Distributed Generation: Electricity Infrastructure Costs and Impacts

Staff IEPR Workshop

California Energy Commission

Hearing Room A

August 22nd, 2013

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Workshop Agenda

9:00 a.m. - Introduction and Background

9:15 a.m. - Southern California Edison: *The Impact of Localized Energy Resources on Southern California Edison's Transmission and Distribution System*

9:30 a.m. – Navigant Consulting: *Distributed Generation Integration Analytical Planning Framework*

11:30 a.m. - Lunch

1:00 p.m. - Panel Discussion: Pilot Project – Developing a State Planning Process Framework to Guide DG and other Preferred Resources to Preferred Locations

Background

2012 IEPR Update – Renewable Action Plan

- Strategy 1: Identify Preferred Geographic Areas for Renewable Development
  - ✓ Identify renewable energy development zones
- Strategy 2: Maximize Value Through Assessment of Benefits and Costs
  - ✓ Modify procurement practices to develop a higher value portfolio (CPUC)
- Strategy 3: Minimize Interconnection and Integration Costs and Requirements
  - ✓ Consider environmental and land-use factors in renewable scenarios
  - ✓ Develop a dialogue on distribution planning and opportunities for a more integrated planning process
- Strategy 5: Research and Development and Financing
  - ✓ Promote research and development for renewable integration

Workshop Purpose

Morning Session:

- Present a framework for analyzing and providing transparency of the costs and impacts of increased penetration levels of distributed generation on the electricity system.

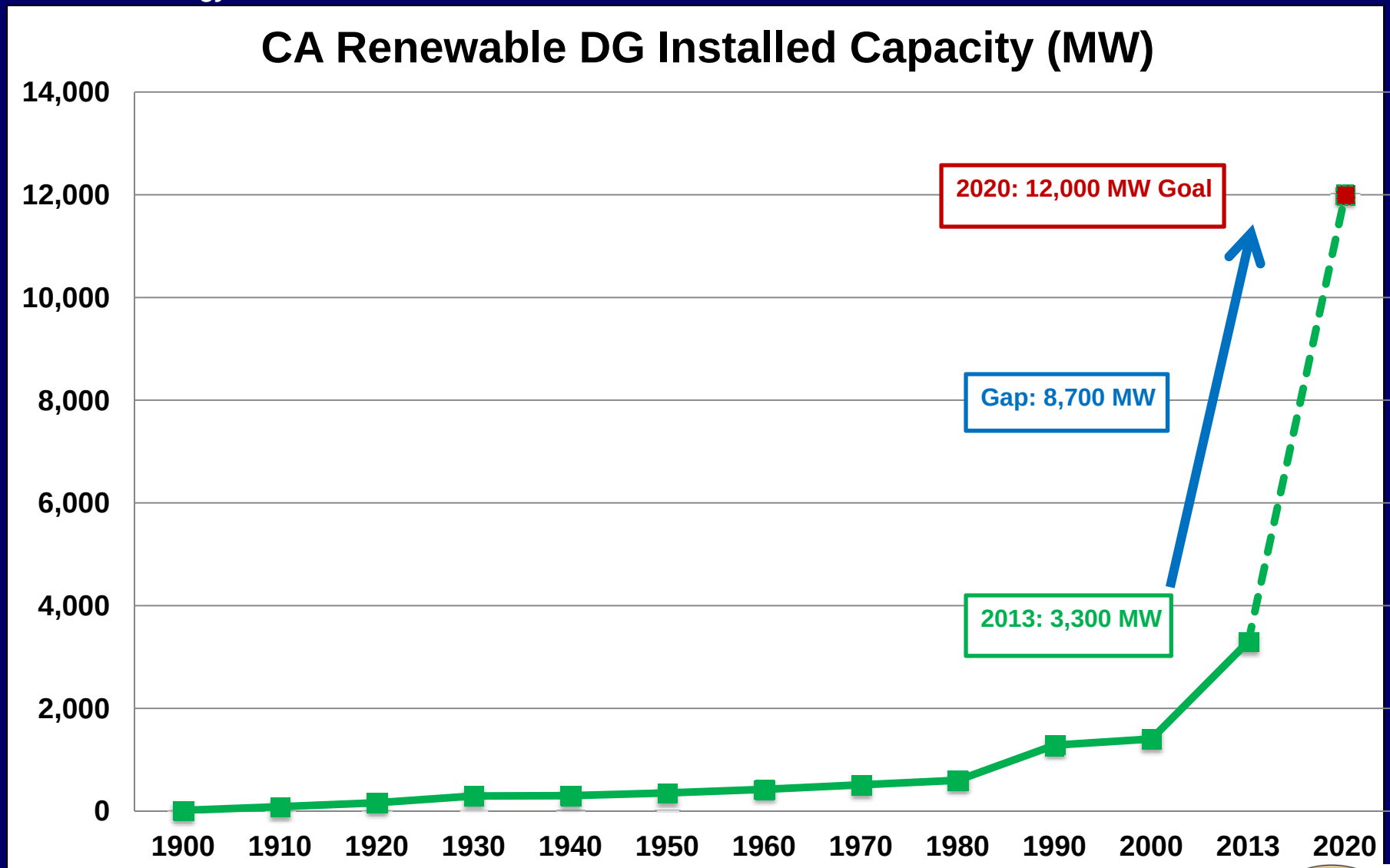
  - ✓ Methodology, assumptions, and preliminary results
  - ✓ State planning tool, not an operations tool
  - ✓ Adaptable to system design of other CA utilities

Afternoon Panel Discussion:

- Discuss a planning process pilot project that develops a framework to guide distributed generation and other preferred resources to:
  - ✓ High-value locations
  - ✓ Low-cost locations
  - ✓ High-impact locations
  - ✓ Environmentally preferred locations

Background

- Governor's Clean Energy Jobs Plan: 12,000 MW of localized renewable energy
- Policy preferred definition of localized renewable energy (or DG)
  - ✓ 20 MW or less
  - ✓ On-site or close to load
  - ✓ Constructed quickly w/ no new transmission
  - ✓ Typically with no to little environmental impact


CA Renewable DG Installed Capacity (MW)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2013
2020
2020: 12,000 MW Goal
Gap: 8,700 MW
2013: 3,300 MW

Background

Challenges of integrating 12,000 MWs of local renewable resources

- Overarching Challenge: Costs

- Technical Challenges
  - ✓ Intermittency of resources
  - ✓ Aging infrastructure
  - ✓ Radial distribution system design
  - ✓ Monitoring and control
  - ✓ Operational flexibility

- Project Siting Challenges
  - ✓ Location dependent
  - ✓ Physical constraints
  - ✓ Environmental Impacts (e.g. habitat, visual, etc.)
  - ✓ Lack of transparent information

Background

- **Southern California Edison Study:** *The Impact of Localized Energy Resources on Southern California Edison's Transmission and Distribution System* (May, 2012)

  ✓ Guiding projects to "preferred areas" is important to minimizing costs

- **Navigant Consulting/Energy Commission Study:** *Distributed Generation Integration Analytical Planning Framework*

  ✓ Energy Commission has contracted with Navigant Consulting to conduct the analysis, and has partnered with Southern California Edison to use their system for the study.
  ✓ Builds on the findings in the SCE study.
  ✓ Analyzes how costs and impacts change based on interconnection location, distribution feeder characteristics, load types, and project size.
  ✓ Develops an adaptable framework for other utilities.

Afternoon Panel Presentation

Background

2012 IEPR Update – Renewable Action Plan

- Strategy 1: Identify Preferred Geographic Areas for Renewable Development
  - ✓ Identify renewable energy development zones
- Strategy 2: Maximize Value Through Assessment of Benefits and Costs
  - ✓ Modify procurement practices to develop a higher value portfolio (CPUC)
- Strategy 3: Minimize Interconnection and Integration Costs and Requirements
  - ✓ Consider environmental and land-use factors in renewable scenarios
  - ✓ Develop a dialogue on distribution planning and opportunities for a more integrated planning process
- Strategy 5: Research and Development and Financing
  - ✓ Promote research and development for renewable integration

Panel Discussion: Pilot Project – Developing a State Planning Process Framework to Guide DG Projects, and other Preferred Resources, to Preferred Locations

Fundamental questions the panel is considering:

- Is continuing with the current process for locating distributed generation projects a viable option?

- If not, what value would be provided by a state planning process that guides distributed generation, and other preferred resources, to preferred locations?

  - ✓ What is a preferred location?
  - ✓ Where are preferred locations?
  - ✓ What are the elements of a state planning process?
  - ✓ How do you align the needed elements?
  - ✓ What data and information is needed?
  - ✓ Which stakeholders need to be involved?

Goals of the panel discussion

- Serve as a "kick-off" for a state planning pilot project that develops a framework for guiding distributed generation, and other preferred resources, to preferred location.

- Build on the SCE and Navigant/Energy Commission studies
  - ✓ How can location specific infrastructure cost information be incorporated into a state planning process?

- Goals of the state planning process framework

  - ✓ Integrate and align planning process
  - ✓ Workable solution for all stakeholders
  - ✓ Optimizes the value of investments
  - ✓ Cost-effective and efficient process
  - ✓ Provides transparent information
  - ✓ Integrates data and information

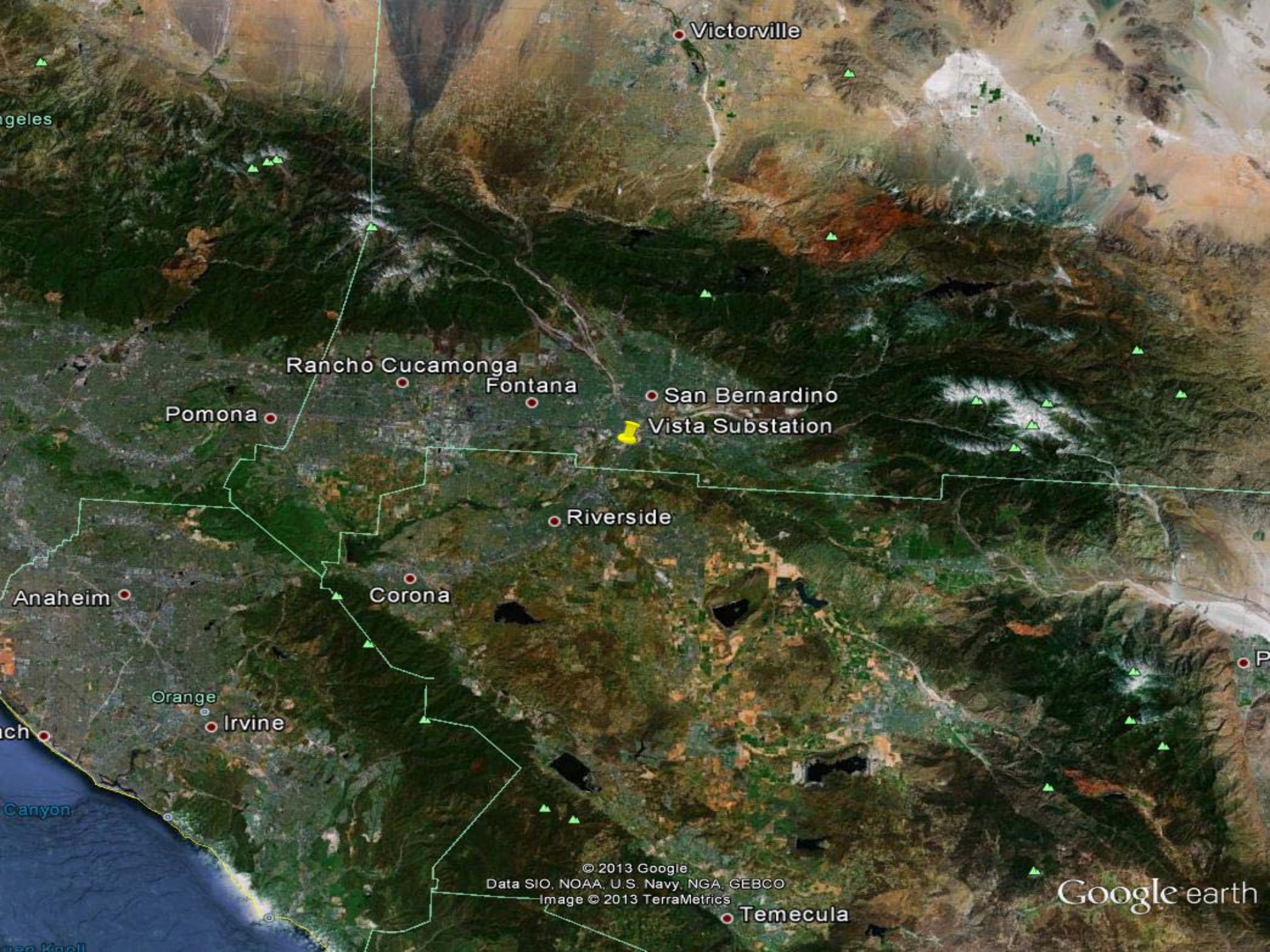
An unsophisticated example:

- Two examples of DG Deliverability nodes in SCE territory:

  ✓ **Vista Substation Node**
  Potential Deliverability = 81 MWs

  ✓ **Santiago Substation Node**
  Potential Deliverability = 160.56 MWs

DG Node		DG in Base Portolio	WDAT / Rule 21 non-NEM DG	Existing non-NEM DG	Existing FCDS non-NEM DG	DG Modeled	DG Deliverable	Existing EO non-NEM DG	WDAT FC Request (not assigned FCDS in DGD process)	Prior Commitment	Potential DGD
Substation	Transmission Level KV										
VISTA	230	80.00	0.00	401.36	400.36	599.92	599.92	1.00	0.00	400.36	81.00
SANTIAGO	230	160.56	13.38	6.22	6.22	211.86	211.86	0.00	0.00	6.22	160.56


Victorville
Rancho Cucamonga
Fontana
San Bernardino
Pomona
Vista Substation
Riverside
Anaheim
Corona
Orange
Irvine
Temecula
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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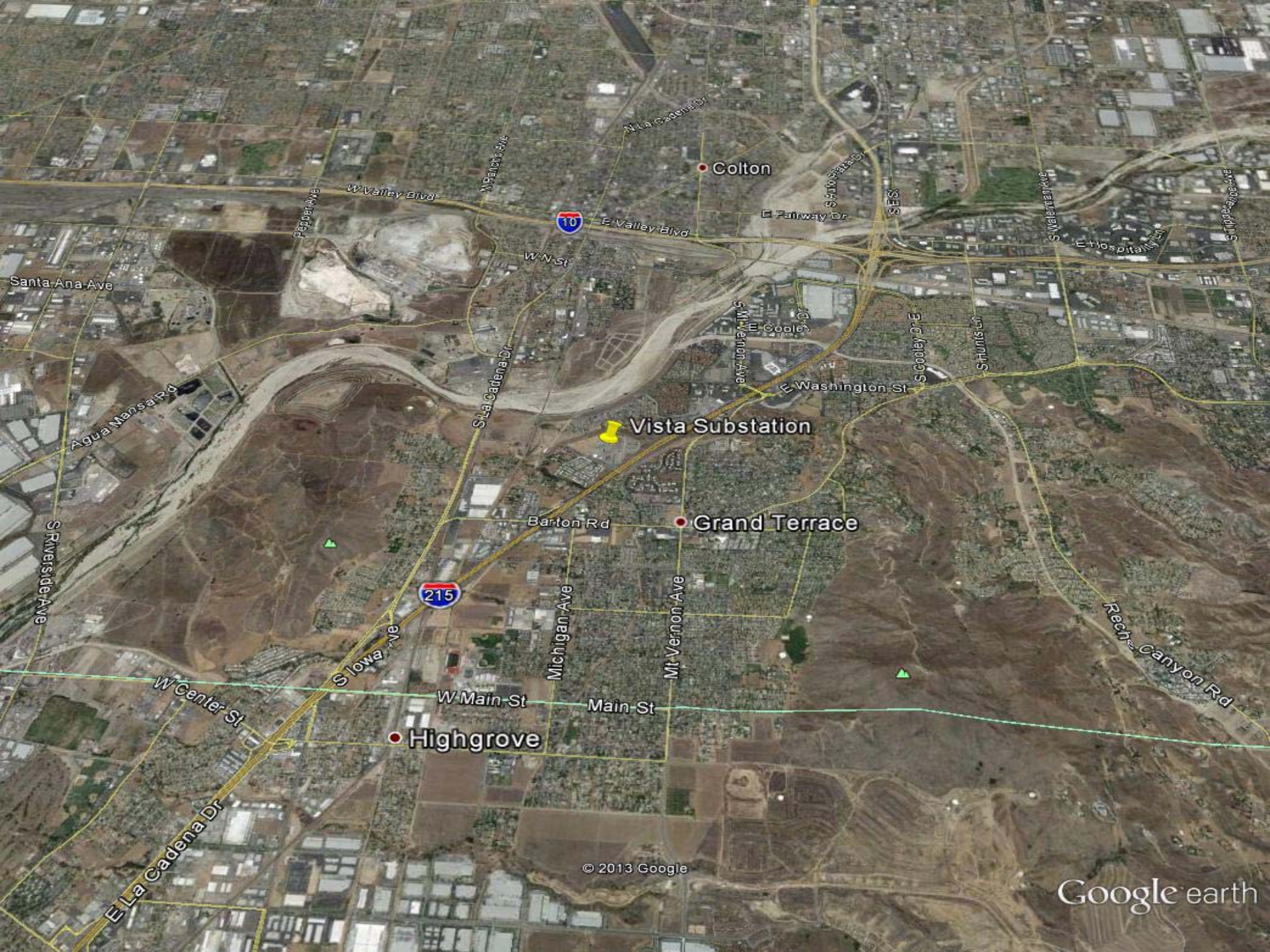
Colton
Vista Substation
Grand Terrace
Highgrove
W Valley Blvd
E Valley Blvd
W La Cadena Dr
E Fairway Dr
W Park Ave
Pepper Ave
W N St
Santa Ana Ave
S La Cadena Dr
E Cooley Dr
S Mt Vernon Ave
E Washington St
S Cooley Dr E
S Hunts Ln
Agua Mansa Rd
S Riverside Ave
Barton Rd
215
S Iowa Ave
Michigan Ave
Mt Vernon Ave
W Center St
W Main St
Main St
E La Cadena Dr
Rech Canyon Rd
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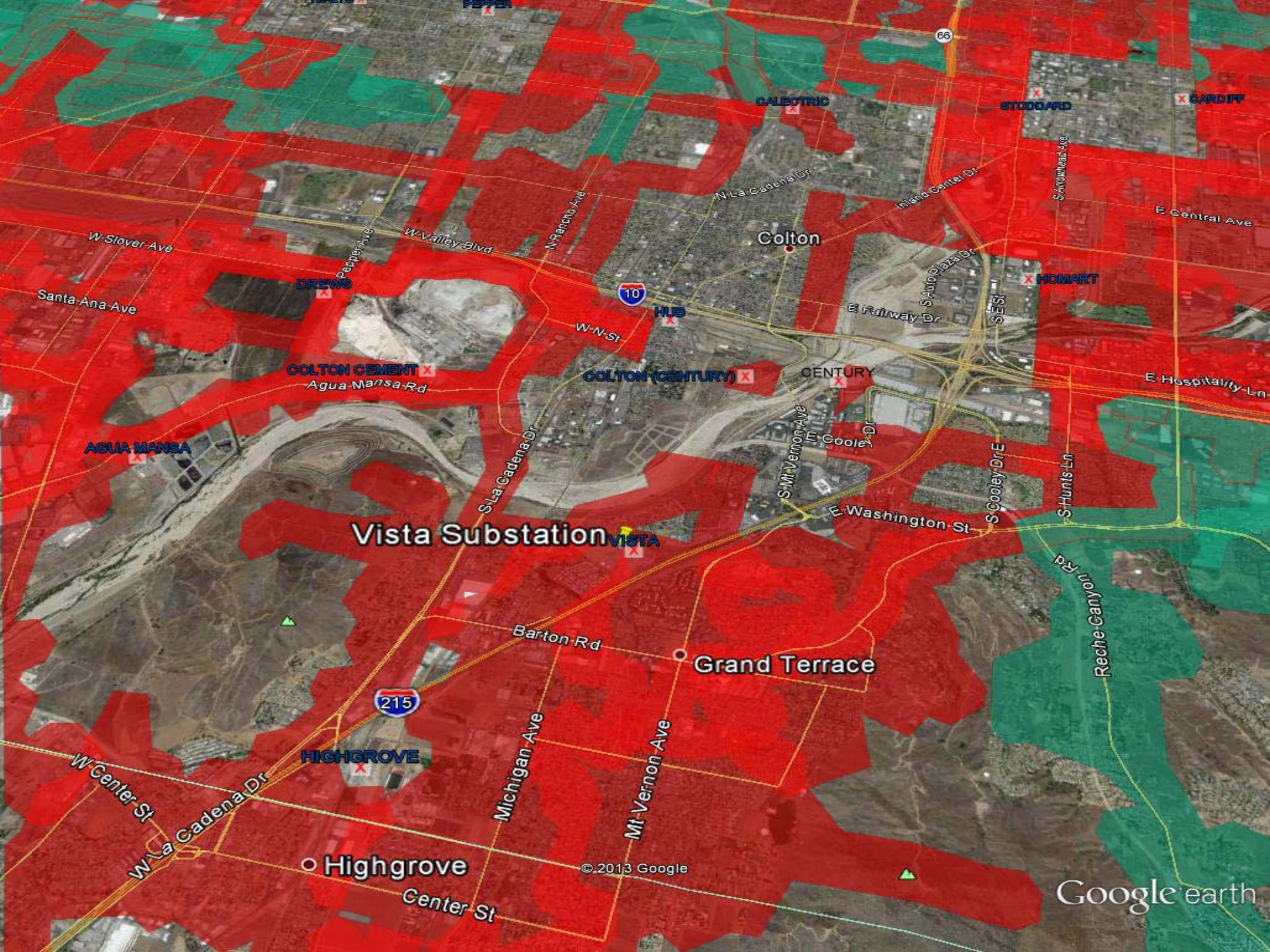
Vista Substation
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Michigan Ave
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E Washington St
E Hospitality Ln
E Central Ave
W Valley Blvd
W Slover Ave
Santa Ana Ave
W N St
E Fairway Dr
Inland Center Dr
S Cooley Dr E
S Hunts Ln
Reche Canyon Rd
Pepper Ave
N Pepper Ave
S Archibald Ave
S Auto Plaza Dr
E Cooley Dr
10
66
215
VISTA
CENTURY
COLTON (CENTURY)
COLTON CEMENT
AGUA MANSA
DREWS
HUB
HIGHGROVE
CALECTRIC
STODDARD
CARDIFF
HOMART
SESI
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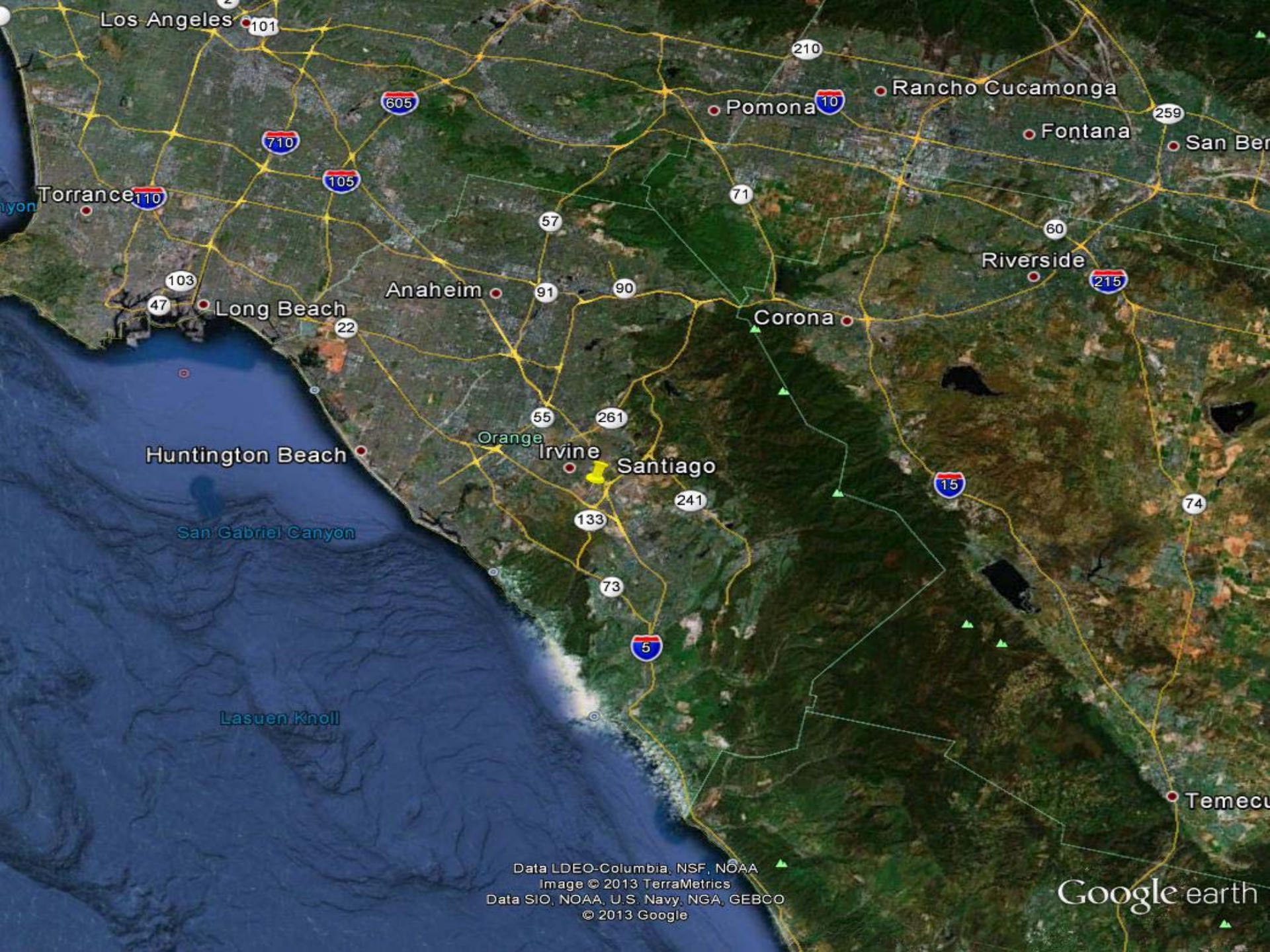
Los Angeles
101
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Rancho Cucamonga
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Torrance
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Riverside
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Anaheim
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Long Beach
Corona
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Orange
Irvine
Huntington Beach
Santiago
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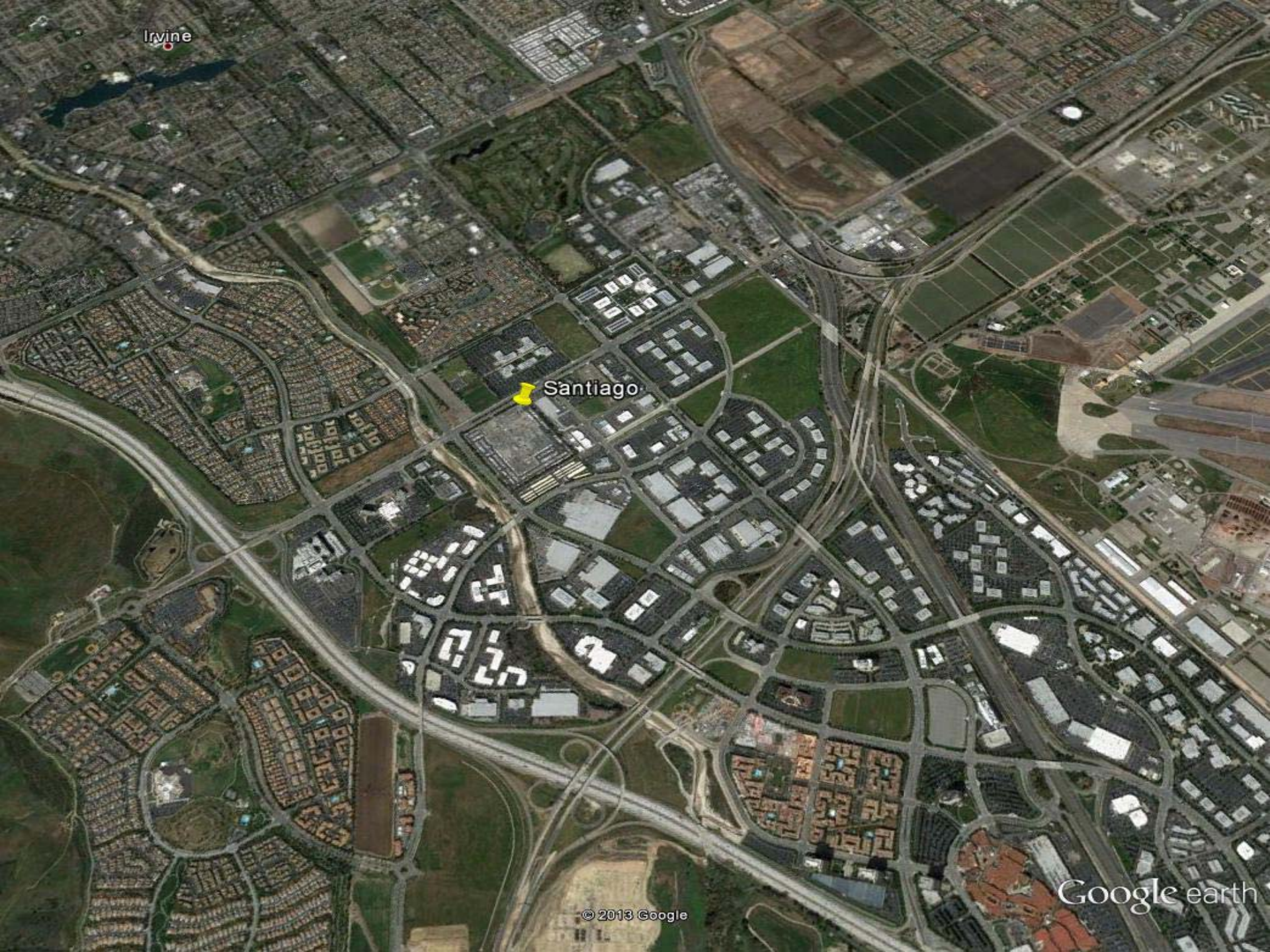
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Santiago
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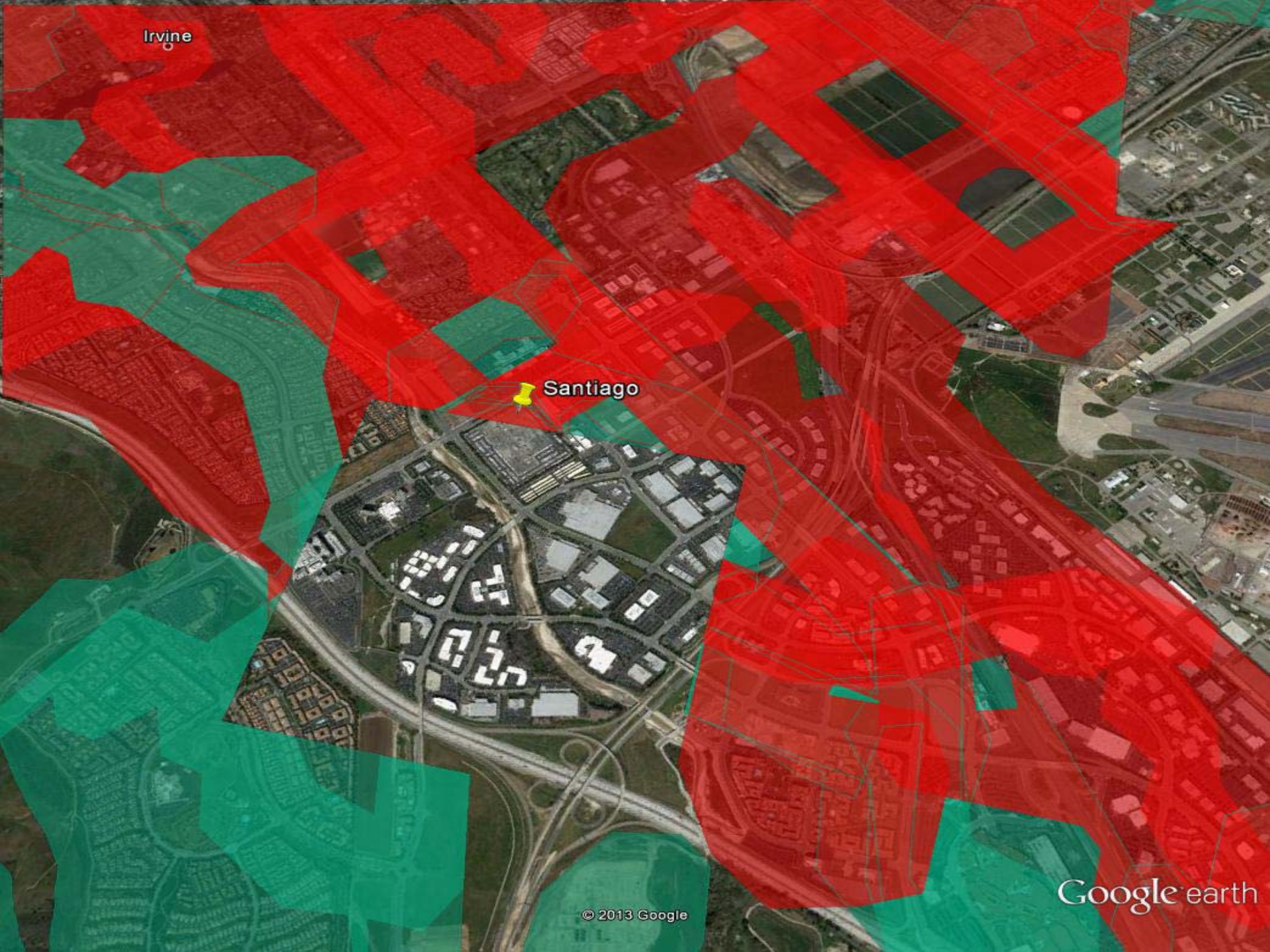
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Panel Questions

1. What value would be provided by a state planning process that guides distributed generation, and other preferred resources, to preferred locations? For example, a preferred location may be an area with cost-containment value and is better suited to accommodate DG resources. Additionally, a preferred location maybe an area that is considered high-impact (e.g. SONGS footprint area) and could benefit from DG resources.

2. Are there high-impact areas in the state that should be targeted for a study on developing a planning process to guide distributed generation development?

3. What are the needed elements for a study on a planning process used to guide projects?

4. Which stakeholders need to be engaged, and what tools and information are needed?