Port of San Diego
Resiliency in Terminal Operations at Tenth Avenue Marine Terminal
The Port Act and Tidelands Trust Doctrine

Details responsibility on behalf of the people of the State of California

Manage San Diego Bay and the Waterfront ‘Tidelands’

Promote commerce, navigation, recreation, fisheries, and environmental stewardship
Port of San Diego Jurisdiction

34 miles of waterfront
2,403 acres of land
3,535 acres of water

- Port Tidelands
- Submerged Tidelands
Economic Engine
More than $1.7 Billion Invested Since 1963

5 public piers
4 terminals
9 museums & attractions
18 hotels
74 restaurants
22 parks
70 artworks
80+ sponsored events

Resiliency in Terminal Operations at the Port of San Diego
11/6/19
Climate Planning Timeline

- **Green Port Program**
  - 2008

- **Green Business Network**
  - 2010

- **Climate Action Plan Adopted**
  - 2013

- **Climate Adaptation & Resiliency Planning**
  - 2019

- **Climate Action Plan Implementation**
  - 2019

**Green Port Program**

**Green Business Network**

**Climate Action Plan Adopted**

**Climate Adaptation & Resiliency Planning**

**Climate Planning Timeline**

**Green Business Network**

**Climate Action Plan Adopted**

**Climate Adaptation & Resiliency Planning**

**Green Port Program**

**Green Business Network**

**Climate Action Plan Adopted**

**Climate Adaptation & Resiliency Planning**

**Resiliency in Terminal Operations at the Port of San Diego**

11/6/19
Climate Action Plan

Greenhouse Gas Emission Reduction Targets
-10% by 2020
-25% by 2035

Note: Timescale is drawn for illustrative purposes.
**Electric Program Investment Charge**

- 17 microgrid projects at 23 sites.
- Total: $75.6 million CEC funds and $71.4 million match funds.
- Projects are located in the CA Investor Owned Utility territories.

### Grant Funding Opportunity-17-302

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Grant Recipient</th>
<th>EPIC Funding (Match )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port of Long Beach Microgrid</td>
<td>Port of Long Beach</td>
<td>$5M ($2.12M)</td>
</tr>
<tr>
<td>Camp Parks Microgrid</td>
<td>Lawrence Berkeley National Laboratory</td>
<td>$5M ($11.41M)</td>
</tr>
<tr>
<td>Miramar Marine Air Station Microgrid</td>
<td>University of California, San Diego</td>
<td>$5M ($6M)</td>
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<tr>
<td>Port of San Diego Microgrid</td>
<td>San Diego Unified Port District</td>
<td>$4.98M ($4.63M)</td>
</tr>
<tr>
<td>Port Hueneme Server Farm Building Microgrid</td>
<td>Electric Power Research Institute</td>
<td>$4.99M ($3.5M)</td>
</tr>
<tr>
<td>Chemehuevi Indian Reservation Microgrid</td>
<td>Handbook Holdings, LLC</td>
<td>$4.99M ($8.4M)</td>
</tr>
<tr>
<td>Virtual Wide Area Urban Microgrids</td>
<td>Gridscape</td>
<td>$4.99M ($3.28M)</td>
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<tr>
<td>Rialto Microgrid</td>
<td>Rialto Bioenergy Facility</td>
<td>$5M ($6.66M)</td>
</tr>
<tr>
<td>Redwood Coast Airport Microgrid</td>
<td>Humboldt State University</td>
<td>$5M ($6.32M)</td>
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<tr>
<td>Santa Rosa Junior College Microgrid</td>
<td>Sonoma County Junior College District</td>
<td>$4.99M ($8.69M)</td>
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<tr>
<td><strong>Total Award</strong></td>
<td><strong>EPIC - $49.97M</strong></td>
<td><strong>Match - $61.02M</strong></td>
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- Demonstrate Business Case for Advanced Microgrids in Support of California's Energy and GHG Policies

- Project Title
- Grant Recipient
- EPIC Funding (Match )
- 17 microgrid projects at 23 sites.
- Total: $75.6 million CEC funds and $71.4 million match funds.
- Projects are located in the CA Investor Owned Utility territories.
Project Overview – Goals of Microgrid Grant

Electrification

Resiliency

Technological Advancement

Replicability
Port of San Diego – Strategic Port

- 1 of 17 U.S. Department of Transportation Strategic Ports - Supply of Emergency Goods / Services

- **Critical Infrastructure:**
  - Jet Fuel Storage for San Diego International Airport
  - Security Gates/Facilities
  - Site Lighting
Microgrid Project Overview

• **Project Consultants**
  o Burns & McDonnell (BMcD) – System Design and Construction Admin Support
  o Electric Power Research Institute (EPRI) – Cyber Security Assessment, Testing/Evaluation, and Knowledge Transfer
  o UC San Diego (UCSD) – Project Evaluation and Knowledge Transfer

• **Application Ask**
  o CEC Funding: $4,985,272
  o District Match: $4,427,973
  o UCSD Match: $201,963

  Estimated Project Budget $9.6 M

• **Overview**
  o Solar PV power, battery storage, and microgrid controller
  o Energy Efficient Lighting Retrofits
  o Decrease electricity costs 60%
Microgrid Preliminary Site Plan

- **858,000 kWh Reduction**
  - Solar 700 kW
  - Battery Storage
  - 700 kW / 2,500 kWh

- **280,000 kWh Reduction**
  - Energy Efficient Site
  - Lighting Retrofits

- Estimated Reduction
  - 360 MTCO$_2$e
Energy Resiliency

Tenth Avenue Marine Terminal Microgrid Project

700-kW Solar PV Array

Battery Energy Storage System / Electrical Infrastructure

Not to drawn to scale.
# Microgrid Technical Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – General Project Tasks</td>
<td></td>
</tr>
<tr>
<td>2 – Microgrid Design</td>
<td>100% Design Phase</td>
</tr>
<tr>
<td>3 – Microgrid Construction</td>
<td></td>
</tr>
<tr>
<td>4 – Operation and Maintenance</td>
<td></td>
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<tr>
<td>5 – Testing and Evaluation</td>
<td></td>
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<tr>
<td>6 – Evaluation of Project Benefits</td>
<td></td>
</tr>
<tr>
<td>7 – Technology/Knowledge Transfer Activities</td>
<td></td>
</tr>
</tbody>
</table>

### Technical Advisory Committee
- **Consultant Role:** UCSD, EPRI, and BMcD
- **Committee:**
  - San Diego Gas & Electric
  - City of San Diego
  - Navy Region Southwest
  - California Air Resources Board
  - San Diego International Airport
  - San Diego Refrigerated Services (TAMT Tenant)
Anticipated Microgrid Project Schedule

<table>
<thead>
<tr>
<th>FY 18</th>
<th>FY 19</th>
<th>FY 20</th>
<th>FY 21</th>
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<tbody>
<tr>
<td>Apr - June</td>
<td>July - Sept</td>
<td>Oct - Dec</td>
<td>Jan - Mar</td>
</tr>
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</table>

**Grant Agreement Development**

- **Grant**
- **Microgrid Project**
  - **Energy Efficient Site Lighting Retrofit**
    - Procurement
    - Lighting Installation
  - **Roof Replacement**
    - Procurement
    - Roof Construction
  - **Microgrid Design**
    - Procurement
  - **Testing, Evaluation and Reporting (Through to 3/2023)**
    - Relevant Tasks:
      - Cyber Security Architecture Assessment
      - Operation and Maintenance Plan
      - Testing and Evaluation
      - Evaluation of Project Benefits
      - Technology/Knowledge Transfer Activities
  - **Construction**
    - Battery Storage / Microgrid Control System
    - Solar / Electrical Infrastructure Upgrades

Resiliency in Terminal Operations at the Port of San Diego

11/6/19
California State Legislative & Policy Framework

**Land Use & Mobility**

*Port Master Plan*

- Sustainable Communities and Climate Protection Act (2008)
- Sustainable Freight Action Plan (2016)

**Climate Change**

*Climate Action Plan Update*

- Executive Orders (2005 and 2013)
- SB 32 – Global Warming Solutions Act (2016)

**Clean Air**

*Maritime Clean Air Strategy*

- Clean Air Act (1970)
- California Clean Air Act (1988)
- AB 617 - Community Air Protection Program (2018)
California State Legislative & Policy Framework

Resiliency in Terminal Operations at the Port of San Diego
Questions / Discussion