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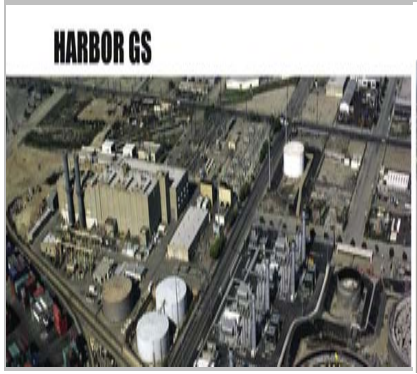

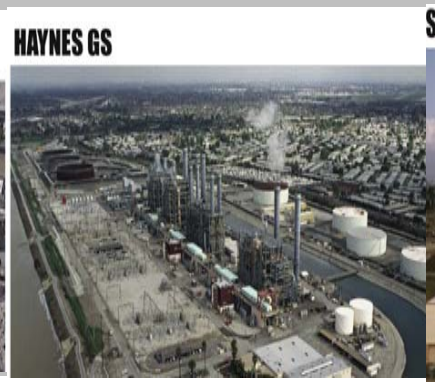

- A Summary of –

Los Angeles Department of Water and Power Grid Reliability Study

Dated December 31, 2010

Presented: April 8, 2011
To: SACCWIS

Los Angeles Department of Water & Power

LADWP Grid Reliability Study

Who are we?

- Municipal Utility
  - Obligation to serve
  - 1.4 million customers, serving a population of 4 million
  - Vertically Integrated – Generation, Transmission, Distribution
  - Own Balancing Authority
  - Local generation for Los Angeles includes 4 large generating stations, 3 use ocean cooling

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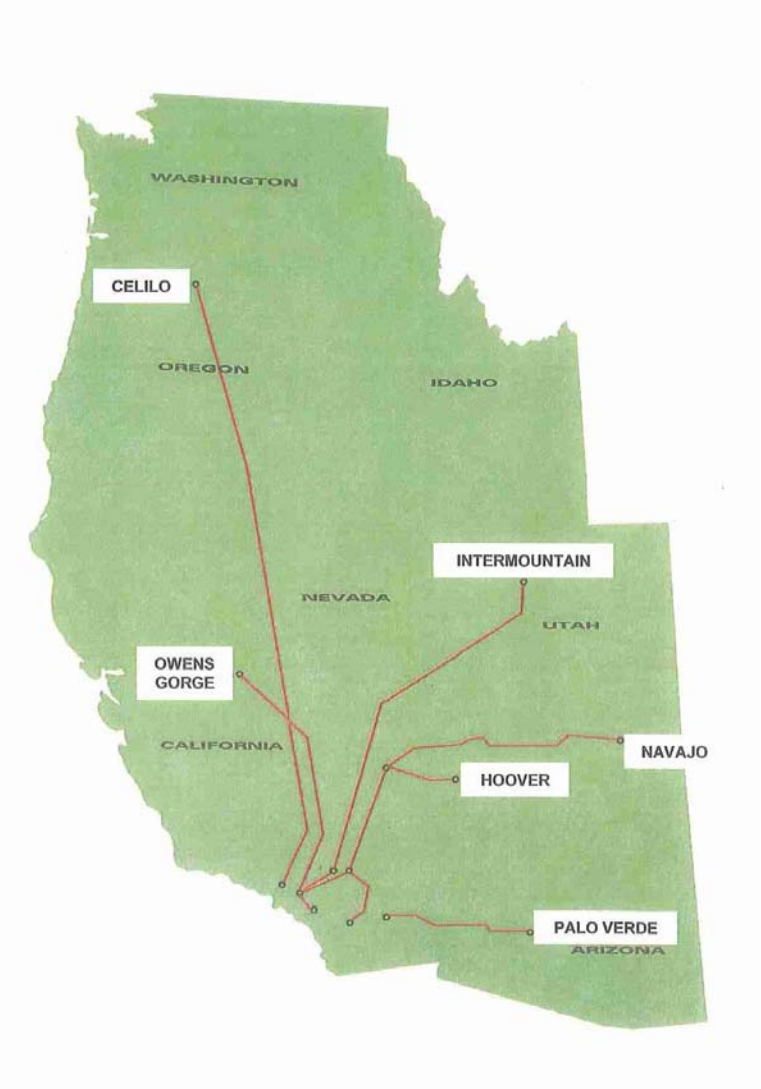
LADWP Grid Reliability Study



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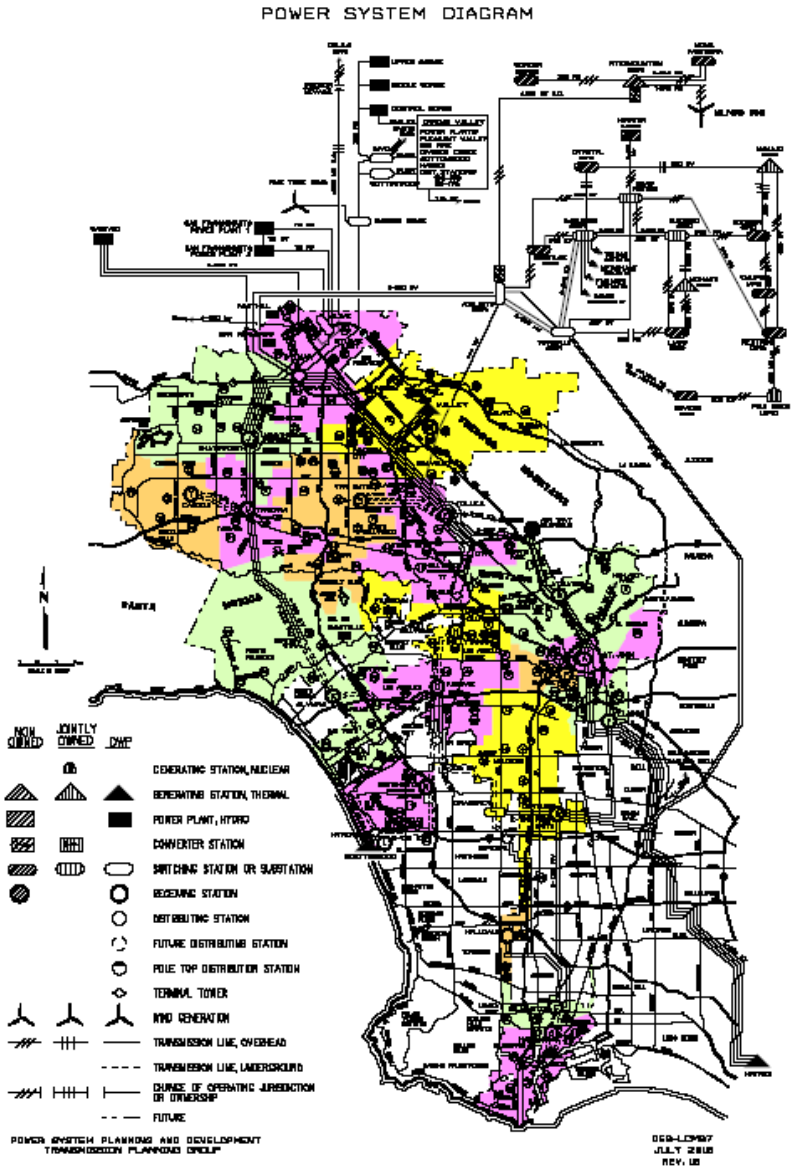
LADWP Grid Reliability Study



What is in the Study?

Local generation requirements to meet the NERC/WECC reliability standards and prudent utility practice.

1. **Resource Adequacy**

   Local resources for reserve requirement / Peak demand forecast

2. **Reliability Assessment**

   Assumptions / Criteria / Results / Critical Contingencies

3. **Study Procedure**

   Objective / Process / Criterion / Voltage and dynamic stability

4. **Load Forecast and Power Reliability Program (PRP)**

   Load forecast / PRP

What does it mean?

1. Resource Adequacy:

Local resources for reserve requirement / Peak demand forecast

- **Resources – Generation and transmission**
- **Operational Reliability – Reserve Requirements**
- **Planning – Peak Demand Forecast & Transmission Configuration**

Bottom line: As located and configured, the current generating units and transmission lines will meet the forecast demand and reliability requirements in 2011.

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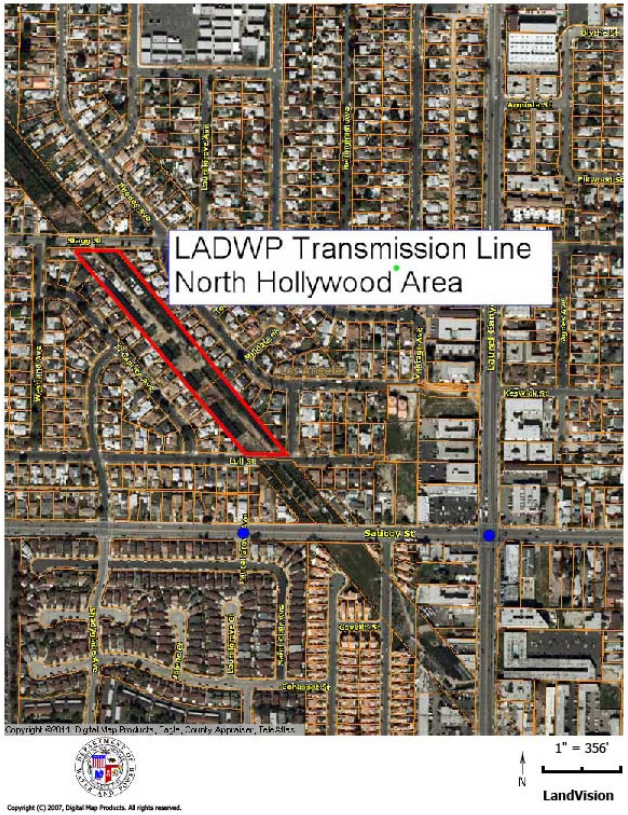
LADWP Grid Reliability Study
What does it mean?



Examples of how transmission growth is limited by residential and industrial growth along current right of ways

2. Reliability Assessment

Assumptions / Criteria / Results / Critical Contingencies

When performing a reliability study, the 3 basic criteria are:

1. **Pre-contingency** – All circuit loading are less than their continuous ratings and all voltages are normal

2. **Post Contingency** – Following the worst contingency (generation or transmission) no circuit loads beyond its emergency rating and no voltages fall below 95% of normal

3. **Recovery** – Following the contingency, sufficient generation must be available to relieve loading on all circuits to their continuous rating and restore voltage to normal

2. Reliability Assessment cont.

Assumptions / Criteria / Results / Critical Contingencies

Generation requirements:

Pre-contingency – Generation required before the event

Post Contingency – Additional generation after the contingency event

Location – must be properly located and available in the power system to meet reliability requirements

3. Study Procedure

Objective / Process / Criterion / Voltage and dynamic stability

Process – Using a power system model, we:

- Run a battery of transmission and generation contingencies (a loss event)
- Identify the worst single generation and transmission contingencies
- Determine how to restore the system to normal
- Identify the minimum generation (and its location) necessary to meet the reliability criteria.

4. Load Forecast and Power Reliability Program (PRP)

Load Forecast / PRP

System Demands – forecasting models

Power Reliability Program – Ongoing upgrades in Generation, Transmission, and Distribution

– To meet SAIDI and SAIFI goals