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<th><strong>Docket Number:</strong></th>
<th>17-IEPR-09</th>
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<tr>
<td><strong>Project Title:</strong></td>
<td>Climate Adaptation and Resiliency</td>
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<td><strong>TN #:</strong></td>
<td>220881-5</td>
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<tr>
<td><strong>Document Title:</strong></td>
<td>Status of Research Project About Climate Vulnerability and Adaptation Options for San Diego Gas and Electric:</td>
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<tr>
<td><strong>Description:</strong></td>
<td>8.29.2017: Presentation by Brian D'Agostino of SDG&amp;E</td>
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<td><strong>Filer:</strong></td>
<td>Raquel Kravitz</td>
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<td><strong>Organization:</strong></td>
<td>California Energy Commission</td>
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<td><strong>Submitter Role:</strong></td>
<td>Commission Staff</td>
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Status of Research Project About Climate Vulnerability and Adaptation Options for San Diego Gas and Electric: Lessons Learned
August 29, 2017
Status Update: Project Overview

- To identify electricity and natural gas adaptation options based on assessment of climate-related hazard vulnerability

- Two separate projects:
  - Electric Sector Vulnerability and Adaptation Study
  - Natural Gas Sector Vulnerability and Adaptation Study

- Tasks are similar between the projects. Main differences are:
  - Electricity focuses on sea level rise and coastal flooding only
  - Natural Gas also considers inland climate hazards
Overall Study Approach

Set the Context (Task 2)
- Review Existing Climate Change Information
- Coastal Hazards
- Inland Hazards
- Adaption measures
- Sensitive assets
- Identify Utility adaptation measures
- Understand Assets / Operation sensitivities

Characterize the Hazards and Exposure (Task 3)
- Collect Data
  - Hazards
  - Resource
  - Asset
- Develop Hazard Scenarios
  - Evaluate current conditions
  - Climate change considerations
  - Resolve missing data
- Model Exposure

Risk Analysis (Task 4 and Task 5)
- Conduct workshops
  - Consider Adaptive Capacity/Existing Risk Control Measures
- Assess Consequences
  - Direct
  - Indirect

Prioritize Risks and Identify Actions (Task 6)
- Conduct workshops
- Rank Risks with Likelihood and Consequence
- Identify Adaptation Measures
  - Develop action attribute list
  - Evaluate Actions
  - Select Actions for Design and Planning
Status Update: Project Overview

Project Overview

What tasks are we undertaking to accomplish this goal?

- Foundational Literature Review and Expert Interviews
- Coastal and Inland Hazard Exposure Modeling
- Assessment of Direct Impacts of Coastal and Inland Hazards to SDG&E Infrastructure and Service
- Assessment of Indirect Impacts of Coastal and Inland Hazards to SDG&E Infrastructure and Service
- Identification and Evaluation of Adaptation Measures
- Evaluation of Project Benefits
- Knowledge Transfer Activities
Status Update: Electric Workshop

SDG&E Electricity System Climate Change Exposure and Impacts Workshop

Monday, May 22
8:30-2:30
SDG&E Emergency Operations Center

Organizations Represented

- Grid Modernization
- Risk Management
- Emergency Management
- Elect Trans & Dist Engineering
- Construction Services
- Insurance & Risk Advisory

The map above is for demonstration purposes only.
SDG&E Natural Gas System Climate Change Exposure and Impacts Workshop

Tuesday, May 23
SoCal Gas Tower, Downtown Los Angeles

Organizations Represented

<table>
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<tr>
<th>Gas Engineering</th>
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<tr>
<td>Operations Risk Management</td>
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<tr>
<td>Emergency Services</td>
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<tr>
<td>Environmental Services</td>
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<tr>
<td>Pipeline Integrity</td>
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<tr>
<td>Insurance &amp; Risk Advisory</td>
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The maps above are for demonstration purposes only
**Status Update: Workshop Breakout Sessions**

**Breakout Session Logistics**

- **Break into two groups**
  - Group 1: Engineering/Operation
  - Group 2: Enterprise Risk/Insurance and Risk Advisory

**Focus questions:**

1. What are your initial reactions & why?
2. What do you think will be problematic and why?
3. Where are the key problems?
4. What are the specific types of infrastructure and services that would be impacted.

Go through the discussion on a hazard-by-hazard basis
Indirect Impacts

Climate Change impacts indirectly affecting the utility infrastructure through impacts on the supply chain or customers (CPUC, 2016)

Upstream Impacts
- Regional supply
- Power system interdependency

SDG & E Gas Infrastructure

Downstream Impacts
- Customers
- Local economy
Overall Study Approach

**Set the Context (Task 2)**
- Review Existing Climate Change Information
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- Understand Assets / Operation sensitivities

**Characterize the Hazards and Exposure (Task 3)**
- Collect Data
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**Prioritize Risks and Identify Actions (Task 6)**
- Conduct workshops
- Rank Risks with Likelihood and Consequence
- Identify Adaptation Measures
  - Develop action attribute list
  - Evaluate Actions
  - Select Actions for Design and Planning
Status Update: Lessons Learned

➢ This project and the associated workshops/networking has contributed to additional resilience activities across SDG&E & SoCalGas

• Cal-Adapt based climate study with the design of new Blythe Compressor Station

• Cal-Adapt based climate study to look at SDG&E Design Standards

• Cal-Adapt based study to look at SDG&E system hardening projects
Questions?