

# SDG&E's Transmission Comparison Study



Stakeholder  
Meeting  
Hosted by  
STEP

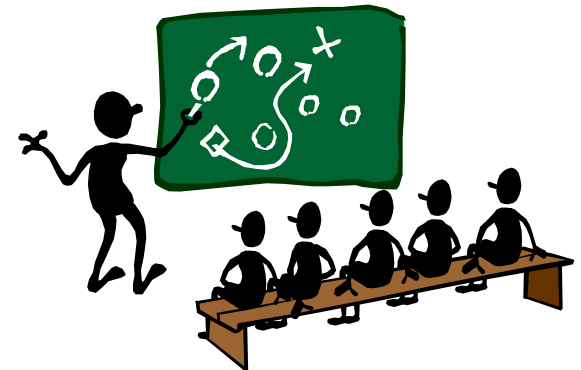
October 1  
2004

# Presentation Agenda

- Introduction
- Objectives for Today
- Proposed Schedule
- Background
- Draft Study Plan

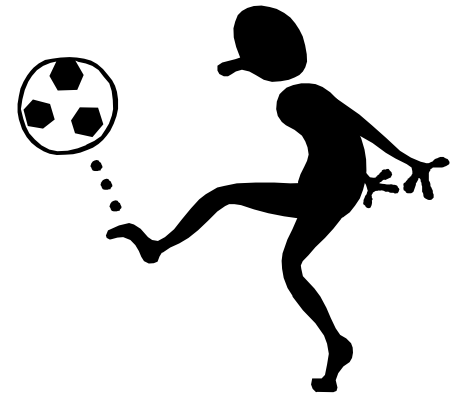
# Introductions

- Director – Caroline Winn
- Technical Team
  - Linda Brown
  - Abbas Abed
  - Harold Todus
  - Robert Jackson
  - David Wang
- Project Management Team
  - Laura McDonald
  - Jonathan Woldemariam
  - JC Thomas



# Objective of Today's Meeting

- Kick-off SDG&E's Transmission Comparison Study
- **Solicit stakeholder input**
- Present a proposal for this stakeholder process
- Introduce Draft Study Plan

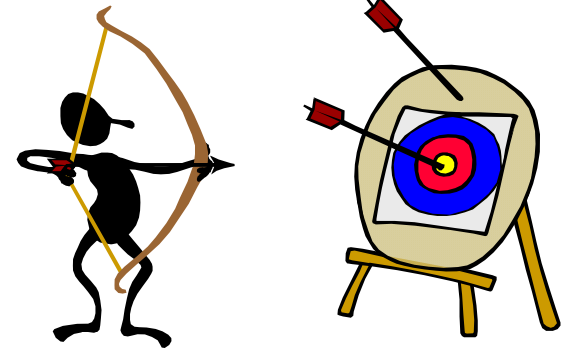


# **SDG&E's Transmission Comparison Study**

- A Study to evaluate transmission alternatives to meet future grid reliability in the San Diego area

- Not a comparison between
  - Generation and Transmission

- Not a Line Routing Study



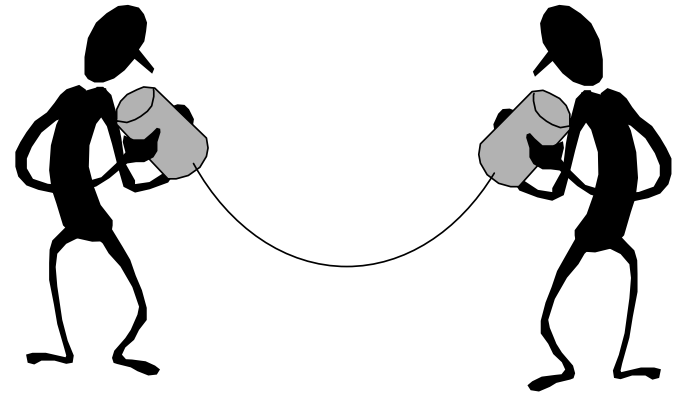
- Not an environmental study

- Not an Interconnection Study

- Various resource sensitivities will be evaluated

# Wanted from Audience

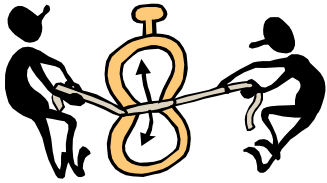
- Your input
  - Study Process
  - Alternatives
  - Assumptions
  - Draft Study Plan
- Request comments on Draft Study Plan  
No Later than Friday, October 15, 2004



<http://www.caiso.com/docs/2002/11/04/2002110417450022131.html>

# Proposal for Stakeholder Process

- SDG&E sponsored stakeholder process
  - Working closely with the ISO & interested stakeholders
- Creation of Working Group
  - Subset of the STEP process
- Provide status reports to the regular STEP meetings



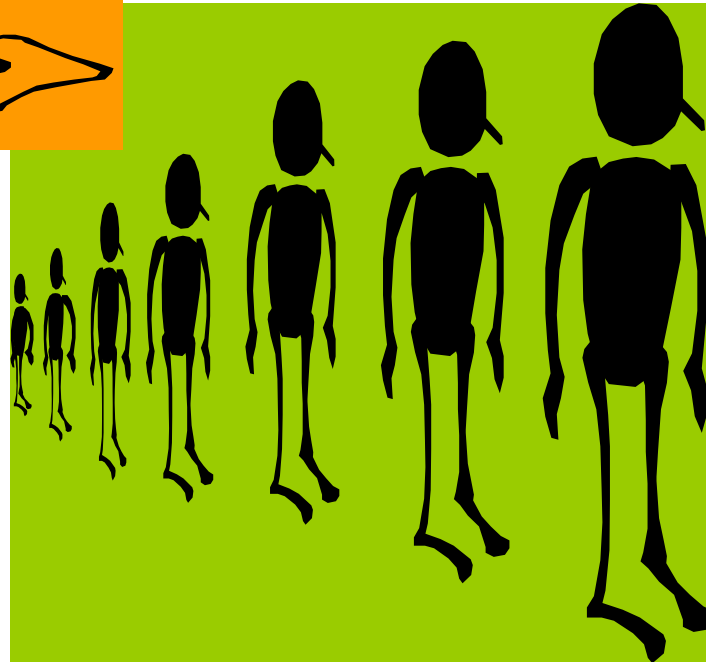
# Proposed Schedule

| Item  | Completion Date         |
|---|-------------------------|
| Issued Draft Study Plan                                   | Oct 1                   |
| <b>SDG&amp;E Stakeholder Meeting #1 – Kick Off</b>        | Oct 1                   |
| Stakeholder Comments to SDG&E on Study Plan               | Oct 15                  |
| SDG&E Finalizes Study Plan                                | Oct 25                  |
| Thermal Studies Initial Completion                        | <i>Early Dec</i>        |
| <b>SDG&amp;E Stakeholder Meeting #2 – Thermal Results</b> | <i>Mid Dec</i>          |
| Transient Stability Analysis Initial Completion           | <i>Early Jan</i>        |
| Voltage Stability Analysis Initial Completion             | <i>Early Feb</i>        |
| Short Circuit Analysis Initial Completion                 | <i>Mid Feb</i>          |
| Economic Analysis Initial Completion                      | <i>Late Feb</i>         |
| Distribute Draft Report                                   | <i>Early Mar</i>        |
| <b>SDG&amp;E Stakeholder Meeting #3 – Draft Report</b>    | <i>Early Mar</i>        |
| Stakeholders Comments to SDG&E on Draft Report            | <i>Mid Mar</i>          |
| SDG&E Distributes Final Report                            | <i>Late Mar</i>         |
| <b>Other Stakeholder/Working Group Meetings</b>           | <b><i>As Needed</i></b> |

# Possible Study Results Matrix

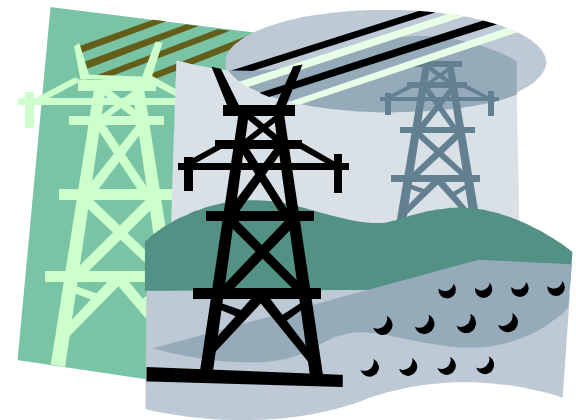
|       | SIL | NSIL | Cost | Stability | Eco-<br>nomics<br>RMR | Eco-<br>nomics<br>Cons<br>Surplus | Access<br>to<br>Renew-<br>ables | Access<br>to other<br>Gen | Constr<br>Feasblty | Export | Future<br>Expan-<br>sion |
|-------|-----|------|------|-----------|-----------------------|-----------------------------------|---------------------------------|---------------------------|--------------------|--------|--------------------------|
| Alt 1 |     |      |      |           |                       |                                   |                                 |                           |                    |        |                          |
| Alt 2 |     |      |      |           |                       |                                   |                                 |                           |                    |        |                          |
| Alt 3 |     |      |      |           |                       |                                   |                                 |                           |                    |        |                          |
| Alt 4 |     |      |      |           |                       |                                   |                                 |                           |                    |        |                          |
| Alt 5 |     |      |      |           |                       |                                   |                                 |                           |                    |        |                          |
| Alt 6 |     |      |      |           |                       |                                   |                                 |                           |                    |        |                          |

# Background



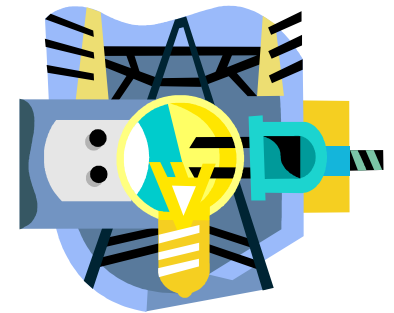
# SDG&E's Long Term Resource Plan - Update

- Filed July 9, 2004
- Includes a mix of
  - Generation
  - Renewables
  - Demand Reduction
  - Transmission
- This Study is simply to evaluate alternatives on the transmission side



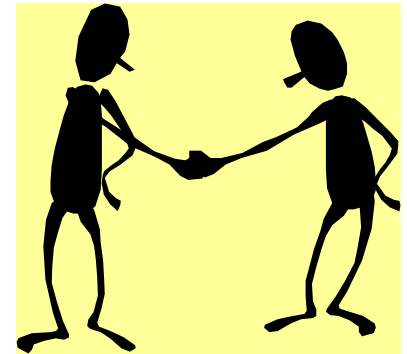
# Timing is everything

- It is prudent to begin study now
- Assumptions – Long Term Resource Plan
  - Base case – Load forecast, some retirements
    - need 1 trans line in **2010**
  - Worst case – High load forecast, retirements
    - need 2 trans lines in **2010**
  - Best case – Low load forecast, no retirements
    - need 1 trans line in **2016**



# Previous Related Studies

- ISEP Working Group: Eastern Interconnect Feasibility Study
  - Jack Bainbridge, Oct 2, 2003
  - Preliminary Routing Feasibility Study
- CAISO: Economic Study Update
  - Mohamed Awad, May 17, 2004
  - Preliminary Economic Study
- CAISO: Comparative Reliability Evaluation for Alternative New 500 kV Transmission Lines into San Diego
  - John Kyei, May 17, 2004
  - Preliminary Technical Screening Study

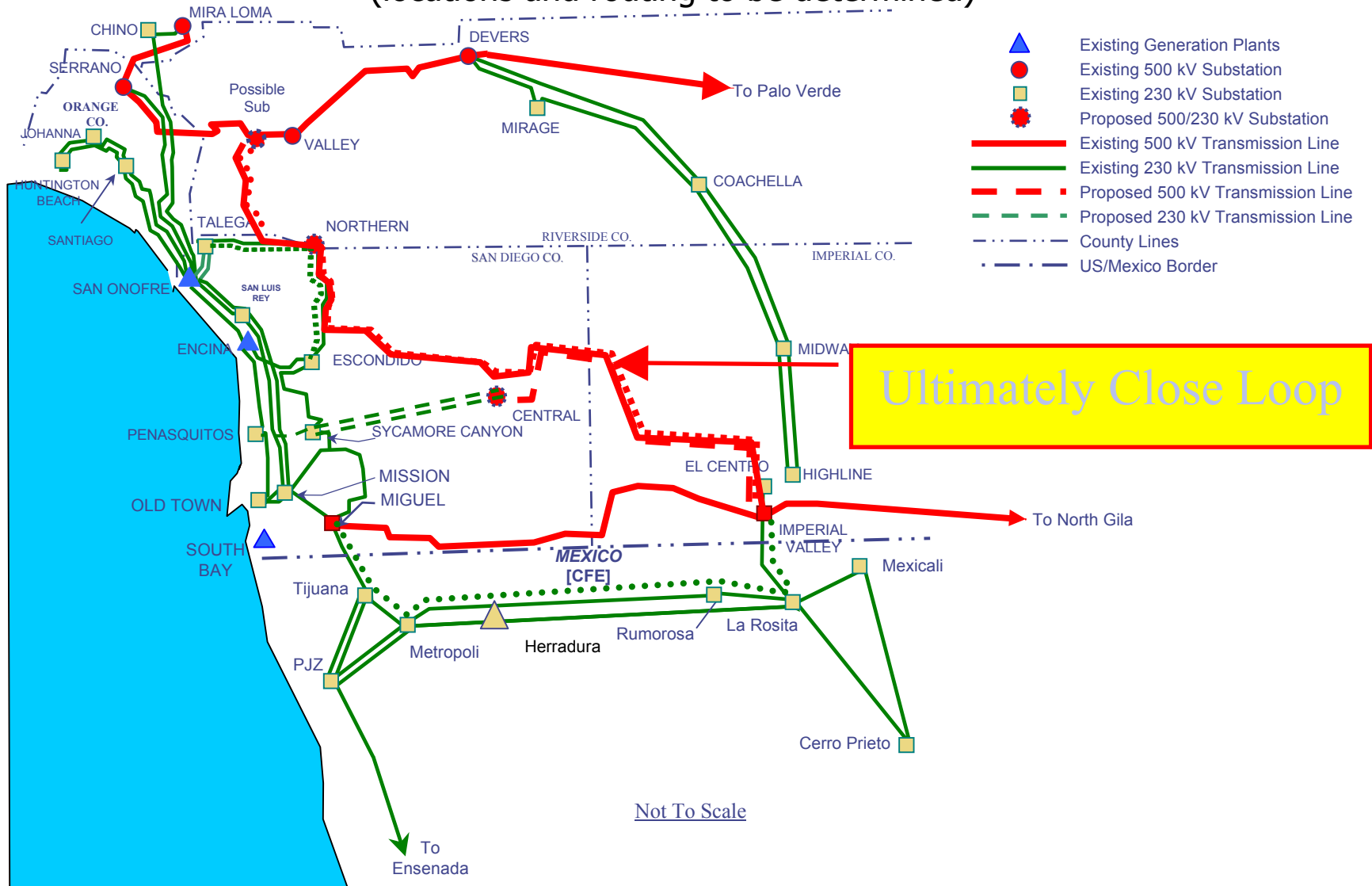


# History of SDG&E Expansions (over the last 30 years)

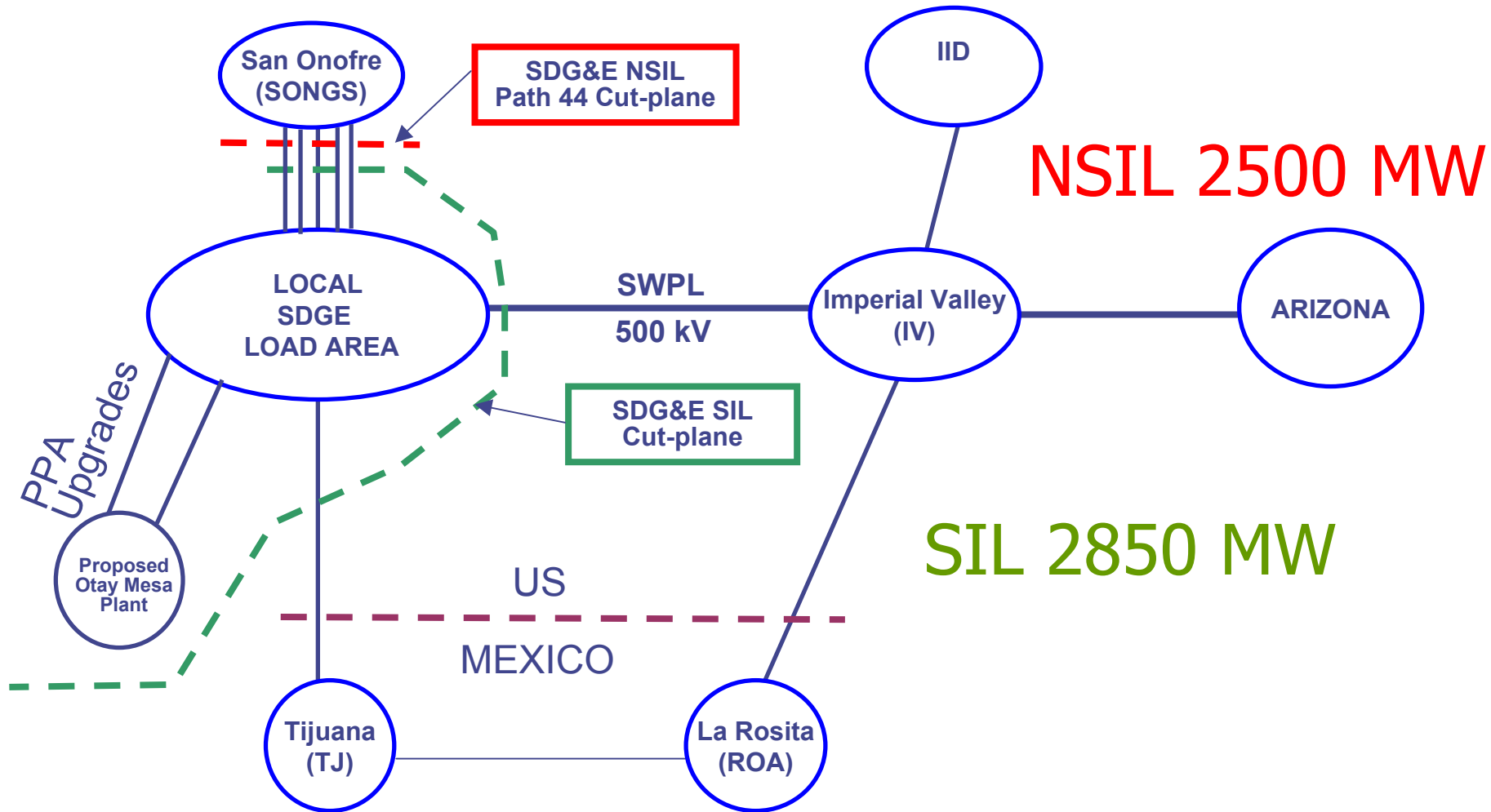
- 1978 CPUC rejects Sun Desert Nuclear Plant
- 1981 CPUC approves Southwest Power Link (SWPL)
- 1984 SWPL completed
  - 280 mi, 500 kV, Miguel – Palo Verde
  - 2-230 kV lines, (Miguel & Imperial Valley – CFE)
- 1999 SDG&E sells generation (except SONGS)
- 2003 CPUC rejects Valley–Rainbow 500 kV Interconnection
- 2004 CPUC Approves RFP for new Generation
- 2004 SDG&E issues RFO for Renewables

# Completing the 500 kV System

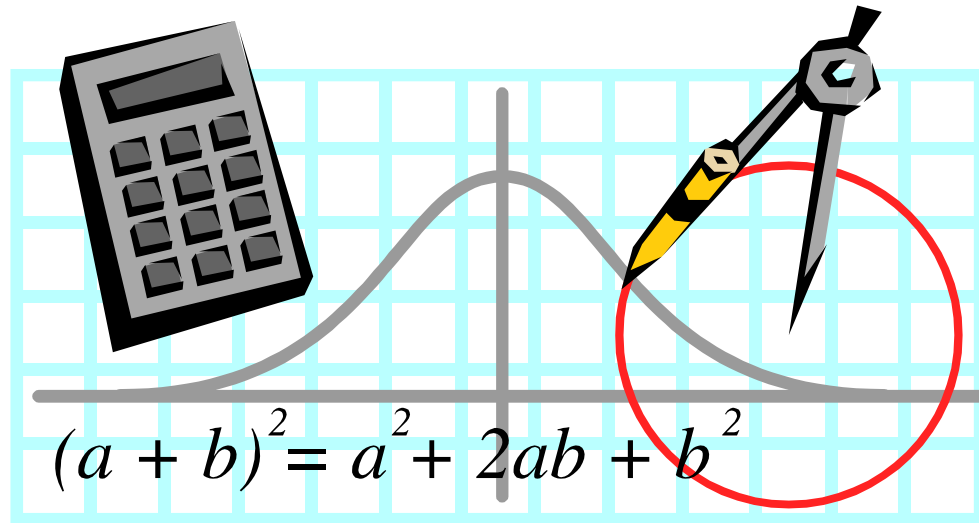
(locations and routing to be determined)



# Import Cut Planes

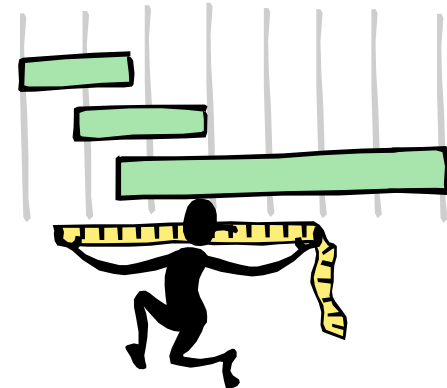


# Draft Study Plan Details



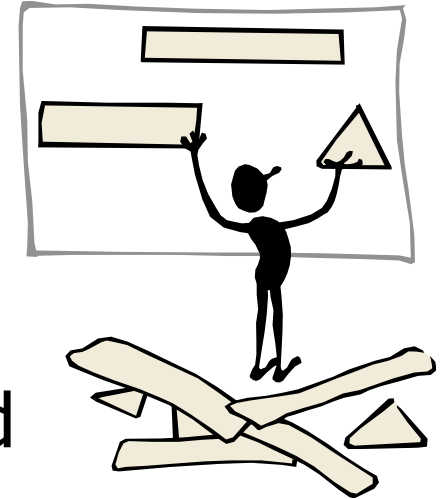
# Technical Study Objectives

- Evaluate Transmission Interconnection Alternatives
- Determine
  - Simultaneous Import Level (SIL)
  - Non-Simultaneous Import Level (NSIL)
- Evaluate System Requirements
  - Thermal
  - Transient Stability
  - Voltage Stability
  - Short Circuit



# Base Case Development

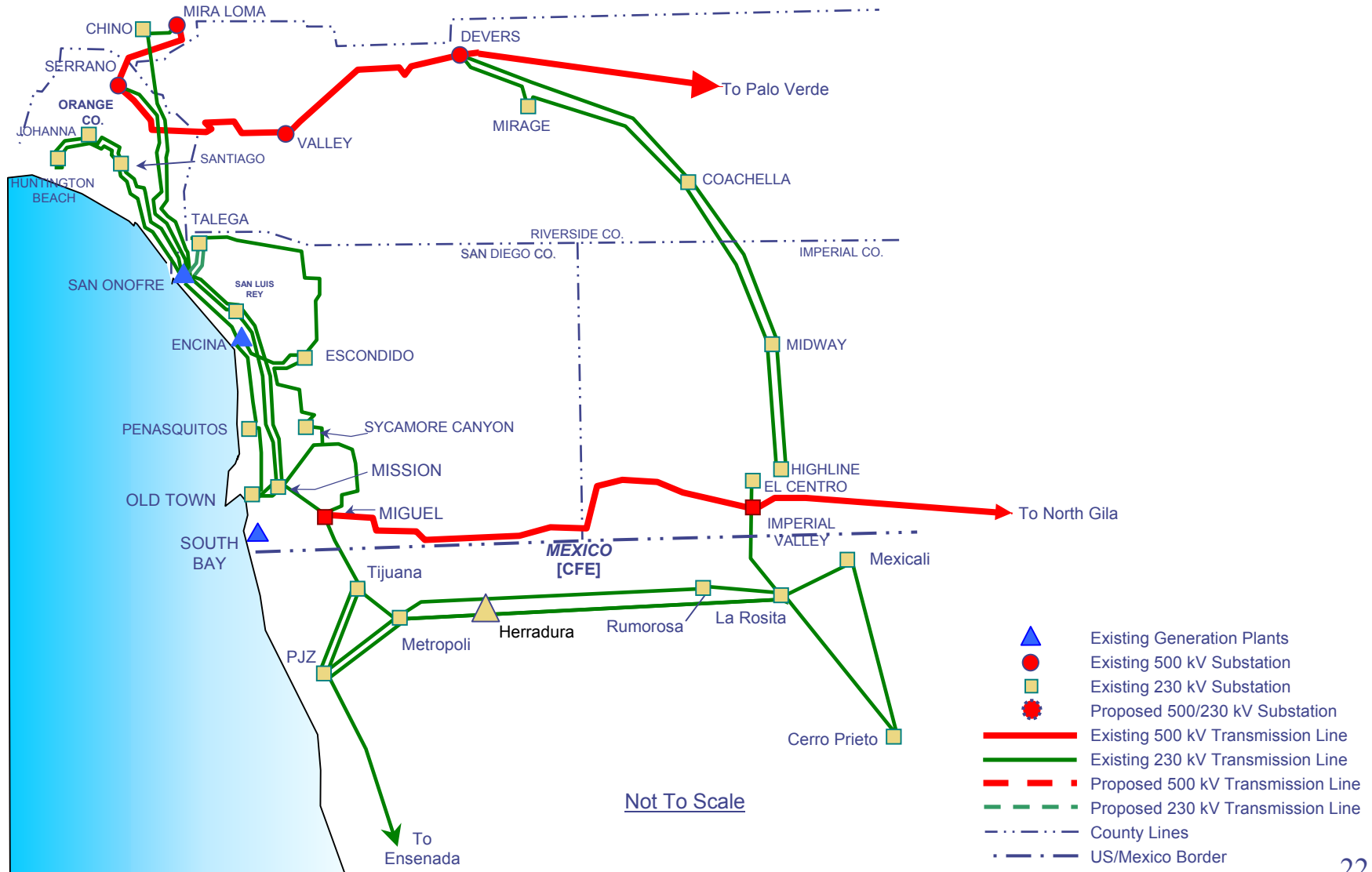
- WECC Base Case
  - HS 2010 – WECC 08HS2s
- Load Modeling
  - 90/10 (1-in-10 year) System Load Forecast
- Load Power Factor
  - 0.992
  - Some load buses may be modified to reflect unique power factors.



# 2010 System Representations

- 1) Benchmark Case (Do Nothing)
- 2) Imperial Valley – Central (IV-Center)
- 3) IV – Northern (IV-North)
- 4) IV – Miguel #2 (IV-ML 500)
- 5) IV – Miguel 230 (CFE 230)
- 6) Serrano/Valley – Northern (SV-North)
- 7) IV-North-SV (Full Loop)

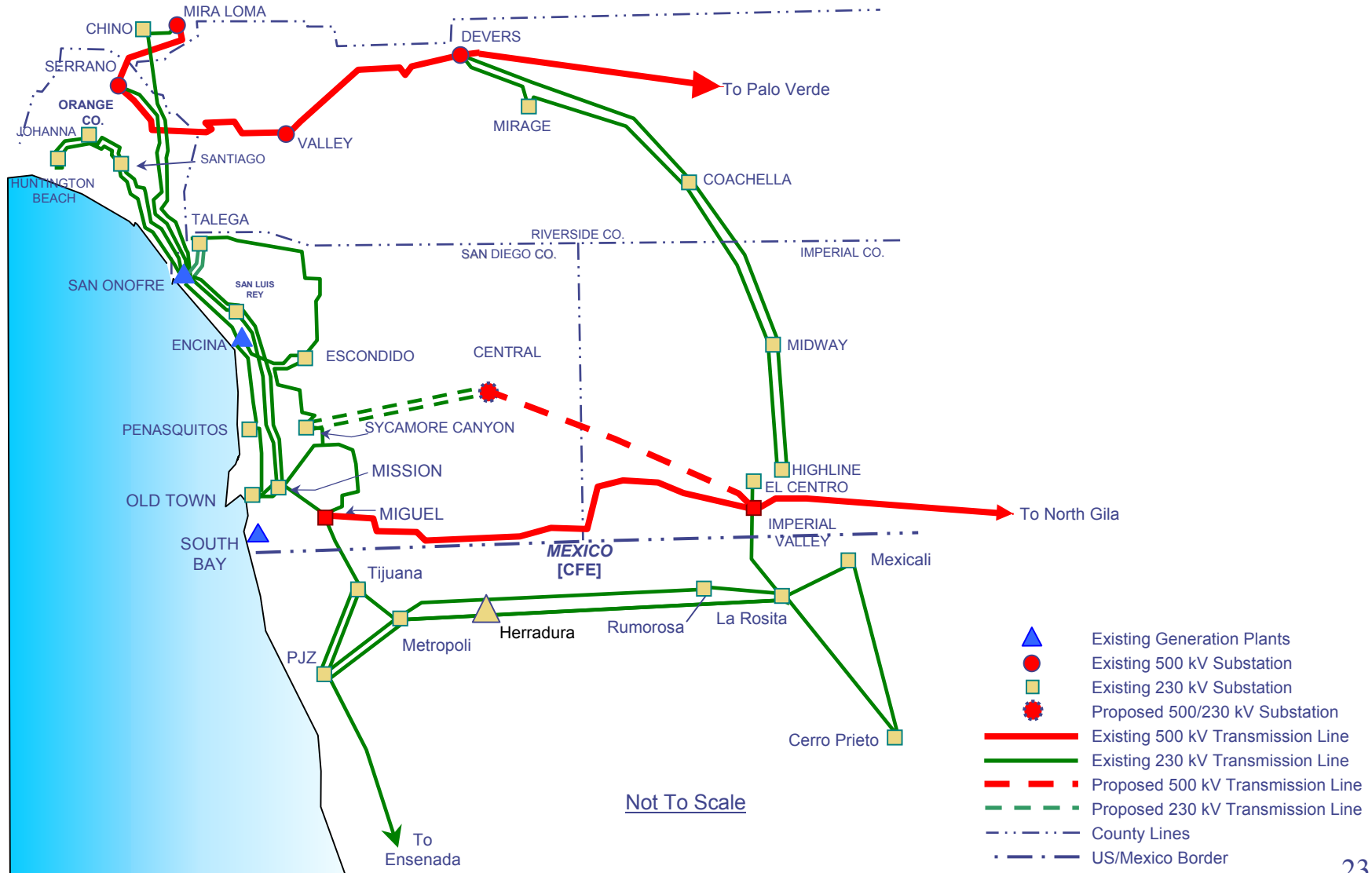
# Alt 1) Benchmark



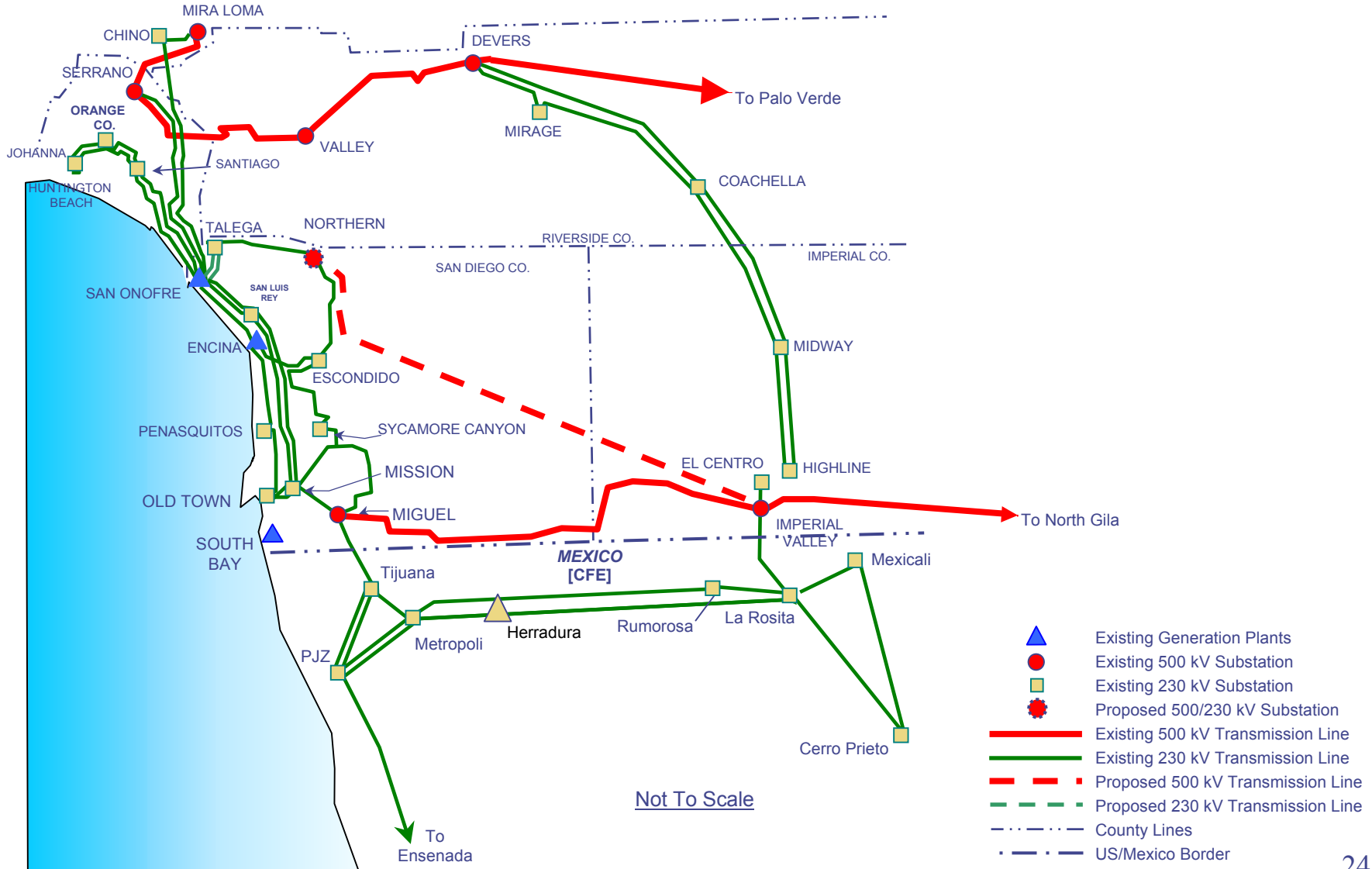
Not To Scale

**SDG&E's Transmission Comparison Study  
2004 October 1<sup>st</sup> - Stakeholder's Meeting**

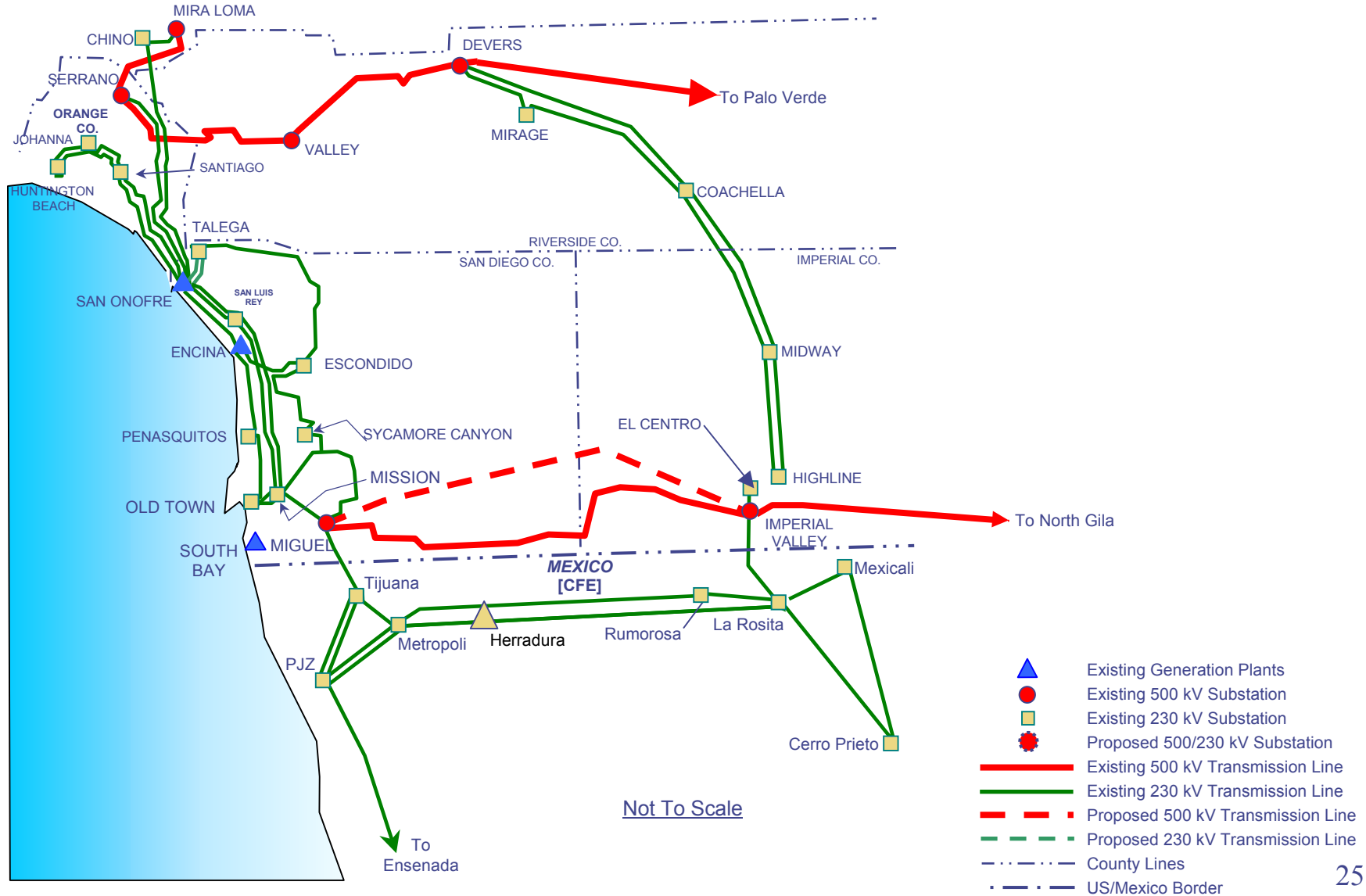
**Alt 2) Imperial Valley – Central  
(locations and routes to be determined)**



**Alt 3) Imperial Valley – Northern  
(locations and routes to be determined)**

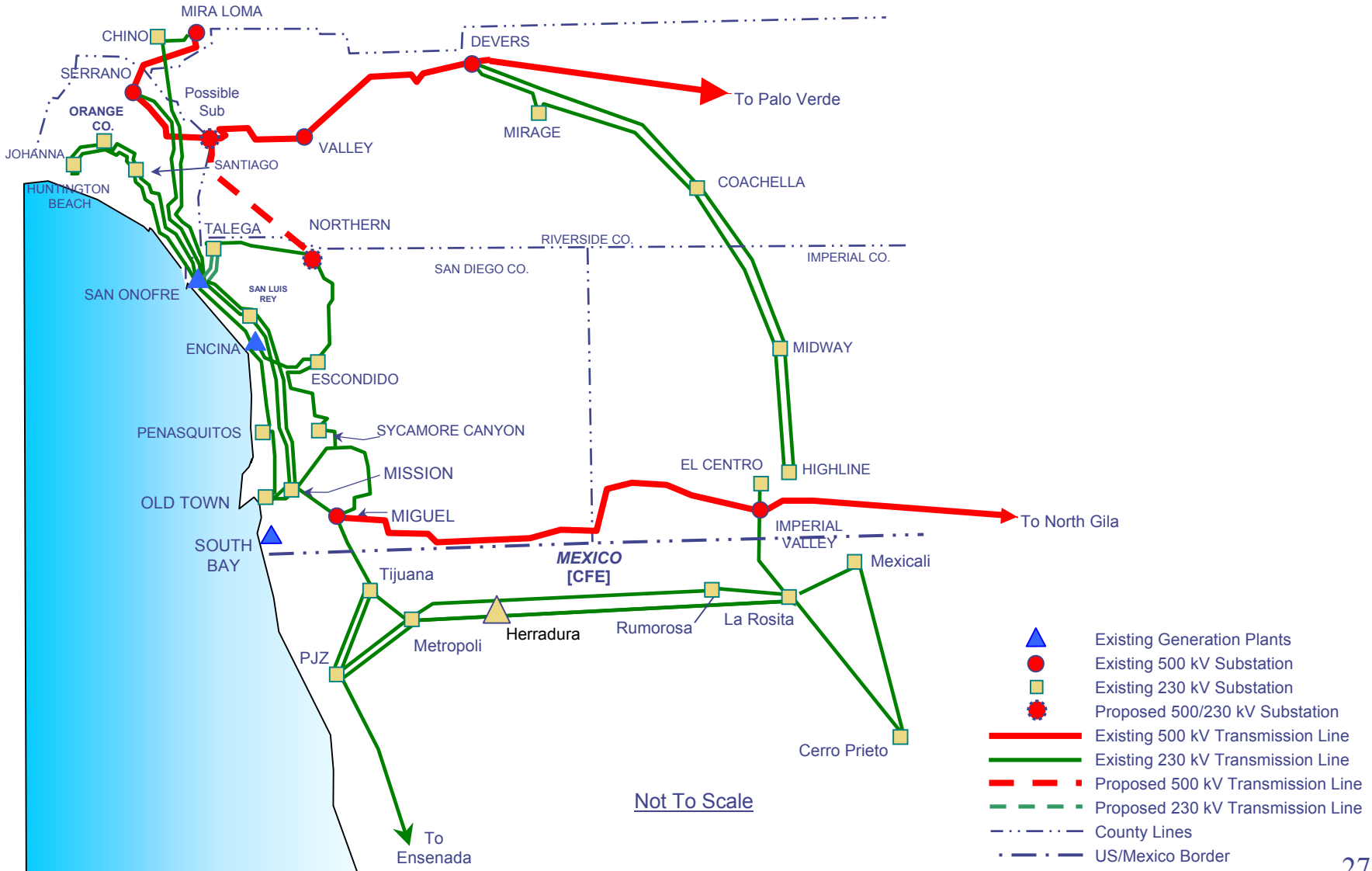


# Alt 4) Imperial Valley – Miguel 500 kV #2 (locations and routes to be determined)

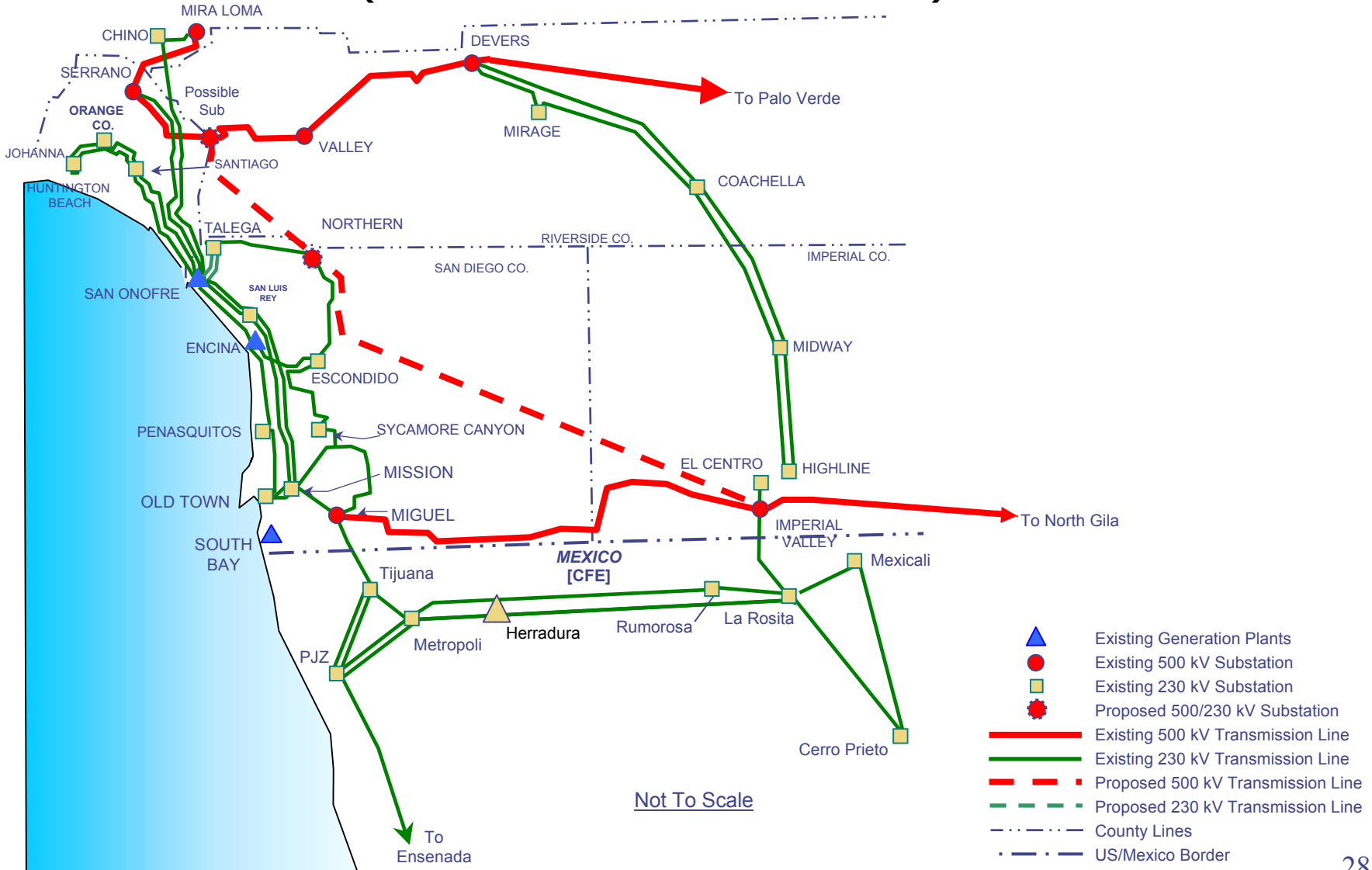




**Alt 6) Serrano/Valley (SCE) – Northern  
(locations and routes to be determined)**



**Alt 7) Imperial Valley – Northern – Serrano/Valley**  
**(completing the 500 kV loop)**  
**(locations and routes to be determined)**



# System Assumptions

## Topology and Power Flows

- 2010 Loads and System Topology
- 4000 MW Import
- Miguel-Mission 230 kV #2 In
- Palo Verde-Devers 500 kV #2 Not In
- EOR 8550 Upgrades
- Updated series compensation, Lugo-Serrano
- Heavy EOR/WOR Flows
  - EOR – 6500 to 7000
  - WOR – 7500 to 8000

# System Assumptions

## Generation

- Palomar In
- Otay Mesa In
  - with both 230 kV lines
- South Bay assumed retired
  - will run a sensitivity with South Bay In
- Mountain View In
- Mohave off

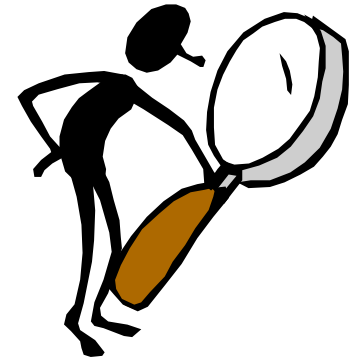


# Sensitivities

- South Bay Generation In
- Palo Verde-Devers 500 kV #2 In
- LEAPS Generation In
- Renewables
- Others?



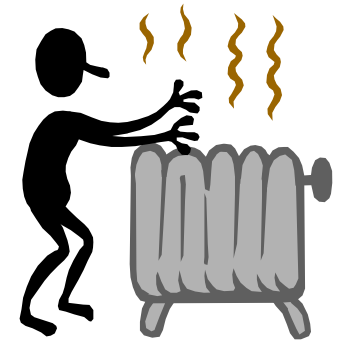
# Study Scope



- Thermal Line Loading Studies
- Transient Stability Studies
- Voltage Stability Studies
  - Aka Post Transient Stability Studies
- Short Circuit/Breaker Duty Analysis
- Economic Analysis

# Thermal Line Loading Studies

- 1-in-10 year load forecast
- Steady state normal conditions
- All N-1 (L-1, T-1, G-1) contingencies
- Worst G-1/N-1 (Largest Unit/SWPL)
- Credible N-2 contingencies
- Extreme event contingencies



# Transient Stability Studies

- 1-in-10 year load forecast
- Select critical N-1 & G-1 contingencies
- Select N-2 contingencies



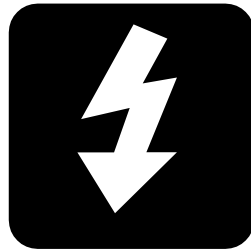
# Voltage Stability Studies

- 1-in-10 year load forecast
- G-1/N-1
- Most significant unit off
- Critical N-1
- Use existing WECC Post Transient Criteria



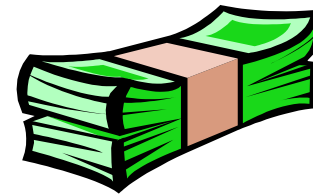
# Short Circuit/ Breaker Duty Analysis

- All SDG&E Buses
- All generators in service
- Changes resulting in Over-Duty



# Economic Analysis

- Currently reviewing
  - Software
  - Databases
  - TEAM Methodology



# Closing Remarks (1)

- **Questions?**
- Next meeting: December 7
  - the day before the next STEP Meeting
- Send Technical comments to:

Robert Jackson  
San Diego Gas & Electric  
8316 Century Park Court, CP52A  
San Diego, CA 92123-1582  
Phone: (858) 654-8293  
e-mail: [rwjackson@semprautilities.com](mailto:rwjackson@semprautilities.com)



# Closing Remarks (2)

- Or, visit our new web site

[www.SDGE.com/newline](http://www.SDGE.com/newline)

and reach

- Laura McDonald
- Jonathan Woldemariam
- Robert Jackson

# Thank You

