS**, Interoperability is defined as the ability for a port's computerized and cloud-based data systems to securely share information and expedite information across port users and relevant transportation providers, including other port or public sector-based, computerized, and cloud-based cargo data systems as needed, in support of operational improvement, and efficiency, and emissions reductions.

**WHEREAS**, the Participants recognize that supply chain data sharing is critical to enhancing goods movement efficiency, to growing the economic competitiveness of California's goods movement sector, to increasing system capacity, and improving freight system resilience.

**WHEREAS**, the Participants recognize the importance of direct collaboration with all partners in goods movement across the supply chain in advancing cloud-based data system development, including truckers, rail, labor, importers and exporters, warehousing, terminal operators, ocean carriers, and government agencies.

**WHEREAS**, the Participants recognize the importance of direct collaboration with industries in California across the supply chain in advancing cloud-based data system development, including but not limited to: agriculture, retail, manufacturing, energy, building and construction, transportation, aerospace and defense, technology, entertainment, tourism, biotechnology, logistics and warehousing, utilities, and natural resource management.

**WHEREAS**, the Participants recognize that systems developed under the terms of this Agreement shall not, in any way, track or monitor labor, including, but not limited to, productivity metrics, or systems that would infringe on a collective bargaining agreement or workers' right to collectively bargain.

**WHEREAS**, the Participants recognize that systems developed under the terms of this Agreement shall be computerized, cloud-based, and should aim to achieve interoperability.

**NOW, THEREFORE:**

## **SECTION I**

### **PURPOSE**

This MOU is to confirm the intent of all Participants to work towards interoperability, as defined, of their respective cloud-based data systems with a common goal of supporting improved freight system resilience, goods movement efficiency, emissions reduction, and economic competitiveness.

## **SECTION II**

### **AREAS OF COOPERATION**

The Participants will confer, discuss, cooperate, and exchange information, to the extent each Participant in its sole discretion deems appropriate, on subjects focused on strengthening interoperability between the Participants' data sharing systems, including but not limited to:

- A. Development of use cases and applications that support operational improvement, efficiency, and emissions reductions;
- B. Outlining of key alignment points in order to achieve resultant interoperability with other container ports;
- C. Ensuring equitable access to data for users;
- D. Identification of data elements and data sources;
- E. Identification of external entities in the supply chain for data sharing;
- F. Development of common definitions and standards for identified data elements;
- G. Ensuring data security and privacy;
- H. User discovery and stakeholder engagement;
- I. Identification of public and private funding resources to support port data system development;
- J. Increasing public and industry awareness on port data system development; and
- K. Connecting and liaising with other local, state, and federal entities of government, private industry partners, and other interested parties to support interoperability and port data system development.

## **SECTION III**

### **EFFECTIVE DATE AND TERM**

This MOU is effective from the date of its signature and shall continue in effect until the earlier of the following occurs:

- A. Three (3) years have lapsed from the effective date of the MOU; or
- B. The Participants agree to extend the term of the MOU through written amendment.

## **SECTION IV**

### **PARTICIPANTS POINTS OF CONTACT**

The Participants designate their respective points of contact for communication and information exchange, as well as any notice required to be submitted under this MOU, as follows:

#### **Points of Contact:**

##### **Port of Hueneme:**

Aaron Valance  
IT Services Manager

##### **Port of Long Beach:**

Randall Smith  
Assistant Director, Business Development.

##### **Port of Los Angeles:**

Sheeba Varughese  
Director of Information Technology/Chief Information Officer

##### **Port of Oakland:**

Pia Franzese  
Senior Maritime Projects Administrator

##### **Port of San Diego:**

Renée Yarmy  
Program Director, Maritime Sustainable Development

## **SECTION V**

### **AVAILABILITY OF PERSONNEL AND RESOURCES**

This MOU does not create any legally binding rights or obligations on any Participant.

This MOU does not involve the exchange of funds, nor does it represent any obligation of funds by any Participant. All costs that may arise from activities covered by, mentioned in, or pursuant to this MOU will be assumed by the Participant who incurs them, unless otherwise stipulated and decided pursuant to a future written arrangement. All activities undertaken pursuant to this MOU are subject to the availability of funds, personnel, and other resources of each Participant.

The personnel designated by a Participant for the execution of this MOU will work under the orders and authorization of the Participant and any other organization or institution to which the Participant belongs. The personnel's work will not create an employer-employee relationship with another Participant or any other organization or institution. Under no circumstances, will any other Participant, or other organization or institution, be considered as a substitute or joint employer of the designated personnel.

## **SECTION VI**

### **COMPLIANCE WITH APPLICABLE LAWS**

All activities undertaken pursuant to this MOU, and all personnel designated by the Participants for the execution of those activities undertaken pursuant to this MOU are subject to all applicable laws, including all laws applicable in the jurisdiction where the activities are performed. Such personnel, if visiting the other Participant to participate in an activity pursuant to this Memorandum of Understanding, will not engage in any activity detrimental to this MOU.

## **SECTION VII**

### **INTERPRETATION AND APPLICATION**

Any difference or disagreement that may arise in relation to the interpretation or application of this MOU will be resolved through consultations between the Participants, who will endeavor in good faith to resolve such differences.

## **SECTION VIII**

### **NO LEGAL RIGHTS OR REMEDIES**

Nothing in this MOU creates any legally cognizable or enforceable rights or remedies as to any Participant. In no event will any disagreement arising under this MOU—including, but not limited to, any alleged breach of, or nonperformance under, this MOU—give rise to any cause of action, or any legal or equitable remedy, in any forum whatsoever. Nothing in this MOU waives any sovereign immunity, or any other applicable immunity or defense, that any Participant may otherwise enjoy.

## **SECTION IX**

### **FINAL PROVISIONS**

This MOU is not transferable except with the written consent of all the Participants.

This MOU may be modified only by written agreement of all Participants specifying the date on which such modification is to become effective.

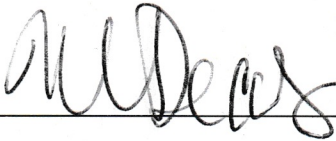
If any provision of this MOU is held by a court of competent jurisdiction to be invalid, void, or unenforceable for whatever reason, the remaining section or provision not so declared shall, nevertheless, continue in full force and effect, without being impaired in any manner whatsoever.

The termination of this MOU shall not affect the conclusion of the cooperation activities that may have been initiated during the time this MOU is in effect, unless the Participants mutually agree otherwise.

It is expressly understood and agreed that this MOU embodies the entire understanding between the Participants regarding the MOU's subject matter.


**IN WITNESS WHEREOF, this MOU is signed by the Participants below.**

**FOR THE PORT OF HUENEME**

 Date: 04-26-2023

Kristin Decas, CEO and Port Director

**FOR THE PORT OF LONG BEACH**

 Date: 04-26-2023


Mario Cordero, Executive Director

**FOR THE PORT OF LOS ANGELES**

 Date: 04-26-2023

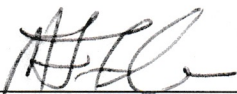
David Libatique, Deputy Executive Director

**FOR THE PORT OF OAKLAND**

 Date: 04-26-2023

Bryan Brandes, Maritime Director

**FOR THE PORT OF SAN DIEGO**

 Date: 04-26-2023

Mike LaFleur, Vice President of Maritime

# Exhibit D – Quarterly Report Template and Instructions

## QUARTERLY PROGRESS REPORT

[Project Name]

[Month, Year]

[Port Name]

[Recipient Project Manager]

### Overall Project Status

[Summarize the current status of the project.]

### Milestones and Deliverables Planned for this Quarter

[Include a bulleted list of planned project activities and milestones for this quarter. Relate these activities and accomplishments to a deliverable or task listed in the Scope of Work and describe why it is valuable to that deliverable or task.]

### Milestones and Deliverables Accomplished during this Quarter

[Include a bulleted list of significant project activities and/or accomplishments. Relate these activities and accomplishments to a deliverable or task listed in the Scope of Work (SOW) and describe why it is valuable to that deliverable or task. Include the project personnel involved in each activity or accomplishment.]

### Challenges and Potential Agreement Changes

[Describe any challenges facing the project and how you plan to address the challenges. Identify any potential agreement changes (e.g., no-cost time extensions, budget updates, or schedule changes) that may be required to address the challenge. Identify any assistance GO-Biz or the TAC may be able to provide to assist in resolving the challenge. Identify any potential scope changes and/or technology changes.]

### Expected Accomplishments for the Next Period

[Include a list of significant project activities and/or accomplishments you expect to accomplish in the next quarter. Relate these activities and accomplishments to a deliverable or task listed in the Scope of Work.]

### Status of Milestones and Deliverables

[Provide the complete list of deliverables as contained in the current Scope of Work using the table format below. Highlight in blue the deliverables that are due in the next quarter. Please use **BOLD text** to indicate when actual dates differ from the associated planned dates.]

Deliverable name	Start Date		Due Date		Status (% Complete)
	Planned	Actual	Planned	Actual	
<b>Task 1.1</b>					
[Subtask]	[Date]	[Date]	[Date]	[Date]	On-time (100%)
[Subtask]	[Date]	<b>[Date]</b>	[Date]	<b>[Date]</b>	<b>Ahead (100%)</b>
<b>Task 1.2</b>					
[Subtask]	[Date]	<b>[Date]</b>	[Date]	<b>[Date]</b>	<b>Delayed (25%)</b>

### Evidence of Progress

[If there is a long time between interim deliverables, then attach evidence of progress (e.g., test data, early

deliverable drafts, product mock-ups, preliminary analyses, architectural diagrams) to allow GO-Biz to review progress and gauge the quality of research results. Provide proof of milestone/deliverable completion as they are achieved and defined in the contract]

### **Metrics Reporting**

[Report on metrics defined in the SOW contract as they are able to be surfaced]

### **Budget Utilization**

[Provide a detailed update on the project budget and expenditures and any potential changes or risks. Have any budget issues occurred during this period? What was done to manage them? Are there any necessary changes to the budget?]

### **Update on Risks**

[Give an update on the risks outlined in the project plan: Has the likelihood changed? What has been done to actively manage them? Have any issues occurred? Did you identify new risks that weren't part of the project plan?]

### **Lessons Learned**

[Describe key takeaways, successes, and lessons learned from this quarter's activities. Examples: What was accomplished through stakeholder engagement? How has stakeholder engagement shaped project implementation? Are there any significant interoperability-related changes as a result of project activities? Have you seen an increase in collaboration among the other California ports? How did this quarter's activities contribute to the implementation status of the MOU?]

## END EXHIBIT D ##

# Exhibit E - Invoice Summary

Submission Instructions: Submit semiannual invoice summary with timing of respective quarterly report. Category Expenditure Summary and Task Expenditure Summary should be additive each period, meaning that as progress is made, the history will also be reflected in the summary. Tabs 1 - 3: enter recipient header information. Enter authorized budget and expenses by 1) category, 2) task and 3) vendor within corresponding tabs 1 - 3.

Submit all invoices and reporting documents to: [supplychain@gobiz.ca.gov](mailto:supplychain@gobiz.ca.gov) and copy GO-Biz Program Manager, Angela Shepard [angela.shepard@gobiz.ca.gov](mailto:angela.shepard@gobiz.ca.gov)

Resources:

DGS State Administrative Manual: <https://www.dgs.ca.gov/Resources/SAM/TOC>

Filename format: Please save file exactly as "PO[/LA/LB/OAK/H/SD]\_[year]-S[number]\_invoice". Example: **"POSD\_2024-S2\_invoice.xlsx"**

Attach this invoice summary file to the Invoice Cover Page.

Invoice Cover Page Requirements: to ensure timely processing and payment it is important that the Invoice Cover Page includes the required information

- Letterhead and logo
- Address and remittance payment address
- Invoice number
- Goods and/or services provided
- Amount needed to be paid
- Payment terms
- Tax applied if applicable
- Total amount

**Recipient Name:** \_\_\_\_\_  
**Agreement Number:** \_\_\_\_\_  
**Invoice Number:** \_\_\_\_\_  
**Period covered by this request:** \_\_\_\_\_

Category	Agreement Reimbursable Budget	Reimbursable Expenses This Period	Cumulative Expenses Billed to Date	% of Reimbursable Spent to Date	Reimbursable Balance
Direct Labor	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Fringe Benefits	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Travel	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Equipment	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Materials/Misc.	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Subcontractors	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Indirect Costs	\$ -	\$ -	\$ -	#DIV/0!	\$ -
<b>Total</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>#DIV/0!</b>	<b>\$ -</b>

**Match Share**

Category	Agreement Match Share Budget	Match Share Expenses This Period	Cumulative Match Share Spent to Date	% of Match Spent to Date	Match Balance
Direct Labor	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Fringe Benefits	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Travel	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Equipment	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Materials/Misc.	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Subcontractors	\$ -	\$ -	\$ -	#DIV/0!	\$ -
Indirect Costs	\$ -	\$ -	\$ -	#DIV/0!	\$ -
<b>Total</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>#DIV/0!</b>	<b>\$ -</b>

<b>Grand Totals</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>#DIV/0!</b>	<b>\$ -</b>
---------------------	-------------	-------------	-------------	----------------	-------------

<b>Reimbursement Total This Period</b>	<b>\$ -</b>
<b>Retention Amount:</b>	<b>\$ -</b>
<b>Total To Be Paid This Invoice:</b>	<b>\$ -</b>

Retention Release Invoice  
 Retention Release Amount: \$ -  
 Final Invoice

**Certification**

I certify under penalty of perjury that this invoice is accurate, correct, and proper for payment in all respects, and reimbursement for

\_\_\_\_\_  
 Signature of Authorized Representative      Date

**Recipient Name:** \_\_\_\_\_  
**Agreement Number:** \_\_\_\_\_  
**Invoice Number:** \_\_\_\_\_  
**Period covered by this request:** \_\_\_\_\_

Task Title and Number	Agreement Reimbursable Budget	Reimbursable Expenses This Period	Cumulative Expenses Billed to Date	% of Reimbursable Spent to Date	Reimbursable Balance
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
<b>Total</b>	\$ -	\$ -	\$ -	#DIV/0!	\$ -

**Match Share**

Task Title and Number	Agreement Match Share Budget	Match Share Expenses This Period	Cumulative Match Share Spent to Date	% of Match Spent to Date	Match Balance
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
	\$ -	\$ -	\$ -	#DIV/0!	\$ -
<b>Total</b>	\$ -	\$ -	\$ -	#DIV/0!	\$ -

<b>Grand Totals</b>	\$ -	\$ -	\$ -	#DIV/0!	\$ -
---------------------	------	------	------	---------	------

<b>Reimbursement Total This Period</b>	\$ -
<b>Retention Amount:</b>	\$ -
<b>Total To Be Paid This Invoice:</b>	\$ -

Retention Release Invoice  
 Retention Release Amount: \$ -  
 Final Invoice

**Certification**

I certify under penalty of perjury that this invoice is accurate, correct, and proper for payment in all respects, and reimbursement for

\_\_\_\_\_  
 Signature of Authorized Representative      Date





**Exhibit F - Submitted Proposal**

2024

# California Port Data Interoperability



**CALIFORNIA**  
Governor's Office of Business  
and Economic Development

**THE PORT**  
OF LOS ANGELES **LA**

**SDSU** | San Diego State  
University

**Carbon Intensity Gateway**

**Port of Los Angeles**

**7/30/2024**

<b>Cover Page</b>	
<b>Port Name</b>	The Port of Los Angeles (City of Los Angeles Harbor Department)
<b>Address</b>	425 S. Palos Verdes Street San Pedro, CA 90731
<b>Project Name</b>	Carbon Intensity Gateway
<b>Technical Point of Contact</b>	<ul style="list-style-type: none"> <li>• Name</li> <li>• Title</li> <li>• Email</li> <li>• Phone</li> </ul>
	<ul style="list-style-type: none"> <li>• Sheeba Varughese</li> <li>• Director of Information Technology/CIO</li> <li>• SVarughese@portla.org</li> <li>• (424) 450-3636</li> </ul>
<b>Business Point of Contact</b>	<ul style="list-style-type: none"> <li>• Name</li> <li>• Title</li> <li>• Email</li> <li>• Phone</li> </ul>
	<ul style="list-style-type: none"> <li>• Chris Chase</li> <li>• Assistant Director of Marketing</li> <li>• Cchase@portla.org</li> <li>• (310) 732-3846</li> </ul>
<b>Total Project Cost</b>	\$3,700,000
<b>Project Summary (500 words max)</b>	<p>POLA's proposed solution in this application is to develop and deploy a Carbon Intensity Gateway by building on the strong foundation established through POLA's CAAP, Air Emissions Inventory, the Environmental Management System, the Clean Truck Program, and the Alternative Maritime Power program. These programs provide a variety of significant data feeds that can be ingested and deployed to help in the creation of a single pane of glass view of a Carbon Intensity Gateway. Through this new portal, and leveraging data sharing of federal agencies such as the Federal Maritime Commission (FMC) and USDOT to provide an enhanced view of the US cargo movement, POLA seeks to unify these efforts and augment the intelligence gathered while also addressing some of the limitations of these programs as follow:</p> <ul style="list-style-type: none"> <li>a- Eliminate data fragmentation: Currently, much of the data resides in separate documents using multiple formats. While the information is useful, it is not easily retrievable considering the size and format of some of the documents. The proposed gateway will simplify this process and provide an access-controlled, single source view.</li> <li>b- Cater to the proper audience: POLA envisions a system to address the needs of supply chain stakeholders, such as beneficial cargo owners, shippers, and truckers. Furthermore, POLA believes that consumer awareness is vital to better decision making since the supply chain</li> </ul>

	<p>evolves around the urgency of shipments requested by consumers. Hence many shippers encourage consumers to lower their shipment urgency when possible. As part of its awareness objectives, the system may display the basics of Scope 1, 2 and 3 emissions by user profile and their impact on the carbon footprint of supply chain.</p> <ul style="list-style-type: none"> <li>c- Make data less dated: The data residing in many current reports represent historical views. While helpful, these reports do not necessarily enable the most informed decisions. The proposed portal will utilize more recent data and, when possible, it will leverage near real-time information to generate simulation models and determine the sensitivity to inputs such as routes, low carbon infrastructure rollout, GHG reductions, and other variables that can help foster resiliency and smart decision making.</li> <li>d- AI enhanced features: With AI generated simulations and predictive models, the new portal will develop an algorithm that could later enable feed users multiple shipping scenarios with the goal of improving the intermodal freight voyage from origin to destination by optimizing operations in near real-time and self-evolving models. Using predictive modeling of emissions in the port hinterland can serve as a valuable tool in identifying areas of concern, evaluating the effectiveness of emission reduction strategies, and promoting sustainable development within ports.</li> </ul>
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## 1. Introduction

The shipping industry accounts for close to 3% of the global GHG emissions and plays a pivotal role in the global economy as the main transporter of energy, food, and materials. According to the United Nations Conference on Trade and Development (UNCTAD), in July 2023 Member States of the International Maritime Organization (IMO) adopted a Revised Greenhouse Gas (GHG) Strategy that sets a sectoral target of net-zero emissions by or around 2050. This is a crucial step for international climate collaboration in general and the shipping sector in particular. The Revised Strategy set for the 2050 target, sets indicative emission reduction targets for 2030 (20% emissions reduction, striving for 30%) and 2040 (70% emissions reduction, striving for 80%), taking all greenhouse gas emissions from the full life cycle, i.e., from production to the combustion of fuels, into account.” NB1

In the United States, California ports handle over 40% of containerized cargo entering the nation, thanks to San Pedro Bay complex - comprised of The Port of Los Angeles (**POLA or The Port**) and the Port of Long Beach - and the ports of Hueneme, Oakland, and San Diego (**The Ports**). Preserving California’s share of international container trade volume – and its related jobs and economic activity – will require advanced cooperation across multiple supply chain stakeholders to enable seamless goods movement and an enhanced cargo owner experience.

Therefore, as part of GO-Biz initiatives, POLA proposes a set of modules to be built on its existing Information Technology platform which will augment it to achieve greater Interoperability among the port community system in California. POLA’s proposed project under California Port Data Interoperability will address the following:

- a. Enabling the ports to securely share information and expedite information exchange between port users and relevant transportation service providers.
- b. Achieving congestion reduction and improvement of the quality of California residents who are using highways and roads leading to the Ports.
- c. Driving emissions reduction and enhancement of security and safety of Ports employees and customers.
- d. Providing a “lift and shift” Interoperability model to other ports across the United States that will enable incentivizing data sharing and hence enhancing efficiencies in containerized cargo movement throughout the United States and its trading partners.

### 1.1. Vision

San Pedro Bay in California is moving approximately 40% of all containerized cargo entering the US each year and about 30% of all containerized exports. POLA also serves as a strong steward of California’s environment. In 2017, the San Pedro Bay Ports adopted the most recent update of the Clean Air Action Plan (CAAP), which set GHG reduction goals from mobile sources (ships, trucks, trains, cargo-handling equipment, and harbor craft) operating in and around the Ports of Los Angeles and Long Beach. The GHG goals in the CAAP are 40% by 2030 and 80% by 2050, compared to 1990 levels. The CAAP contains specific measures to reduce GHG emissions from each of the five major mobile source categories.

POLA is committed to a sustainable environment and, through the CAAP and other environmental initiatives, the Port looks to play a pivotal role in leading the acceleration to the IMO’s “Net-zero by 2050” goal. POLA recognizes that achieving this target requires an overhaul of many processes involved with shipping cargo. The Port of Los Angeles has already entered into agreements with several ports in Asia to create green shipping

corridors that will accelerate deployments of net-zero ships across the Pacific Ocean and greener terminal equipment and partner ports.

Through its application under California Port Data Interoperability, POLA is proposing three projects, California Ports Mobile Application, an expansion to a Universal Appointment System and a Carbon Intensity Gateway, that will complement one another. The three projects build on the existing systems that will drive Interoperability and emissions reduction. Further enabling California to set the standards for clean cargo movement through its digital port community system in the United States.

POLA's strategy to lead the way towards carbon neutrality calls for the following 3 phases:

**a. Phase 1: Regional Carbon Neutrality**

POLA asserts that the first step to carbon neutrality is to deploy an accurate and a reliable emissions measurement system that captures PM and NOx emissions produced by fossil powered machinery, equipment, and vehicles from the five major mobile source categories operating in and around the Port (The Assets). As a first step, POLA will focus on emissions generated by both trucks and railroads and will leverage its annual inventories of air emissions as a baseline for migrating this data into a near real-time view.

POLA plans on introducing a comprehensive baseline (Emissions Baseline) repository portal for NOx and PM emitting Assets using established methodologies for estimating ports related emissions at POLA (Asset Green Score). This web-based viewer can be accessible publicly through a portal linked to POLA's website. The Asset Green Score system and Emissions Baseline are deployed in comparable platforms set by international ports and cities called the Port Environmental Index (PEI). This step will capture emissions by trucks and rail systems and will evolve around POLA, the City of Los Angeles, and surrounding areas, therefore procedures and improvements will first be implemented around POLA and its community.

**b. Phase 2: Incorporating additional segments of the supply chain**

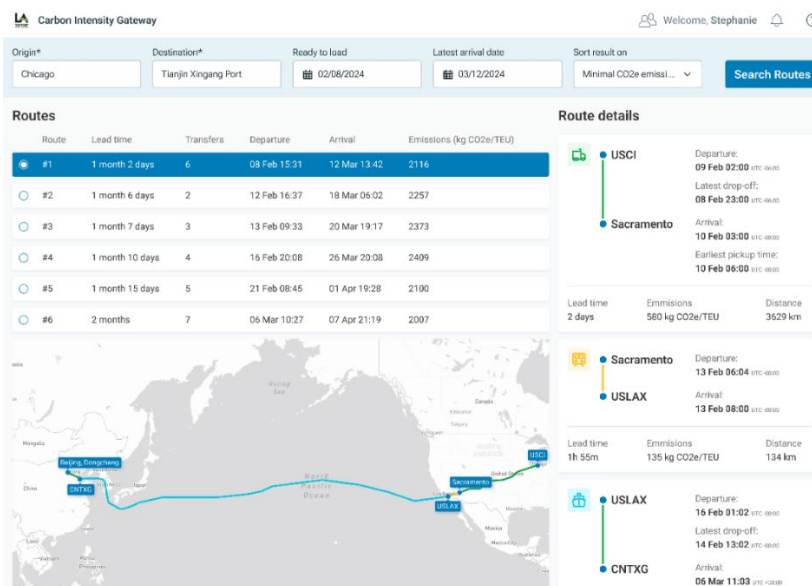
In phase 2, additional supply chain related values will be added to the emission calculator. This could include ocean vessel voyages, on-terminal motor moves, and docked vessel power consumption. POLA will utilize the Emission Baseline and Asset Green Scores to evaluate progress toward establishing goals and evaluate potential new measures to reduce The Assets emissions within its premises. This plan will include specific NOx and PM emission targets in line with IMO 2025 targets and CAAP goals.

Once the Emission Baseline and Asset Green Score systems are successfully deployed for POLA, the next step is to extend similar systems to The Port of Long Beach and the Port of Oakland due to their high volumes of container movement. This natural scalability will drive Interoperability between these ports first before expanding to the rest of the California Ports.

**c. Phase 3: Global Carbon Neutrality through Green/Optimum Routing**

POLA proposes a new web-based portal to generate shipping estimates, emissions assessments, and lead-times for POLA's import and export containers routing that helps users to intelligently choose from routes that fit their needs. The system will generate alternative routing with different priorities based on cargo urgency, shipping cost, and carbon emissions footprint by container. In this phase, incentives are now generated to

encourage greener routes. The system will also generate models and scenarios to help the port community optimize their operations at the terminals for greener outcomes. This system not only benefits POLA and its terminal operators but also freight forwarders, beneficial cargo owners, and shippers that are pledging to lower their carbon footprint by selecting ecofriendly routes for their shipments.



*Exhibit 1: POLA’s Vision for Container Carbon Intensity Gateway*

**1.2. Current State**

As ports continue to expand in size and capacity to meet the growing trade demand, the impact of their operations on air quality and climate change becomes increasingly significant. While nearby regions may experience economic benefits, there are significant concerns regarding the emission of atmospheric pollutants which have adverse effects on both human health and climate change. For most shipping decision makers priority is currently given to expediting cargo using the fastest route possible at the lowest cost. Despite many efforts to include carbon footprint into the equation, many shippers discount it due to the added cost it generates or the delays it might cause for shipments. Furthermore, the supply chain system continues to suffer from inefficiencies due to the poor availability of real-time coordination and continued disruptions. This leads to delays, which increase costs and results in higher carbon emissions.

**1.3. Proposed Future State**

POLA proposes a future where supply chain trends are more predictable to help the shipping community address exception management, global crises, and annual seasonality. Similarly, carbon footprint should be just as foreseeable and well understood by the daily decision makers in the shipping industry as other parameters such as seasonal fluctuations, pricing models, and fleet demand. This can be done by incorporating insights gained through predicting supply chain related emission inventories. Incentivizing “good” environmental behavior and penalizing parties that disregard the impact of their operations should also be considered. The prediction of emission inventories could lead to potential operational planning using environmental constraints and the minimization of the total level of emissions at the Ports. Understanding these predicted values could lead to operational changes to help establish emission thresholds

for different pollutants. Benefits of this approach are:

- a. Geospatial identification of high-emitting areas, including strategies to help reduce emissions.
- b. Assess and prioritize emission reduction strategies in areas that have the most significant impact on emissions.
- c. Facilitate plans for sustainable development around expansion and operation of ports. Port managers can design port facilities and operations that minimize their impact on the environment.
- d. Enhance stakeholder engagement by providing stakeholders with a clear understanding of the impact of port operations on the environment.
- e. Accurate prediction of pollution levels allows port authorities to ensure compliance with environmental regulations and emission standards. By staying within the prescribed limits, ports can avoid penalties and maintain their reputation as environmentally responsible entities.

## 2. Scope

### 2.1. Problem Statement

According to the International Energy Agency, “in 2022, the rebound in passenger and cargo transport activity following the coronavirus (Covid-19) pandemic led to a 3% increase in transport CO<sub>2</sub> emissions compared to the previous year. Transport emissions grew at an annual average rate of 1.7% from 1990 to 2022, faster than any other end-use sector except for industry (which also grew at around 1.7%). To get on track with the Net Zero Emissions (NZE) by 2050 Scenario, CO<sub>2</sub> emissions from the transport sector must fall by more than 3% per year to 2030. Strong regulations and fiscal incentives, as well as considerable investment in infrastructure to enable low- and zero-emission vehicle operations, will be needed to achieve these emissions reductions.”

A lack of mindfulness among select shipping community leaders continues to be a challenge for embracing environmentally friendly shipping decisions. For example, a lack of understanding of emissions scopes 1,2 and 3 and their environmental impact is a challenge that could be addressed through increased awareness efforts. Additionally, annual financial commitments add pressure on companies to focus on lowest cost shipping routes regardless of the environmental impact of their decisions. Finally, like traditional movement data, emissions and carbon footprint data generated by the supply chain is also fragmented and, in many cases, unreliable.

### 2.2. Current Data Systems and Processes

#### 2.2.1. Air Emissions Inventory

Currently, POLA’s annual activity-based emissions inventories (Air Emissions Inventory) serve as the primary tool to track the Port’s efforts to reduce air emissions from maritime industry related sources. The implementation of these measures is identified in the San Pedro Bay Ports (SPBP) Clean Air Action Plan (CAAP) and through regulations promulgated at the state and federal levels. Development of the annual air emissions estimates is coordinated with a technical working group (TWG) comprised of representatives from the Port of Los Angeles, the Port of Long Beach, U.S. Environmental Protection Agency, Region 9 (EPA), California Air Resources Board (CARB), and the South Coast Air Quality Management District (South Coast AQMD). Emissions estimated in the inventory reports are consistent with CARB and US EPA published methodologies.

### **2.2.2. Clean Air Action Plan (CAAP)**

Since 2005, POLA has monitored air quality within its operational region of influence in Los Angeles Harbor. This air quality monitoring program supports the Port's commitment to improve air quality within the San Pedro Bay Ports area under the Clean Air Action Plan (CAAP), by helping to better manage and provide feedback on the Port's air quality improvement efforts. CAAP is a landmark air quality plan that establishes the most comprehensive, far-reaching strategy for reducing port-related air pollution and related health risks, while allowing port development, job creation and economic activity associated with that development to continue.

### **2.2.3. Port of Los Angeles Clean Truck Program**

Established in 2008, the Clean Truck Program, part of the San Pedro Bay Ports Clean Air Action Plan, has reduced air pollution from harbor trucking by more than 90% through voluntary early action and compliance with state laws.

### **2.2.4. Air Quality Monitoring**

The Air Quality Monitoring program includes a network of four air monitoring stations that measure a comprehensive set of air pollutants within the region of influence. The air quality monitoring stations measure ambient air pollution levels in the vicinity of the Port of Los Angeles. As part of the program, meteorological monitoring stations operate adjacent to each air monitoring station, to help interpret the air quality data and for use in other Port programs.

### **Alternative Maritime Power**

Alternative Maritime Power is a unique air quality program that focuses on reducing emissions from container vessels docked at the Port of Los Angeles. Instead of running on diesel power while at berth, AMP-equipped ships "plug in" to shore side electrical power. AMP is also referred to shore power, cold ironing, or High Voltage Shore Connection (HVSC) Systems.

### **Environmental Management System**

The Port of Los Angeles initiated a pilot Environmental Management System (EMS) in 2003 and obtained International Organization for Standardization (ISO) 14001 certification in 2007. The Port of Los Angeles was the first major west coast port to obtain third-party, independent certification under ISO. In 2015, the program was recertified under the updated standard, indicating the ongoing commitment of Port management and staff to continuous environmental improvement.

## **2.3. Proposed Solution**

POLA's proposed solution in this application is to develop and deploy a Carbon Intensity Gateway by building on the strong foundation established through POLA's CAAP, Air Emissions Inventory, the Environmental Management System, the Clean Truck Program, and the Alternative Maritime Power program. These programs provide a variety of significant data feeds that can be ingested and deployed to help in the creation of a single pane of glass view of a Carbon Intensity Gateway. Through this new portal, POLA seeks to unify these efforts and augment the intelligence gathered while also addressing some of the limitations of these programs. Furthermore, POLA will utilize data sharing of federal agencies such as the Federal Maritime Commission (FMC) and USDOT to provide an enhanced view of the US cargo movement. The objectives of the proposed solutions are as follow:

- a. **Eliminate data fragmentation:** Currently, much of the data resides in separate documents using multiple formats. While the information is useful, it is not easily retrievable considering the size and format of some of the documents. The proposed gateway will simplify this process and provide an access-controlled, single source view.
- b. **Cater to the proper audience:** POLA envisions a system to address the needs of supply chain stakeholders, such as beneficial cargo owners, shippers, and truckers. Furthermore, POLA believes that consumer awareness is vital to better decision making since the supply chain evolves around the urgency of shipments requested by consumers. Hence many shippers encourage consumers to lower their shipment urgency when possible. As part of its awareness objectives, the system may display the basics of Scope 1, 2 and 3 emissions by user profile and their impact on the carbon footprint of supply chain.
- c. **Make data less dated:** The data residing in many current reports represent historical views. While helpful, these reports do not necessarily enable the most informed decisions. The proposed portal will utilize more recent data and, when possible, it will leverage near real-time information to generate simulation models and determine the sensitivity to inputs such as routes, low carbon infrastructure rollout, GHG reductions, and other variables that can help foster resiliency and smart decision making.
- d. **AI enhanced features:** With AI generated simulations and predictive models, the new portal will feed users multiple shipping scenarios with the goal of improving the intermodal freight voyage from origin to destination by optimizing operations in near real-time and self-evolving models. Using predictive modeling of emissions in the port hinterland can serve as a valuable tool in identifying areas of concern, evaluating the effectiveness of emission reduction strategies, and promoting sustainable development within ports.

Emissions data and data sources can be found in Exhibit 11 under Section 7.2 Environmental Data and Emissions Reductions.

<b>Scope 1, 2 &amp; 3 Emissions:</b> The process of classifying the various types of carbon emissions generated by a firm through its own operations from product inception to delivery to the consumer. They cover the impact of the broader value chain.	
<b>Scope 1 Emissions</b>	Consist of GHG emissions that a corporation generates directly to make products. These activities include extracting raw material, transportation, and product assembly.
<b>Scope 2 Emissions</b>	Consist of GHG emissions generated indirectly such as the energy produced remotely and procured to run a firm’s factory and cool its offices. This includes emissions that are produced by a 2 <sup>nd</sup> party on the company’s behalf.
<b>Scope 3 Emissions</b>	Consist of GHG emissions associated with the corporation’s upstream and downstream value chain. This category for example covers emissions generated from buying products from suppliers and from those generated by the products at the user end.

*Exhibit 2: Scope 1,2 & 3 Emissions to be considered in the value chain*

#### 2.4. Scope of Work

Given the large scope of the proposed vision, POLA proposes that the initial work under this application covers only Phase 1 content as described in this section. Furthermore, the design will include a provisioning of development and architecture design for Phase 2

and Phase 3 as described in **Section 1.1**. This will enable an easy transition to the 2 phases when the foundation is built.

In this application, Phase 1 will deploy a near-real time emissions measurement system that captures emissions produced by both trucks and trains and will leverage its annual inventories of air emissions as a baseline for migrating into a near real-time view. POLA will then introduce a comprehensive baseline repository portal for emissions using established methodologies for estimating ports related emissions at POLA. This web-based viewer can be accessible publicly through a portal linked to POLA’s website. This step will evolve around POLA, the City of Los Angeles, the Port of Long Beach, and the local region. Once the platform is built and the UI/UX and API design and specifications are complete, ocean vessel voyages, on-terminal motor moves, and docked vessel power can be easily added in a subsequent stage.

The following is a high-level Scope of Work matrix summarizing the various tasks and sub-tasks. It explains the activities required to deploy the proposed Carbon Intensity Gateway:

Task	Description	Milestones and Deliverables
1.1	Discovery Phase 1	Research, collect and analyze the Carbon Intensity Gateway project information and plans. Validate the scope of work, deadlines, and user experience expectations. Ensure necessary data in making technical and architectural decisions are available.
1.2	Discovery Phase 2	Engage different stakeholders, including MTOs, Shipping Lines, BCOs, Dray Providers, Railroads, and others to ensure applicability of data and information.
1.3	Documentation Phase 1	Phase 1 - Establish a repository for software engineers, UX designers and developers to store and maintain processes and functions to develop the portal.
1.4	Documentation Phase 2	Phase 2 – Complete open tasks in repository set up as final product is near completion. Deliverables include planning, metrics, scheduling, estimation, and system documentation among others. Provide required project reporting to state agencies as required.
2.1	Data Acquisition Phase 1	Identify data sources, from available stakeholders, acquire feeds converting data to a digital content and ensuring data feeds are complete and accurate. This includes batch 1 of data sources.
2.2	Data Acquisition Phase 2	Complete Batch 2 and 3 of data sources.
2.3	Data Implementation Phase 1	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for batch 1
2.4	Data Implementation Phase 2	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for batch 2 and a portion of batch 3.

2.5	Data Implementation Phase 3	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for final batch. Run testing for the entire data model. Ensure seamless data transfer between environments.
3.1	Data Foundation	Establishment of Database warehouse and Extract, Transform, and Load (ETL) processes.
3.2	Data Modeling	Creation of representation of data, relationship, structure, constraints and rules of organization and data storage. Completion of an Entity-Relationship Diagrams (ERDs).
3.3	API Development	API design and specification. Complete and test API coding including error management.
4.1	Development	Conceptual design of the AI-Driven LCA/GHG emission real-time prediction methodology. Analysis of the energy efficiency process in the hinterland intermodal transportation system. Algebraic formulation of container carbon reduction mathematical models.
4.2	Implementation	Deployment of AI structures for enhanced prediction and optimization. Integration with Data sources.
5.1	(Rail) UX Development	UX Development and analysis of the energy efficiency process in the hinterland intermodal transportation system for Railroad assets.
5.2	(Rail) UI Implementation	Complete User Interface and visual design for Railroad and related vehicles.
6.1	(Truck) UX Development	UX Development and analysis of the energy efficiency process in the hinterland intermodal transportation system for trucks.
6.2	(Truck) UI Implementation	Complete User Interface and visual design for trucks.
7.1	QA Testing	Execute Functional, performance, security and usability testing and User Acceptance Testing for the portal. Address errors, bugs, and defect repairs.
8.1	Deployment	Final push of the code of the Carbon Intensity Gateway to the production environment.

#### 2.4.1. Project Inclusions

In addition to the functionality and features listed in Section 2.4, the new portal will incorporate the following features: following

- a. **AI-Driven near Real-Time Distributed Optimization of Container Carbon Emissions Reduction for Hinterland Intermodal Freight Operations:** An AI-driven real-time distributed optimization (RT-DO) system will be developed, considering the dynamic nature of the intermodal freight transportation system. The model will use near real-time data and analytics to optimize operations, reducing costs and carbon emissions. The system should consider near real-time data on transportation routes, cargo volumes, and costs. The modeling methodology will be based on the concepts of advanced parallel, and distributed analytics. The project will deploy models at different levels. The first level presents near real-time

distributed optimization mathematical models for cargo routing which are used to determine the most efficient/sustainable path for traffic flow in a transportation network, considering a wide range of factors such as intermodal switching, traffic, and demand resource limitations. Intermodal switching refers to the transfer of cargo between different modes of transportation, such as from a ship to a truck or from a train to a waterway.

**2.4.2. Project Exclusions**

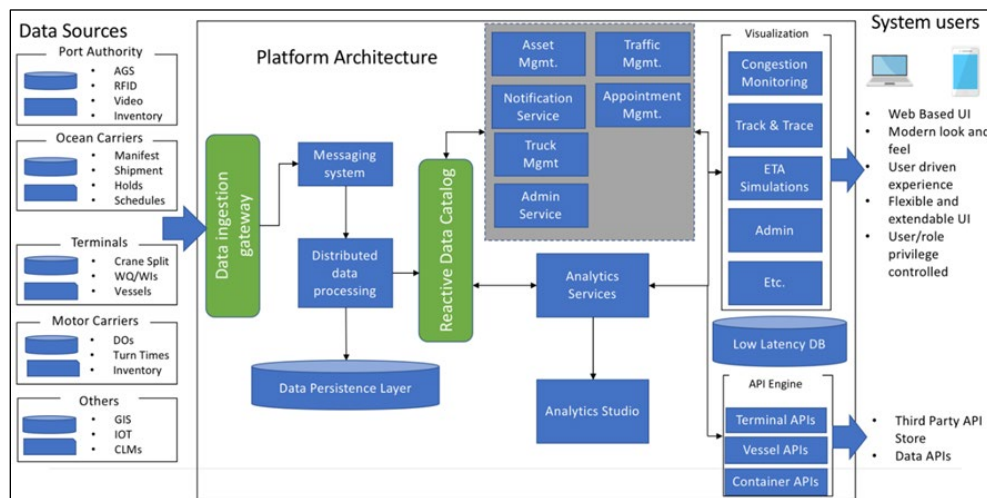
At the initial deployment, the Carbon Intensity Gateway will focus on the scope defined in Phase 1 in addition to a provisioning of development and architecture design for Phase 2 and Phase 3 as described in Section 1.1. This will enable an easy transition to the 2 phases when the foundation is built. However, deployment and implementation of Phases 2 and 3 will be covered in a subsequent phase.

The Carbon Intensity Gateway is an initial milestone that would build on future grants such as Clean Ports funding by expanding lanes and footprint that are not covered under this scope. It will also compliment the Port of LA operational budget that has been used to enhance emissions and CIG reduction technologies withing the Port complex.

**3. Software Development, Cloud and System Architecture**

**3.1. Software Development and Technical Collaboration**

The solution architecture for the existing digital supply chain platform is established to ingest data from various stakeholders. This platform interfaces with the stakeholder’s ecosystem such as marine terminal operators, ocean carriers, rail operators, chassis providers, beneficial cargo owners and CBP among many others. Through APIs, EDI, and other standard communication protocols, stakeholders can interface with the digital supply chain platform.

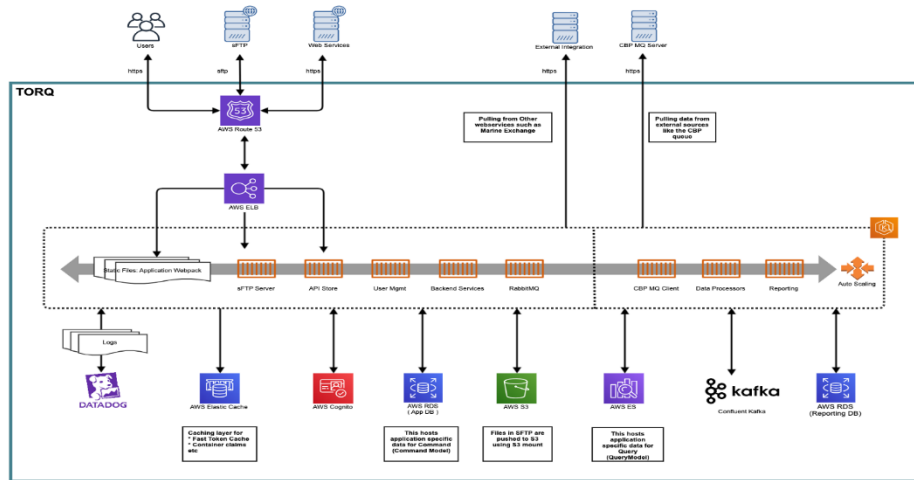


*Exhibit 3: Carbon Intensity Gateway High Level Platform Architecture*

**3.1.1. Custom Solutions**

Development of the Carbon Intensity Gateway will utilize Agile development principles with all work tracked through Rally software which tracks all features and associated user stories as the portal progresses. Engineering teams work on two-week sprint cycles with all written code subject to full regression testing with QA tollgates to validate user story completion prior to production deployment. Backend system will consist of three

development environments, including Dev, Staging, and Production, each will mirror the other in both structure and data management to enable clean development and testing. Full interface control documents will be made available during the coding and development of the applications.



*Exhibit 4: Carbon Intensity Gateway High Level System Design*

The development environments will utilize AWS components and be entirely hosted in the cloud. In addition to being hosted on AWS servers, the development will include other AWS components such as S3, Elastic Search, RDS, etc. Confluent Kafka and DataDog alerting and monitoring will also be part of the architectural design. The Carbon Intensity Gateway will not require any “on prem” hardware or software deployment. All code and development tools/environments are required to undergo full CATO (continuous authorization to operate) validation to ensure adherence to strict cybersecurity standards.

The Port of Los Angeles will work with their existing technical partner in the development of the Carbon Intensity Gateway as it builds upon the work of the existing Port Optimizer™ application. All original data input into the system will remain the property of the original source data provider, while the ownership of any derived data, software, or other IP will be governed by the contract between the Port of Los Angeles and their selected technical partner. Any potential risks associated with vendor lock-in will be mitigated by ensuring that all developed assets are easily portable to a new provider with minimal effort, including source code and underlying databases. Additionally, standardized data formats will be used everywhere possible to ensure easy integration with new providers.

**3.1.2. Scalability**

The Carbon Intensity Gateway will be based off the current Port of Los Angeles Port Community System, Port Optimizer™. Port Optimizer™ utilizes a robust backend database structure that is designed for large data sets and is optimized for logistics data. Currently, the Port Optimizer™ data foundation is processing close to 2 billion events annually with room to scale to multiple times that. It is not expected that the new data sets that will be part of the portal will cause any concerns with data or system scalability.

DataDog and other in-house monitoring will be used within the system architecture to alert development teams to any potential issues before they happen. Currently, these systems are in place with multiple levels of technical support to handle varying levels of severity with response teams in place to address any potential issues.

### **3.1.3. Reliability and Resiliency**

As part of engineering development of the Carbon Intensity Gateway, all code will be subject to full regression testing ensuring that any potential bugs are identified and addressed prior to production code deployment. Should any potential issues occur, full back-ups of data and infrastructure will be available to ensure minimal downtime and quick recovery.

### **3.1.4. Usability and Downstream Stakeholder Engagement**

The Carbon Intensity Gateway is designed to be an easy-to-use portal that will allow all port stakeholders to access data pertaining to the current state of operations at the Port of Los Angeles (and ultimately the other California ports.) This Carbon Intensity data will be presented via intuitive dashboard segments that include easy-to-read charts and graphs and clearly defined output data. It is expected that access to the Carbon Intensity Gateway will be a free service provided by the Port Authorities.

Initial data sets for the portal will rely heavily on existing data connections already established at the Port of Los Angeles for the Port Optimizer™ project, including EDI 309/310 manifest files from Ocean Carriers, EDI 322 and APIs from MTOs, and other selected data from additional providers. The Port will work with MTO partners and other stakeholders to ensure that additional data can be added to the system as needed. Additionally, the port will work with San Diego State University as it develops the carbon intensity algorithms. It will be necessary to ensure that all data providers to the system are aware of the expected usage of the source data within the portal and that they are comfortable with sharing that data. The Port will utilize different options to ensure data access including incentive programs and tariffs as needed.

## **3.2. Sustainability and Maintenance**

The software for the Carbon Intensity Gateway is designed to be easily maintained and sustained post-initial development. This includes ensuring that all code is commented appropriately to allow for future maintenance. Additionally, schema changes will be kept to a minimum with everything tracked and maintained through internal wikis to maintain clarity in design and development. System upgrades will be performed on a pre-published schedule with ample notice provided to all affected users. Additionally, any scheduled maintenance will be prioritized for periods of low usage to minimize disruptions.

Ongoing maintenance budgets will be evaluated and incorporated into both the initial development budget and as part of subsequent development efforts from the Port of Los Angeles and other future participating Ports.

## **3.3. System Testing Plan**

Quality Assurance regression testing will be integral to the success of the Carbon Intensity Gateway portal. This testing will be developed in cooperation with the development team to ensure that test cases are representative of the user stories and will result in a bug free final product. Test cases will cover both backend development including the validation of data integrations and outputs, as well as full user interface testing, including ensuring proper functionalities for all interactive user elements and access controls. Testing will be tracked through Rally alongside the respective user stories with full QA sign-off required before any code can be deployed to productions. As new features are designed and developed for the portal as part of future iterations, the same QA processes will remain in place.

## 4. Data

### 4.1. Standardization

The Carbon Intensity Gateway will be designed to adhere to and utilize existing data standards, but also participate in helping to define standards for the next generation of data access. The Carbon Intensity Gateway will utilize a data foundation that is designed to be agnostic to data formats and input methods, however, it is expected that most data inputs into the portal will be variations on existing EDI standards or well-documented APIs. As part of the development of the portal, the backend engineering will ensure that any necessary data inputs into the system are well defined to more easily allow future ports to participate. This will include clearly defined data elements and structures, sample files for EDI messages, and JSON files for API inputs. Wherever it is logical to utilize DCSA standards, The Carbon Intensity Gateway will endeavor to do so. The Port of Los Angeles will work with other participating ports to help ensure their access is not limited by data format challenges.

### 4.2. Data Culture and Change Management

One of the advantages of the Carbon Intensity Gateway is that it is built upon the Port of Los Angeles Port Optimizer™ application. As part of the development of Port Optimizer™, the Port of Los Angeles has maintained multiple direct data connections with almost all major ocean carriers, all terminal operators at the Port of LA, Railroads, chassis providers and other data providers with the port ecosystem. These data feeds have been cultivated and maintained for several years and are the product of extensive work between the Port, our technical vendor, and the stakeholders. The Port has spent significant time ensuring that data providers are well-educated in both the use of their data in our programs, but also very aware of all safeguards and monitoring in place to ensure that data remains protected. Well defined data access policies are in place and shared with providers as part of the data acquisition process.

### 4.3. Data Journey

Data will be ingested into the Carbon Intensity Gateway data foundation via various input methods including EDI, API, and other sources. Once ingested, data will be normalized and sequenced based on key values within the data sources as those inputs are broken into their component pieces. These key values will be used to match and sequence disparate sources into a cohesive data story that will be available via clearly defined internal APIs that will feed to the portal UI. Depending on the source of the data, it will be processed through as batch data or streaming. Monitoring will be in place to validate data accuracy including, but not limited to, automated test scripts that will look for out of sync/incongruous data. Bad data will be identified and either corrected, if possible, or reported to the source data provider for correction or updates. Data volumes will be expected to be significant as all movement of vessels and containers within the port will be monitored and tracked.

### 4.4. Governance

POLA's governance of information security is achieved through a cross-functional, coordinated management structure that includes business IT, legal, audit, and risk organizations.

POLA protects its data and underlying infrastructure by relying on controls across the following areas:

- a. Security Oversight

- b. Human Resource Security
- c. Asset Management
- d. Access Control
- e. Cryptography
- f. Physical and Environmental Security
- g. Operations Security
- h. Platform Security
- i. Cloud Operations
- j. Information Systems Acquisition, development, Maintenance
- k. Supplier and Customer Security
- l. Information Security Incident Management
- m. Business Continuity

#### 4.5. Data Privacy

Data Privacy is an integral part of the design of the Carbon Intensity Gateway app. As part of our data acquisition process, we ensure that all data is acceptable to be shared by the source data provider. In addition, the portal is designed to remove certain information types which might constitute PII or other proprietary data. In general, the portal will adhere to both GDPR and CPRA standards. Further to that, the app purposely removes the need for data that could be considered commercially sensitive by truncating any specific entity (shipper, consignee, etc.) information and commodity information (other than hazmat status.). The resulting data is robust in that it provides detailed logistical information, but secure in that the information removes sensitive segments. All data inputs are bound by existing cybersecurity protocols within the Port of Los Angeles and their selected technical partner.

#### 5. Cloud Infrastructure

For Cloud Infrastructure information, please refer to Sections 3 and 4.

#### 6. System Security

In 2014, the Port of Los Angeles was the first seaport in the nation to establish a Cyber Security Operations Center (CSOC) and staff it with a dedicated cybersecurity team. The CSOC currently serves as a centralized hub for proactively monitoring the Port's own technology environment to prevent and detect cyber incidents. In 2015, the Port also became the first port to achieve ISO 27001 information security management certification.



*Exhibit 5: POLA a Cyber Security Operations Center (CSOC) Cyber Resilience Center*

As the cyber threat and risk landscape continues to rapidly change, the Port continues to research and invest in the most current technology and safeguards to further enhance its cybersecurity management capabilities. Over the last decade, the Port of Los Angeles has increasingly focused on expanding the digitization of its operations and creating an enhanced 'smart port' community. While this increased use of digital technologies has resulted in more efficiencies and cargo planning capabilities throughout the supply chain, it has also prompted the need for the Port to develop more sophisticated systems to protect against cybersecurity risks and disruption threats to both Port operations and the overall supply chain. This need for additional cybersecurity protection became even more evident during the COVID-19 pandemic, when the Port detected a significant increase in the level of cyber threats. Cybersecurity and advocating for a secure and responsible digitized supply chain has long been a priority at the Port, even before the pandemic. The Port's 2018-2022 Strategic Plan identifies cybersecurity as a top priority, both in support of goods movement and overall operational risk mitigation.

### **6.1. Application Security**

The Carbon Intensity Gateway will make use of OKTA for user registration and authentication. Users in the portal will be required to create a username/login consistent with cybersecurity best practices and will then be registered via two-factor authentication within the OKTA registry. All authorization and access attempts are stored within the AWS cloud environment through secure audit logging. Internal and administrative users will be identified and monitored for continued access via normal security protocols, including but not limited to consistent auditing of user lists and domain-level restrictions. All development code is subject to multiple CP (Cybersecurity Protocol) tollgates to ensure adherence to development policies and best practices.

Internationally, the Port of Los Angeles co-chairs the chainPORT Cyber Resilience Working Group. Initiated by the Hamburg Port Authority and Port of Los Angeles in 2018, chainPORT is an international partnership among the world's leading ports, designed to share innovations, strategies, and best practices. On a national level, the Port of Los Angeles chairs the American Association of Port Authorities (AAPA) Cybersecurity Committee for collaboration with U.S. ports and other federal agencies. Locally, the Port of Los Angeles collaborates with law enforcement and other City of Los Angeles departments on cybersecurity. Cyber security and data protection are important considerations in the design and production of all POLA deployed projects and products. POLA understands the importance of integrating industry standards such as National Institute of Standards (NIST) and the International Standardization Organization (ISO) into safeguarding applicable data and infrastructure.

### **6.2. Cloud Security**

This section is not applicable as a third party will be responsible for the cloud environment. However, the Port of Los Angeles will ensure through its bid criteria that suppliers will conform to POLA's and California cloud security regulations, tracking and auditing policies.

### **6.3. Corporate Security**

The Port of Los Angeles will ensure that any technology partners selected to work on this project will adhere to the strictest of cybersecurity standards as governed by CSOC standards. This will include ensuring that access controls are in place for all users, including the monitoring of all hardware and software to ensure compliance. Successful

partners will need to demonstrate and provide documentation on security training and awareness as well as needing to provide documented security policies. Any security incidents that are observed will need to be reported and addressed in a timely fashion and will be subject to audit and review from the Cyber Security Operations Center

**7. Legal and Regulatory**

**7.1. Integration and Support of State and Federal Data Initiatives**

All POLA built systems built under the GO-Biz funding will support relevant state and federal data initiatives by providing data and reporting. These will include:

- a. The Federal program
  - United States Department of Transportation (USDOT) FLOW Program
  - Ocean Shipping Reform Act of 2022
  - US EPA’s Clean Ports Initiative
  - USDOT and Federal Highway Administration’s Port Cooperative Driving Automation Drayage Truck Development program, implemented by Leidos
  - Additional relevant programs administered by Leidos
- b. State agency and program
  - CARB
  - CalSTA
  - California Freight Mobility Plan
  - California Sustainable Freight Action Plan
  - CalTrans Port and Freight Infrastructure Program
  - Senate Bill 671/CTC

**7.2. Environmental Data and Emissions Reductions**

POLA envisions the use of ML models to predict emission inventories produced by the port operations. POLA and selected vendors will compare different models through optimization tools to identify areas of concern and evaluate the effectiveness of emission reduction strategies for a sustainable development of ports.

The sources of pollution include ships and logistics activities developed within the ports, such as the entry of trucks, and the use of cranes and forklifts. Although the characterization of emissions is particularly difficult due to the multiple tasks carried out within the facilities, it is possible to develop pollution control strategies to ensure the air quality of coastal cities using information obtained from inventories to analyze source contributions.

Near real-time data can be obtained from a variety of sources. Advanced analytics and ML algorithms can be used to process and analyze real-time or near real-time data, providing insights and suggestions to stakeholders in near real-time.

Data	Historic data source	Dynamic data source
Maritime freight traffic	Same as dynamic, 60 days active, 4+ years in cold store, Port of Los Angeles 5+years Wharfinger, Spire	Customs and Border Protection, Manifest for the Port of Los Angeles This applies to the main ocean carriers except for COSCO, Wan Hai shipping lines.
Rail freight traffic	Rail data provider such as Railinc	Rail data provider such as Railinc
Road freight traffic	5+ years in-gate/out-gate for POLA	POLA In/out-gate (Excludes Road traffic), GeoStamp
Maritime routes	Reports from ocean carriers' web.	Dynamic routes accessible from carriers' websites.
Rail routes	Class 1 and short lines	Class 1 and short lines

Inland Waterways routes	Inland waterways Carriers	Information on the river system, such as its topology, current, and water levels. This data is used to simulate the river system and the flow of cargo on it.
Truck routes	Dray providers	Providers (area of focus). Data can be provided daily.
Port traffic	2+Y historical of Marine Exchange, Spire Global API, Live data for ALL vessels within USA EEZ.	Marine Exchange, GeoStamp Vessel to Port ETA functionality. Ability to call on all historical data Spire has (back to 2011)
Shipment Data	On demand Freight data	O/D, type of goods being transported, and desired delivery date. Used to match shippers with carriers to meet needs.
Weather Data	Several sources	The latency and frequency of weather data can vary depending on the source and the type of data. Data collected from ground-based sensors may have lower latency and higher frequency than weather data collected from satellites. Similarly, certain types of weather data, such as temperature and precipitation, may be collected and updated more frequently than other types of weather data, such as cloud cover or wind speed.

*Exhibit 6: Examples of emissions data sources required for the Carbon Intensity Gateway*

**7.3. Labor Protections**

The proposal for the Port of Los Angeles does not collect and will not report any data related to labor at the port. All data that is being ingested as part of the application will not be modified from the original source. Additionally, no metrics or KPIs will be created or maintained that relate to productivity or output as it relates to labor and safeguards will be in place to protect these interests.

**8. Project Structure**

**8.1. Project Timeline**

Below is a project development timeline that includes Tasks and Milestones described in the Scope of Work and Budget. The timeline is a high-level project plan with defined milestones. Data availability and reliability represent an important component of this project. Project timeline may be adjusted in case reliable and accurate data is not available to accommodate for alternative resolutions. Note that several of the milestones listed extend across multiple quarters as the development work will occur in phases. Prior to initiating the project, a more detailed project plan will be provided.

Task #	Description	Milestones and Deliverables	Start Date	End Date
<b>Task 1 Discovery Phase</b>				
1.1	Discovery Phase 1	Research, collect and analyze the Carbon Intensity Gateway project information and plans. Validate the scope of work, deadlines, and user experience expectations. Ensure necessary data in making technical and architectural decisions are available.	Sept 24	Dec 24
1.2	Discovery Phase 2	Engage different stakeholders, including MTOs, Shipping Lines, BCOs, Dray Providers, Railroads, and others to ensure applicability of	Sept 24	Jan 25

		data and information.		
1.3	Documentation Phase 1	Phase 1 - Establish a repository for software engineers, UX designers and developers to store and maintain processes and functions to develop the portal.	Sept 24	Dec 24
1.4	Documentation Phase 2	Phase 2 – Complete open tasks in repository set up as final product is near completion. Deliverables include planning, metrics, scheduling, estimation, and system documentation among others. Provide required project reporting to state agencies as required.	Sept 25	Dec 25
<b>Task 2 Data Ingestion and Integration</b>				
2.1	Data Acquisition Phase 1	Identify data sources, from available stakeholders, acquire feeds converting data to a digital content and ensuring data feeds are complete and accurate. This includes batch 1 of data sources.	Sept 24	Dec 24
2.2	Data Acquisition Phase 2	Complete Batch 2 and 3 of data sources.	Oct 24	Jan 25
2.3	Data Implementation Phase 1	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for batch 1	Oct 24	Jan 25
2.4	Data Implementation Phase 2	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for batch 2 and a portion of batch 3.	Jan 25	Mar 25
2.5	Data Implementation Phase 3	Bring data into the Carbon Intensity Gateway data foundation, including normalization, and sequencing of data and ensuring that data is split into the proper component database sections for final batch. Run testing for the entire data model. Ensure seamless data transfer between environments.	Mar 25	Jun 25
<b>Task 3 Back-End Environment, Data modeling and Foundation</b>				
3.1	Data Foundation	Establishment of Database warehouse and Extract, Transform, Load (ETL) processes.	Oct 24	Sep 25
3.2	Data Modeling	Creation of representation of data, relationship, structure, constraints and rules of organization and data storage. Completion of an Entity-Relationship Diagrams (ERDs).	Oct 24	Sep 25

3.3	API Development	API design and specification. Complete and test API coding including error management.	Jun 25	Sep 25
<b>Task 4 Algorithm Development</b>				
4.1	Development	Conceptual design of the AI-Driven LCA/GHG emission real-time prediction methodology. Analysis of the energy efficiency process in the hinterland intermodal transportation system. Algebraic formulation of container carbon reduction mathematical models.	Sept 24	Mar 25
4.2	Implementation	Deployment of AI structures for enhanced prediction and optimization. Integration with Data sources.	Mar 25	Jun 25
<b>Task 5 Rail Feature</b>				
5.1	UX Development	UX Development and analysis of the energy efficiency process in the hinterland intermodal transportation system for Railroad assets.	Oct 24	Feb 25
5.2	UI Implementation	Complete User Interface and visual design for Railroad and related vehicles.	Mar 25	Jun 25
<b>Task 6 Truck Feature</b>				
6.1	UX Development	UX Development and analysis of the energy efficiency process in the hinterland intermodal transportation system for trucks.	Jan 25	May 25
6.2	UI Implementation	Complete User Interface and visual design for trucks.	Jun 25	Sept 25
<b>Task 7 QA Testing</b>				
7.1	QA Testing	Execute Functional, performance, security and usability testing and User Acceptance Testing for the portal. Address errors, bugs, and defect repairs.	Sept 25	Nov 25
<b>Task 8 Production Deployment</b>				
8.1	Deployment	Final push of the code of the Carbon Intensity Gateway to the production environment.	Dec 25	Dec 25

## 8.2. Project Team

Below is an overview of the Carbon Intensity Gateway Project team.

### 8.2.1. Chief Information Officer

The Port's Chief Information Officer (CIO) will be responsible for ensuring a successful implementation of CalPorts. They will manage the following tasks within this project, including approving the deployment of information technology, delegation of IT tasks, and overseeing new network and system implementations.

**8.2.1. Business Development and Marketing Director**

The Business Development and Marketing Director collaborates with technology suppliers and will focus on container related activities in the supply chain enhancement and optimization. They will also maintain relationships with beneficial cargo owners and railroads.

**8.2.2. Carlos Paternina (PhD)**

Dr. Carlos D. Paternina Arboleda is the Assistant Professor Academic Affairs at the Fowler College of Business Management Information Systems Department at San Diego State University. Dr. Paternina's research has been published in numerous top engineering, management and logistics journals and he has been honored as an "Outstanding Professor" while at Universidad del Norte. He earned both his Ph.D. and master's degree in industrial engineering at the University of South Florida. His primary areas of research are supply chain analytics and optimization, transportation and distributions systems.

SDSU through Dr. Paternina's guidance will lead the following effort:

- a. Conceptual design of the AI-Driven LCA/GHG emission real-time prediction methodology,
- b. Analysis of the energy efficiency process in the hinterland intermodal transportation system.
- c. Algebraic formulation of container carbon reduction mathematical models.
- d. Deployment of AI structures for enhanced prediction and optimization.

**8.2.3. Software Engineers and Developers**

The software developer team will be responsible for creating, testing, and refining the computer applications as it relates to the Carbon Intensity Gateway. Their primary role is to build programs required for the portal, collaborate with the rest of the teams such as software testers and quality assurance (QA) staff and approve final portal design. Software engineers will drive the macro level of the project by, designing, developing, and testing the various computer systems and laying out the optimum set up of the software architecture.

**8.2.4. Product and Project Management Team**

The product and project management team will be leading the product and project from inception to completion. They will ensure the delivery of a high-quality project within the bounds of the project's statement of work (SOW), on schedule, and within the budget. The team will oversee and provide leadership to the technical project team members while keeping all critical stakeholders apprised of the project status. They drive well-versed project management methodologies deployed in both data and software projects of this size which command a significant level of subject matter expertise required within the digital supply chain industrial segment to better support the team and interface with users.

**8.2.5. UX Research & Design Team**

The UX Designer team will ensure a first-class user experience for people that are using the Carbon Intensity Gateway. UX Design is critical in translating user needs, style guides, and requirements into an elegant software solution that addresses all the project goals and objectives. The UX Design team will think not only about meeting requirements, but about how the design choices scale and fit within the larger established platform and exceed user expectations. Our UX Team have excellent problem identification and solving

skills and communicate continuously with the technical project manager and contributing team members.

**8.2.6. Solutions Architect and Data Scientist Manager**

The Director of Software Engineering will lead a group of data scientists who will utilize analytical, statistical, and programming skills to collect, analyze, and interpret large datasets. This team has extensive experience in working with a variety of stakeholders and functional teams to uncover data-based insights to deliver improved business outcomes. This team will be critical in developing the analytical elements of the project, ensuring that the statistical methodologies are sound and scalable.

**8.3. Collaboration**

Given the substantial modeling involved in a GHG based portal, POLA proposes to work in partnership with an academic institution that has an extensive domain and research capability in the emission monitoring and reduction field in the freight and maritime industry. Therefore, POLA envisions to collaborate with San Diego State University (SDSU) Center for Artificial Intelligence in the following areas:

- a. The implementation of LCA and GHG emissions methodologies, based on the work of Prof. Paternina-Arboleda and his department on using AI to accurately predict Port Emissions Inventories.
- b. The creation of resilience metrics for hinterland container carbon reduction based on AI-driven RT-DO of intermodal operations.

San Diego State University (SDSU) is a public research university located in San Diego, California. SDSU has state-of-the-art facilities for research, and world-class faculty with expertise in diverse areas. The university has a strong focus on sustainability and is committed to promoting environmental responsibility through its research and educational programs. The added value of SDSU to this project proposal yields in the Mathematical modeling of intermodal transportation networks, based on disruptive methodologies.

Once the module is complete in POLA and the Port of Long Beach environment, it will be scaled to the remaining three Ports, the Ports of Hueneme, Oakland, and San Diego. Hence Ports collaboration will be needed for a successful scalability of the portal. Both SDSU will leverage its previous collaboration with the Port of San Diego while POLA will use its rapport with the remaining Ports to collaborate for the best interests of California.

**8.4. Project Risks**

Risk	Risk Level	Mitigations
Some maintenance and hosting cost may be needed post-performance period.	Low	Every effort made in the proposal to use no cost/non-proprietary/existing data sources. Post the performance periods, the port and its suppliers will agree on a sustainable manner to cover the incremental maintenance cost.

Lack of collaboration from certain stakeholders or ports to provide necessary data for a particular module.	Medium	POLA is currently receiving data from the major terminals, CBP, Ocean Carriers, select GPS providers, dray companies among others. The project currently assumes data will continue to flow from these stakeholders. However, there may be new data feeds that will be required to build the mobile applications. In this case, POLA will leverage existing partnership to receive the data. Otherwise, we will have to procure the data at a cost as set in the budget and contingency.  If some data is not provided, POLA may reduce the functionality of a select module or delay its deployment until an agreement is reached.
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### 8.5. Project Budget

Below is an estimated project budget using the major tasks and milestones described in the Scope of Work of this portal. The project budget is based on the technology as deployed at the Port of Los Angeles and other components implemented within the supply chain ecosystem. The budget may vary slightly at the time of execution due to many factors such data availability, manpower and potential enhancements identified. The budget is derived based on annual salaries and rates of IT developers, software engineers and UX designer using 2024 and 2025 figures that accommodate for a 5% annual increase. Furthermore, the estimates are based on recent implementations of several projects within the industry based on recent RFPs. A contingency factor is also built in to cover for risk items as shown in the risk matrix. All amounts shown below the budget table such as personnel salaries, wages, travel, equipment, supplies etc. are included in the total shown in the budget table and are not incremental to the budget table.

Task #	Description	Grant funds	Outside Funds	Total
<b>Task 1 Discovery Phase</b>				
1.1	Discovery	\$200,000		\$200,000
1.2	Documentation	\$20,000		\$20,000
<b>Task 2 Data Ingestion and Integration</b>				
2.1	Data Acquisition	\$100,000		\$100,000
2.2	Data Implementation	\$380,000		\$380,000
<b>Task 3 Back-End Environment and Foundation</b>				
3.1	Data Foundation	\$400,000		\$400,000
3.2	Data Modeling	\$500,000		\$500,000

<b>3.3</b>	API Development	\$200,000		\$200,000
<b>Task 4 Algorithm</b>				
<b>4.1</b>	Development	\$350,000		\$350,000
<b>4.2</b>	Implementation	\$150,000		\$150,000
<b>Task 5 Rail Feature</b>				
<b>5.1</b>	UX Development	\$300,000		\$300,000
<b>5.2</b>	UI Implementation	\$250,000		\$250,000
<b>Task 6 Truck Feature</b>				
<b>6.1</b>	UX Development	\$300,000		\$300,000
<b>6.2</b>	UI Implementation	\$250,000		\$250,000
<b>Task 7 QA Testing</b>				
<b>7.1</b>	QA Testing	\$250,000		\$250,000
<b>Task 7 Production Deployment</b>				
<b>7.1</b>	Deployment	\$50,000		\$50,000
<b>TOTAL</b>		<b>\$3,700,000</b>		<b>\$3,700,000</b>

1. Personnel Salaries, Wages, and Fringe Benefits

Staff Position	Annual Salary	Annual Fringe	% of Time on Project	Year 1	Year 2	Total
Engineering, Software and Development	\$120,000	N/A	100%	\$310,000	\$310,000	\$620,000
UX/UI Development and Design Team	\$150,000	N/A	100%	\$190,000	\$190,000	\$380,000
Data Modeling and Foundation	\$71,000	NA	100%	\$327,500	\$327,500	\$655,000

2. Travel

Description	Total Cost
Discovery & Documentation	\$65,000

3. Equipment

Item	Description	Quantity	Cost Per Item	Total Cost
None	Equipment is not applicable in this project			

4. Supplies

Item	Description	Quantity	Cost Per Item	Total Cost
None	Supplies are not applicable in this project			

5. Contractual Costs

Partner	Role	Funding Allocated
Application Developer	Back-End Environment, API development, and OS platform development	\$900,000
SDSU	Conceptual design of the AI-Driven LCA/GHG emission real-time prediction methodology. Analysis of the energy efficiency process in the hinterland intermodal transportation system. Algebraic formulation of container carbon reduction mathematical models.	\$350,000

6. Indirect Costs

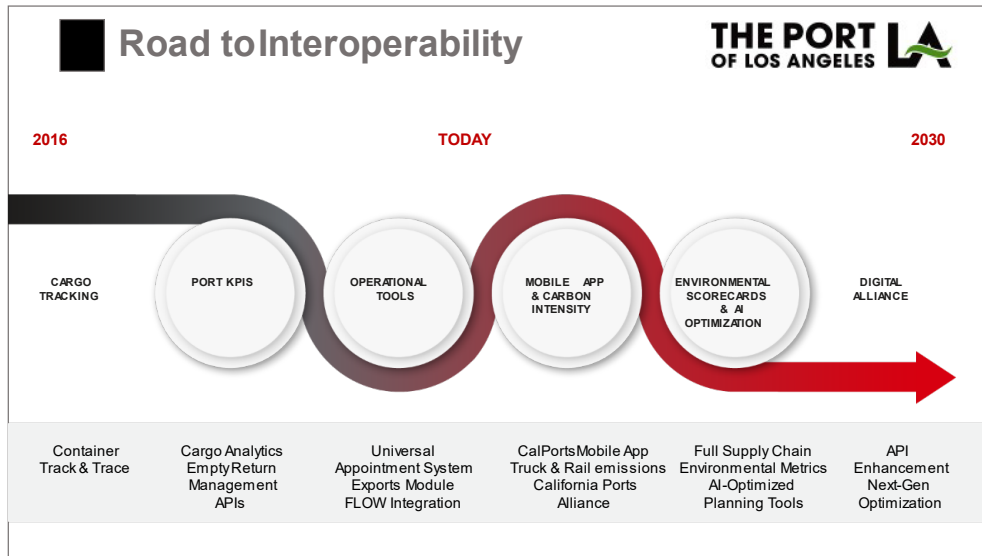
Description	Total Cost
Software, Maintenance & Support	\$680,000

7. Matching Funds and Additional Funding Sources

Funding Source	Description	Total
None	No matching funds or additional funding is planned	

**8.6. Additional Funding Resources**

While POLA is not leveraging supplementary funding to its GO-Biz Interoperability applications, the port is heavily investing in other sides of digitizing its IT infrastructure and cloud system in an urgent effort to accelerate the path to Interoperability. POLA’s adjacent projects such as the Clean Ports, Resilient Cyber Security, ATCMTD, Digital Warehouse visibility and Carbon Intensity are all feeding to Interoperability. One area that remains critical and missing to Interoperability is enabling the inclusion of other ports within California. GO-Biz Interoperability presents a major opportunity to achieve this needed inclusion. Below is POLA’s roadmap to Interoperability.



*Exhibit 7: POLA’s roadmap to Interoperability*

**8.7. Project Metrics**

Below are metrics to be measured through the deployment of the Carbon Intensity Gateway proposed:

- a. System capacity as a measure of the ability to handle traffic volumes during normal/peak periods, considering number/capacity of lanes, number/frequency of vehicles, availability of modes.
- b. Travel time reliability as a measure of a network's predictability. This metric considers i.e., congestion, incidents, and weather conditions that can cause delays or disruptions.
- c. System adaptability as a measure of the ability of a transportation network to adapt to changes in demand, technology, or other factors that can impact services. This metric considers factors such as new technologies, flexibility to adjust based on demand, and respond to disruptions.
- d. System redundancy as a measure of availability of alternative routes or modes in the event of disruptions to the primary network. This metric considers factors such as number and location of alternative routes, availability of transit or other modes, and ability to switch between modes.
- e. Environmental impact as a measure of sustainability, which takes into consideration factors such as energy consumption, emissions, and the impact on local ecosystems.

*NB1 Source: [Global Marine Port and Service Market to 2027: Trends, Opportunities and Competitive Analysis \(researchandmarkets.com\)](https://www.researchandmarkets.com)*